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## ERRATA.

*In the December Number of the Second Volume.*

Page 654, *dele* Note.

655, line 11, for '514dth' read '.514dth.'

15, for '  $\times (572,300)^2$  &c.' read '  $\div (572,300)^2 \times$  by  $\frac{52.9}{1609}$ '

3, from bottom, for '+' read '÷.'

659, 32, for 'W. Burt' read 'T. S. Burt.'

*In the Present Volume.*

	ص	سطر	غلط		صحيح	سطر	غلط		صحيح
	۳	۱۴	بقعها		السلطنة	۴	انسلطنته		۱۲
	۳	۱۴	ثذائى		هشتاد و هشتاد و دو	۵	هشتاد و هشتاد و دو		۱۲
	۴	۱۴	زائر		طبيه	۱	طيب		۱۳
	۴	۱۴	رضائى		وتعالى	۱	وتعالى		۱۳
	۶	۱۴	ثقبيل		مشواه	۱	مشواه		۱۳
	۹	۱۴	و در		هوشيارى	۵	هوشيارى		۱۳
	۱۰	۱۴	جرعه		ملايك	۶	ملائك		۱۳
	۱	۱۷	عظم		جميل	۱	حمل		۱۴
	۱	۱۷	مانده		بقيع	۲	يقع		۱۴
					فيوض	۲	قبوض		۱۴

Page 53, 39, for 'granity,' read 'granite.'

58, last line of Tibetan, for རྩིད read རྩིད

61, line 3, of ditto, 2nd Stanza, for རྩིད་ལ read རྩིད་ལ

111, 30, for '178,' read '278.'

226, Note, for 'svasú' read 'svasrú'

251, 4, from top, before 'astronomy,' insert 'on.'

— 18, from foot, for 'Hercules,' read 'λ Herculis.'

- Page 252, line 7, from top, *for* 'simi,' *read* 'semi.'
- 13, from top, *for* 'attractions,' *read* 'attraction.'
- 8, from foot, (note) *for* 'in,' *read* 'on.'
- 253, 7, from top, *for* 'extinction,' *read* 'extrication.'
- 12, from foot, *for* 'to have,' *read* 'we have.'
- 9, from foot, place the comma *before* 'has.'
- 254, 8, from top, *for* 'monogram,' *read* 'monograph.'
- 18, from foot, *for* 'greater comparatively,' *read* 'comparatively greater.'
- 17, from foot, *for* 'heat-conducting probable,' *read* 'probable heat-conducting.'
- 255, 1, *for* 'Phlegraen,' *read* 'Philegraen.'
- 16, from top, *for* 'precipices,' *read* 'precipitous.'
- 18, from foot, *for* 'of,' *read* 'at.'
- In the Latin interlineation of the column 1. 12, in the large Devanágari plate, *for* 'Magnatis,' *read* 'Magni.'
- 310, 1, *for* 'fur,' *read* 'from.'
- 313, 10, *for* 'near Kabul' *read* 'in the Punjáb, lat. 32<sup>o</sup>. long. 72<sup>o</sup> east of Paris.'
- 315, 25, *for* 'mass,' *read* 'chamber.'
- 367, 24, *for* 'seer' *read* *salás* (or *piee*)=282 grs. troy.
- 378, in the General Table, *for* 'Timátchir,' *read* 'Tinutchin.'
- 403, line 17, *for* '3<sup>o</sup> 0' 0",,' *read* '0<sup>o</sup> 0' 0'.'
- 409, in column headed Saugur, *for* '12 18,' *read* '11 18.'
- 443, line 9, *for* '10 and 11' *read* '9 and 10.'
- 10, *for* 'own,' *read* 'now.'
- 447, 37, *after* FARNAVIZ, *insert* (*fard-navis*, record-writer.)
- 450, last line, *for* 'Larikhara,' *read* 'Lashkhara.'
- 452, 14, *for* MIOPA *read* MIOPA.
- 498, 21, the 19th character, **l** should be **l** like the one immediately preceding it.
- 560, line 31, *for* 'cross,' *read* 'crop.'
- 593, 4, *for* 'univalve,' *read* 'bivalve.'

## ADDENDUM.

Page 450, line 10, *insert as a foot note*, \* Dr. J. Swiney has pointed out to me the following passage in the "*Analecta Antiquitatum et Consuetudinum Persicarum*," contained in a work entitled, "Asia, by BAPTISTA GRAMAYE," page 377.

"Dianam Persicá vocé NANNEAM vocabant, et certis mysteriis colebant."

This is precisely the word on the reverse of the Kanerkos coin, and would prove the figure to represent the moon, a very probable circumstance, as some coins since discovered place her in direct connection with Mithra, the sun. It also readily accounts for the word MAO, on numerous coins of the same class, that being doubtless the Zend for *Mav* (Sunscrip) and *Mah* (Persian), the moon.—  
J. P.

[For Directions to the Binder see the last page of the volume.]

JOURNAL  
OF  
THE ASIATIC SOCIETY.

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No. 25.—January, 1834.

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I.—*Professor Schlegel's Enigma.—Mode of expressing numerals in the Sanskrit and Tibetan languages.*

AT the end of the pamphlet lately addressed by Professor SCHLEGEL to Sir JAMES MACKINTOSH, on the subject of the Oriental Translation Committee of the Royal Asiatic Society\*, we find a morceau of enlightenment for the continental orientalists, on the Hind<sup>u</sup> method of expressing numerals by symbolical words, which the learned author states himself to be the first to expound to European scholars.

It is certainly a curious circumstance that neither COLBROOKE, DAVIS, nor BENTLEY, when quoting, translating, and commenting on the text of Sanskrit astronomical works, should have taken occasion to explain the system invariably used by their authors in expressing verbally the numbers occurring in their computations and formulæ; it must doubtless be attributed to their considering the subject too trite and obvious to need any remark, or otherwise the very passage quoted by Professor SCHLEGEL would surely have elicited some observation by the translator. It is true however that many of the terms thus technically adopted by the Sanskrit arithmeticians and astronomers, as the only mode perhaps of screwing the uncount elements they had to deal with into the procrus-

\* This pamphlet contains also an attack upon Dr. H. H. WILSON, which that gentleman will doubtless answer for himself, and some severe criticism on the careless manner in which oriental works are issued from the press by Calcutta Editors generally. We trust our Orientalists will be able to shew that such censure is not deserved, or at any rate that it applies but partially; and we should like to have the opportunity of pointing out those works (such as the Sháh náma) to the accuracy of which real editorial care was devoted, and on which the confidence of the reader may be implicitly placed.—Ed.

tean bed of poetical metre, are not to be found in the best dictionaries ; for instance, *veda*, for 4 ; *ananta* for 0 ; *Rudra* for 7 ; while on the other hand many, such as  $\nabla$ , for zero ; *vasu*, for 8, &c. will be found in WILSON'S last edition.

I extract the Professor's remarks at length, since equal credit is due to his ingenuity in unravelling the mystery, in the absence of native pundits, who would have cleared it up in a moment, as if it had altogether been a sealed book of hieroglyphics to the more fortunate student on this side the water, as to the rising schools of Sanskrit philosophy in Germany and France.

*Explication d'une Enigme.*

“ Dans les Recherches Asiatiques, vol. xii. p. 231, M. COLBROOKE cite un auteur qui dit que le nombre des jours sidéraux compris dans la grande époque, appelée *Calpa*, est : 1,582,236,450,000. Il donne le texte même, dont les mots qui répondent à ce nombre, signifient littéralement : quatre espaces vides (ou zero), cinq, *véda*, goût, feu, jumeaux, alle, huit, flèche, lune. Tout ces mots sont réunis en un seul composé agrégatif.

Qu'on se figure maintenant l'embaras des écoliers interpellés pour expliquer comment cette bigarrure fait précisément un trillion cinq cents quatre-vingt-deux billions, deux cents trente six millions, et quatre cents cinquante mille. La chose est pourtant bien sûre : il ne peut y avoir erreur. Voici le mot de l'enigme. Les mathématiciens Indiens ont une méthode d'exprimer les chiffres par des noms restreints à un certain nombre d'objets. Ils commencent à la droite par les unités, et remontent vers les chiffres d'un ordre supérieur. Cela a l'air d'une puérité, il y a pourtant là-dessous un but raisonnable. On a voulu se prémunir contre l'altération des chiffres qui se glisse si facilement dans les livres copiés à la main. Quand le traité était rédigé en vers, comme c'est un ancien usage dans l'Inde d'employer la versification même dans les livres scientifiques, la garantie en devenait d'autant plus forte.

Voici l'explication. Les deux premiers termes, étant des chiffres sans déguisement, n'en ont besoin. *Véda* ; ces livres sacrés sont au nombre de quatre. *Goût* : on en compte six espèces principales : le doux, l'amer, le salé, l'aigre, le poignant et l'astringent. *Feu* signifie trois ; par rapport aux trois feux sacrés que les brahmanes entretiennent. *Jumeaux*, *alle*, signifient naturellement deux ; le dernier mot est employé aussi pour les deux moitiés d'une lunaison. *Flèche* signifie cinq : ce sont les cinq flèches du dieu de l'amour, dont les pointes sont armées de fleurs. Ces flèches sont un emblème des cinq sens par lesquels l'amour pénètre dans l'ame. *Lune* est un, parcequ'il n'y a qu'une seule lune.

On voit cependant qu'il y a là dedans quelque chose de conventionnel. Par exemple, le mot de goût, chez les Indiens comme chez nous, est employé aussi métaphoriquement, pour les différentes impressions que produit la poésie. Alors l'énumération varie de huit à dix. Il faut donc savoir que, lorsque ce mot est substitué à un chiffre, l'on doit entendre le goût matériel.

Un autre auteur cité par M. COLBROOKE, exprime le même nombre de la manière suivante, &c.''

The only difference in the second enumeration quoted by the Professor consists in the substitution of *ocean, quality, vasu,* and *lunar day,* for 4, 3, 8 and 15, respectively: of which *vasu* alone requires explanation, being the name of a species of inferior divinities, eight in number.

The astronomical pundit of the Sanskrit College has enabled me to publish a catalogue of the principal terms thus numerically employed in the *Surya-siddhanta,* the *Arya-siddhanta,* the *Bhāsvatī,* and the other numerous astronomical works of the Hindús. It does not seem necessary to offer any explanation, beyond a simple translation of the terms, since in most cases their origin is obvious to such as are acquainted with the metaphysical or mythological systems of the Hindús. The only equivocal expression in the list appears to be *समुद्र, ocean,* which may either represent *four* or *seven*: but it is invariably employed in the former sense in the *Surya-Siddhanta* and other best authorities.

The mode of expressing any number greater than nine is, by placing consecutively the term for each figure, beginning with the lowest or right-hand figure, as will readily be understood from the example quoted by Professor SCHLEGEL; and as there are numerous synonymes of most of the simple terms, which may be selected as they may be the best adapted to the metre of the intended *aslok,* an infinity of compounds may be thus formed which must be perplexing enough to a student, in addition to all the other difficulties of a science of calculations. For a few compounds, however, as 11, 12, 15, 32, &c. single expressions have been created, founded on the names of Siva, the signs of the zodiac, the days in a half-lunation, the number of human teeth, and other similar analogies, that are easily retained in the memory.

The following is the list alluded to, omitting most of the synonymes of each word, which would have swelled it to an inconvenient length.

- ० or 0. *शुक्ल kha*; vacuity, *अवन्त, आकाश* &c. space, heaven, zero, cypher.
- १ or 1. *पृथ्वी prithvī*; the earth, (and its synonymes *भूमि, भू, कु* &c.)  
*चन्द्र chandra*; the moon, (*चन्द्रमा, इन्दु, विनायक,* &c.)  
*रूप rūp*; form, colour, &c.
- २ or 2. *पक्ष paksh*; a wing, the half of a lunar month,  
*नेत्र nētra*; the eye, (*नेत्र, अक्षु, अक्षि,* &c.)  
*भुज bhuja*; an arm, (*बाहु, दोस्,* &c.)  
*यम yam*; twin, also the deity of *Naraha* or hell.  
*अश्विन् ashvina*; the twin sons of *Surya*.  
*द्वह dhada*; jaw, (the two jaws.)
- ३ or 3. *बन्धि banhi*; fire, (*अग्नि,* and its synonymes.)  
*राम Rāma,* the deity *Rāma*; (the three are *Rāma, Balarāma,*  
 and *Parasurama*.)

- पिनाकमयज्ज *Pinākanayāna* ; a name of *Siva*, (*trīlochan*, 3-eyed.)  
 गुण *guna* ; the three qualities, good, middling, and bad.
- ३ or 4. वेद *Veda* ; the four *Vēdas*, (and their synonymes.)  
 अब्धि *abdhi* ; an ocean, ( समुद्र सिन्धु, &c.) N. E. S. and W. seas.  
 कृत *Krita* ; the first of the *four* ages of the world.  
 युग *Yuga*, an age, as the preceding.  
 जल *jala* ; water, वारि, नीर, &c. (similar to ocean.)
- ५ or 5. वाण *vān* ; an arrow, (and its synonymes.)  
 प्राण *prān* ; inspiration, the five modes of vital inspiration.
- ६ or 6. अङ्ग *anga* ; the members (head, arms, legs, and body.)  
 रस *rasa* ; taste, the six savours.  
 राग *rāga* ; mode of music (the six Hindu musical modes.)  
 ऋतु *ṛitu* ; the six seasons according to the Hindu division.  
 तर्क *tark* ; *Shāstra* : the six *Shāstras*.  
 अरि *ari* ; the enemy, the six dangers, or temptations.
- ७ or 7. मुनि *Muni*, a saint, sage, (and its synonymes ऋषि, &c.)  
 स्वर *swara* ; vowel, the six vowels.  
 नग *naga* ; a mountain, अश्ल, पर्वत and other synonymes.  
 अश्व *ashwa* ; a horse, (the 7-faced horse of *SURYA*.)  
 समुद्र *samudra* ; an ocean, the seven encircling seas\*.
- ८ or 8. वसु *Vasu* ; the eight demigods so called.  
 गज *gaj* ; an elephant (and its synonymes.) Eight elephants support the eight *Dishās*, or cardinal points.  
 नाग *nāga* ; a serpent ; the eight species of snakes.  
 मङ्गल *mangala*, happiness, good fortune.
- ९ or 9. अङ्क *anka* ; a numeral : the nine units from 1 to 9.  
 छिद्र *chhidra* ; an inlet, (the nine orifices of the body.)  
 ग्रह *graha* ; a planet, (the 7 planets and two lunar nodes.)
- १० or 10. दिशा *dishā* ; a side, quarter, (and its synonymes,) the eight cardinal points, with the zenith and nadir. For this and all numbers composed of two or more figures other compound expressions may be formed, as शून्य अक्षर cypher-earth cypher-moon, meaning *zero*, *one*, or *10*, as explained in the foregoing remarks : the following numbers however have simple expressions likewise.
- ११ or 11. ईश *Isha* ; a name of *Rudra* or *Siva*, (and his other 11 names.)
- १२ or 12. सूर्य *Sūrya* ; the sun, (from his 12 monthly appellations.)  
 चक्र *chakra* ; a wheel, the zodiac.
- १३ or 13. विश्व *Vishva* ; the universe, (the 14 *bhuvanas*, deducting *baikunt* on *Vishnu's* heaven) : see the next number.  
 काम *Kāma* ; Cupid ; the *Swāmī* or lord of the 13th *tīthī* or lunar day.

\* Only used in the *Granthas* of South India.

- १४ or 14. **सप्तन** *ṣṣvansa*; the world, or universe: the seven upper and seven lower heavens.  
इन्द्र *Indra*, a name of the god Indra, (renewed at fourteen epochs.)  
मनु *Manu*; the fourteen manooos, or saints.
- १५ or 15. **तिथि** *tithi*; a lunar day, (fifteen in a semilunation.)  
अह *aha*; a day, (from the same analogy.)
- १६ or 16. **कला** *kalā*; a digit, one-sixteenth of the moon's diameter.  
अष्टि *akhri*; a metre, consisting of four lines, having sixteen syllables in each.  
नृप *nripa*; a king; (and its synonymes, from the tale of the 16 rajās in the *Mahābhārat.*)
- १७ or 17. **अत्यष्टि** *atyakhri*; a stanza of four lines, with seventeen syllables to the line.
- १८ or 18. **धृति** *dhriti*; ditto having eighteen syllables in a line.
- १९ or 19. **अतिधृति** *atidhriti*, ditto with nineteen syllables in each line.
- २० or 20. **नाख** *nakh*; a finger nail.
- २१ or 21. **स्वर्ग** *Swerga*; heaven. The twenty one heavens.
- २२ or 22. **जाति** *Jāti*, kind, sort; race, family, cast.
- २४ or 24. **जिन** *Jina*; the 24 Jinas of the Buddh religion.
- २५ or 25. **तत्त्व** *tatwa*; the 25 essences: the five quintuple elements.
- २६ or 26. **उत्कृति** *utkṛiti*; in prosody, a stanza of four lines of twenty-six syllables each.
- २७ or 27. **अ** or **नक्षत्र** *nakshatra*; a star, the 27 lunar mansions.
- ३२ or 32. **दन्त** *danta*; a tooth, the number of human teeth.
- ३३ or 33. **देव** *Deva*, a god, for the 33 crores of Hindu gods; or by other accounts, 11 Rudras, 12 Suryas, 8 Vasus, and 2 Viswadevas.
- ४९ or 49. **तान** *tāna*; tune; the seven octaves (of seven notes each.)  
**वायु** *vāyu*, the air, the 7 vayus and their 7 subspecies.

On looking over Mr. A. CSOMA'S manuscript translations and extracts from the Tibetan works in the Society's library, my attention was attracted to the passage in his life of SHAKYA, where the Tibetan author quotes the epoch of BUDDHA from a variety of different authorities: here the same numerical system is seen to prevail;—the printed Tibetan text has the dates in figures above, and written at length in the body of the text, in the same kind of symbolical words, as if to secure them from the danger of alteration; this system in fact gives the same safeguard against the incertitude of figures as the mode of writing values and sums at length in European documents is intended to secure. To elucidate the subject at the time, a separate note was drawn up by Mr. CSOMA, shewing that the symbolical terms employed by the Tibetan writers were chiefly if not entirely derived, like their literature in general, from Sans-

krit originals. I am happy in being permitted to take this opportunity of publishing the catalogue and notes of this indefatigable scholar, placing in juxtaposition the parallel expressions of the Sanskrit language, for the convenience of comparison with the catalogue just given of the terms usually employed in the latter tongue.

*Tibetan Symbolical Names, used as Numerals.*

“ In astronomy and astrology, there are many works to be found in Tibet, that have not been introduced into the *Kah-gyur* or *Stan-gyur* collections. Of these the most celebrated is the *Bei'dúrya Kárpo*, written by *s.Da-srid Sangs-r.gyas r.Gya-m,ts'ho* (ལྷ་ལྷིང་སངས་རྒྱལ་ལྷ་མཚོ་,) a regent or vice-roy at *Lhassa*, in the last half of the seventeenth century of our æra. In all these works, symbolical names (མངས་པར་ *grangs br,da*, numerical signs), are used instead of numerals, in all arithmetical and astronomical calculations. As for instance : + ལཱ, for +2; —མེ, for —3; × ཚ, for × 4; ÷ ལྷོ, for ÷ 32.

This mode of expressing numbers has been borrowed from India by the Tibetans. For some of the numerals specified below, there are yet other synonymous terms applied in Tibetan, as in Sanskrit, but in their works these only are of general use. Although the nine units, together with the zero (0), would be sufficient to express any greater number, yet there are used the following numerals also : 10, 11, 12, 13, 14, 15, 16, 18, 24, 25, 27, and 32.

When dictating to an assistant in symbolical names what to write in characters, the pandit commences the operation from right to left : thus if he says ལེ་མ (12), མཎའ (0), མཚོ (4), the other writes 4012, &c. This method is the same with that followed in the Shastras of India therefore it is unnecessary to add any thing further on the subject.

The following numbers are expressed by such names as are stated here below, and explained in English, to which the Sanskrit terms also have been added (with a few exceptions) not from Tibetan books, but from other sources :

१ or 1. བརྩམས་, \* *gzugs*, body ; S. *sharīram*.

ལྷོ, *zla*, the moon ; S. *chandra*.

ལྷོ་ལྷ་མཚོ་, *hot-tkar*, white brightness, the moon : S. *shwēta-rochis*.

བསེ་རུ་, *bse-ru*, rhinoceros ; S. *gandaka*.

२ or 2. ལཱ, *lag*, the hand : S. *bhujā*, *hastā*, or *pani*.

མིང་, *mig*, the eye : S. *nétra*, *chakshus*.

\* Note. The articles, དཔ, དོ, དམ, དོ, མ, མོ, (*Papo, Va, vo, ma mo, &c.*) have been omitted after the roots, since the words occur mostly in this form.

- རྩང་ཕྱོགས་, *zung-phyogs*, or simply རྩང, *zung*, the two sides, wings, halves, a pair, couple; S. *chhada*, *pakshó*, &c.
- འབྲེམ་མཉམ་, *hkhrig*, or འབྲེམ་, *bgrod*, the twins; copulation:
- ༡ or 3. འོག་རྩེ་, *hjig-rtan*, the world; S. *loka*.
- ལོ་ན་དོན་, *yon-tan*, quality; S. *guna*.
- མེ་, *mé*, fire, S. *agni* or *anala*.
- ཚེ་, *rtse*, top, summit: S. *agram*.
- ༤ or 4. མཚོ་, *mtsho*, a sea or lake: S. *samudra*.
- ཆུ་, *chhu*, water; S. *jala* or *wari*.
- རྩང་, *rkang*, a foot: S. *pàda*.
- རྩི་མཛེས་, *Rig-byéd*, a Vèda; S. *Vèda*.
- ༥ or 5. འབྲུང་, *hbyung*, an element; S. *bhútam*.
- དབང་, *dvang*, an organ of sense; S. *indrayam*.
- མངའ་, *mdah*, an arrow: S. *bána* or *vána*.
- ཕུང་, *phung*, a heap of the aggregates constituting the body and soul; S. *skándha*.
- ༦ or 6. མཚོ་མས་, *mtshams*, the six cardinal points: the north, east, south west, zenith and nadir.
- རྩི་བོ་བ་, *ro, bro-va*, taste, savour; S. *rasa*.
- དུས་, *dus*, time, season; S. *samaya*.
- ༧ or 7. ཐུབ་པ་, *Thub-pa*, a sage; S. *Muni*.
- ངང་སྟོང་, *Drang-srong*, an hermit; S. *Rishi*.
- རི་, *ri*, a hill or mountain; S. *parvata*.
- རེས་གཟུགས་, *Res-gzah*, a special or chief planet; S. *Graha*.
- ༨ or 8. ཀླུ་, *klu*, an hydra or snake; S. *nága*.
- སྦྱུང་, *sbrul*, serpent; S. *sarpa*.
- གདོང་སྦྱང་, *gdengs-chan*, a hooded-snake; S. ?
- ལྷོ་ལྷོ་, *lto-hgro*, creeping on its belly; S. *uraga*.
- ནོར་ལྷོ་ or ལྷོ་ལྷོ་, *nor-lha*, wealth, or the eight gods of wealth: S. *Vasu* or *vasudéva*.
- སྟོང་པ་, *sred-pa*, affection, passion: S. ?
- ༩ or 9. མུ་, *risa*, root (or vein): S. *múla*.
- གཞི་, *gter*, treasure; S. *kosham*.

- གཟའ་, *gzañ*, a planet ; S. *graha*.  
 རྩ་ག, *bu-ga*, a hole, S. *chidra*.  
 རྩོན་པོ་, *Srin-po*, an imp or goblin ; S. *Rákshasa*.
- ༡༠ or 10. ལྗོངས་, *phyogs*, corner, quarter, point : S. *Dik* or *Dish*. The ten points. 4 cardinal, 4 intermediate, the zenith and the nadir.)
- ༡༡ or 11. རྩོན་པོ་ཕྱེད་, *h.phrog-byed*, that takes by force ; S. *Hari* for *Siva*.  
 དྲག་པོ་, *Drag-po*, the brave or fierce, S. *Rudra*, for *Siva*.  
 བདེ་ལྗུང་, *Bde-hbyung*, the source of happiness ; S. *Shambhu*, another name of *Siva*.  
 དབང་ལྷན་, *Dvang-phyug*, the powerful : S. *Ishwara*, for *Siva*.
- ༡༢ or 12. ཉི་མ་, *Nyi-ma*, the sun ; S. *Surya*, *Arka*, *Bhánu*.  
 ལྷིམ་, *khyim*, the sun's place in the zodiac ; S. *Griha* or pl. *Grihás*, the 12 zodiacal signs.
- ༡༣ or 13. འདོད་པ་, *hdod-pa*, lust, desire, wish, Cupid ; S. *Káma*.  
 ལྷོས་ཕྱེད་ or ལྷོས་ཕྱེད་, *myos-byed*, that inebriates or makes mad, lust, desire, wish, Cupido. S. *Madana*, *Káma Díva*.
- ༡༤ or 14. ཡིད་, *yid*, the mind ; S. *manas*.  
 མ་ཕ་, *Ma-nu*, ditto ; S. *manu*.  
 རྩིང་པ་, *Srid-pa*, existence, birth, the world ; S. *bhuvanm*.
- ༡༥ or 15. ཚེས་ཉིན་ལྷན་, *tshes, nyin-zhag*, the 15th day of a lunar month ; any day of the semilunation. S. *Aha* or *Ahan*.
- ༡༦ or 16. མི་བདམ་, *Mi-bdag*, lord of men, a sovereign ; S. *Narapati*.  
 རྒྱལ་པོ་, *Rgyal-po*, a king, prince ; S. *Rája*.
- ༡༨ or 18. ཉེས་པ་, ལྷོན་, *nyes-pa*, or *skyon*, vice, fault, blemish, S. *Dosha*.
- ༢༤ or 24. རྒྱལ་བ་, *Rgyal-va*, he that has been victorious, a Jina or Buddha ; S. *Jina*.
- ༢༥ or 25. དེ་ཉིད་, *de-nyid*, the same self ; S. *tatwam*.
- or 27. སྐར་མ་, *Skar-ma*, a star, one of the 27 constellations in the path of the moon ; S. *Nakshatra*.
- ༣༢ or 32. སྟོ་, *So*, a tooth ; S. *danta*,
- For 0 zero or 0 the following three terms are used :  
 མཁའ་, *mkhah*, void, space, S. *kha*, *ákasha*, *gaganam*.  
 ལྷིག་, *hig*, a spot, stain ; S. ? *nabhas*.  
 འདྲ་པ་, *Stong-pa*, the vacuum ; empty space, zero ; S. *shúnyam*

## II.—A Brief Description of Herat. By Munshi Mohun Lal.

To the Editor of the Journal of the Asiatic Society.

SIR,

The arrival here lately of a package from India, bringing Journals of the Asiatic Society, of which you are the source, containing many curious novelties, has excited my desire to contribute some little information to so great a public object.

I was two years in the Dehli College, under the tuition of Mr. TAYLOR, and encouraged to gain the eternal advantage of learning by C. E. TREVELYAN, Esq. who is my kind patron.

At my friend Mr. B. FITZGERALD'S house, I met Lieut. A. BURNES, whom I accompanied at his wish, and of my own free will, to *Bokhára* and Persia, in the capacity of a Persian Munshi. I am now in company with Dr. GERARD. We have only native articles of writing, and are also not in a place of solitude, or even of quiet repose, an account of the preparations for encountering SHAH SHUJA. I therefore hope you will be kind enough to forgive the feebleness of my observations, and the badness of my pen and paper, but I trust my endeavours in the accompanying will not be the less acceptable in describing a brief account of Herat.

I remain, &c.

Kandahar, 10th October, 1833.

MOHUN LAL.

### The City of Herat.

Tradition and the following Persian verse say, that the foundation of the city of *Herát*, or *Hari*, was by an ancient king called LAHRASP, who was succeeded by GUSHTASP. ALEXANDER, the successor of BEHMAN, built and finished the structure of Herat very beautifully, and after him it was never repaired.

لهواسپ نهاده است هري را بنياد گشتاسپ برابنيای ديگر بنهاد  
بهمن پس ازان عمارتی ديگر کرد اسکندر رومی اش همه داد بداد

[Lahrásp laid the foundations of Haré; Gushtasp erected many buildings thereon; Bahman after him added greatly to the town, and Alexander put the finishing stroke to it.—]

The city is environed by a strong wall, and also by a small, weak, and thirsty ditch. The circumference is nearly four miles. The houses in the city are generally made of two stories high, and have very small doors to enter at.

Great part of the population of the city, and even of the western district, is *Parsi Baban*, the follower of *Panj-tan*, or five persons, namely, MUHAMMED, ALI, FATIMAH, HASAN, and HOSAIN.—They are all fond of the Persian government—not with regard to religion, but through the ill treatment, which they daily receive from KAMRAN and his ministers.

He is a decrepit and gloomy prince. He excites the pity of mankind. He has neither state nor good palace, which is like a prison. He is

destitute of the signs of royalty, and a ray of meanness and melancholy gleams on his features.

He is afraid of his ministers and of the whole Ala koo zay family, who over-rule him. He is anxious to get rid of them, and to be an ally of the English Government, of which he often talked very friendly.

SHAIR MUHAMMED KHAN, the Acting Vizier, is a talkative and base man. He suspected us to be Russian spies, and twice sent thieves at night to destroy us, but availed nothing.

Our abode in Herat for seven months was very far from agreeable, especially as we hoped to be in Cabul in December. Upon one hand, the plague was ravaging the city; on the other, the dearth of every article caused us to spend a great deal of money.

The streets of Herat are very narrow and dirty, but the roofed bazar, or *chársú*, gives an idea that in old days it was a great market in Khorasan. The shops are adorned by English chintzes, which are here very dear.

The people of Herat, though poor, are fond of pleasure. They go daily to gardens, which resemble paradise, and pass their time in firing from horse-back, in racing, and also in singing, joking, dancing, and sleeping.

Their dress is a red shirt and an open red trowser, below a cloak or *chogha*, and on the head a turban of *Pesháwer lungi*. They tie a very thin cloth round their waist, and keep a knife on their girdle for show, and also for aggression.

The suburbs of Herat are exceedingly fertile, and covered by numerous villages, which extend as far as the eyes reach. The whole country is divided into four parts: namely, *Obaih*, *Kurakh*, *Ghuryan*, and *Sabzwar*, or *Isfazár*.

Since KAMRAN'S dynasty, the commerce of Herat has fallen to nothing. The caravans are plundered, as we ourselves were witness of. The resident merchants are fined in a large sum of money upon any foolish pretext of the Government.

There are two frequented roads from Herat to Bokhára, one goes through *Maimara*, where the caravans generally meet with difficulty. The other, which is easy, leaves *Sirakhs* on the left hand. By this last route the caravans cross the *Mur-gháh* river, and reach Bokhára after 23 marches, the distance of which (a merchant told me) is 110 farsangs, or 480 miles.

The caravan pays duty only in four places through all the way, and I have got the name of every stage written in my diary.

I subjoin the list of the income of Herat, which if you think sufficiently interesting and proper, you may include in this letter.

	<i>Tomans.</i>
1 Money collected from <i>tehtids</i> ,.. .. .	1150
2 Weavers annually pay .. . . .	1500
3 The soap manufacture is monopolized for .. . . .	700
4 The monopoly of Bokhara caravan passing through Kurakh, .. . . .	600
5 The head of the grape-sellers pays annually.....	250
6 Money collected by stamping skins and caps,.....	600
7 Money collected by the above means on new cloth,.....	800
8 Money collected by stamping woollen things,.....	100
9 <i>Mir Shahi</i> , or money collected by the inhabitants for the purpose of watching at night against thieves,....	200
10 The chief seller of the heels of shoes pays.....	160
11 Monopolizer of water and wind mills pays.....	600
12 Money collected from the people for catching thieves, <i>doozd bagiri</i> ,..	200
13 Cash collected from the districts or <i>Belúhats</i> ,.. .. .	2000
14 Custom-house officer of <i>Sabzwár</i> pays .. . . .	300
15 Do. of <i>Ghuryan</i> pays.....	1500
16 Money collected from the black tents of <i>Emak</i> or <i>Elat</i> annually,.. . . .	2000
17 Monopolizer of wood for burning and all other uses pays,.....	300
18 The head of the horse-sellers pays .. . . .	180
19 Money collected from <i>Zeh tábi</i> , or skin ropes, exported to India,.....	4
20 The inhabitants of <i>Caravan-serais</i> pay.. . . .	50
21 Money collected from the <i>Kandahar gate</i> ,.. . . .	150
22 Do. collected from the <i>Khusk gate</i> ,.. . . .	50
23 Duty taken upon charcoal,.....	60
24 Money obtained from all shops,.....	1000
25 Duty taken upon tobacco,.....	200
26 <i>Dubbagh</i> or the head of skin-cleaners pays.....	110
27 Money collected from stamping the <i>kafsh</i> or a kind of shoe,.....	300
28 Monopolizer of assafœtida pays.....	600
29 Money collected from each Toman's king, called the <i>Toman Shahi</i> , ..	300
30 Manufacturer of the rice or <i>Shall</i> pays annually,.....	600
31 Monopolizer of the mint (in Haji Firoze's reign, 50 <i>tomans</i> every day,) now pays yearly,.....	120
32 Revenue of <i>Ghuryan</i> ,.. . . .	220
33 Do. of <i>Obaih</i> ,.....	300
34 Do. of <i>Kurakh</i> ,.....	110
35 Do. of <i>Sabzwár</i> ,.....	100

*List of the Corn produced in Herat, &c.*

	<i>Karvan.</i>
Corn produced in the suburbs of <i>Herat</i> ,.....	27000
Do. in <i>Obaih</i> ,.....	2000
Do. in <i>Kurakh</i> ,.. . . .	1020
Do. in <i>Ghuryan</i> ,.....	2000
Do. in <i>Subzwár</i> ,.....	1300

20 Rupees make a Toman of Herat, which is equal to 6 Rs. and 12 As. of India.

*Karvan* is a measure of 100 maunds of Tabriz, which is equal to six maunds and 10 scers of India.

On the 4th of July, 1833, before the sun rose, we set out to the east of the city, to examine the place called *Gázur Gáh*, where the body of ABU ISMAEL, or KHAJEH ABDUL ANSAR, the son of ABU MANSUR, the son of ABU AYUB, the son of MAT ANSAR, or the bearer of MUHAMMED'S Koran, reposes.

ABU ANSAR was struck with stones by the boys, when he was doing penance, of which he expired in 1065, A. D., or in 481, Hejri\*. He had learned about 12,00,000 poems by heart, and was the author of 1,00,000 couplets.

When we reached the pleasant *Gázur Gáh*, we entered the *Chár-su* or square of HASAN KHAN SHAMLU, who has also built a few shops and a fine cistern on account of the periodical fair in spring. Having passed through the *sahan*, we came to the door which led us to the grave of ABU ANSAR. The door is made of copper, and on each side are fine and clear mosques, where we saw a few Koráns laying on the shelves or *ráhals*. The *Musnavi*, or the book of Maulanai Ríim, is recited every morning, and the people faint during the invocation.

On our right hand were the tombs of MANSUR SULTAN, the father of SHAH RUKH MIRZA, and of the descendants of AMIR TIMUR. On our left were buried the successors of CHENGIZ KHAN. The body of MANSUR was lodged on a large platform, bordered with marble, and towards the head of the tomb we saw the following inscription :

این صحنه بدیع البنیان منبع الارکان که از کمال صفوت و صفا و غایت  
 بهجت و باحاکمی نزهت ریاض رضوان راوی زینت مناظر جنان است  
 و اوار رحمت الهی و آثار فیض فضل نامتناهی از ساحات لایح و تابان  
 برای سلطان سعید مغفور غیبات السلطنت والدین منصور و اولاد مبرور  
 عمارت یافت بتاریخ سال هشت صد و هشتاد و دو که فضل بی پایان  
 بیان مینماید و نسایم خلد برین از شمایم تربت عنبرینش منتسم می آید  
 چون بهشت از مرقد منصور سلطان رخ نمود  
 این عمارت تابو جهی بس نکوتاریخ — بود  
 نوشته سلطان مشهدی

The substance of the inscription may be thus rendered :

“ This excellent construction and meritorious work which resembles Paradise, resplendent with the lights of divine favour and the blessings of the merciful God, has been built with great art and beauty as the monument of the famous Sultan GHUUSUDDIN MANSUR and his pious descendants, in the year of H. 772. Written by SULTAN MUSHHADI.”

\* The year 481 Hejiri began on the 27th March, 1088, not 1065 as above stated.  
 —ED.

Among the graves of CHANGIZ KHAN's family was a body covered with black marble, on which we beheld the surprising sculptures of the ancient unknown hewer. The works are incomparable at the present day. The stone was carved in seven figures, called "*haft kalm*," or seven pens. I copied the following inscription from the above tomb :

بهر تاریخ شه عالیقدر طیبہ اللہ و تعالیٰ مشواہ  
برسر تربت او کلك قضا کرد تحریر فقط طاب ثراه

[On the day of the great king's death, the Lord sent him repose, and the pen of fate inscribed his simple epitaph "rest in peace." [A. H. 718.]

The tomb of ABU ANSAR was very large, bordered with marble, and covered with stones: on the head of the grave stands a marble *lôh* which resembles a *minâr* : it is beautifully made of two pieces. The size of one piece is five feet high, and of the other is 10-feet. It is covered with Arabic letters, and has only one in the following Persian :

ان خواجه که در صورت و معنی شاه است و ز سر حقیقت دوگون آگاه است  
از روی حساب جمل اردانی فات تاریخ وفات خواجه عبدالله است

[The Khajeh, in look and verity a king, was equally versed in the affairs of both the worlds : would you know the date of his death, read it in the words '*Khajeh Abdulla*.' i. e. A. H. 737. The words *اردانی فات* give the same date.]

The tomb is commanded by a magnificent high arch, erected by SHAH RUKH MIRZA, 480 years ago. It is 70 feet high.

TIMUR SHAH resolved to gild the arch, but was diverted by some accidents. On the right hand of the tomb are many inscribed poems written by the celebrated author named JAMI, but the following verse made by HASUN KHAN SHAMLU informs us the day of ABDUL ANSAR's death :

دهد تا ساقی عرفان دلت را جام هوشیاری در آرد بزمگاهی خواجه عبدالله انصاری  
بود لوح مزارش نازنین سروی که از شوخی ملایک را چو قمری کرد گرم ناله وزاری

[If you are desirous that the cupbearer of wisdom should give you a cup full of understanding, come into the banqueting house of *Khajeh Abdulla Ansari*. His monument is like the graceful cypress which enchants the angels to hover over it, crying and lamenting like doves.]

When we came out of the door, we went to the cistern, which contains a very delicious, sweet-flavoured water, called *Ab Zem-zem* ; it is cold in summer, and hot in winter, which I believe is owing to a deception in the temperature of the atmosphere. There were written plenty of verses in the arch, which I wished to copy.

بهر تعظیم مزار خواجه انصار کون خان عادل شاهرحم چون وضع بنیاد حمل  
صحن کا زرکاه را رشک یغ الجنه دید ازقبوض روح اهل الله چون قدس خلیل  
بقعها انشا نمود و تکیه ها ایجاد کرد بهرتوحید ثنای مالک الملک جلیل  
ساخت بهر تشنکان زایر این استان این مصفا بر که در راه رضای حق سبیل  
سناه ازین خیر جاری برد خلق الله فیض چون سحاب تشنه آب رحمت از دریای نیل  
چون که عمری همچو کشتی سیلهء و اچ خورد ساختمستغرق تفسر اعاقبت حمل ثقیل  
نیدمت در ترکیب آب و خاک چون رنگ نبات باعث اوصاف اورا شد کهن سالی دلیل  
کرد تعمیرش ز احفاد قان مرحومه بهر تحصیل ثواب واقعی و خیر جمیل  
مهد علیا عصمت اندید و در درج حیاء انکه نبود در حریم عفتش شبه و عدیل  
تا خورد زین بر که یکدم آب هر لب تشنه جرعه اوسازد از کوثر خداوند جلیل  
سال تعمیرش خضر جستم ز پیر عقل گفت  
ریخت از بهر کرم در حوض زمزم سلسبیل

[The purport of this long inscription is, that ADIL SHAH RUKH erected a well and terraces, &c. for the use of pilgrims to the tomb of KHAJER ASSAR, which having fallen into disrepair were reconstructed at the expense of a female descendant of CA'N one of the sons of CHENGIZ KHAN in the year (*kouz-zemzem-silsabil*) 1090.]

The original name of *Gázur Gáh* is *Kazar Gáh*. *Karzar* mean in Persian battle, and *Gáh*, place, (the place of battle;) in short, it is the seat of happiness and pleasure, and the people always go and pass their time in drinking and singing, which seems very inconsistent with the solemnity of the dead.

The water of the neighbouring covered fountain runs beautifully through the canal which ornaments *Gázur Gáh* and makes it a lovely spot in Herat.

Towards the north of the city, under the base of the hills, flourishes a pleasant edifice, called *Takht Safar* constructed by SULTAN HOSAIN MIRZA, the fourth descendant of AMIR TIMUR. In spring the neighbouring fields and mountains are covered with a bed of yellow and red flowers, called *Ur Ghavan*. The place is now going to decay, but seems to have been once a paradise. A tank of water possesses a magnificent fountain, which with its watery arrows fights with the top of the building. The height of the edifice is measured 100 feet.

In the reign of SULTAN HOSAIN MIRZA the punishment for the people of bad demeanor was to reduce them to the office of masons, who were

ordered to assist in the building of *Takht Safar*. He also published a poem and applied it on every gate, that the passengers should read it.

هر که با لاله رخاں بادۀ گلرنگ کشد  
حکم مرزاست که برتخت سفرسنگ کشد

[All who have been trespassing in the pleasures of wine and beauty, by Mirza's command must add a stone to the *takht-safar*.]

To the N. E. of the city stand the two very grand ruins separated by the stream *Anjir*.

SULTAN HOSAIN MIRZA leaves his name by building a stately college, which is all levelled to the ground. Two arches and four minars have still a grand appearance, and are separated into two equal parts by the above stream. The arch and the two minars which are situate on the right bank of the water are in the vicinity of the grave of SULTAN HOSAIN, who is remembered with great respect and honor. He reigned in 1500, A. D. The head master of the college was the famous poet named JAMI, whose works are very interesting indeed.

On the left bank of the stream rests the body of GOHER SHÁD, the daughter of AMÍR TIMUR, and the sister of SHAH RUKH. The grave is shaded by a very high gilt dome. There were formerly nine tombs, all made of black marble, ornamented by inscriptions in the Arabic character. The letters are all rubbed out and not legible.

She built a fine edifice called MUSALLAH, and is said to have been the most incomparable lady in the world. She never married, but devoted herself to the perusal of the Korán; she was anxious to encourage the people to learn. The place is decorated by four high minars and two lofty arches, which make a beautiful square of 75 paces.

On the top of the arch were a few defaced Arabic inscriptions, which I could not read. The minars seem half finished, and bent towards *Meshid*, to salute EMAM REZA. I ascended a minar of two stories high by difficult paces, and had a very striking view of the city. Every story contains 20 steps.

Having passed the square, we entered a lofty dome, which encouraged us to climb five stairs, and to come into the gilt and painted room where GOHER SHÁD prayed.

All these ruins are decorated with azure and gold colour: (the blue colour is made of lapis-lazuli, which is found in considerable quantities in the mines of *Badakhshán*.)

It is alleged, one day GOHER SHÁD, accompanied by 200 beautiful ladies, came into the college, and ordered all the students to go out; she passed all day in the place, and had the pleasure of seeing every room.

One of the students, being sleepy, was not aware of her coming, and therefore he remained in the college. He awoke and peeped fearfully through the holes of the window. He cast his eyes on a ruby-lipped lady, one of the companions of GOHER SHÁD." She caught the sight of the scholar, and fell in love with him. She left her associates, and entered the room of the student, who gained the pleasure of her society.

She was a delicate virgin, and after leaving the student, she joined her party, who suspected her by the irregularity of her dress and manners.

GOHER SHÁD, on the information of this, was very much vexed, and to wipe away the reproach, she married all her associates to the students of the college, who were first ordered to avoid the friendship of the women. She gave them clothes, fine beds, and good salaries to live upon; she made rules for the collegians to meet their wives after seven days, on the condition not to forget their studies. She did all this to arrest the progress of adultery.

On the east end of the city flourished a very grand ancient building, called *Masjid Jamah*, or great mosque. It was erected by SULTAN GHIASUDDIN, the old king of Gaur, 700 years ago. He was the son of MUHAMMED SAM, and the sixth descendant of ABU BAKR, one of the friends of MUHAMMED.

The mosque has four doors and many arched domes. We made our entrance through the door called *dar-hauz-vakil*. Having traversed 70 paces under a roof supported by massive pillars, we opened into the great square of the mosque.

On our left hand were two pieces of marble, decorated with Persian inscriptions, which contained no valuable subjects, but an order to the custom-house officers, to provide the *mullas* with livelihood. The length of the square is 111 paces, and the breadth, 83.

There are four lofty and magnificently painted arches facing each other. The arch which stands to the west led us into the praying place, covered with heaps of mud, which has lately fallen by the severity of the winter. We saw a marble tomb-stone lying on the ground, which had Arabic characters. It was engraved by FEROKH SHAD SHERVANI, to cover the grave of SULTAN ABU SAED KURGANI.

The eastern arch exhibits a great deal of Muhammedan neglect. It is almost hidden under considerable masses of earth. The arch, which is situate towards the south, contains numerous Arabic inscriptions. They are all wasted away by the rains.

The northern arch is the place for students; it conducted us into a cupolated structure, where we were astonished to see a marble slab in

the shape of a door. It was of a single piece, and so beautifully clear, that our faces were reflected in it. The length of the stone was ten spans, and the breadth, eight.

Having passed through a very small door, we happened to come into a square of 20 paces, where the body of SULTAN GHIASUDDIN reposes. The place is very filthy, and the grave is reduced to pieces. There is no inscription at all. The roof has fallen into decay, and overwhelms the tomb. There are many graves also, and the bones of the dead seemed to be decayed. Our sight got dim by visiting the sepulchres. There was no difference between the tomb of the great Sultan and that of the poor man.

In the square of the mosque is a small cistern of water, for ablution, and a large heavy vessel of tin, made by SULTAN GHIASUDDIN; the circumference of which was 20 spans, and the thickness of the edge was one. There were inscriptions written on the borders of the vessel, dated 700 years ago.

It was repaired by MALAK GHIASUDDIN CU'RT, 470 years ago, and repainted by MIR ALI SHAIR, the minister of SULTAN HOSAIN, 350 years ago. The verse informs us the day of the repair.

این بقعه که کشته بود چون عظم رمیم مابنده کعبه یاقوت احیای عظیم  
تاریخ عمارتش ز دل جستم گفت ثانی بنای بنیة ابراهیم

[This place, which was before vile as a rotten bone, has acquired enduring fame like the *kaaba*. I inquired the date of the building, and my mind answered: "it is a second altar of Abraham." A. H. 950.]

The ruined buildings of Herat are beyond my ideas of description, and I am very sorry indeed that I am not well conversant with the English language.

One *farsang* far from the city towards the south is a famous bridge, called *Pul Múlún*. In former days there were 33 arches, but now only 27 remain.

No history gives us any information about the foundation of the bridge, but the people say that it was built by a lady named NUR BIBY, who lived more than 1000 years ago. The books of Herat give no account of the bridge, which is called by the natives 'the matchless in the world.' The inundation of the river was so rapid, during our residence at Herat, that three arches were swept away from one end, and nearly for two months all intercourse between Herat and other places was arrested.

From *Kochan*, or *Kabu Shain*, where we were with the camp of H. R. H. ARÁS MIRZA, *Astrabad*, a sea-port town on the bank of the Caspian, is nine days' journey; and I am sorry not to know what sort of road continues from this to the above place; but in winter we hear the road

to *Astrabad* is so muddy and troublesome that foot passengers even find difficulty to go.

The horsemen from *Kochan* to *Herat* may come very easily in eight days, and are supplied with all sorts of provision in the way. From *Herat* to *Cabul* the route is beautifully covered with villages, the produce of which can feed a considerable army. It is 20 days' journey without crossing any hill.

On the death of VIZIR FATHA KHAN, his brother, DOST MUHAMMED, mutinied against SHAH MUHAMMED and Prince KAMRAN, and defeated them after a great loss. They escaped from *Cabul* and came to *Herat* through the *Hazára* country, after 13 marches; they were also accompanied by a numerous army.

SHAH ZAMÁN, on his coming to the throne, had occasion to quell an insurrection at *Cabul*, and arrived there from *Herat* in the space of 10 or 11 days, and a large body of horsemen accompanied him.

The road through which these two above-mentioned kings came to *Cabul* is hilly, and the people are called independent *Hazáras*.

From *Cabul* to the bank of the Indus, the road, through the *Khybur* country, is not to be traversed by carriages, and is eight days' journey: and from thence to *Lahore* we saw ourselves in some places that it was a difficult route. 15 marches bring the travellers from the bank of the Indus, or *Atock* to *Lahore*.

ALEXANDER THE GREAT, on his invasion of India, came by this road, without encountering any difficulty, and also NADIR, who is called an adventurer, followed his example.

Our last interview with SHAH KAMRAN was a very friendly one. He promised a great deal to be friendly with the British Government, and never to submit to the Persians, who he said, are the "obedient slaves of the Russians." He told Dr. GERARD to come again to *Herat* on leave from the Government, where they both will get a great advantage by working the valuable mines of his country.

### III.—*On the Climate of the Fossil Elephant.* By the Rev. R. Everest, M. G. S. &c.

[Read at the Meeting of the 26th December, 1833.]

Since the discovery of fossil bones of the *Pachydermata*, and some large *Carnivora* in England and other parts of Northern Europe, it has been usual to consider them as evidence of a tropical climate having existed in those localities, while the animals to which they belonged were living.

The term has been rather vaguely used; for the Cape of Good Hope, of which country four of the animals whose bones have been found most abundantly are natives, viz. the elephant, the rhinoceros, the hippopotamus, and the hyæna, is situated without the tropics, and in a hemisphere much colder than the northern one.

But, barring this, the assertion has been more seriously called in question by Mr. FLEMING, a Scotch naturalist, who observed, that the circumstance of certain animals being incapable of bearing a certain climate was no proof that their congeners laboured under a like disability; and he instanced the rein-deer, which by its habits, its food, and its climate, is totally separated from the genus, in which, according to its conformation, it must be ranked.

Unless therefore (he continued) you can prove the identity of the fossil with the existing species, you cannot with propriety draw any conclusion, as to the climate the former may have lived in.

In confirmation of this, we may remark under what disadvantageous circumstances we commonly judge the animals of a tropical climate unable to bear our northern cold. They are mostly individuals who have not even been born in a domestic state, but have been caught wild, caged, and suddenly exposed to a great change of temperature. We see in our own people, and in animals brought with us from Europe, the consequences of such a change, equal to, though the reverse of, the other. What numbers are carried off, and how few can preserve a healthy and vigorous condition with every precaution that can be taken; yet man, the horse, and the dog are, with little exception, the hardiest of existing animals, and the most universally diffused over the globe. We have a marked instance of the liability even of certain varieties of the same species to suffer more than others, in the Newfoundland dog, which, I believe, no one has ever succeeded in preserving alive in India.

The objection of Mr. FLEMING was strengthened by the circumstance that the elephant, which was found in Siberia preserved in ice had actually a coat of long hair, such as would have fitted it for living in a severe climate. Mr. LYELL too quotes from Bishop HEBER the information that along the lower range of the Himalaya mountains, in the north-eastern border of the Dehli territory, between lat. 29°, and 30° he saw an elephant covered with shaggy hair. I have inquired a great deal, of people used to elephants, respecting this, since my residence in the Dehli territory, but could never find any one who was aware of the existence of such a breed or variety of the animal. One solitary individual was mentioned to me, as having been seen at Dehli some years ago, with a good deal of long hair upon it, but it was altogether an

anomaly, being of a dirty white or cream colour, like the state elephants of the Burmese sovereign.

Since Mr. FLEMING raised the objection above stated, the discovery of fossil bones of the elephant in Yorkshire, intermingled with those of the Bison, a North American animal, and several species of land and fresh-water shells yet existing in Great Britain, seems to have determined, that the climate, at the period those animals lived, was nearly what it is at present. But it is still a question of some interest, how much that difference was; and our situation in a country, where races of animals similar to those, whose bones have been found fossil, are yet existing, enables us to throw some light upon this. I mean, of course, supposing the species to be the same. If we revert to Mr. FLEMING'S objection that no argument can be drawn from the capabilities of one species, as to those of another, then we must desist from reasoning on the subject, until we can ascertain the law according to which different species of the same genus are distributed over the globe.

Of the six species of Carnivora which were discovered in the celebrated Kirkdale cavern, four are yet inhabitants of Northern Europe, viz. the bear, wolf, fox, and weasel; of the two others, the tiger and the hyæna, the first is sometimes found at the very edge of perpetual snow in the Himálaya, as we learn from Mr. HODGSON'S account of the Mammalia of Nepal\*. PENNANT too mentions it among the snows of Mount Ararat and in Armenia, and it is said to be abundant (see PLAYFAIR'S Geography) in the northern part of the peninsula of Corea on the eastern coast of China. This peninsula extends from 34° 30' to 43° N. Lat. and its climate cannot differ greatly from that of Pekin in 39° N. Lat., where it is stated that the frost lasts from November to March, and that the thermometer is usually below 20° Fahrenheit at night in winter time. An account too, has lately been published in Calcutta of a trading ship (the Sylph) having been frozen up on the same coast, in Lat. 40° by the 1st of December. So that there can hardly remain a doubt, but that the tiger is capable of bearing a climate even more severe than that of England, probably one approaching to that of the southern coast of the Baltic.

The only circumstances essential to its existence appear to be a great extent of very thick forest, and an abundance of ruminant animals, both which would be the consequence of excess of moisture. It is most numerous, I believe, in Ceylon, the eastern peninsula of India, the Delta of the Ganges, and the vast belt of forests that border the outer Himálaya range; every where, in short, that great moisture, and the vegetation consequent upon it are to be found. Where the climate becomes dry, as in the country to the west of Dehli, the soil sandy, and the vegeta-

\* Journal, As. Soc. vol. i. page 340.

tion stunted, it is supplanted by the lion, an animal which infested that part in great numbers a few years back, though since the arrival of the English it has become extinct, or nearly so.

I have not yet been able to ascertain the limit of the climate of the hyæna. But there are two animals in the list of the Kirkdale remains, viz. the weasel and the water-rat, that are, at present, confined to high northern latitudes. The first of these (see PENNANT'S Table of Quadrupeds of Arctic Zoology, vol. 1,) extends only as far south as Barbary, and the last no further than the south of Europe, so that, in a degree, they enable us to set a limit to the heat of the ancient climate, as the elephant and animals allied to it do to the cold. The next question, therefore, that occurs to us is,—what extreme of cold these latter are capable of enduring?

The greatest elevation at which the wild elephant is found in the mountains to the north of this, is at a place called Nahun, about 4000 feet above the level of the sea, and in the 31st degree of N. Lat. I have not met with the temperature of Nahun itself in any work, but we have given us in the GLEANINGS the temperature of Seharunpoor, 1000 feet, and Mussoori 7000 feet above the level of the sea, both places in nearly the same latitude and longitude. They are as follows.

Seharunpur Mean Temperature.

Jan.	Feb.	March	April	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
52	55	67	78	85	90	85	83	79	74	64	55

Mussoori.

39	39.5	52	60	72.5	73	65.5	65.5	61.5	60.5	52	40
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Now Nahun being, as to elevation, half way between these two, we cannot err greatly in taking the arithmetic means of these numbers for its temperature. Thus, we have,

45.5	47.	59.5	69	78.5	81.5	75	74	70	67	58	47.5
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for the mean temperature of each month, giving a yearly mean of 64.4. Now the yearly mean of Keswick in Cumberland, which we may assume for that of Kirkdale, is 48°, leaving a difference of 16.4° still to be accounted for.

But we may remark that this climate of Nahun is what has been called an "excessive," in opposition to an insular, climate; that is, one in which, owing to its distance from the ocean, the extremes of heat and cold are very great. Thus, the month of January averages 45.5, and June, the hottest month, is 81.5, making a difference of 36 degrees; whereas, at Edinburgh, the mean of January for five years is 37, and of July (usually the hottest month there) only 60°, giving a difference of only 23 degrees.

It may be worth while to compare the five coldest months at both places. Taking the average at Edinburgh for five years, and adding one degree

for the difference of latitude between that place and Kirkdale, the numbers stand thus :

	Nov.	Dec.	Jan.	Feb.	March
Nahun,.....	58	47.5	45.5	47	59.5
Kirkdale,.....	42.1	41.8	38	39.8	42.1
Difference,.....	15.9	5.7	7.5	7.2	17.4

So that for the three coldest months in the year, the elephant actually endures a temperature not differing in the average more than 6°.8 Farh. from that of Yorkshire at the same season.

Now we have no reason to suppose the great heats of the summer essential to the existence of the elephant ; if, therefore, we alter only these five months at Kirkdale, so as to raise them above the minimum at Nahun (45.5), we have a climate, which we may reasonably suppose it capable of bearing the year through. Allowing the differences between each successive month to be as at present, we might place the numbers thus :

	Nov.	Dec.	Jan.	Feb.	March
Kirkdale,.....	50.1	49.8	46	47.8	50.1

The total number of degrees added to the five months is 40, which would raise the mean of the whole year from 48 to 51.3. The months of April and October would be warmer than at present ; but this would be compensated by the diminished heat of the summer months, which would probably be somewhat cooler.

Here then the argument of Mr. FLEMING applies with peculiar effect. Most species with which we are acquainted have certain breeds or varieties which are somewhat more hardy than their fellows. Thus the oxen, and sheep, and horses that are bred in the low pastures of the south of England, would perish in a country where the black cattle and sheep of the Highland of Scotland, and the ponies of Stetland, would thrive. If therefore it be not improbable to suppose that the present elephant of Northern India is fitted to live in an insular climate, the mean temperature of which is about 52° Farh., it is by no means unlikely that a breed somewhat hardier may have existed in a mean temperature four degrees lower, or 48°.

There is yet, however, some further evidence, that the elephant is capable of bearing a climate somewhat similar to that which has been above assigned to it.

HANNIBAL, on his famous expedition into Italy, took with him a considerable number of elephants, which were probably obtained in Mauritania. A detailed account has been left us of the difficulties he was subjected to, particularly in the passage of the Alps ; but it is no where that I can find stated, that the elephants suffered more than the other beasts of burden belonging to the camp. The transport of them across

the Rhone is minutely told; and yet, though the army remained four days upon the snow; though Hannibal himself is said to have told one of his Roman prisoners, that he had lost 36,000 men, besides a vast number of horses and other beasts of burden; though he is represented by his adversary SCIPIO, before the engagement on the banks of Tesino (Ticino), as having lost two-thirds of his horse and foot in the passage of the Alps, yet nothing is said about the elephants, until the battle of Trebia, when, owing to the severe fatigue, and long exposure to a snow-storm, great numbers of men, cattle, and almost all the elephants perished. Shortly afterwards, we read of a pitiable destruction of men and cattle in the attempt to pass the Apennines, and that here also seven of the elephants, which had hitherto survived, were lost. One only was left in crossing the marshes of the Arno in the ensuing spring.

Thus, it appears, that these animals, who had the disadvantage of being born in a climate far to the south, and not even reared in a domestic state, endured the extreme cold and privation consequent on the passage of the Alps late in the autumn, and a winter campaign succeeding it. Now the elephant, though capable of sustaining great burdens, is said to bear long marches and scarcity of food very indifferently. These two causes, therefore, must have contributed in a great degree to their loss.

HANNIBAL recruited his army with men and cattle in the countries he passed through, and was thus enabled to proceed; but we have no account of what proportions of the original expedition, which left the shore of Africa, were living at the time of crossing the marshes of the Arno, and what had perished. In the absence of this, we can only guess at the different capacities of man, the horse, the ox, and the elephant, to endure fatigue and cold. Yet did we know nothing of this last, except from the history above alluded to, we could hardly doubt, but that, if gradually inured to a colder climate, in a succession of generations, it would easily bear any temperature above the freezing point.

The freezing point, however, would of necessity set a limit to the existence of any animal of the size and structure of the elephant. In a country occasionally subjected to heavy falls of snow, which remained unthawed upon the ground for several days, such a creature would be unable to move about in search of food, and must consequently perish. On this account, the elephant of Siberia could not have lived in a very severe climate, notwithstanding its long hair and mane.

It is singular, that the ancients should have had a tradition of an animal somewhat similar, not maned indeed, but crested: "Mirum unde cristatos Juba tradiderit" is the expression used by PLINY in speaking of

the elephants of Ethiopia, which were a different breed, it appears, from those of Mauritania.

If we turn to the map of Europe, in the 2nd vol. of *LYELL'S* Geology, we shall find that a great proportion of it was beneath the sea at a late geological period, a circumstance fully sufficient to account for the small difference of climate, which we have supposed to be necessary for the existence of the elephant. We know enough of the laws which regulate the atmospheric phenomena, to be able to assert this change as one that must necessarily have happened. It is needless, therefore, to investigate the matter further.

I have not been able to learn the greatest elevation at which the rhinoceros is to be found, but it cannot be much less than that of the elephant.

There is another question connected with the climate of these extinct animals, and that is the period of their existence. The bones of some of them have lately been found in caverns in the south of France, intermixed with those of men, and fragments of a rude kind of pottery. Some have endeavoured to explain away the direct inference from this fact, viz. that the animals were contemporaneous with the human race, but hardly with success.

We know nothing of Gaul before the conquest of it by Cæsar, nor have we any account of Germany of an earlier date. What species, therefore, may have existed in the wildernesses of these countries, for a thousand years, or more, previous, we cannot determine. The fossil elk of Ireland, which was once termed "antediluvian," is now believed to have existed in the forest of Germany at a comparatively late period. Since the time of the ancients, several large animals have become extinct in regions which once harboured them. Thus the lion has deserted Greece since the time of Aristotle. The elephant has left Northern Africa (I mean that part of it to the north of the great desert), and the hippopotamus the Nile, since the days of the Cæsars. The rhinoceros, which a few centuries back was found as far to the west as Attock on the Indus, is now confined to the forests east of the Ganges. Can we then suppose that in the many centuries previous, during which it was co-existent with man, its limits were not greatly circumscribed? Is it not rather probable that both it and the elephant (which is now limited by the Sutlej) may at no very remote period have been found far west as the Caspian, and that from thence as well as from still further limits both have gradually retreated, as they are still retreating, before the attacks of man, and the clearing of the forests.

IV.—*Chirra Punji, and a Detail of some of the favourable circumstances which render it an Advantageous Site for the Erection of an Iron and Steel Manufactory on an extensive scale. By Lieut.-Col. Thomas C. Watson.*

Now that the commercial privileges of the East India Company are abolished, and that free scope is given to the improvement of India, through the enterprising speculations of British subjects, it may fairly be expected ere long that the efforts of enlightened industry, and all the aid of modern machinery and scientific research, supported by a liberal outlay of capital, will be employed in perfecting the existing produce and manufacture of the country, as well as bringing into vigorous and flourishing development many sources of national prosperity which have hitherto languished under the unwholesome shadow of a wide-spreading and disqualifying monopoly.

My present object however is not to speculate on possibilities, but to bring forward a few plain matters of fact, which may appear to others who have the means of turning them to account to be pregnant with matter of some importance.

A residence of considerable duration in the Kasya or Silhet hills, and my observations and inquiries while sojourning there, have impressed my mind with a full and satisfactory conviction, that works might be established in those hills for the manufacture of iron and steel on a very extensive scale, and under as favorable a combination of circumstances as can well be imagined or desired. It would be foreign to my purpose, and I fear beyond my ability, to attempt anything like a scientific treatment of this subject, and I shall therefore content myself with merely detailing in the order in which they strike me, certain *matters of fact*, leaving the inference to be drawn from them to those better qualified than myself to consider the question in all its bearings and relations.

The sanatory station of Chirra Punji is situated on the range of mountains that bound the plains of Silhet on the north, and which run nearly east and west. There is little or no rise in the country, to the very foot of the hills; the ascent to which is for the most part very abrupt. The Sanatorium is about 4,200 feet above the level of the sea, and distant about eight or ten miles from Tyrea Ghat, where the ascent commences, to which place the Pandua river is navigable nearly half the year. The journey from Tyrea to Chirra is seldom performed in less than four hours.

The average temperature of Chirra throughout the year is more than

twelve degrees of Farenheit below that of the plains of Bengal: in the months of March, April, May, September, and October, the difference is full twenty degrees.

As to climate, my own opinion, founded on personal experience of its effects on the health of my own large family, is highly in favor of its salubrity. I have no hesitation in giving it the preference to any I have ever been in; it must however be admitted that a widely different view has been taken on this point by others, who consider the dampness of the atmosphere, during the rains, as injurious to persons labouring under organic affections of the liver; whether this opinion is correct, or not remains to be proved, for I believe a large majority of medical gentlemen who have visited the Sanatarium concur in considering the climate as highly congenial to the European constitution: in which opinion they are borne out by the florid and general healthy appearance of the European soldiers; but more especially of children, amongst whom no casualty has taken place in three years, though many have been afflicted with complaints incidental to childhood, which in all human probability would have proved fatal in the plains; some also who have been sent as a last hope in a state of extreme debility have been restored to perfect health in a few weeks. In these hills Cholera has never been known, although its ravages have frequently extended to the villages at their feet. The bilious remittent or jungle fever of Bengal is also unknown, and I believe no instance has occurred of a fatal case of dysentery.

Tyrea Ghat, which is at the commencement of the ascent, may be reached by the Pandua river, which is navigable for small boats, from the beginning of May, to the end of September; during the other months land carriage commences from Pandua, or Manipoor Ghat, the former distant from Tyrea two, and the latter four, miles. The Kasya porters however make no additional charge, their fares for conveying a load of one maund up or down the hill being four annas, whether taken up or laid down, at Tyreal, or either of the other stations. The road between Tyrea and Chirra has been recently much improved, and is for the most part practicable on horseback. There is no doubt that a liberal outlay of money, under the directions of a skilful engineer, would make it fit for wheeled carriages, at all events for elephants and loaded bullocks; it is also certain that at a moderate expence means might be devised of bringing coal, iron, and other bulky and heavy articles down to the plains, at one-tenth part of their present cost; but I shall take a future opportunity of submitting to the Asiatic Society, a model of a cheap and simple machinery, which I have contrived for the purpose.

From Calcutta, by a steam boat, the journey to Chattak (on the Soorma river) may at all seasons be performed in less than six days.

Chattak is distant from Tyrea Ghat by the way of Pandua about fourteen miles, which is generally performed in from four to eight hours.

The journey from Dacca to Chirra, by large accommodation boats, usually occupies about ten or twelve days; the return voyage is performed in five or six days. Ladies and sick people are carried up the hill in light doolies by two Kasyas, for eight annas each; but the liberality of passengers has of late caused a considerable increase in this charge. Children to the age of eight or ten years are taken up with great security and comfort in baskets, by a single Kasya porter, for four annas. Bulky articles, which cannot be carried by a single person, often cost a sum for conveyance, which appears out of all proportion; for instance, a chest, weighing a maund and a half, will be taken by one man for one rupee; but a square piano forte of the same weight will not be carried for less than ten or twelve.

The only provisions used by Europeans, which are produced in the hills, are beef and pork: these are abundant, cheap, and good. A cow fit for killing, weighing about 200 lbs., may be purchased for six rupees, and a well and clean fed porker, for the same price; of late the Kasyas towards Myrung, in the interior of the hills, have got into the way of cultivating potatoes with great success: these at present are sold at rather a high price, but a few years will bring them down. The crop comes in at the most convenient season in the month of September, when Patna potatoes become unfit for use, of which advantage might be taken in supplying the Calcutta market. A few other vegetables may also be had in the hills. It must be admitted however that little progress has yet been made in gardening.

Grain of all kinds is brought from the plains. Rice sells from 35 seers to one maund for a rupee; other grains, in proportion; but at all times much cheaper than in Calcutta. Eight ducks for a rupee; large fowls, nine and ten for a rupee; small fowls, 20 and 22 for a rupee; eggs, 160 for a rupee; bread, 12 loaves for a rupee, but competition will make this much cheaper. Sheep must be brought from the plains and fed. Farmyards answer admirably: pigeons thrive and increase rapidly; rabbits require more care than has hitherto been bestowed on them; milk and butter abundant, but rather dear.

The native fruits are excellent and abundant in the season; that is, from November till the end of February, the finest oranges in India may be had for about one thousand for a rupee.

The pine-apple plant, which produces the hemp, of which specimens are sent herewith, is raised with hardly any care in the culture, in all the valleys surrounding Chirra, but chiefly in that of Nanguth, about six hours' journey from the Sanatarium, where it flourishes in great luxuriance.

producing in the season, June, July, and August, an abundant crop of fruit, which is admitted to be as much superior to pine-apples grown elsewhere in Bengal, as the Kasya (or as they are called) Silhet oranges are to those of any other part of India. When in full season, this fruit is some times sold at the Sanatarium at upwards of 380 for one rupee; it is rather above the common size, weighing from  $\frac{1}{2}$  to  $\frac{3}{4}$  of a seer each; it contains much juice, and it only remains to be ascertained, whether this fine fruit (certainly the cheapest, considering its quantity known to exist any where) may not make fine cider, or whether by distillation, it may not be converted into good brandy. The leaves of the plant are gathered by the Kasyas according to the wants of their respective families, and *not* for the purpose of *trade*, generally before the commencement of the rains; they are soaked in water for some time, before the fibre is separated by being beaten out, this fibre appears remarkably strong, but I have not had opportunity of submitting it to any comparative trials. It is chiefly used by the Kasyas for the net pouches or bags which form part of the equipment of every inhabitant of the hills. One of these I have the pleasure to send you. Should this hemp be found adapted for cordage, canvas, or even for paper, it may become an article of much importance, as I can assure the Society that the plant may be spread to any extent that may be supposed desirable, with little care and hardly any expense.

The pepper vine grows wild in the jungles; it is also cultivated in small quantities about the houses of the natives. The specimen now forwarded is the produce of such culture. It is used by the natives in their ordinary food, and is sold in the bazar of every village; but I have not been able to find that it is ever exported. There can be no question however but the cultivation of this vine may be extensively increased.

Specimens of Indian Rubber I have already presented to the Society. It is produced from a tree which grows to a considerable size amongst the rocks, and which being of quick growth may be propagated with ease to any extent from suckers or even from slips; but even without increasing the plant, a very considerable supply might now be furnished were the article to be in demand. From the various purposes to which it has lately been applied in England, it may one day become a valuable article of export; in its liquid state I have succeeded in moulding it into any shape.

The cotton which is brought by the Kasyas to the plains for sale is purchased by them from the Garrows, a tribe inhabiting the northern side of the range of hills which divide Assam from Sylhet, but as this article has been already fully described by Captain FISHER I merely mention it whilst enumerating the various productions of the Kasya moun-

tains, which may eventually become valuable articles of commerce.

Honey and bees'-wax are produced from bees kept, as in England, in a domestic state, but they are also obtained from the jungles. As yet bees'-wax has only been exported in small quantities; there is, however, no reason why it should not be abundantly collected as an article of traffic, if not of manufacture on the spot.

The Kasyas have no regular artificers, except blacksmiths and iron-founders, but they are all handy and expert in the use of the *daw* or cleaver, and also with the adze, with which they square their timbers and smooth their planks. They are not often employed in building houses, as workmen from the plains come up in any number that may be required; of these, excellent bricklayers may be had at the rate of seven rupees a month; good carpenters, at seven rupees per month; grammies, at five ditto; stone-cutters, at five ditto; coolies, at four ditto. Kasya workmen may be hired by the day at three annas, but the best way of employing them, and the way they like best, is by contract; in this way, the tasks they perform are incredible. I shall scarcely be believed when I state the particulars of some task-work, which was executed by a few Kasyas, with their wives and children, in the course of last month (October, 1833). I had a wall built round my estate of dry stones, those on the exterior being broke into square or oblong slabs, so as to present a smooth, well-built, and regular surface. This wall was four feet high, at the base it was four feet wide, and two feet at the top; each foot in length consequently contained twelve cubic feet of masonry; but every twelve feet in length, containing 144 cubic feet, were completed at one rupee twelve annas, till the whole was finished, measuring upwards of 800 feet; thus, six cubic feet, weighing, I should suppose, more than 1000 lbs. cost only one anna:—cheaper labour than this I imagine it would be hard to find in any country. The Kasyas are remarkably athletic and industrious; their women partake in their hardest labours; and the children commence carrying heavy burdens at a tender age: they live well, have comfortable houses, and the poorest amongst them is not without gold or silver ornaments.

Their wealth has heretofore resulted from the manufacture of iron, which process is explained by Mr. CRACROFT in the fourth number of your journal for the month of April, 1832. Of late, the sale of iron has been unusually dull, and numerous individuals who were employed in digging, washing, and smelting the ore, are out of employment.

All these people are available for any manufactory that may be formed at Chirra, at very moderate wages.

Building materials, either for temporary or permanent buildings, are abundant and cheap; for the former, posts, eighteen feet long, and from

eight to twelve inches in diameter, cost one rupee each; marwells and roaks, or roof sticks, eighteen feet long, and four inches in diameter, sell at ten and sixteen for a rupee; small hill bamboos, called aspar, ten feet long and  $\frac{3}{4}$  of an inch in diameter, for lath and plaster walls, and binding on chuppers, or grass roofs, cost one rupee for 250; latkorahs, or squared timbers, five inches square, and eighteen or twenty feet long, for joists or rafters, sell four for the rupee; rattan grows at the foot of the hills, and is remarkably cheap; good grass for thatching is brought from the plains at four rupees a thousand bundles, each (being tight bound) measuring  $7\frac{1}{2}$  inches in circumference.

For permanent buildings, the common grey sandstone, which forms the structure of the table land of Chirra, is found by far the best material. This stone is found in inexhaustible quantities, in slabs or layers from six inches to two feet thick; it may be easily split into square blocks by the wedge and hammer; these blocks require little or no dressing before they are passed into the hands of the mason. When the puckah houses belonging to Messrs. SARGENT and CRACROFT were erected, the facility of working this stone was not understood; hence, a material was used, a red spongy soft sandstone, which was squared by the Kasyas, and sold at the enormous rate of four rupees a hundred; these same stones now sell for one rupee the hundred; but they will never again be made use of in building. The common grey sandstone before alluded to is the same of which the wall is built, which I have described under the head of price of labour: it hardens from exposure to the air, and is not in any situation liable to decay or decomposition. It is of this stone also, cut into blocks of eight or ten feet long, three feet wide, and two thick, of which the monument to the memory of the late Mr. SCOTT is now in progress of construction under the orders of the Government; it is likewise the material employed by the Kasyas for their tomb stones, some of which are single blocks, standing nearly thirty feet high, being bulky in proportion, and which, according to the tradition of the natives, have stood uninjured for many centuries. Limestone is brought to the spot whenever required, within the Sanatarium, for six rupees the hundred maunds: burning it even in the simple and wasteful manner now adopted costs about ten rupees more, so that good fresh lime, fit for use, only costs sixteen rupees the hundred maunds; it may however be burnt on an extensive scale in proper kilns, for five or six rupees the hundred maunds. Fire-wood for burning lime costs four rupees eight annas the hundred maunds. Good sand for mortar may be got in the immediate neighbourhood of any spot where a building is to be erected; excellent clay for making bricks or tiles is found within half a mile of the Sanatarium; but except for mixing with mortar and building furnaces, bricks will not be much in use at Chirra. Good timber may be had, and

of considerable scantling, but the price increases in proportion to the difficulty of conveyance; beams of twenty-two feet long and nine inches square cost six rupees each; but if the Kasyas were furnished with trucks for its conveyance, large timbers might be brought in, at one-fourth of the Calcutta price. The saw is not yet brought into use for cutting planks; a saw-mill might with advantage form part of such a concern as I should recommend to be established at Chirra. The experiments which have hitherto been made in the pukka or terrace roofs of Messrs SARGENT'S and CRACROFT'S houses, lead to an opinion that they will not answer at Chirra. Mr. CRACROFT, I believe, has fully adopted this opinion, and expresses a conviction, that permanent buildings will require to be roofed with copper, lead, or spelter; but I am far from coinciding in this conviction, being satisfied that a fair trial has not yet been given to terrace-roofs; those at present existing, which have failed, were constructed too late in the season, and consequently were not sufficiently beaten down and consolidated before the heavy rains set in. Pukka roofs to be effectual at Chirra should be constructed at a pitch of about fifteen degrees; should cover the walls and project so as to form a sort of false verandah from three to four feet beyond them. The composition should be laid on by the middle of December; and the process of beating down should be slowly and regularly persevered in, till a perfect consolidation is obtained. Such a roof I am convinced will answer; and if so, a most important object will have been accomplished, as all the materials are on the spot; whereas, metal for roofs must be brought from Calcutta at great expence, and experienced workmen must also be brought to lay them on, and kept in employ for their occasional repair.

These valuable materials are supplied in exhaustless abundance from a range of hills which run about three miles north and south across the table land, extending between the Sanatorium on the east, and the village of Nunklow on the west. This range rises abruptly to the height of about four hundred feet: its summit is flat, and it is covered from top to bottom, in contradistinction to the surrounding hills, with timber jungle and luxuriant vegetation; its base may cover an extent of six or seven square miles (but this is mere conjecture). At the foot of this range the lime-stone is produced, and at about one-third the distance up, a seam of coal is exhibited of from ten to sixteen feet thick, in various directions, so as to leave no doubt of its extending almost in an horizontal stratum through every part of the range; this seam has been the more easily traced, as there have been slips from all parts of the range, leaving perpendicular gaps, where the various strata composing the structure of the hill lie exposed to a considerable extent of its elevation.

At the foot of one of these gaps or slips it was that I first discovered,

amidst the wide-spreading confusion, large masses of coal. I took Mr. Cracroft to the spot, and his scientific skill enabled him at once to detect the seam from whence these masses were supplied, and to hazard a confident conjecture that it extended throughout the whole range, and this conjecture has been fully verified by discoveries which have since been made. The specimens which have been sent to Calcutta and proved at the mint, and also by the Secretary of the Physical Class of the Asiatic Society, were taken from the heaps of the material which lay exposed to the air and weather. At the time we thought the specimens excellent, and I believe a favorable report was made of them in Calcutta, but we have since ascertained that they are beyond comparison inferior to the coal which has been detached from the seam. This is now in use at Chirra, and is admitted to be of the very finest quality, being largely impregnated with bituminous matter, easily converted into coke, and leaving scarcely any ashes or earthy residue: a specimen shall be forwarded to the Society by an early opportunity. This supply which may be wrought with the greatest facility, and which is not more than one mile distant from the Sanatorium, might be estimated to meet the demand of ages; but it is ascertained that the material exists in all parts of the hills in profuse abundance.

The manner in which the iron ore is obtained and worked is, I believe, fully described in Mr. CRACROFT'S paper before alluded to; it therefore only remains for me to state that it may be brought in to any required extent at twenty-five rupees the hundred maunds; two-thirds of this price however may be considered as payment for the conveyance. Any means that can be devised to facilitate this, will proportionally reduce the price. I shall forward to the Society by an early opportunity a few seers of the ore, that its quality may be submitted to experimental proof, and I have reason to believe it will be found of the very finest quality.

Coke for smelting iron may be made on the spot to any extent, and charcoal for making steel is abundant and cheap, and a little arrangement in making it will still farther reduce the price.

The pipe-clay of Chirra has I believe been already noticed by Mr. CRACROFT as a valuable commodity in the manufacture of crucibles, furnaces, and fire-bricks.

In the neighbourhood of Chirra there are numerous streams that supply sufficient water in the driest seasons, to work overshot mill wheels, but the river which bounds the Sanatorium on the west and south is decidedly the best that can be selected, from its vicinity to the coal, lime, and charcoal; also to the bazars, and populous village of Chirra Punji. In the course of this stream, from the village of Chirra to that of Moosmai,

at the edge of the table land, where it plunges over a perpendicular precipice of two thousand feet, there are numerous spots admirably calculated for the construction of water-mills—spots where there are abrupt falls of from ten to twenty feet, and from whence aqueducts might be made to regulate the supply of water required.

When I commenced this sketch it did not occur to me that I should have been led into so much of what may appear tedious detail. I fear I may have almost exceeded the limits allowed, but I shall now conclude by saying, that should the Secretary of the Physical Class, or any other scientific gentlemen from the presidency, feel inclined to visit Chirra, and form their own judgment on the facts I have endeavoured to detail, he or they, should they proceed by a steam-boat, will find at Chattak six hundred maunds of coal for their return-voyage. This supply has been brought down the hill by Mr. Cracroft and myself, expressly with the view of encouraging visitors from Calcutta, in the expectation that the frequent report of competent and disinterested individuals may at length open the eyes of the Government and of the community, to the many advantages, as a sanatory position, and as a highly valuable acquisition, which belong to the hitherto neglected station of Chirra Punji.

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V.—*Description of the Mode of Extracting Salt from the damp Sand-beds of the River Junna, as practiced by the Inhabitants of Bundêlkhand.*  
By Lieut. J. S. Burt, *Engineers.*

The operation is performed by three persons, one of whom is employed in collecting a quantity of damp sand, another in preparing a filtering vessel, and filling it, as well as in emptying a receiving vessel of the saline liquid which has been collected, and the third in superintending the boiling of the liquid until it evaporate, and leave a salt at the bottom of the pitcher. The sand selected for the purpose is that which swells up (*phulta*), or is raised by the solar heat a little above the general surface of the bed, and is generally found near to the stream, where the moist saline particles are alone affected by the sun; however, a quantity of sand becomes intermixed with the salt as it swells into innumerable little hillocks, which vary in size from an inch to three or four inches, or more, in diameter, according to the quantity of saline matter contained in them.

As soon as the gatherer has collected a common ratan-basketful of sand, he conveys it upon his head, and depositing the contents near to the filtering vessel, returns for a fresh supply; then comes the filler. It is however necessary first to describe the manner in which the filtering vessel is set up. The accompanying plan, elevation, and section

(Plate I.) shew it; *a* is a mass of sand heaped up to the height of about four feet, on three sides of a *nánd*, or baked earthen pot, which measures from one and a half to two feet in height, and fifteen to eighteen inches in breadth; it is fixed into the mass of sand, and rests upon three, and sometimes upon two, pieces of stick or bambu placed across the top of a receptacle, in which lies a small *ghara* or pitcher immediately below it, so as to receive the drops of salt-water as they fall down through an aperture cut in the bottom of the large *nánd* or pan. Over and perpendicularly across the aperture is placed a thin bit of stick or bambu, sufficient to bear a small piece of coarse cloth, which is laid across the stick, depending down through the opening to the distance of about three inches, and directed to the little pitcher below; upon the stick is placed an irregular spherical fragment of tile, or earthen pot, broken angularly, so as to allow the water which disengages from the sand to flow beneath it, and pass along the piece of cloth that rests upon the stick to the receptacle below. In addition, a second piece of cloth is laid over the tile, so as to cover it, and prevent any sand from escaping underneath the latter, and mixing with the filtered liquid; every thing being prepared, the filler throws into the *nánd* a quantity of the saline collection, until the vessel is filled to within two or three inches of the top, when he fills up the remaining space with fresh water, taken from the river close by; the water in a short time percolates the sand, and falls into the pitcher by the means above-mentioned, and is found to consist of a brine, exceedingly salt in taste at first, but diminishing afterwards according to the quantity of water which is added from time to time, as the upper surface subsides. The liquid in the small pitcher is emptied into a third pan, in which it is conveyed to a *chulah* or clay fire-place, sometimes prepared at the spot, but more frequently at the manufacturers' abode, where it is subjected to the action of the fire, and allowed to simmer under a slow heat, until the liquid has all evaporated, and the salt remains at the sides and bottom of the vessel. The colour of this salt is brownish; it is of an excellent quality, and is much superior to the black salt which is given to horses, and if it were refined, would, I doubt not, be fit for the table; the flavor being very good when the salt is fresh.

It is rather a curious circumstance that salt should be found mixed with the sand of the *Jumna*, a river of which the water is so pure and fresh to the taste, (although it is considered by the natives as almost unfit to be drank in the hot and rainy seasons;) the quantities gathered are, however, under the present management of the poor, trifling, and but barely sufficient to give the laborer a sustenance, although he is allowed by the *Raja* in *Bundelkhand* a portion or plat of sand free to himself and family for the season. The rates, quantities, &c. are as follows:

Each of the three persons, (sometimes women are employed,) can gain their anna per day by making two and half seers of salt, which sell at the rate of one rupee per maund. They work each from sun-rise till about noon, and not later, as they consider "sufficient for the day is the evil thereof;" besides, after twelve o'clock, the sun becomes too powerful for them to work out of doors.

The locality of this salt preparation is on the Bundélkhand side of the river, about thirty-six miles by water, and twenty-four by land, above Culpee; is under the authority of the Budèk Raj, and is situated opposite to the village of Marhapoor, near Karimkhan (or Kurmookah Ghat), where the chief operations of removing the rocks which impeded the navigation of the Jumna have been carried on for some time past.

The favorable season of the year for this salt operation is only in the hot dry months of April, May, and June, before the river rises; for on its subsidence, which takes place at the close of the rainy season, the sun must be allowed to gain some power before these people can attempt a renewal of the process, because the only sand from which the salt is disengaged is drawn forth and raised above the general surface of the bed by the direct influence of the sun's heat, which is not sufficiently powerful in the cold season to produce such an effect. I am not aware whether the little hillocks of swollen-up sand subside again or not after the sun's departure below the horizon, but I should think that they do not. A number of sand mounds, fifty or more, raised here and there, some given up, and the rest in progress, were to be met with in June last; but I should scarcely think if the preparation of salt were carried on after this manner on a more extensive scale, that it would reimburse the speculator for any large sums of money that he might hazard in the manufacture of the article.

It appears, from the natives' account, that four baskets filled with this saline collection weigh about two maunds of forty seers each (160 lbs.), or forty lbs. each basketful; also, that half a seer (one lb.) of salt was extracted from a maund weight, or eighty lbs. of sand. That a day's work, consisting out of doors, of six hours, (passed in collecting, filling, and filtering till noon; and the rest of the day in the evaporating process,) enabled the manufacturer to prepare a sufficient quantity of salt for him and each of his family to gain an anna a day clear, for the fire cost him but little, as he gathered or picked up the fuel, consisting of old sticks and *gobar*, or dried cow-dung, and he purchases the earthen pots for a mere trifle, and they last a long time, excepting the one subjected to the action of the fire. This anna, equal to three half-pence, is found to be sufficient for the individual's maintenance; but I suspect he gains something more, as he stated that

to every labourer whom he employed in excess to his own family, he paid hire at the rate of an anna a day.

He sells the salt unrefined, at the cheap rate of one rupee per maund of forty seers, but this afterwards sells in the towns or cities whither it is conveyed, at a rate triple or quadruple (as I understand) its first price; it however previously undergoes a process of refinement. Half a seer of salt per diem is prepared from each of the mounds in which only one *ghara* is fixed, so that to enable a family of three persons each, to get their anna a day at the above rate of one rupee per maund, they must keep up fifteen ~~sand~~ mounds, with a *naud* in each.

I do not know what is the proportion of salt found in the superficial hard crust of the dry earth at Cawnpoor\*, where I have seen people scraping the ground for it, to the depth of half an inch, or more; it would be worth while to ascertain, but I should think the proportion of salt there exceeded that found in the bed of the Jumna, although it is probably not so good.

As the *naud* was only filled once a day with the sand, and as half a seer, equal to one lb., of salt was extracted from it during that period, the proportion of the latter to the former will be easily found; for,

The *ghara* contained (by calculation) 0.8836 decimal parts of a cubic foot of sand; considering the space that was filled with it to be a hemisphere, and the specific gravity of sand being 1520, the weight of that quantity will be eighty-four lbs. nearly; therefore the proportional weight of salt extracted from thus much sand, will be one lb. of salt to eighty-three lbs. of sand, nearly. The native's account agrees extraordinarily well with this calculation, for he said that half a seer of salt was extracted from a maund weight, or eighty lbs. of sand, as before noticed; thereby differing only three lbs. from this statement: his assertion therefore is to be relied upon as nearly correct.

VI.—*On the Saline Nature of the Soil of Ghazipoor, and Manufacture of Common Salt, as practised by the Natives of the Villages of Tutulapoor Ratouly, Sahory, Chilar, and Becompoor. By Mr. J. Stephenson, Supt. H. C. Saltpetre Factories in Behar.*

The surrounding soil in the vicinity of the above villages in the district of Ghazipoor contains a large proportion of various kinds of saline matter, such as muriate, sulphate, and carbonate of soda, together with nitrate of potass (saltpetre) and nitrate of lime.

Near the village of Ratouly, about four coss N. W. of the station, an opulent native is making a large new tank. Here the excavation already made afforded me a section of six feet deep. The first four feet

\* See Journal vol. i. page 503.

from the surface is formed of mud and clay: below this, two feet of kankar contained a large proportion of saline matter, consisting of sulphate and muriate of soda. The efflorescence is in such abundance, on the sides and bottom of the excavation, that I gathered it in handfuls, to obtain an average sample. The bottom of the tank was covered with kankar in nodules and lumps recembling stalactites.

The circumstance of so much saline matter being found here at the depth of four feet below the surface, resting upon and impregnating the stratum of kankar, naturally leads me to the supposition (taking all appearances into consideration) that a constant, *but slow*, decomposition is going on between the carbonate of lime, contained in the kankar, and the muriate of soda in contact with this singular stratum. Hence the formation and development of carbonate of soda, in the same manner as observed in the Natron lakes, and beds of Egypt, by the justly celebrated French chemist BERTHOLLET, though, from his description, the appearances in that country are more strongly developed, than I observed to be the case at the above place. The upper part of the kankar bed being undulated, it therefore frequently crops out at the surface, and of course the saline earth in proportion. This accounts for the efflorescence appearing in patches, as it were, especially when moisture is retained in the soil at all seasons, which is the case in the vicinity of jheels. However, as I wish to confine myself to facts alone, I leave this subject to be taken up by others better acquainted with geology than myself. There seems (as far as my observations extended) to be no want of materials for nature to operate upon; for in the space of a few miles I found the earth to contain sulphate, muriate, and carbonate of soda, with here and there the nitrates of potass and lime, distributed in patches through a large tract of country.

Near the above excavation for a tank, and close by the village of Ra-touly, is established the largest salt factory that I had an opportunity of inspecting. I generally found them situated where the patches of muriate of soda predominated, and the following notice attempts to describe the operations of the manufacture as it came under my own observations during my visits to the factories for the purpose.

The manufacture of salt is commenced on the latter part of the month of February, and is carried forward till the commencement of the rainy season; for being upon the principle of solar evaporation, the operations can only be carried on during the dry hot months.

The first operation is to scrape the surface of the soil (in the same manner as saltpetre is scraped off and gathered in Tirhoot), and collected in heaps near the filters. The latter are the same in principle, though different in shape and size to those used for the manufacture of saltpetre,

being an oblong square of fifteen feet by five, and not more than nine inches in depth. They are built with the stiff kankar clay, with the stalks of sugar-cane laid crosswise, to form the bottom of the filter, instead of bamboos and mats used to form the bottom of the saltpetre filters. A few which I saw had a layer of jungle grass laid over the canes, which rendered the filtering process more effective.

About fifty maunds of the saline earth is operated upon, at each charge. This raw material being laid on the bottom of the filter, so as to form an uniform thickness of about five inches, and trodden down to the desired hardness by the feet of the operator. Water, from a well close by, is then poured upon the earth to the depth of three or four inches, and the whole suffered to remain tranquil for the space of several hours, during which time, the fluid finds its way through the earthy bed, and dissolving the salt in its passage, runs off in the form of a weak brine, by means of a spout into an earthen vessel used for a receiver.

The brine thus obtained is more or less charged with a colouring matter from decomposed vegetable matter and oxide of iron which the kankar soil contains. On a subsequent examination of the brine from several filters, I found the average to give a specific gravity of 1.095.

The brine obtained in the above manner next undergoes a subsequent process, as follows :—on the surface of the ground, near to the filters, evaporating beds are constructed of about twenty feet square, and not more than four inches in depth. The bottom is formed of the nodules of *kankar* limestone, plastered over with a cement of the same material, similar to the roof of a pukka built house. These pan-like squares are for the purpose of solar evaporation. A thin layer of cow-dung is spread over the surface of this evaporatory, and the *ras* (as the natives term the brine) is poured over, till the dung is saturated. The evaporation goes on, and when the mixture is sufficiently dry, the saturated dung is collected into a large heap, in order to be burned, or calcined, in the same way that *khāru lon* earth is burnt in Tirhoot, except that the cow-dung serves instead of rice-straw for fuel.

The calcined saline mixture is then removed to a filter (formed of clay), of smaller dimensions than the one above, which I have attempted to describe, (being only about five feet long, three broad, and two deep,) when it is again subjected to the process of filtration. But in this second process, no more water is used than is necessary to dissolve the common salt (which is known to be more soluble than most other salts) contained in the calcined mixture; consequently a very strong solution of brine is obtained from this second operation. By the process of burning, the colouring matter is in some measure destroyed, so that the brine from this second operation is less coloured than that resulting from the

first operation of filterings, and its specific gravity of course is much increased. It is now sufficiently prepared for final evaporation, and is therefore removed again to the evaporating squares, and exposed (very thin) to the action of the sun and heated air, which it appears is sufficiently powerful to evaporate the saline solution to dryness, leaving a thin crust of a brownish white coloured salt attached to the bottom of the solar evaporatory, from which it is taken off by means of an iron chisel.

The salt thus obtained is, however, far from being a pure article: an average sample which I collected, and subsequently subjected to analysis, produced the following result—100 grs. operated upon.

Insoluble matter (sand).....	3.0
Sulphate of soda.....	37.0
Muriate of soda.....	60.0
	100.0

A slight trace of nitrate of lime was detected during the examination.

The quantity of salt produced, of the above quality, at the *Ratouly* factory, is twenty-five maunds for each filter, and there being seven in number, the total produce for three months' operations will amount to 175 maunds, which, at the stated price of rupees four per maund, make a total value of rupees 700. However, as this amount is from the manufacturer's own statement, the real produce may be one-third more.

An average sample of the saline earth, which I carefully collected from the heaps merely scraped off the soil at two of the factories, being analysed, gave me the following result:

100 grs. operated upon.

The filtered solution made no change on turmeric paper. It therefore contained no loose alkali. I obtained precipitates from the following re-agents, viz. muriate of barytes, nitrate of silver, oxalate of ammonia, prussiate of potass, and liquid ammonia: these precipitates, being carefully washed and dried, produced the following equivalent results:

Earthy matter, insoluble in the three mineral acids.	} silex.. .. .	89.0	
Earthy matter, soluble in muriatic acid,	{ carbonate of lime.....	4.0	
		alumina and oxide of iron..	0.2
Saline matter, soluble in water, . . . .	{ sulphate of soda.. .. .	2.7	
		muriate of ditto.. .. .	1.5
		nitrate of lime . . . . .	0.4
		moisture.....	2.0
		loss.....	0.2
		100.0	

VII.—*Progress of the Boring for Coal at Jamutra in Cutch.* By Capt. C. W. Grant, *Engineers.*

[Extracted from that Officer's Report to J. Bax, Esq. Sec. to the Bombay Government, communicated to the Asiatic Society by the Supreme Government, 30th Jan.]

"On the 3rd instant, I dispatched 125 maunds of coal from the vein at Dujapoor, agreeable to the desire of the Right Honorable the Governor.

"I continued sinking the bore at Jamutra as mentioned in my letter of the 18th June, until towards the latter end of July, when the rain fell, and the river came down so suddenly, that I had but just time to save the boring apparatus, and it was of course impossible to go on with the work, so long as the monsoon continued. At this time also, the whole of my establishment, my personal servants, and the sepoy guard, were attacked with fever—one man only out of 31 escaping it, so that I was obliged to allow them to go into Bhooj, for a few days, for change of air. As soon after the receipt of your letter of the 24th July, as the men had regained sufficient strength to work, I commenced digging out the coal at Dujapoor, and by the beginning of September, had it all ready for shipping to Bombay; since then, we have again been working at the bore at Jamutra, and we have now got down 184 feet below the bed of the river, or 190 feet below the general level of the country, principally through the sandstone and slate-clay, with here and there an exceedingly hard stratum or band of iron stone, as will be better seen by the enclosed list of the numerous strata passed through. The last 22 feet of white sandstone consists entirely of the finest particles of white quartz, and is evidently the channel of an underground spring; for after sinking through it some feet, the water rose, and flowed out at the mouth of the hole in large quantities, night and day, without ceasing, as much as could be conveyed away by a seven or eight inch pipe. It is rather brackish, it cannot be otherwise, as it has to pass through 148 feet of very brackish water, which is constantly flowing in from the sides of the hole, before it can reach the surface; but I have no doubt, but that if it came up through pipes, it would be perfectly sweet. I particularly mention this circumstance, as the boring for water is now becoming of great interest, and my meeting with a spring 190 feet below the level of the plain, shows that success in that line should not be despaired of, even when not found at small depths. The flow of water is constant and uniform, and runs down the river in a fresh stream, and very much impedes our work; so much so, that added to the great depth of the bore, it renders the work exceeding tedious and difficult. I am only waiting to hear the result of the trial of the coal just sent down, to stop work here, and should the coal be approved of, have it in contemplation to commence a bore at Dujapoor, and see if any other veins lie under the present one.

In the mean time, I am about to make a long tour through the northern and western parts of the province, where, I think if any where, coal is likely to be found. I have already examined a great deal of the eastern side of the country, and after this trip, shall have a tolerable idea of the geology of the province.

"The strata passed through in the present bore, as shown by the enclosed list, are such as usually denote the presence of coal; viz. sand stones, slate clay, and iron ore, and iron pyrites, and bear a very strong analogy to the sections of some of the coal districts in England. Whether coal exists beneath this, the means at my disposal do not permit me to ascertain, except at a great cost; but from the evident traces and presence of coal, though in small quantities, over a large extent of country of which Jamutra is one boundary, still inclines me to think that it must, though in this instance I have not been fortunate enough to hit upon it.

The establishment of a steam communication between Bombay and Europe being now I hope placed beyond a doubt, the discovery of coal so conveniently situated as this, appears to me to be more than ever a desideratum, and I beg you will assure the Right Honorable the Governor in Council, that no exertions shall be spared on my part to contribute to so desirable an object."

*List and description of the several Strata passed through in Boring for Coal at Jamutra in Cutch.*

No.		feet.	inches.
1	Red and brown sandstone.....	20	0
2	Thin band of clay iron ore or stone.....	0	6
3	Brown sandstone.....	1	6
4	Thin band of clay iron stone.....	0	6
5	Argillaceous sandstone and slate-clay in thin alternate laminæ,..	4	0
6	Clay iron stone, .....	0	3
7	Sandstone and slate clay in thin laminæ.....	5	0
8	Amygdaloidal rock in a state of decomposition.....	2	0
9	Shale slate clay containing a thin vein of coal.....	1	10
10	Sandstone slate clay in thin laminæ.....	5	0
11	Light red sandstone.....	1	6
12	Sandstone and slate clay in thin laminæ.....	5	0
13	Light-brown sandstone, .....	0	11½
14	Deep red ditto.....	3	3
15	Light-brown and yellow ditto, very soft.....	7	9
16	Brown argillaceous sandstone.....	3	11
17	Reddish brown sandstone.....	1	3
18	Very argillaceous sandstone.....	0	11
19	Variegated sandstone.....	4	0
20	Deep red ditto.....	3	10

No.		feet.	inches.
21	Sandstone composed of very coarse grains of quartz, &c. and oolite deep red by oxide of iron, . . . . .	1	2
22	Fine argillaceous sandstone and slate-clay, . . . . .	0	2
23	Very coarse quartz sandstone or breccia, deep red, . . . . .	0	9
24	Ditto ditto white ditto, . . . . .	3	7
25	Very argillaceous sandstone, . . . . .	1	1
26	Very coarse light-brown sandstone, . . . . .	1	4
27	Brown sandstone, fine, . . . . .	4	0½
28	Coarse quartz sandstone, . . . . .	2	10
29	Very hard red sandstone, . . . . .	1	1
30	Sandstone and slate-clay, . . . . .	1	8½
31	Red ferruginous sandstone, exceedingly hard, . . . . .	2	0
32	Very coarse quartz sandstone, . . . . .	0	7
33	Argillaceous sandstone, . . . . .	1	5
34	Clay iron stone, excessively hard, . . . . .	1	7
35	Deep red sandstone, . . . . .	5	9
36	Very argillaceous sandstone, strongly impregnated with iron, . . . . .	9	10
37	Excessively hard rock, consisting of particles of quartz-clay slate and strongly cemented in ferruginous clay, . . . . .	2	0
38	Reddish argillaceous sandstone, . . . . .	9	3½
39	Very coarse quartz breccia or sandstone, . . . . .	3	8½
40	Very fine grained sandstone, . . . . .	1	4½
41	Very coarse quartz ditto, . . . . .	1	10
42	Red sandstone, . . . . .	4	8
43	Hard red clay, . . . . .	0	8
44	Hard brown sandstone, . . . . .	2	5
45	Blue clay or slate clay, . . . . .	6	0
46	Grey or pyritous iron ore, exceedingly hard, . . . . .	1	6
47	Slate clay, . . . . .	1	3½
48	Pyriteous iron ore, exceedingly hard, . . . . .	2	3
49	Blue slate clay, with pieces of iron pyrites, . . . . .	14	0
50	Hard red iron stone, very difficult to cut through, . . . . .	1	3
51	Slate clay, . . . . .	4	0
52	White sandstone, composed of extremely fine particles of quartz, . . . . .	15	0
53	(A few small pieces of coal were now brought up): perfectly white sandstone, composed of extremely fine particles of quartz, . . . . .	7	0
54	Total depth of bore at present reached, including 42 ft. 1 in. in the height of the bank of the river, . . . . .	190	1½

N. B. Below the white sandstone is a very hard rock, at which we are now working, and which serves as the pavement of the water channel described in the letter.

VIII.—*Discovery of an Ancient Town near Behat, in the Doab. By Capt. P. T. Cautley, Supt. Doab Canal.*

[Extract of a letter read at the Meeting of the 30th instant.]

"I have this day despatched by dák banghy, for the museum, a number of coins, of very great interest, from their having been found in the site of an ancient (apparently Hindu town,) which site is now seventeen feet below the present surface of the country, and upwards of twenty-five below that of a modern town near it. I will confine myself in this mere notice at present, to stating, that in consequence of the clearing out of the canal bed south of the Belka falls, near the town of Behat, north of Sehárunpoor, the exposure took place; and on the canal being laid dry shortly after, the coin, &c. were found amongst the shingle in the bed of the canal. I may mention that this line is altogether distinct from that which is said to be the ancient canal, and therefore even were there not distinct marks to the contrary, there can be no quibbling on the articles having been *transported*, which is a favorite argument of the day. In the present case, the section is thus; the surface of the country at that point being much lower than that on which the town of Behat stands:—

Grass jungle with cultivation on the surface of the country. River sand, 4½ feet.

A seam of sand with traces of shingle.

Reddish clay mixed with sand, ..... 12½ feet.

A..... A, site of ancient town,..... A..... A

Black soil full of pots, bones, &c. in which the coin and other articles have been discovered,..... 6 feet.

Bed of canal, 23 feet below surface.

The line marked above "site of ancient town A A A A" is distinct in section for about a quarter of a mile, and were it not for the breaking down of banks, &c. it would be seen much further; the soil upon which the town appears to have stood is very black, and full of bones and pieces of pots of different description: bricks of a large size, and of unusual shape, appearing as if they had been made to suit the circular form of wells: pieces of the slag of iron-smelting furnaces, (such a thing as smelting iron at Behat was never heard of,) arrow heads, rings, ornaments and beads of different descriptions; in short, an Oriental Herculaneum, for there appears every chance of the discoveries being extended hereafter. The appearance of small pieces of kankar (amongst the shingle), of which I also send one or two specimens, is an extraordinary feature, as kankar is not known in this part of the country."

NOTE. The probable date of Lieut. CAUTLEY'S subterranean city, to whatever cause its inhumation may be attributed, can be pretty well placed

within cognate limits through the very fortunate discovery of many coins imbedded in the same place with the bricks and bones. The coins belong to three different species already made known through Mr. WILSON'S paper on the Society's cabinet\*.

1. The *Indo-Scythic* coin, or that having the figure of a man in a coat of mail, offering something on a small altar (Nos. 23 to 33, Plate II. As. Res. xvii.), which has been referred with much probability to the commencement of the Christian era:—of this only one coin is recognizable out of 26.

2. The chief part of the coins belongs to the series No. 69, Plate III. of the same volume, of which nothing at all is known; only two have hitherto been seen, one of which was dug up in cutting the trench of the new road from Allahabad to Benares: this however was square, as was a duplicate in Colonel MACKENZIE'S collection, but all those now brought to light are circular: they are identified with it by the elephant on one side, and by one or more singular monograms. Some of them differ considerably in other respects, having a Brahmany bull on the reverse, and an inscription in unknown characters round the edge†.

3. The third species of coin is of silver. A square lump with no regular impression, but simply stamped with various *chhāps*, as might have been the custom anterior to the general introduction of coined money. Of this ancient coin, the MACKENZIE collection furnishes abundant examples, (Plate V. figures 101 to 108,) but his researches altogether failed in ascertaining their date, or even their genuineness, both which points are now satisfactorily developed by the present discovery. They must all date posterior to the Indo-Scythic dynasties in Bactria, and belong to a period when (as in China at present) silver was in general current by weight, while the inferior metals (for all of the present coins are not of copper) were circulated as tokens of a fixed nominal value.

This discovery alone would be of great value, but it is only one of innumerable points for which we may eagerly expect elucidation from this Herculaneum of the East.

The appearance and state of the tooth and bone sent down are also of high interest; they are not entirely deprived of their animal matter, though it is in a great measure replaced by carbonate of lime. The tooth is of the same size, and belongs to the same animal (the ox) as those of the *Jumna* fossils, presented by Capt. E. SMITH at the last meeting, but the mineralization in the latter has been completed, whereas in these it remains imperfect.

J. P.

\* See Asiatic Researches, vol. XVII.

† We shall insert drawings of these coins, and of other objects discovered on the same spot, when Capt. CAUTLEY favors us with further particulars.

IX.—*A Brief Account of the System adopted by Divers in the Deccan, for the Recovery of Valuables, lost in the Tanks and Rivers of that Province. By Lieut. G. J. Taylor, 7th Mad. Lt. Cav.*

Happening to lose a valuable diamond ring when swimming some years since in a tank in the Deccan, I was induced to employ a set of divers for its recovery: not, I confess, with much hopes of success, notwithstanding the confident tone in which I was assured they seldom or never failed in their search. I was however most agreeably disappointed, for after seven hours' labour, the ring was found. As the mode which they adopted, for the recovery of the lost article, was new to me, and may possibly be unknown to many of your readers, I venture to forward the following brief sketch of their proceedings. The head of the set I employed, and who eventually was successful in his search, was a celebrated diver in that part of India. He wore a beautiful gold bangle on his right arm—a present from the Peshwa BAJEE RAO for having recovered a valuable emerald from the Tapti river, which that prince had dropped in crossing the stream. He assured me, that although a most laborious and sometimes painful trade, he had usually found it a lucrative occupation.

I may add that I subsequently saw the same mode adopted, on various occasions, for the recovery of the nose ornaments, ear-rings, and other jewels lost by women when bathing on the ghats of the great rivers and banks in that part of the country, and almost always with success.

Their method is as follows:

A set of divers consists of three persons, two of whom dive by turns, while the third sits on the adjoining bank. The two divers wade to the place pointed out, if within their depth, each carrying with him a circular flat-bottomed wooden basin, with sloping sides, about seven inches deep and two and a half feet in diameter. With this the diver descends, and having scooped into it as much of the surface of the mud or sand as it will contain, ascends with the platter and sends it ashore, where its contents are carefully washed and examined by a third person. If the water be not deep, when one man has stooped under water, he is kept down by his partner, placing one foot upon his neck or shoulders, until the platter is filled, on which a signal is made, the foot is withdrawn, and the man rises to the surface. But when the depth of water will not admit of such arrangement, the diver sinks a grapnel or heavy stone from a canoe, and then descends by the rope. When he ascends, the platter is lifted into the boat, and there examined. In this way, they continue to work for hours, each diver descending in turn, until they have examined the whole surface of the mud or sand around the place pointed out, and very seldom fail of success if ordinary information be only afforded, as to the spot near which the

article has been lost. They remain under water from one to one and a half minute at a time—oft times more, if the water be deep. They adopt the same system precisely, whether in still water or in a running stream : only that in the latter, of course their labour is more severe—their success more precarious.

Their remuneration depends solely on success; the ordinary salary being one-third of the extricated value of the lost article, and which is divided in equal portions among the set.

X.—*Register of the Weather at Futtehgurh (Lat. 27° 21' N. Long. 79° 30' E.) from April 1832 to October 1833. By M. P. Edgeworth, Esq. C. S.*

The thermometer was placed in the open air, on a wall fronting the north, until 1st January, 1833, when it was removed to an open veranda on the north side of the house. Up to 26 Sept. the maximum was taken by a self-registering thermometer, which was accidentally broken : it was then taken at 2½hp. m. till December, } by a spirit thermometer,  
 2 p. m. till April, }  
 3 p. m. till August }

and from August 6, by a self-registering thermometer. The minimum all along by a self-registering spirit thermometer.

NOTE. We have endeavoured to render the abstract, into which want of space has obliged us to condense our correspondent's register, more complete by expressly numerically the number of days, windy, cloudy, fair, &c. in each month, as far as can be gathered from a register not intended to shew these points with accuracy. The columns of west and east wind comprehend 45° degrees on either side of the cardinal point, as it seemed more proper to class these winds (north-west, south-east &c.) with the directions generally prevalent, than with the north and south winds, which are of rare occurrence.

The mean temperature of Futtehgurh seems nearly as high as that of Benares or Ghazipoor\*, but we are not aware that the instruments used had been previously compared with a standard.

For four days of 1832, Mr. EDGEWORTH took the temperature every hour during the day and night: which enables us to prove that the supposition of deriving the mean temperature of a place from the means of two hours of the same name will not hold good. At the foot of the hourly register we have given the means of the pairs thus deduced; and under them the errors from the mean of the whole (75°.55), which may be taken as the corrections due to each pair. The mean of the extremes of heat and cold (76°.55) is 1.00 higher than the mean diurnal range. In my register for Benares (App. x. As. RES. xv.) I found the excess to be 0.86, which is a near accordance with Mr. EDGEWORTH'S result.—J.P.

\* See vol. i. 29, and vol. ii. 604.

## Register of Temperature and Weather at Futtehgurh.

Month.	Thermometric Averages.								Winds.					Weather.				Remarks.
	Min.	10A.M.	Max.	10P.M.	Mean of all.	Mean of max. and minima.	Diurnal variation	Monthly deviation from annual mean.	Calm.	N.	W.	S.	E.	Clear.	Cloudy.	Rain.	Storms.	
1832.	°		°			°	°											
April, .....	72.3		96.0			84.1	23.7		9	5	9	1	4	30	—	—	—	10 10 North-westers.
May, .....	76.6		101.			88.8	25.1		1	0	28	0	2	31	—	—	—	1 1 Ditto, fresh wind.
June, .....	82.5		104.2			93.4	21.4		6	0	13	0	11	—	—	—	4 6 6 Storm, with rain.	
July, .....	80.1		94.0			87.1	14.5		8	0	1	0	22	—	—	—	16 1 1 Storm, sultry.	
August, .....	78.9		90.9			84.9	12.5		1	5	11	2	12	9	6	15	—	Rainy and fair.
September, .....	74.6		89.9			82.2	15.3		2	0	18	0	10	—	—	—	—	Fair?
October, .....	65.8		84.9			75.4	19.1	— 2.1	2	3	9	1	16	29	—	—	1 1	Hot wind six days.
November, .....	57.9		72.7			68.8	21.8	— 8.7	—	—	10	—	4	30	—	—	—	Fine,
December, .....	49.5		66.5			58.0	17.0	— 19.5	—	—	3	—	—	17	10	4	—	Cloudy, } register not filled, ? all fair.
1833.																		
January, .....	47.6	59.8	67.1	58.4	58.2	57.3	17.1	— 20.2	—	—	4	—	3	26	5	—	—	Fair.
February, .....	54.4	64.1	72.0	62.1	63.1	63.2	17.6	— 14.3	2	2	19	2	3	20	6	2	1	Variable weather.
March, .....	65.1	76.8	83.7	73.0	74.6	74.4	18.6	— 3.1	0	1	24	0	6	22	4	5	0	Monsoon set in.
April, .....	76.6	87.8	95.6	84.1	86.0	86.1	19.0	+ 8.5	0	3	25	0	2	30	—	—	—	4 Strong hot wind.
May, .....	83.3	92.0	99.9	90.2	91.3	91.6	16.6	+ 14.1	0	2	14	1	14	28	3	4	8	Violent storms, hot.
June, .....	89.5	98.0	104.8	94.5	96.4	96.6	16.3	+ 19.1	—	0	23	0	7	20	8	3	8	Dull morns, stormy.
July, .....	82.9	88.3	92.0	86.5	87.4	87.4	9.1	+ 9.9	0	0	9	0	22	10	20	14	3	Light, rainy.
August, .....	82.2	86.3	88.1	84.4	85.2	85.3	5.9	+ 7.8	0	1	9	0	21	8	15	19	2	Changeable-clearing.
September, .....	80.7	86.8	91.4	84.9	85.9	86.1	10.6	+ 8.6	1	1	11	0	17	22	7	3	0	6 Days hot wind.
Mean of 1st yr,	67.1	—	85.2	—	—	76.4	18.6	annual	—	—	—	—	—	—	—	—	—	—
2nd year,	69.5	78.2	85.7	76.0	77.5	77.5	18.7	range, 39.3	5	13	140	4	115	262	78	48	27	—

## Hourly Observations of the Thermometer taken for four days in 1832.

1832.	XII.	I.	II.	III.	IV.	V.	VI.	VII.	VIII.	IX.	X.	XI.
19th Aug.	81	80.5	80.5	80.5	80	80	80.7	83	85.7	88	89	90.8
23rd Sept.	77	74.5	74.5	74.5	74.1	73.3	73	77	79.7	84.5	88	90
21st Oct. . .	67.6	65.5	65	64.8	63.7	61.8	61	61.6	66.5	71	74	76
18th Nov.	59	57	56.5	55.7	55.3	55	54	54	57	62.7	67	72
Means, . .	71.1	69.4	69.1	68.9	68.3	67.5	67.2	68.9	72.2	76.5	79.5	82.2
1832.	Noon.	I.	II.	III.	IV.	V.	VI.	VII.	VIII.	IX.	X.	XI.
19th Aug.	94	92	91	90	90	88	86	85	84	83	82.5	82
23rd Sept.	92	92	92.5	92	91	90	86	82	80.5	79	79	78
21st Oct.	79	81	81	79.8	78	75	71	69	68	67.3	67	66.9
18th Nov.	75	77	78	78	77	74	70.3	68	64	62	61	60.5
Means. . . .	85	85.5	85.6	84.9	84	81.7	78.3	76	74.1	72.8	72.4	71.9
Do. of pairs.	78.1	77.5	77.4	76.9	76.1	74.6	72.7	72.4	73.2	74.7	75.9	77.0
Differences.	+2.51	+1.89	+1.73	+1.36	+0.59	-0.91	-2.80	-3.10	-2.37	-0.87	+0.39	+1.47

The last column shews the differences of the means of pairs (of hours of the same,) from the mean temperature of the whole twenty-four hours  $75^{\circ}.55$ . The 19th August was cloudy after ten o'clock; the rest were fine throughout. The greatest heat of the day occurs at 2 p. m.: the minimum temperature at 6 o'clock in the morning.

## XI.—Note on the Botanical Specimens from Mount Ophir.

[Accompanying Lieut. Newbold's Letter—Read 30th February.]

The specimens from Mount Ophir, with which I was favored the day before yesterday, consist of two Ferns, three Lycopodiæ, and two Phænogamous plants. They are not in a good state of preservation, and only one has any fructification, but they are nevertheless very valuable, and I feel greatly obliged to Lieut. NEWBOLD for them. The most interesting among them is a specimen full of good sori of *Matonia pectinata*, BROWN, published in 1830, in *PLANTÆ ASIATICÆ RARIORÆ*, vol. i. p. 16, tab. 16, from a specimen, unique in Europe, which was gathered in the identical locality by Col. FARQUHAR. The individual now before me beautifully confirms the generic character and general observations relative to this remarkable fern, which were politely supplied for the above work by Mr. BROWN; in shape it differs in having a bifid frond, the pinnæ being unilateral towards the bifurcation. The other fern may perhaps be a *Blechnum*. The Lycopodiæ are very curious, and belong seemingly to new species. Of the Phænogamous plants, one is exceedingly remarkable. It has the habit of some members of the coniferous, as well as the myricaceous, tribe; the structure of the wood obviously brings it under the former; the leaves are acerose, opposite, and gland-dotted. Perhaps it is a *Dacrydium*. The other plant belongs perhaps to the family of Ericææ.

## XII.—*Proceedings of the Asiatic Society.*

*Thursday Evening 30th January, 1834.*

The Rev. Principal W. H. MILL, Vice-President, in the chair.

After reading the proceedings of the last meeting, the Society proceeded to ballot for the officers of the ensuing year, when Sir C. T. METCALFE, Sir J. FRANKS, Rev. Principal MILL, and Mr. W. MCNAGHTEN, were elected Vice-Presidents: and

J. Tytler, Esq.	Capt. A. Troyer,	C. E. Trevelyan, Esq.
Baboo Ramcomul Sen,	J. R. Col-	Dr. J. T. Pearson,
vin, Esq.		D. Hare, Esq.
Capt. W. N. Forbes,		Dr. N. Wallich,

were elected Members of the Committee of Papers.

MESSRS. HAMILTON, MACKENZIE, STOFFORD, and BEATTIE, proposed at the last Meeting, were unanimously elected Members.

Before proceeding to the business of the meeting, Mr. J. T. PEARSON proposed the following resolutions, which were carried unanimously:

1. That the thanks of the Society be tendered to Mr. J. PRINSEP, for his liberality in circulating copies of the *Journal*, edited by him, gratuitously to the Members.

2. That under existing circumstances it is expedient that the Society pay for all copies distributed to its members for the future, as well as for the past year.

Read a letter from W. E. FRERE, Esq. Secretary, Bombay Branch Royal Asiatic Society, acknowledging the receipt of the 17th and 18th volume of the *Asiatic Researches*, and requesting to be furnished with the 15th and 16th volumes. Also letters from H. HARKNESS, Esq. Sec. Roy. Asiatic Society, and from J. FOUHALL, Esq. Sec. of the British Museum, advising receipt of the 17th volume.

Read a letter from J. TYTLER, Esq. Sec. Oriental Translation Committee, regretting that the state of their funds would not admit of their undertaking the publication of Mr. YATES' *Nalodaya*, in India, and proposing either to transmit it to the Home Translation Committee, or to subscribe for copies, should the author prefer printing it on his own account. To be referred to Mr. YATES.

The Secretary read the following report on the accounts and proceeding of the past year.

### *Annual Report.*

"In drawing up a report upon the affairs of the Society for the past year, I shall confine myself to points connected with the finances and constitution of the Society; the literary and scientific objects which have been brought forward during the year have been already noticed in the printed proceedings of the monthly meetings, and are therefore well known to all the members. The mode of publishing these proceedings in detail, and furnishing lists of all the books presented, members elected, and papers read, has only been adopted for the last two years; but it has already been

of material benefit to distant members, who have become more connected with the main body through these means, and have frequently applied for books which they have seen announced, or have taken part in discussions going forward within our walls, and have become more active contributors of new facts in the literature and science of the vast country within our range. The good effect of publishing and spreading abroad at once all that goes forward in our Society cannot be better proved than by instancing the letter read this evening from the Secretary to the Bombay Branch of the Asiatic Society, which was before ignorant that any volume of Researches had been published later than the fourteenth! That the published Researches are not so well known, or so generally distributed, as they ought to be, may be implied from the complaint in the third volume of Professor HEEREN'S Historical Researches, that he was only able to get access to the first twelve volumes of the Transactions. All this will now be corrected through the activity of our agent, the Boden Professor, whose interference has already been visibly productive of amendment in the despatches of books from Europe, latterly left too much at the discretion of the book-seller.

The number of members at present on the list is 85: the diminution during the past year has been, by death, 2; by retirement to England, and other causes, 10: the addition from new elections has been 14.

The receipts and disbursements, as abstracted from the collector's general account, are exhibited in the accompanying statement. They contain many items belonging properly to the last year; such as the printing of the last two volumes, which have necessitated an encroachment on the stock of the Society to the extent of 7500 rupees. Strict economy has however been preserved with regard to the expences of the present year—the whole, including a remittance of £100 to our agent in England, being within the sum absolutely collected in the same period, and leaving a balance in hand, if the outstanding quarterly bills be included, of nearly five thousand rupees.

## PAYMENTS.

To paid Military Orphan Press, for printing 500 copies of the 18th vol. Asiatic Researches, . . . . .	4,286 14 0
To Bill for Repairs, Museum &c. passed in December, 1832, . . . . .	1,023 15 1
To Establishment from Dec. 1832 to 31st Oct. 1833, . . . . .	1,533 11 0
To Contingent expences, . . . . .	115 12 9
To Orphan Press Bills, for Binding, . . . . .	246 0 0
To Duties, for 3111, . . . . .	206 3 0
To 12 copies, 1st vol. Journ. As. Soc. . . . .	144 0 0
To Museum Collection and Cabinets, . . . . .	109 0 0
To Repairs of House, . . . . .	77 13 9
To Orphan Press for printing 500 copies, 2nd part of the 18th vol. Asiatic Researches, . . . . .	1,962 0 0
To engraving Maps and Plates, . . . . .	316 8 0
To Experimental Boring, . . . . .	500 0 0
To remitted to H. H. Wilson, Esq. £100, as Agent in England, . . . . .	923 1 3
	11,804 14 10
By Balance of Cash in hand, this day, . . . . .	80 8 5
	Sicca Rupees, 11,825 7 3

## RECEIPTS.

By the Sale of Researches, . . . . .	160 0 0
By Subscriptions collected, . . . . .	3,904 0 0
By Interest on 7,500, Paper sold, . . . . .	243 12 5
By Sale of Company's Paper, . . . . .	7,429 10 11
By cash from Government for the Burmese Image Pedestal, . . . . .	88 0 0

Sicca Rupees 11,825 7 3

## Stock and Dependencies.

Company's paper deposited with the Government agents, . . . . .	17,560 0 0
Interest for one year (not drawn), . . . . .	700 0 0
Outstanding Quarterly Bills, recoverable, . . . . .	4,286 0 0
Dividends on Macintosh & Co's Debt of 11,964. G. G. . . . .	

With regard to the collection of the quarterly contributions, the late unfortunate failures have necessarily caused much inconvenience both to the collector and to absent members, and to this cause may be attributed the apparently large amount on the defaulters' list. Still there are some names against which too large a balance appears to stand as due, and it is for the Society to determine, whether the members thus continuing in default are to be allowed the privilege of calling themselves

such, while the burden falls upon their more regular brethren. The contributions of eighty members (without entrance fees) would be 5120, whereas only 3900 were collected; and in this sum is included 302 rupees, from the Right Honorable the Governor General, the Patron of the Society, who, contrary to former precedents, has liberally directed that he should be charged as an ordinary paying member. The Society is aware that an endeavour has been made, though it is not yet matured, to introduce the option of compounding for the quarterly subscriptions, and I cannot but anticipate that this measure, if adopted, will prove more productive to our finances, and more convenient and agreeable to most of the members. It will also save the expence and delay of collection.

It has been my desire to lessen in some degree the burthen to paying members, by distributing the Journal gratis to them during the past year: the result has not proved so encouraging as I could have wished, but with some modification I hope still to be able to continue the measure.

Of the subscription for Mr. H. H. WILSON'S Bust, Rs. 1080 have been collected and remitted to that gentleman: no intimation has been yet received of the probable cost of the bust.

Although it has not been thought prudent to commence a new volume of Researches, or even the printing of the Index of the 18 volumes, sanctioned by the Committee of Papers, the press has not been idle, and I have the pleasure to lay on the table a copy just completed of M. CSOMA DE KOROS' Tibetan Dictionary, printed at the expence of Government, and under the auspices of the Society, as reported on the 20th Feb. last. M. CSOMA'S Grammar will now be put in hand, and the whole completed in the course of the present spring.

The plan of increasing the museum has remained uncompleted for the want of means, as the rooms on the ground-floor cannot be adapted to the purpose without terracing them anew and enclosing the arched openings to the north. Mr. PEARSON was induced to accept the office of gratuitous Curator in the month of July last, and an assistant curator had been brought on the strength of the establishment some months previously, who has been employed in cleaning and preserving the objects now in our cabinets. But it must be obvious that this branch of the Society cannot flourish, while those who might be expected to cherish and support it are constantly engaged in other duties and reside at too great a distance even to pay the rooms an occasional visit. One new cabinet has been constructed to receive a collection of shells arranged by Dr. PEARSON, and the geological almirahs have become nearly filled with contributions from various quarters.

With regard to the Library, it seems essentially necessary to incur some expence for the better preservation of the books, especially the valuable records of other Societies, presented periodically in paper covers. I beg to propose that some professional person be appointed binder to the Society, who may be entrusted with the binding of all new books on fixed rates, under the Committee of Papers.

The furash of the Museum, a very old man, who has been with the Society since its first establishment, has been allowed to retire on a trifling pension without causing any additional charge to the establishment.

We have to deplore the loss of two Members, by death, during the past year, one of them, Captain HERBERT, is so well known by the high services he has rendered to science in India, that the tribute of an obituary testimony to his memory becomes

his due, and I have only to regret that I am not yet provided with the materials for a sketch of his short but eminently useful career.

By departure to Europe, our loss of members has been still more severe, but it may be hardly fair to consider that a deprivation which but changes the scene and sphere of their exertions and utility.

I have purposely refrained from alluding to the labours of a more exalted nature, which have brightened the proceedings of the past year, because I consider it to be the privilege of the highest officer of the Society to review the objects and progressive success of the institution over which he presides. Severe indisposition has unfortunately placed it out of the power of our President to restore the laudable custom of an annual address on the present occasion; which is the more to be regretted, as this is the jubilee anniversary of the day on which the illustrious founder of the Society was elected its first President. The close of that eventful period finds the parent Society shorn of all its exclusive honors, and forming but one, perhaps the humblest, of the numerous bodies associated in Europe and in India, for the prosecution of "inquiries into the history, antiquities, the natural productions, arts, sciences, and literature of Asia." The tree which was auspiciously planted by the great Sir WILLIAM JONES, to use his own expression, has long since produced its fairest blossoms, and its most exquisite fruit. It has spread its roots in distant lands, where the arts of cultivation are better understood, and the value of its produce can be more skilfully developed; but we must not forget that we here assemble under the shade of the original tree, and that however decayed the parent stock may have become, while its more vigorous branches are taking root in France, Germany, and England,—still it is to the Asiatic Society of Bengal that belongs with propriety the motto assumed by one of its illustrious scions, "*Quot rami tot arbores.*"

#### Library.

The following books were presented:

Transactions of the Royal Asiatic Society, 2nd part of the 3rd volume, new series, and the Proceedings of the 10th Annual Meeting of the Society, with the Reports of the Council, Auditors, and Committee of Correspondence, held on Saturday, May 11th, 1833.—*By the Society.*

Proceedings of the Geological Society, Nos. 30 and 31, with a list of its members for 1833.—*By the Society.*

Garcin De Tassy, Appendice aux Rudimens de la Langue Hindoustani.—*By the Author.*

Marcoz, Erreur des Astronomes et des Geometres.—*By the Author.*

Journal Asiatique, Nos. 59 and 66.—*By the Asiatic Society of Paris.*

Journal of Medical Science, No. 1, vol. 1st.—*By Messrs. J. Grant, and J. T. Pearson, Editors.*

Meteorological Register for December, 1833.—*By the Surveyor General.*

The following works received from the Oriental Translation Fund of Great Britain and Ireland.

No. 414, Atkinson's Customs and Manners of the Women in Persia, and their domestic superstitions:

Shea's Translation of Mirkhond's History of the early Kings of Persia.

Travels of Macarius, parts 3rd and 4th, translated by F. C. Balfour.

The following books, received from the book-sellers :

- Heeren's, Asiatic Nations, 3 vols.  
 Rosen, Corporis Radicum Sanscritum Prolusio, 1 vol. P.  
 ——— Radices Sanscritæ, 1 vol.  
 ——— Rig Vedæ Specimen, 1 vol.  
 Freytag, Arabischen Verskunst, 1 vol.  
 ——— Dictionary Arabico-Latinum, 1st and 2nd vols.  
 Kosegarten, Chrestomathia Arabica, 1 vol.  
 Benary, Nalodaya Sanscritum carmen, 1 vol.  
 Bohlien, Carmen Arabicum Amali dictum, 1 vol. P.  
 Jernour's Treatise on Languages, 1 vol.  
 Tyerman and Bennet's voyages and travels, 2 vols.  
 Prichard's Celtic Nations, 1 vol.  
 Upham's Sacred and Historical books of Ceylon, 3 vols.  
 Malcolm on the Government of India, 1 vol.  
 Brydges Dynasty of the Kajars, 1 vol.  
 Fairholme's Geology of Scripture, 1 vol.  
 Historical Sketch of Sanscrit Literature, 1 vol.  
 Alison's Physiology and Pathology, 1 vol.  
 David's Turkish Grammar, 1 vol.  
 British India, 3 vols.  
 Lardner's Cabinet Cyclopedia, middle ages, 1 vol.  
 Wilken's Mohammedi Filii Chondschahi, vulgo Mirchondi Historia Gasnevidarum, 1 vol.  
 Lassen, Gymnosophista, 1 vol. P.

*Physical.*

A native *talwâr*, and three water-fowls, from Assam, were presented by Dr. BURLINI.

Read, a letter from G. A. BUSHBY, Esq. Secretary to Government, communicating an account of the boring experiment lately conducted by Captain GRANT in Cutch. [Printed in the present number.]

Read extracts from the Third Annual Report of the Society of the Natural History at the Mauritius, presented by M. JUL. DESJARDINS, Secrétaire et Membre Fondateur, dated 24th August, 1832.

Read a note from Captain JENKINS, forwarding specimens of a rich ore of mammellated and stalactitic manganese, found in the Ajmîr mines; and also of shot manufactured on the spot by Captain DIXON from the Ajmîr lead.

Read a letter from Colonel WATSON, presenting further specimens of coal, iron, and other productions of the Kasya hills.

Read a note from Ensign NEWBOLD, forwarding the specimens of gravity, gold dust, and plants referred to in his account of an excursion to the summit of Mount Ophir in the Malay peninsula.

[See a note by Dr. WALLICH on the plants, inserted in the present No.]

Read a letter from Captain P. T. CAUTLEY, Superintendant of the Doab Canal, announcing his discovery of the remains of an ancient city underground, in the neighbourhood of Seharanpur, and presenting two silver and 24 copper coins found there, and a fragment of bone.

[This announcement is printed in the present number.]

Submitted, an essay on the land and fresh water shells of India, by Lieutenant T. HUTTON, accompanied with specimens of the same.

[This will be published in our next.]

Submitted, a note by Lieutenant Colonel HODGSON on the use of glass for the balance wheels of chronometers, accompanying a pamphlet on the subject, by ARNOLD and DENT, presented by the same member.

### XIII.—Miscellaneous.

#### 1.—Correction of an Error in Gregory's Mathematics.

As Gregory's Mathematics is generally used as a book of reference you would be the means of saving many from error by correcting in the Journal of Asiatic Society, the following misprint at page 297. T.

$$\text{For } V = \frac{307 \sqrt{(R-1^b)}}{S1-\frac{1}{2} \log. (S+\frac{1}{2}\delta)} - r^b \sqrt{(R-1^b)}.$$

$$\text{Read } V = \frac{307 (\sqrt{R-1^b})}{S1-\frac{1}{2} \log. (S+\frac{1}{2}\delta)} - r^b (\sqrt{R-1^b}).$$

#### 2.—Tufa Formations in Persia.

Having procured a party of horsemen, we proceeded over some very rugged ground, five miles in an E. S. E. direction, when we came to the ruins of the palace erected by Suliman, one of the first khalifs of Bagdad. It is a fine quadrangular structure, built round a natural basin of 70 yards in diameter, and presenting one of the most singular phenomena in nature. A small channel, of four inches wide and three deep, carries off the superfluous water, which appears to be considerably agitated by a strong spring; on a nearer approach this is found to be occasioned like the smaller one of Yakout Buttak, by gas, which is only confined by the body of water through which it forces its way. The water flowing from this fine reservoir forms small pools outside the gates, and a deposit of tufa immediately takes place, of which the whole hill is composed, and has most probably been formed in a similar manner, though it has now reached a height of 300 feet. The water appears to occupy a greater space below than above, but all the line I could procure (400 feet) was insufficient to find a bottom, either at the side or centre, where I was able to go on a raft. The whole of the mountains about appear to be of a similar formation, and the brooks are almost filled up by large masses of light porous tufa. Madreporé is also abundant. The place is highly ornamented in the arabesque manner, and has been one of the best modern buildings in Persia. To the north, on the top of one of the highest peaks of Balkas, stands a strong castle, with four towers, and about 100 yards of a side. I could not ascertain to what era it belonged, but imagine it was far anterior to Muhammedanism, and probably was a fire temple of the later period. It had no Arabic inscriptions, which every where cover the walls of the lower building. After a minute survey of the palace, and getting some of the Arabic inscriptions copied, which were only verses from the Koran, or moral sentences, I proceeded to a remarkable peaked hill, about two miles to the south-west, called the *zendan*, or prison. With con-

siderable difficulty we scrambled up to the top of the hill, which is higher and steeper than the former, but of a similar formation. On reaching the top, I found an immense hollow of the same irregular form, with signs of water having been considerably agitated against its sides; but in other respects exactly resembling the crater of a volcano. The eye could not reach the bottom, so that I could not ascertain if there was still water; the diameter of this was considerably less (perhaps forty feet). We descended with even more difficulty than we had clambered up, and commenced a strict search round the base, to ascertain if water had ever forced its way through the mass of rock. On the western side the hill appeared to be less compact than in other places, and a considerable channel, in which there is now no water, has been washed away apparently by a rapid current. I therefore think it not impossible that this hill, like the former, had once been the same kind of basin, gradually formed by a deposit of the water, which, at last, on reaching a height beyond which the sides were unable to resist its pressure, found a passage through the lower part. Whether this is the case or not, I leave to the decision of more able geologists than myself; but the fact is undoubted, that this mass of mountains in the neighbourhood, 7500 feet high, appears to its very summit to be composed of the same light deposit. In the south-west extremity are extensive mines of sulphur, and a white substance was shown me, which they used in their sherbet, of a pleasant acid taste: they praised it as being an excellent tonic.—*Monteith's Tour; Jour. Geog. Soc.* iii. 7.

### 3.—*Gigantic Natural Arch.*

At the seventeenth mile we reached the town of Makoo, and its gigantic cavern. The whole party were struck with amazement, and instinctively halted, not able to trust our eyes as to the reality of the scene before us. A vast arch, 600 feet high, 1200 feet in span, and 20 feet thick at the top, at once presented itself to our view. This cavern is 800 feet deep, but, as the sun then shone directly in, the height and breadth alone attracted our attention. At the very bottom of this is a castle inhabited by a chief of the tribe of Biaut; and at the junction of the limestone and lava a number of small caves have been partially excavated, accessible only by a ladder. From one of these a small stream of water trickles down the rock, but the artificial works look, in the vast space of this natural excavation, like ants' nests on a wall. It appears to me that this could only have been formed at the time of some great convulsion of nature. From the breadth of the sheets of lava, I do not think they came from any volcano, but by the sudden rise of a great extent of country. Had a number of small volcanoes at any time existed, the meaning of Azerdijan (country of fire) applied to the whole province, could not be doubtful. The chief was jealous of a close examination of his fortress, and though a ladder, for which I applied, to examine an inscription at the western side, was promised, it never came. From the ground I could see that the writing was neither Arabic nor Armenian, and had some appearance of Greek or Roman characters. The place is a modern structure, but the upper caves have always been in use as places of refuge. There are about 400 houses in the town: some few stand under the rock, but as masses of stone have frequently fallen, the generality are outside, and protected by a low wall; they could easily be destroyed from the top of the rock.—*Monteith's Tour.*

Meteorological Register, kept at the Assay Office, Calcutta, for the month of January, 1834.

Day of the Month.	Barometer reduced to 32° Fahr.				Thermometer in the Air.					Depression of Moist-bulb Thermometer.				Hair Hygrometer.		Rain.	Wind.			Weather.			
	At 4 A.M.	At 10 A.M.	At 4 P.M.	At 10 P.M.	Minimum at 4 A.M.	At 10 A.M.	Max. by Reg. Ther.	At 4 P.M.	At 10 P.M.	At 4 A.M.	At 10 A.M.	At 4 P.M.	At 10 P.M.	At 10 A.M.	At 4 P.M.		Inches.	Morning.	Noon.	Evening.	Morning.	Noon.	Evening.
																		do			do		
1	.979	.950	.907	.861	56.0	67.0	82.4	69.4	61.8	4.8	6.7	8.7	5.8	85	83		o.	n.	n.	clear.	clear.	clear.	
2	.948	.954	.930	.890	58.0	68.8	88.0	69.8	63.0	5.0	7.1	9.0	7.4	83	82		w.	n.	n.	do	do	do	
3	.941	.940	.916	.863	55.5	67.4	76.5	69.1	61.3	2.6	7.3	7.6	6.0	84	83		n. e.	n. e.	n. n.	do	do	do	
4	.901	.906	.906	.892	56.5	65.3	64.0	64.0	58.8	3.0	6.4	5.5	1.9	88	93		n. e.	n. n.	n. n.	do	do	do	
5	.922	.921	.928	.908	54.0	64.8	75.5	66.7	63.0	1.4	5.4	5.5	5.2	92	90		n. e.	n. n.	n. n.	stratus.	cloudy.	do	
6	.983	.982	.982	.934	57.2	64.3	75.0	67.5	59.5	3.3	5.4	5.5	6.5	92	90		o.	n.	n.	clear.	clear.	clear.	
7	.930	.922	.974	.912	54.2	64.1	76.6	66.7	60.7	2.5	5.9	7.4	6.5	82	82		o.	n.	o.	do	do	clear.	
8	.963	.943	.968	.941	54.2	63.6	79.0	67.0	60.0	4.7	6.8	9.0	6.9	85	89		o.	n. w.	n.	do	do	do	
9	.941	.935	.914	.876	53.5	63.5	73.0	66.8	57.4	4.5	6.8	9.8	3.5	83	89		n. w.	n. w.	n. w.	do	do	do	
10	.944	.930	.911	.848	51.0	63.3	77.8	66.1	58.4	3.0	7.7	9.1	6.4	83	78		n. w.	n. w.	n. w.	do	do	do	
11	.932	.906	.910	.854	53.0	63.1	78.1	67.4	60.0	3.8	6.3	9.7	6.0	85	77		n. e.	n. w.	n. w.	do	do	do	
12	.934	.908	.920	.868	54.2	65.0	78.0	69.0	64.2	2.2	6.4	9.6	8.1	86	78		n. e.	n. w.	o.	do	do	do	
13	.965	.953	.932	.893	57.0	66.0	82.0	70.0	63.2	3.8	6.5	9.5	4.1	83	80		o.	n. w.	n. w.	do	do	do	
14	.930	.929	.912	.869	57.0	65.5	78.2	70.0	61.5	3.8	6.0	11.1	3.3	85	73		o.	n. e.	o.	do	do	do	
15	.976	.971	.972	.925	56.0	68.1	83.8	69.9	61.6	3.9	6.7	10.3	3.8	86	76		o.	n.	o.	do	do	do	
16	.984	.980	.930	.880	56.3	66.2	81.1	74.0	64.0	3.0	7.0	10.4	6.0	84	77		w.	o.	o.	do	do	do	
17	.928	.935	.938	.922	59.1	66.5	87.8	71.0	65.3	0.3	5.3	9.7	4.8	81	80		o.	o.	w.	fog.	do	do	
18	.903	.905	.881	.843	63.3	67.7	90.7	72.8	66.1	0.7	5.8	11.5	7.5	90	73		o.	o.	o.	fog.	do	do	
19	.912	.912	.882	.866	59.0	63.2	91.0	72.0	63.0	5.9	8.4	9.5	6.2	81	80		n.	n.	n.	clear.	do	do	
20	.911	.981	.872	.836	60.3	67.8	79.7	72.0	65.0	5.1	8.6	11.0	9.1	81	75		n.	n.	n. e.	do	do	do	
21	.967	.975	.852	.825	58.1	67.8	89.2	73.6	64.0	5.1	8.5	11.5	6.4	81	75		o.	n.	n. e.	do	do	do	
22	.965	.918	.883	.860	60.0	68.6	82.9	74.0	66.4	4.4	8.5	11.1	10.0	87	76		n. e.	W.	o.	do	do	foggy.	
23	.902	.980	.855	.820	61.2	69.2	87.8	74.0	69.1	6.1	4.7	7.5	3.0	95	87		o.	o.	o.	fog.	do	do	
24	.853	.905	.839	.862	67.5	72.0	84.5	76.0	67.2	0.8	4.7	9.0	7.2	89	82		o.	o.	o.	fog.	do	do	
25	.940	.940	.880	.853	62.0	70.4	83.7	75.3	69.2	3.8	5.7	10.0	7.1	91	89		o.	w.	o.	fog.	do	do	
26	.912	.937	.846	.845	65.6	72.4	82.0	76.8	71.3	0.3	3.0	4.5	2.9	97	95		o.	o.	n.	clear.	do	do	
27	.845	.880	.879	.873	72.4	75.4	85.4	78.5	71.3	3.2	3.4	4.4	1.7	97	96	0.20	o.	S.	S.	fog.	misty.	dull.	
28	.876	.911	.921	.890	68.2	73.4	86.0	76.3	69.2	1.2	4.2	10.1	6.1	94	79		o.	n.	S.	circ. str.	cloudy.	rain.	
29	.977	.962	.921	.840	63.0	71.5	84.0	75.4	65.2	3.3	7.6	11.2	5.9	83	75		o.	n.	o.	misty.	all day.	clear.	
30	.934	.936	.960	.902	62.5	70.6	84.0	74.8	62.1	2.5	8.0	13.1	6.0	83	75		o.	n.	o.	clear.	do	do	
31	.967	.970	.971	.910	69.0	70.8	85.5	76.0	62.0	4.3	8.9	11.3	6.0	83	75		o.	n. w.	e.	do	do	fog.	
Mean.	29.935	30.022	.907	.896	58.9	67.5	75.6	71.1	63.6	3.5	6.4	9.2	5.7	87	80	0.20	day's breeze N.			clear and cold.			

The instruments are the same, and similarly situated, as in 1833. A standard Thermometer by Newin has been received from England, and found to correspond to the tenth of a degree with the instrument registered by me since, 1820. A Standard Barometer compared with the Barometer at Somerset House is shortly expected. J.P.

# JOURNAL

OF

## THE ASIATIC SOCIETY.

No. 26.—February, 1834.

I.—*Extracts from Tibetan Works, translated by M. Alexander Csoma de Korös.*

*Tibetan beau-ideal of a wife.*

[Extracted from the *Bkah-hgyur*, *mdo kha*, leaf 106-7; corresponding with leaf 73-74 of the *Lalita vistara*, the original Sanscrit text, in the Lantsa character, presented to the Society by Mr. Hodgson].\*

THE required qualities in a maiden who may aspire to be united in marriage with SHAKYA are thus defined by himself :

“ No ordinary woman is suitable to my taste and habits ; none who is incorrect in her behaviour ; who has bad qualities, or who does not speak the truth. But she alone will be pleasing and fit for me, who, exhilarating my mind, is chaste, young, of good complexion, and of a pure family and descent.” He indited a catalogue of these qualifications in verse, and said to his father, “ If there shall be found any girl with the virtues I have described, since I like not an unrestrained woman, let her be given to me in marriage.” “ She, who is young, well proportioned, and elegant, yet not boastful of her beauty, (lit. with her body;) who is affectionate towards her brother, sister, and mother ; who always rejoicing in giving alms, knoweth the proper manner how to bestow them on the priests and brahmans :—if there be found any such damsel, father, let her be brought to me. One who being without arrogance, pride, and passion, hath left off artifice, envy, deceit, and is of an upright nature :—who even in her dreams hath not lusted after any other man ;—who resteth content with her husband, and is always submissive and chaste :—who is firm and not wavering :—who is not proud or haughty, but full of humility like a female slave :—who hath

\* See Journal, vol. i. page 380, and page 1—8, where a brief analysis is given by Mr. Wilson, of the contents of the *Lalita vistara*.

no excessive fondness for the vanities of sound, smell, taste, (music, perfumes, and exquisite meats,) nor for wine:—who is void of cupidity:—who hath not a covetous heart, but is content with her own possessions:—who, being upright, goeth not astray; is not fluctuating; is modest in her dress, and doth not indulge in laughing and boasting:—who is diligent in her moral duties, without being too much addicted to the gods and festivals (or righteous overmuch). Who is very clean and pure in her body, her speech and her mind:—who is not drowsy nor dull, proud nor stupid;—but being of good judgment, doth everything with due reflection:—who hath for her father and mother-in-law equal reverence as for a spiritual teacher:—who treateth her servants both male and female with constant mildness:—who is as well versed as any courtesan in the rites and ceremonies described in the Shastras:—who goeth last to sleep and riseth earliest from her couch:—who maketh every endeavour with mildness, like a mother without affectation:—if there be any such maiden to be found, father, give her unto me as a wife.”

Afterwards, the king (Sans. *Shuddhodana*, Tib. *Zas-Qtsang-ma*,) directs his brahman minister (Sans. *Purohita*, Tib. *Mdhun-na-hdon*,) to go into the great city of *Capila-vastu*, (Tib. *Ser-skya-qzhi*,) and to inquire there in every house after a girl possessed with these good qualities, shewing at the same time SHAKYA'S letter, and uttering two *Ślokas*, or verses, of the following meaning: “Bring hither that maiden who has the required qualities, whether she be of the royal tribe, or of the brahman caste; of the gentry, or of the plebeian class. My son regardeth not tribe nor family extraction: his delight is in good qualities, truth, and virtue alone.”

ཕྱི་ལ་རྒྱལ་སྐྱམ་བུ་མེད་པ་ལྟོགས་པ་  
 རྒྱུ་རྒྱལ་སྐྱམ་པ་དམངས་རྒྱལ་སྐྱམ་པ་དེ་བཞིན་ཏེ།  
 ལྷ་ལ་ཡོན་ཏན་འདི་ཡོད་པ་ལོ།  
 ལྷ་མོ་དེ་ཞི་འདི་འཛོམས་ཅིག་ཀྱང་།  
 ད་ལྟོ་སྐྱུ་འདི་རྒྱལ་སྐྱམ་པ་དང་།  
 ལྷ་སྐྱུ་ལ་དེ་མཚོན་འཛོམས་མ་ཡིན་  
 ཡོན་ཏན་ལ་དེ་ལ་ཡོད་པའི་ཚོས་ཀྱི་རྒྱུ་ལོ།  
 དེ་ལ་འདི་ཞི་ཞིང་དགའོ།།

The objections of the Buddhists to the seclusion of woman may be gathered from the following imaginary conversation of SHAKYA'S wife, extracted from the *Kah-gyur*, Do, Kh. vol. leaf 120-121, (corresponding with the Sanscrit *Lalita vistara*, leaf 85.)

*Sd-hsbe-ma*, (S. *Gôd*.) the wife of SHAKYA, upon hearing of her being upbraided by the domestics for not concealing her face when in company with others, expresses herself in some verses (against the veil), the meaning of which is as follows :

“ Sitting, standing, and walking, those that are venerable, are pleasing when not concealed. A bright gem will give more lustre if put on the top of a standard. The venerable are pleasing when they go, they are agreeable also when they come. They are so whether they stand or whether they are sitting. In every manner the venerable are pleasing. The man excellent in virtue is pleasing when he speaks ; he is so also when he sits still. As an example, doth not the *Kalapinka* bird appear more beautiful when she chaunteth her lovely song in your presence? The venerable man who putteth on a garment made of the *kusha* grass, or whose squalid clothing concealeth not his emaciated body, still shineth with his own lustre. He that hath good qualities is adorned by those qualifications. They who have put off all vices are venerable. Fools, committing vices, howmuchsoever they be adorned, are never pleasing. Those that have malice in their heart and speak a sweet language are like a poisoned bowl into which nectar is poured ; or a cleft on a rock that is rough both inside and outside. Communion with such men is as though you would touch the mouth of a snake. With respect to the venerable, all resort to them, all reverence them. They are supported and cherished by all men, as the stairs descending to the water's edge are kept in repair by the multitude. The venerable are always like a bowl full of milk and curd. It is a great happiness to see human nature capable of such purity. Fraught with blissful consequences is the gift of such men as have renounced the company of the wicked, and being directed by a venerable religious guide, are become enamoured of the doctrine of the most perfect (Buddha). For such as have restrained their body, have suppressed the several defects of it, have refrained their speech, and never use a deceitful language ; and having subdued the flesh, are held in restraint by a pure conscience : for such, to what purpose is the veiling of the face ? They that have a cunning heart are impudent and shameless ; and having not the required qualities, do not speak the truth :—though they should cover their body even with a thousand clothes, they would go about in the world more naked than the unclothed. They that have concealed their passions, and have kept them under subjection, and are content with their own husbands, and think not on any other ;—such women, when not concealed by a veil, shine forth like the sun and moon. Moreover DRANG-SRONG, (S. *K.s'hi*.) the great Lord (God), who is wise in knowing the hearts of others, yea, also the whole company of the gods, know my

thoughts, my good morals, my virtues, my obligation, and my chastity. Therefore, why should I conceal my face?"

*Zas-Qtsang-ma*, (the *Madhdodana*, the father of SHAKYA,) her father-in-law, was much pleased with these expressions, and presented her with several precious things. He uttered at the same time one *śloka*, the meaning of which is this: "My son being adorned with such qualities as he has, and my daughter-in-law having such virtuous qualifications as she describes; to see two such pure persons united together, is like when butter and ghee are mixed together."

ཇོ་པོའི་བྱ་ནི་ཡོན་ཏན་རྒྱ་ལྷན་པ་བཅུ་པ་དང་།  
 མནལ་མའི་རང་གི་ཡོན་ཏན་རྒྱ་ལྷན་པ་ལྷ་ལ།  
 སེམས་ཅན་དག་པ་དེ་གཞིས་ལྷན་པ་རྒྱུ་པ་ནི།  
 མའ་དང་མའ་མི་ལྷན་པ་རྒྱ་ལྷན་པ་བཞིན་ཀྱང་།

As breathing in accordance with the virtuous sentiments of the above favourable specimen of the Tibetan sacred works, we may here extract a curious correspondence, (whether imaginary or real we will not pretend to determine,) stated to have taken place between a princess of Ceylon and the Buddhist saint. This letter is very generally known and admired throughout Tibet, being introduced in every collection of epistolary forms for the instruction of youth.

*Ratnāvalī's Letter to Shākya.*

*Mutig-chen*, (S. *Ratnāvalī*.) a young princess of Ceylon, the daughter of the king of Singala, having been informed by some merchants of Central India (*Madhyam*) of Buddha and of his doctrine; she was much pleased with it; and, when those merchants returned home, she sent some presents to CHOM-DAN-DAS (SHAKYA), with a letter of the following contents:

ལྷ་དང་ལྷ་མིན་མི་ཡིས་ལྷ་ལ་བཞུགས་པ།  
 ལྷ་དང་བཞུ་དང་དང་བཞུ་དང་ལས་དེས་གྲོལ་ཞིང་།  
 བཞུ་ལོ་གསལ་པ་རྒྱ་ཆེ་རྒྱུ་ལས་གསལ་པ།  
 དང་ལྷ་དང་བཞུ་དང་ལས་ལྷ་ལ་ཞུགས་པ་ལོང་།

"Reverenced by the *Suras*, *Asuras*, and men; really delivered from birth, sickness, and fear; Lord! who art greatly celebrated by thy far extending renown, from the Sage's ambrosial portion, kindly grant me! (meaning religious instruction or wisdom.)"

SHAKYA received this letter, and sent to the princess a picture of *Buddha* on cotton cloth, with some verses written above and below the image, containing the terms upon which refuge is obtained with *Buddha*,



much adulterated with sand. The current in front of the town is slack; and the channel is wider and deeper than opposite the cantonment.

In the height of the rains, the *Nerbudda* reaches barely half way up the above-mentioned kankar bank; although in some seasons the waters have risen so high as to be on a level with the ghats of the town; but such instances are of rare occurrence.

The rains of 1826 were extremely heavy, and the *Nerbudda* rose to an awful height. In that year a very curious and singular circumstance was witnessed by some of the officers there. It was as follows: Between the fort and the race-course there were some small stunted shrubs, or bushes, approaching the species known by the name of *byr*, which grew not far from the river's edge; in the centre of one of which, some natives, who happened to be passing by the spot early one morning, perceived a curious looking mass, apparently entangled therein; and which, on a nearer approach, they much to their surprise discovered to be a young alligator!—a few ropes having been procured from the cantonments, they were thrown in running nooses over his tail, head, and body, by which means he was hauled out of his bramby resting-place, and *lattee-mar'd* to death. He measured about six feet in all. The river had covered the bush the day preceding, into which it is conjectured the velocity of the stream had carried him with such force, as to make his extrication therefrom hopeless, and the river having fallen during the night had left him high and dry—when taken, it was observed, that he was *minus* a paw, which had been amputated at the wrist.

At the distance of about 50 yards above the junction of the *Towa* river with the *Nerbudda*, there is a ledge of black lime-stone rock, which stretches the whole way across the *Nerbudda*, connecting the two banks by a causeway, as it were; a fine waterfall is the result—while immediately below it is an exceedingly deep (*koond*) hole, which is literally alive with immense alligators. The ascent from its steepness and slippery nature is impracticable to them, and they content themselves with sporting about in the deep water at its base.

From this waterfall to the *Goondry Ghat*, (fordable from November to June,) the *Nerbudda* is both deep and broad:—cultivation meets the eye on the southern side, while a dense jungle and impervious underwood skirts the very bank on its northern face.

The entrance to the *Towa*, for the distance of 100 yards or so, is intricate on account of hidden rocks below, and also large masses and blocks of rock, some of a black, some of a white, and some of a reddish tinge, which are scattered about at different elevations above the level of the water. These being passed, the channel of the river is unob-

structed in the rain, beyond *Sindkhira*; the current flowing over a sandy bed and soil, between low banks, at times retreating to the water's edge.

At the distance of about one hundred and fifty yards below the village of *Boodeny*, there is another ledge of rock, which, stretching right across, connects both banks. This ledge, however, is neither so wide nor so high as the former one mentioned; although the roaring of the water falling over it is heard a long way off. That obstruction being cleared, the river pursues its onward course in quickened speed, and depth, and likewise width of stream, for some distance below the village of *Doongurwara*.

Both the long, as well as the bull-mouthed alligator is met with in the *Nerbudda*. I recollect one of the latter having been shot by a ball, which perforated his brain, and which on measurement reached nine feet 10 inches in all. Curiosity having led us to open him, in the hopes of meeting in his maw with some of the silver ornaments, which had graced the wrists and ankles of the little children, which had been taken away, when bathing at the ghats, by these amphibious monsters; our labours were rewarded by finding simply the hairy hide of a young hyæna, which one of the party had ordered to be thrown into the river a short time antecedent to the capture of the alligator. It was conjectured, that the hairy particles with which the hide was covered had prevented its being digested.

The country all the way to *Seonee*, where there is an old stone *gurhee*, or fort, is one fine, extended, sheet of cultivation; the soil being a rich black loam. This town is situated about 34 miles to the S. W. of *Hoshungabad*, and is without exception one of the best looking and cleanest towns in this part of India. It possesses, moreover, a very wide street, which is the principal thoroughfare. The houses too are mostly new, and built with great regularity and neatness. I allude particularly to the new suburb, at the south end of the town, which has arisen since the country became settled and quiet under our rule. To the south of the town, several young mango topes were planted, and also several pukka *boulees* erected. The south-east view presents a range of mountains in the distance, while to the S. S. E. the fortress of *Souleegurh*, which is built on the top of a rocky isolated hill, at the distance of 12 or 15 *kós*, is visible. There are several wealthy *mahajuns* resident in the town, besides several *dookandars*, who carry on a small trade with *Hoshungabad*, *Boorkhanpoor*, and other places of less note in the neighbourhood. The exports are but few, and these consist chiefly of grain and ghee, at least they are the staple commodities of export. Iron smelted in the neighbouring hills forms also a small article of export. *Seonee* is a great place of resort for *Brijary* bullock-

men, who often arrive with a string of upwards of five hundred head of cattle, and after loading depart for *Mhow*, *Aseeryur*, *Bombay*, *Sagur*, &c. The country all around is one uninterrupted flat, with cultivation, with the exception of a short patch of *praus* jungle round *Bhugwara*, and the same also about *Kahureea*. Gram, wheat, peas, the different kinds of *dals*, *bajra*, and the *jowar* form the chief cultivation: *khéts* of sugar-cane (the thin white species) and cotton are occasionally met with. The herds of buffaloes and cows are also very large and numerous, while their subsistence is both easy and abundant.

The strata of the country is a black soil, with the exception of some few parts through jungle, where the road led over a gravel bed.

From *Pugdar* (a Gosain's village) to the *Moorun* nuddee, a thick low jungle of *praus* and underwood, with occasional stunted trees, and several *byr* bushes extends, through which the narrow and uneven road leads;—a gravel soil is again met with. *Doura-ghat* is the site only of a village that once was. The *Moorun* is a hill torrent, varying from 80 to 120 yards in width: at the ford from bank to bank, it is about 150 yards: its channel is obstructed in several parts by ledges of rock, which in some places present a bluish black, and in others again a whitish tinge;—not being a geologist I cannot take upon me to say the nature of it, but I strongly conclude it to be limestone. At the ford it was massive, and laid bare in the bed of the torrent. The descent from the jungle into the *Moorun* is trifling and gradual, (naturally); but the ascent on the opposite side up to the small hamlet of *Umāra*, which stands on a high bank of sandy soil (*cachār*), is very steep. After we left *Seonee*, the long range of tree-covered hills, which bounds the prospect to the south, as well as the S. E. became more clearly defined, and we were approximating them fast each stage.

The *Vindhya* range, which skirts the northern bank of the *Nerbudda*, is no longer visible, and the eye has one uninterrupted range to the N. and also to the W., over an extensive plain, bounded only by the horizon. The whole of this level tract is one sheet of cultivation, studded, as it were, with occasional topes of mango trees.

*Bhadoogaon* is a small town, or rather a large village, of which in 1824, a man named Reka Sét was the *malgoozar*. It is situated on the western bank of the *Gunjal* river, which flows at the ford in a shallow rippling current over a pebbly bed, but deepens considerably a short distance beyond the town. The north part of *Bhadoogaon* is situated on a high bank, overhanging the stream. To the S. E. is a dense jungle, which stretches for some way towards the hills.

From *Bhadoogaon* to *Rhitgaon*, the country is open generally speaking; here and there a small patch of *praus* is met with on either side of

the road. (I have ever observed that when the soil is of a black loam, there have remarked the widest extent of praus, as well as a greater cultivation of the cotton shrub.) Two villages only were seen near the road.

*Rhitgaon* is a small town, less in point of size than *Bhadooogaon*, situated on the west bank of the *Ajnuul* nuddee: this stream flows in a gentle current over a sandy bed; no rocks or stones being perceptible. In the centre of the place is a small dilapidated mud *gurhee*, or fort.

The country from *Rhitgong* to *Mugurduh* is a black loam soil, with a great deal of *praus* jungle and *byr* bushes on each side of the road—yet, withal, there was a pretty fair cultivation, considering the paucity of villages and the scanty population.

Since we left *Seonee*, we have been travelling over a bye-road, and one but very little passed, and seldom if ever used by way-farers and travellers. The great thoroughfare to *Aseergurh*, *Boorhanpoor*, &c. branches off from *Seonee* through *Hurda*.

*Mugurduh* is a small village, distant about 69 miles from *Hoshungabad*, and stands on the confines of the Company's ceded districts. It is situated on the northern bank of the *Machuk* nuddee, a small stream, taking its rise at no very great distance in the mountainous regions to the eastward, and discharging itself after a short course into the *Nerbudda*.

This village is situated in a low ground, and there is a slight descent to it the last half mile. It is a small poor place, the inhabitants being either all cultivators or herdsmen—and chiefly of the same cast as their late *patel* (or headman) Ram Singh, who was a Rajpoot, and who, some years back, emigrated from Hindustan to settle there. The only trade of the place consists in the exportation of grain and ghee, and unwrought lumps of iron, as obtained from the neighbouring hills, after a coarse and rude process of smelting. The soil around is very rich, and the crops of wheat, (little of which is grown, however, hereabouts,) gram, *jowar*, *boota*, and *bajra* are, in consequence, both fine and abundant. Sugar-cane with *rhur dal*, and a small patch here and there for the cotton shrub, meet the eye occasionally; the finest and best looking crops are the *jowar*, whose stalks have reached eleven feet and a half in height, although the general height is from six to eight feet; while their pods are well filled with grain. Between the village and the nuddee, there is a very fine *burghut* tree, which has thrown out several thick branches, which descending perpendicular to the earth, have entered it and taken root. These ramifications, giving support to the parent stem, contribute to a great increase of shade. The place is extremely unhealthy just after the rains; for it is literally embosomed

in jungle, and save where cultivation extends, is surrounded by rank vegetation and underwood. The very air around is tainted by malaria, while the rotting foliage adds to the unwholesomeness of the place. The water of the nuddee is unfit to drink, for it is contaminated by leaves and putrid vegetable matter:—like all mountain torrents, it is nearly dry in the cold and hot seasons, and water is only to be seen in pools. I happened to be stationed on command at this village, with a company of sepoy and a few irregular horse, in the month of October, and lost two or three men from cholera, while several others were laid up with fevers, chiefly of the intermittent kind, with some few cases of ague.

The water in the best and most frequented well, and which the camp used occasionally, if drawn up in a *lota* over-night, and set aside, had its surface covered in the morning with *oily particles*.

The population is scanty about *Mugurduh*. The village of *Indrapoora*, (of which a Goand, named Luttea, was *patél* in 1825.) *Sanajhar* and *Banspanee*, fine-sounding names, are wretched hamlets, buried in the jungle, and inhabited by Goands. This caste of Hindoos are almost jet-black, and dirty and forbidding in their appearance; while they are short in stature, and thick-set in point of make. Their dialect is peculiar to themselves. The whole race appears wretched and poor—a small *dhotee* and a coarse *chudur* to wrap over their bodies form their outward garments. Their tenements consist of huts, whose walls are built of stakes cut from the neighbouring forest, entwined with *rude* wicker-work, and plastered and besmeared over with mud; while the roofs consist of a thin layer or coating of dried grass, over which are spread some *praus* leaves, and a few battens made from the bamboo, fastened over all to prevent its being acted upon by the wind. The Goands are remarkably fond of swine and buffaloes; they are fond also of rearing fowls. When leaving the road, and penetrating the forest's depths, an occasional hut is met with, completely isolated, and from such I have seen a Goand issue forth, its only human tenant, while a favorite pig has met my eye not far from the threshold. This race of human beings are little better in the human scale than demi-savages; they are very superstitious, and like all dark minds, place great confidence and belief in the charms and quackery of their *gouroos* (or priests). They have rites peculiar to themselves, and tread the jungles' depths at dead of night, without the slightest feeling of dread or fear from tigers or other wild beasts. It has often been a matter of surprise to me, that these men should dare, both by day and night, to traverse and thread these deep forests, unapprehensive of danger from wild beasts (especially tigers) which in these parts are fearfully abundant. Habit with man is certainly a second nature.

*Dooleea* is a fine village, considerably larger than *Mugurduh*, at the distance of three miles W. by N. from it, and is (I believe) the Company's frontier to the westward. It is built on a rising ground at the distance of a couple of hundred yards from the *Machuk* nuddee, which is here both deep and wide, resembling a good-sized river rather than a nuddee. On the opposite bank, on the edge of the nuddee, stands the village of *Mcergaon*, (associated in recollection of Shekh Dulla's visit,) in Scindea's district, of which a Gosain is *zumeendar*, holding it rent-free.

Beyond *Dooleea* a good road leads nearly due west to the town of *Charuah*, belonging to Scindea, where the high-road is gained which leads through *Cheinpoor* and *Ghora-puchar* to *Aseergurh*, *Boorhanpoor*, and *Bombay*.

It is time now to extend my remarks on the country beyond the Company's jurisdiction, and as I believe those parts have seldom been visited by any Europeans, and that little is known thereof, I will in this place state what fell under my limited observation, when traversing that part of India in the early part of November, 1824, when in pursuit of the free-booter Shekh Dulla.

The ford at the *Machuk* nuddee is quite dry after the middle of October; for its bed, composed of large round sand-stones, is in that spot as elevated as the level of the water on each side of it. This nuddee for the distance of two or three miles on each side of the village, is filled with large pieces of rock and stones.

The road, over a black soil, to *Goomgaon*, of which place a Goand was *pat'l*, was very bad and extremely confined, and only adapted for a rude and narrow species of carts, called *Sagahs*. The estimated distance is between four and five miles—low stunted trees, with *praus* jungle and *byr* bushes, skirted the road, nearly the whole distance. An occasional small patch of cultivation, barely sufficient for the population, near the wretched-looking villages of *Kotwar*, *Zemineea*, *Parada*, *Amerkhal*, and *Moortalai*, which were situated at a very short distance from off the road, was seen. The inhabitants were all Goands, black in colour, stunted in stature, squalid in appearance, and all poverty-clad. They all, however, possessed small herds of buffaloes and swine, while fowls were abundant.

*Goomgaon* is a good-sized village; a rivulet runs close to it—to the eastward of the village, and at the distance of about fifty yards, there is a thick underwood, consisting chiefly of the much-alluded-to *praus*, (or dock,) and *byr* bushes, beyond which rise abruptly a low range of (sandstone, I believe,) hills, covered with foliage. To the S. W. an excellent road leads to the small village of *Peepuria*, distant about three miles, and beautifully situated in a fine open plain, teeming with topes

of mango-trees and cultivation. To the S. and at the distance of about a couple of miles, are seen the continuation of the low range of hills, noticed close to *Goomgaon*. This is the lower range of the *Kali-bheet* hills.

The road out of *Goomgaon*, in the direction of *Mukrai*, is very good and very wide; yet there is little or no thoroughfare on it:—a few *brinjary* bullocks with grain, and the Goands bringing to the plains their lumps of unwrought iron, are the chief, if not only people met with; *moosafirs* (travellers) are never seen.

At the distance of about three miles from *Goomgaon*, we arrive at the foot of a *ghat*, the ascent of which is by no means long, nor particularly steep. The soil appeared to be of a gravelly nature; the whole of the distance from the village to the top of the *ghat* was skirted by a wood jungle, in which not a single village was visible, while the first mile led through large detached blocks and masses of rock, apparently of limestone formation, which were scattered about in great confusion. It had the appearance of having been caused by an earthquake.

On reaching the top of the *ghat*, a fine prospect is presented on all sides; in the first place, we stand on table-land, (at an elevation, I conjectured, of between 15 and 1800 feet above the sea,) which stretches to the east, to the south, and to the west for a good distance. The southern aspect however was bounded, where the horizon intersected the view, by lofty hills, whose towering peaks rose proudly to the sky. These I supposed to be the lofty range, amongst which the fortress of *Gawilgurh* stands: facing round to the N., a splendid view of the plain below for miles and miles in extent, thickly studded with fine tops of trees, and whose face presented one beautiful sheet of cultivation, gladdened the eye. This magnificent view extends nearly in a half circle from W. to E. The soil on the table-land, I particularly noticed, was of a very black loam. The road was of very great width, very level, and in an excellent state; the strata thereof consisted of a reddish colored gravel.

At the distance of a mile or two further on, a miserable hamlet was reached, consisting of half a dozen huts, called *Doomgaon*. The people who inhabited them were of the *Bhúmkar* caste; and in all respects, save the name, were the counterpart of Goands.

From *Doomgaon*, we left the high road, (if such it can be called, being seldom, if ever, travelled,) and branched off to the left by a narrow pathway into the jungle depths. The first part of the way was a rapid descent into a small valley, in which we found innumerable streams to cross, and wherein we were closely surrounded by hills and forest. At the expiration of two or three miles' progress, a hill was ascended, half way round the crest of which a narrow and dangerous footpath led:

at our feet, and washing the base of the hill, flowed a respectable mountain stream, filled with fragments and detached masses of rock, and having but little water. There was a gradual descent on the other face of the hill, where this stream was crossed again. At the distance of a couple of hundred yards from the ford stood a Goand hamlet, a mere collection of five or six wretched-looking huts: at the distance of a mile further, we crossed a small open plain, in which the jungle was cleared away, and the soil cultivated. This patch, however, extended but a short distance, for it was bounded on the left hand by a range of well-wooded hills, and on the right by high grass and *praus* jungle, with hills close at hand. Another stream, a little deeper than those previously passed, was reached, and a short and easy ascent out of its gravel bed brought us to the Goand village of *Basigurh*, which is situated on the crest of a small hill, covered with wood; it was a small place, and of no note whatever, save being the supposed haunt of the Pindary free-booter Shekh Dulla. To the S. S. E., in a hollow, stood, some short distance off, another Goand hamlet called *Kali-kho*.

Returning the same road, I remained a few minutes at *Doomgaon* to take a look at the fort of *Mukrai*, which appeared to be about three or four miles distant, nearly south. Its walls appeared very high, and were built of light red-colored sandstone. The front presented a beautiful appearance, situated as it was on the table-land, or plateau, while the rays of the morning sun, shining right on it, increased the effect.

*Mukrai* is the residence of a Goand Raja. The *Sianee* nuddee flows under its walls. On making inquiries for *Kali-bheet*, I was informed that it was only 25 miles distant from *Mukrai*, but I conceive its site further to the westward.

The natives of this part of India appeared quiet and inoffensive, but sadly poverty-stricken, while the population was excessively scanty. The climate is fatal to the European constitution, between the months of June and December. Malaria rages greatly during the intervening months, and the water both of the running streams and wells is unfit to drink, without being previously boiled. Fogs and mists are of frequent occurrence just after the rains. Two or three different kinds of fish are procurable in the *Machuk* nuddee, but *chelwas* (a kind of sprat) and eels predominate, and green pigeons are abundant.

If I recollect rightly, there was in *Mugurduh* one *bunya's* (or chandler) shop; one blacksmith's; one carpenter's: these two obtained a livelihood by forging and making and repairing the rude implements of husbandry, beyond the knowledge of which their skill did not extend; and two or may be three *korees*, (Hindo weavers,) for the weaving of *dhotees* and *chudurs*.

Table of Latitudes and Longitudes of Places in Central India  
(Valley of the Nerbudda)

Names of Places.	Latitudes. North.	Longitudes. East.	Height above the Sea.	Remarks.
Gunoorgurb, M.	22 50	75 40	feet.	A fortress in Malwa (Bhopal), 13 miles N. W. of Hoshungabad.
Hindiah, M. . . .	22 26	77 0 (a mistake.)		A town and fort on the S. side of the Nerbudda, which is here 1000 yards broad, belonging to Sindeca.
Hoshungabad, M.	22 43	77 43		A town and fort on the south bank of the Nerbudda, here 900 yards broad.
Ditto, E. . . . .	22 44 58	77 47 45		
Ditto, fort, . . . . .	22 45 36	77 45 54		
Baitool, Fort, E.	21 51 7	77 51 5		A city and fort in Gondwana. The Baitool valley was ceded to the Company in 1818-19.
Tughdhar, Hill, E.	21 49 34	78 1 49	2854	A hill E. by S. from the city of Baitool, noted in the Gt. Trig. Survey.
Bagda, Hill, E. . . .	21 54 5	78 5 2		A high hill to the east of the Baitool cantonment, noted in the Gt. Trig. Survey.
Dhabba Deo, E. . . .	22 5 14	77 58 22	2852	A hill noted in the Great Trig. Survey.
Alumpoor, E. . . . .	22 3 33	77 37 58	2643	A hill noted in the Great Trig. Survey.
Nurwurgurb, E. . . .	22 13 45	77 39 25	2722	Ditto.
Neelgurb, E. . . . .	22 49 58	77 49 16		A hill near Hoshungabad, noted in the Great Trig. Survey.
Black rock, E. . . . .	22 30 38	78 9 58	2879	Ditto.
Black rock, E. . . . .	22 43 48	77 47 12		A small isolated hill of rocks, distant 1 m. 1 f. 74 yds. S. by E. from Hoshungabad.
Goradiah Hill, E.	22 45 4	77 42 59		A hill in the Bhopaul territory, noted in the Great Trig. Survey.
Nemaaur, M. . . . .	22 27	77 0		A small town on the north bank of the Nerbudda.
Morpani, E. . . . .	22 29 34	77 57 3		A hill station noted in the Gt. Trig. Survey.
Bhembhet, E. . . . .	22 49 56	77 40 34		Ditto.

Note.—The letter M. denotes that the latitudes and longitudes are from Sir T. Malcolm's work; E. that they are taken from Major Everest's data in the Grand Trigonometrical Survey of 1824.

[See the accompanying map, Plate II.]





III.—*A Summary Description of the Geology of the country between Hoshungabad on the Nerbudda, and Nagpoor, by the direction of Baitool. By Lieut. John Finnis, 51st Regt. Asst. Exec. Offr. 14th Divn.*

[Presented to the Asiatic Society, 15th July 1829\*.]

The route between Nagpoor and Hoshungabad presents as great a variety of formations and as interesting a series of minerals, as is probably to be met with in any part of India of equal extent.

The formations exhibited are trappean, primitive, transition, and secondary, frequently under a very peculiar and confused arrangement with regard to each other, and much intersected by veins of greenstone and trap.

I regret that the circumstances of my march did not allow a more leisurely survey of the geology of a country so well deserving the attention of more competent geologists, or of forming a more regular map of the road described; but I shall hope that my sketches may help to connect the descriptions of other observers, the present route being, I believe, unexplored.

The formations appear to be distinctly divided into five principal divisions.

The first division includes the tract of country lying between Nagpoor and Baitool to the south bank of the Machna river.

An unvaried formation of trap occurs during the whole of this distance, and the face of the country is covered with round wacken boulders.

The trap forms the southern and eastern boundaries of the valley, and it stretches away to the S. W., but its extent in this direction and to the E., I am not acquainted with.

2nd Division.—The second division comprises the space within the southern and northern gháts on the Machna.

This river at Baitool is running to the west, and after winding round some hills it re-crosses the road, running east to join the Towa river at Shahpoor. The distance is about 27 miles, the intermediate country, hilly.

On the N. bank of the Machna at Baitool, trap no longer appears; it is followed by strata of quartz and mica schist, traversing the plain up to the hills north of cantonments. These are of quartz, brittle, very

\* We have taken occasion to publish this interesting account of the geology of the country south of Hoshungabad, in juxta position with Lieut. Miles' paper, for the advantage of incorporating the two route surveys furnished by these officers, in the map. Some apology is due to Lieut. Finnis for the delay which has occurred in bringing his labours to the notice of the public.—Ed.

highly stratified, and vertically disposed; the layers seldom exceed 11 in. in thickness. The specimens from this locality are marked A.

Nos. 1, 2, and 3, are loose specimens from the plain; 2 and 3 would be found, I think, to enter into the hills. The superstratum of the hills is a sandy clay marl, which continues nearly the whole way to Neempancee. [See notice at the foot of this article.—Ed.]

No. 4 is a specimen of the only limestone found near Baitool; it rises abruptly about 10 feet from the bed of a nullah of calcareous sandstone. The limestone No. 5 occurs lying on the right of the road about 5 miles N. of Baitool, and crosses the road at the bottom of a small ravine.

The pudding stone No. 6 appears about 10 miles from Baitool, to the east of the road, elevated above the plain a foot or so only; it is exceedingly hard, broken with great difficulty, and chips off then in thin flat conchoidal pieces. After crossing the nullah at Neempancee, the trap rock No. 7 rises above a black alluvial soil, and rounded masses of 10 and 11 are scattered about. Farther on, the road becomes full of ravines, and the gneiss, 11, is found in mass, but in intimate connection with the unstratified rock 10. The trap 10 in many places shows itself superincumbent on 10 and 11. At the top of the Neempancee ghát, the granite, No. 9, forms nearly the whole summit of the hill, mixed, however, with 10, and the northern descent of the ghát is principally composed of this latter. After passing the ghát at the banks of a nullah, is a low hill of granite and greenstone together, 12 and 13. The latter occurred also above the Neempancee ghát, shooting up through the soil in roundish masses, and near Baitool, to the N. E. of cantonments: the walls of the fort of Keeslah have been built with the same stone. It is met with occasionally proceeding north, intermixed with quartz, until arriving near to Shahpoor, where common trap reappears, and thence the remainder of the road is over a sandy clay soil.

3rd Division.—The 3rd division includes the country between the Machna river and the nullah, one and half mile south of Keeslah, and is bounded on the W. by the small range of Jamgurh hills, which is a ramification from the Mahadeo hills, after they change their direction to the S. W.

After passing the Machna at Shahpoor all traces of granite are lost, and the sandstones B, 1 and 2, become very general. The sandstone strata extend with very little interruption from Shahpoor to Keeslah, and to the foot of the Bhoragurh and Jamgurh hills, frequently showing themselves above the alluvial soil, and traversed occasionally by veins of quartz and trap, as at a nullah half way between Shahpoor and the Bhora nuddee, where a trap vein (No. 4) about 12 yards

wide passes through the sandstone from a S. E. direction. It forms the bed of the nullah, and can be traced for a considerable distance.

The trap dyke is itself intersected in various directions by No. 5 in veins not exceeding 3 feet.

The specimens B, No. 3, were taken from a vertically disposed mass about 10 feet in width, which crosses the road on descending a low hill of sandstone, No. 2. The quartz runs E. and W., and is with great difficulty broken across the laminae.

About 4 miles from the Machna river and 3 miles up the Bhora nuddee, are the seams of coal displayed on both banks of the stream under a thick bed of sandstone\*. All the small nullahs run over sandstone beds. After crossing the Bhora nuddee, trap again immediately occurs and continues for a mile and half to the base of a hill of sandstone. The trap is traversed by a vein of calcareous spar, No. 6, about 6 inches wide: no trap appears farther north, and after crossing the sandstone hills, the road passes over a black alluvial soil, which continues to the river N. of Keesla, and the only rock met with is sandstone grit, No. 7.

4th Division.—The 4th division comprises the low range of hills between Keesla and Putroda, forming the pass to the valley of the Nerbudda. These hills form a part of the great range of Mahadeo hills, which at this point form a salient angle projecting to the north west.

After crossing the nullah north of Keesla, the road lies over *kankars* or tufaceous limestones for a short distance, until reaching some low hills where commences a mica schist formation with and without garnets, and interstratified with whitish and greyish limestones, granular and micaceous. The road is thickly strewed with loose limestones and *kankars*.

Little mica slate occurs in the low ground, except passing into or intimately connected with micaceous limestone.

Specimens C 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, and 12, were taken from the immediate vicinity of the road, and their positions are so confused and intricate that I could not attempt to describe the order in which they are arranged. Granular limestone and mica slate appear to form the main rocks, but the whole are intimately blended together and alternately passing into each other.

No. 2 apparently composes the entire mass of two or three low hills. Nos. 3 and 4 form some undulating land near No. 2. On the E. of the road near these rocks are abundant specimens of a greenstone rock, in

\* See notice of specimens of the same coal received from Captain OUSELEY. Journ. As. Soc. vol. ii. p. 435.

appearance being hornstone crystals imbedded in lime. The garnets in the mica slates are, as far as I have ascertained, all imperfect, soft and ochrey colored.

The limestone specimens 5 and 7 occur very generally along the west of the road, and 7 forms a hillock by the side of a nullah about 15 feet high, irregular and steep; 6 and 8, specimens of micaceous limestone or of mica schist and limestone passing into each other, are found in the banks and beds of nullahs.

10 forms the top of a small hill west of the road near the end of the pass towards Putroda; it appears to repose on a substratum of mica slate.

The specimens marked D, are from the neighbourhood of the Hathee-Doab hill and pool.

D 1.—is the limestone burnt for use for the works at Hoshungabad.

D 2.—is an abundant rock extending E. and W. and up the road to Baitool.

The Nos. 6, 7, 8, 9, form the hill of Hathee-Doab; 6 forms the base, and 8 the summit of the hill.

D 1, 2, and 4.—Compact limestones found on either side of the Hathee-Doab hills; the quartz, 3 and 6, are scattered about on the road to Hathee-Doab; 5 forms the foot of the hills, 9 and 10 are loose specimens met with here and there.

5th Division.—The 5th division extends from Putroda to the Nerbudda at Hoshungabad.

After passing through the hills a rich field of cultivation opens to view, and the rocks are lost under the deep alluvial soil of the valley of the Nerbudda. South of the river two insulated mounds of new red sandstone, rising abruptly from the plain about  $1\frac{1}{2}$  miles from cantonments, are the only rocks which show themselves on this side of the river, and they are shoots from the northern or Vindya range which, opposite Hoshungabad, are of this formation.

In excavating two wells of the depth of about 70 feet at Hoshungabad, no rock was met with, but the coarse calcareous conglomerate common in the bed of the Nerbudda.

At the junction of the Towa river with the Nerbudda, 4 miles above Hoshungabad, sandstone ridges cross the river, and 60 miles below, at Hindia, the river is traversed by a basaltic dyke, and the intermediate rapids between those two points are formed of sandstones and coarse conglomerates, rising in some places several feet above the level of the river; opposite the cantonments the bank is formed of the conglomerate, and has all the appearance of the ruins of old uncoursed rubble work, E.

The specimens N and J B are from the road by Jamanee to Boor-da, and from Neelgurh, a hill lying to the E. of the road from Jamanee. Nos. 1 and 2, I B limestones lie under the trap No. 3, I B : the limestone 4, I B, is at the foot of the ghát : fine grained sandstones 5, 6, I B, cover the ascent, in which trap is again met, with indurated clays and sandstones, as 5 ; 6 and 10, I B, form the beds of nullahs between the ghát and the coal strata in the Bhora mudde.

*Specimens referred to in the above account.*

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| <p>A. No. 1, granite, large, irregular, of white quartz and silvery mica.</p> <p>A. 2 and 3, mica schist.</p> <p>A. 4, foliated tufaceous limestone.</p> <p>A. 5, a reddish brecciated limestone.</p> <p>A. 6, a silicious conglomerate.</p> <p>A. 7, compact wacken.</p> <p>A. 9, large-grained granite flakes of silver mica, white quartz and light flesh-coloured felspar.</p> <p>A. 10, a dark red, small grained syenitic granite nearly all felspar.</p> <p>A. 11, gneiss, dark, small mica in layers.</p> <p>A. 12, grey granite, dark mica decomposing.</p> <p>A. 13, much hornblende, white quartz, and perhaps felspar mica, one or two spots.</p> <p>B. 1, very fine-grained sandstone, with thin veins of quartz and quartz crystals in bunches.</p> <p>B. 4, brown wacken, containing large crystals of _____ ?</p> <p>B. 6, dark aluminous shale, traversed by very minute veins of calc. spar.</p> <p>B. 3, vesicular laminated white quartz.</p> <p>B. 2, minute-grained soft sandstone.</p> <p>B. 6, pure white calc. spar.</p> <p>B. 7, hard sandstone grit.</p> <p>C. 1, mica slate.</p> <p>C. 2, ditto do. with garnets, &amp; contorted.</p> <p>C. 3 ditto filled with large garnets ; the mica in the 3 above, in very minute crystals.</p> <p>C. 4, hornblende crystals, with specks of mica greenstone.</p> | <p>C. 5, white granular limestone.</p> <p>C. 6, limestone with mica.</p> <p>C. 7, granular limestone, as 5.</p> <p>C. 8, a dark-brown stone, lime and mica.</p> <p>C. 9, mica in lime.</p> <p>C. 10, a hornblende rock,</p> <p>C. 11, mica schist passing into lime.</p> <p>C. 12, a conglomerate of mica, schist and hornblende crystals in lime.</p> <p>D. 1, a tufaceous limestone.</p> <p>D. 2, crystallized limestone.</p> <p>D. 3, a schistose granular limestone, mica in strata.</p> <p>D. 4, calc. conglomerate.</p> <p>D. 5, ditto tuff.</p> <p>D. 6, quartz rock, grey.</p> <p>D. 7, ditto ditto, resembling a silicious conglomerate.</p> <p>D. 8, 9, ditto ditto.</p> <p>D. 1, flinty whitish limestone.</p> <p>D. 2, buff-coloured ditto.</p> <p>D. 3, common white quartz.</p> <p>D. 4, striped red and white ditto.</p> <p>D. 5, mica schist with garnets.</p> <p>D. 6, ditto striped red ditto.</p> <p>D. 7, ditto ditto.</p> <p>D. 8, a limestone conglomerate.</p> <p>D. 9, nodule of greenstone.</p> <p>D. 10, black clay, slate.</p> <p>E. conglomerate of the bed of the Nerabudda.</p> <p>I B. 2, 3 and 7. grits.</p> <p>Nos. 5½ and 7½ conglomerates.</p> <p>No. 5, A white tufaceous limestone, imperfectly crystallized.</p> |
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[The specimens are deposited in the Museum of the Asiatic Society.]

IV.—Further Information regarding the Siah Posh Tribe, or reputed descendants of the Macedonians. By Munshi Mohun Lál\*.

I had the pleasure to despatch to you a small account of Herát, which I hope has met your approbation. We are now at the ancient place called *Jalálabad*, which was one of the capitals of the Macedonian dynasty. At this spot I happened to meet the great *Muftí*, who often came to see Dr. GERARD, and has lately travelled into the country of the *Siah Posh*; or, as he called them, "*Kafirs*." He kindly gave us the following accurate though brief account of the above tribe :

From *Jalálabad* he went to *Karún*, and from thence to "*Cha Ghul Serai*." Having passed through the valleys called *Darah Nur*, *Damunj*, and *Vakul*, he arrived the third day at the village named *Katar*, occupied by the *Siah Posh*. The inhabitants, whom he called the masters of beauty and charms, came to see him, and were surprised at some feats of his horse: this animal is hardly known in the country of *Siah Posh*.

Their dress is of goat skin, and their hair hangs down to their shoulders. They drink wine as well as water, and never sit upon the ground, but only in chairs. This shows perhaps that they are the descendants of ALEXANDER THE GREAT.

As to their religion, they worship idols, either made of stone or woods, which they call *Búruk*, or *Maha Dev*. They wear an iron ring in their ears, and a string ornamented with shells, round their necks. This seems to be the custom of the Hindu Jogis, or red-dressed beggars in India. They sacrifice cows on their holidays, as the Muhammedans do in the day of *Eeduzuha*. If a stranger happens to ask them where is God, they point with their fingers towards the west or Mecca. They read the Muhammedan kalimeh to please the Musulmans, and at the same time confess themselves to be *Kafirs*; in short, their religion is not known.

They never intermarry with their relations, as the Hindus do; the ceremonies of the wedding are very singular. They bring their wives unveiled on their shoulders, dance, run, and jump in the streets, (like a jackass, as the *Muftí* says,) while they are accompanied by crowds of men and women, who play upon drums and flutes, and make a great noise. The parents of the girl are exceedingly pleased to see the husband using his great endeavours in jumping, as they think him the most intimate lover of his wife.

They have made a public house, where they send the pregnant women before their accouchement, and keep them forty days there. No

\* See Lieutenant BURNES' notice on the tribes claiming descent from ALEXANDER THE GREAT, in the second volume of the Journal, page 305.

man is allowed either to enter the room or pass by the house, but only females. This custom I believe prevails among the Jews.

The funeral of the *Siah Posh* people is triumphantly solemnized. The corpse is generally attended by young men, who sing, skip, dance, and play upon drums. The deceased, unwashed, is carried away upon the shoulders of men, in a large box, as among the Muhammedans. It is taken upon the top of a high mountain, and put open in the sun. They sacrifice a cow, and give a feast to the attendants of the funeral. Then they return home, and do not weep at all.

After sixty days, when the body is putrefied, and eaten by birds, the women of the family go in an assembly upon the mountain. They pick up the bones, and after washing them in a stream, they bring them home, sit round them, and then mourn for a short time; after this, the men come and convey the bones to a large cave excavated in the ground. They throw them in it, and turning to the bones, they say, "This is the heaven for you."

The language of the *Siah Posh* is mixed with that of Hindústání, Persian, and Afghání. They use the word *istri*, which means either in Hindí or Sanscrit, a wife: they say, *ravray*, which signifies in Afghání to bring. They also use the word *khub*, which imports in Persian, good.

From the instruments of war of the *Siah Posh* people, we imagine that a model of the Macedonian soldiery continues yet in this country. They make war with spears, and are good archers. They tie ~~scimitars~~ round their waists, and carry shields upon their backs. They fight with great ferocity, gnashing their teeth, and roaring like a lion. The victors are crowned with the chaplets made of the leaves of the mulberry-tree.

The women, who possess an unbounded beauty, manage all the exterior business, while their stout and handsome husbands remain in the house, feeding the children in their arms. The females cultivate, bargain, and rove about to procure a livelihood. The men follow no employment except that of occasional warfare.

The labours of the women in tillage are productive of fine rice, wheat, and barley. Fruits are abundantly reared: from the fine grapes they make good wine, and the syrup of the water-melon they use instead of sugar. They eat the flesh of every animal except that of dogs and jackals.

If any stranger is found guilty of adultery, either with any body's wife or daughter, the *Siah Posh* never sentence him to death like Muhammedans, but extort from him a little sum of money amounting to 12 or 13 rupees.

At this unlawful act the *Siah Posh Kafirs*, (the *Mufti* says,) in lieu of getting enraged, are happy to say to their acquaintances that their

females are such liberals as to satisfy the heart of every man, who is the best creature of God in the world.

*Kumbir*, *Save*, and *Kulman* are the largest towns in the country of the Kafirs. They are well erected, having long and broad streets without a single shop. The *Siah Posh* have very few she-goats in their country.

I could not extend my inquiries much farther about the Kafirs, as the *Mufti* left us soon on his route to *Kābul*.

The *Siah Posh* claim their descent from the Arabs, and some of them acknowledge to be descended from the Macedonian soldiers. For my own part, the names of the *Siah Posh* males seem to be quite different from all nations in the world, except the Europeans, namely *Shaulah* and *Jankhen*.

The artists in that part of the country are called *Bari*. They are not civilly treated by other *Siah Posh* who are known by the name of *Sahu*, and they are not even allowed to sit before them.

Many of the *Siah Posh* call themselves *Maliks*, or Princes, who use their force to sell the children of the *Baris* to the neighbouring Muhammedans. They call them the descendants of those slaves which their lion-figured fathers brought at the invasion of India; but the *Mufti* says, that they do not mention particularly the name of *Sikandar*.

In our late journey to *Bokhara*, we had one *Badakhshāni* pilgrim in the caravan, to whom we are highly indebted for his valuable information. He mentioned, that the rulers of his neighbouring regions, besides the chief of *Durvaz*, *Kator Shah*, *Suleiman Shah*, and *Ghazub Shah*, being Muhammedans, still derive their origin from the hero son of the Macedonian Philip. He adds also, that the soldiers under them, whose nativity runs to that of the *Siah Posh*, extract their genealogy from the warriors of the great conqueror.

In my opinion, the *Siah Posh* soldiers, who claim also the same descent, were the countrymen of those of *Badakhshān*; but when the violent invasion of Muhammed subverted the rich valley of the Oxus, many of the Macedonian descendants were converted to *Islām*, and many, avoiding that religion, left the valley and chose their ground upon the mountains near *Hindu Kush*. They live there now independently, keeping their former principles of worshipping the idols, (as the Macedonians did their heathen deities,) and calling themselves the hero descendants of ALEXANDER'S soldiers. They put on the black skin of the goat, and do not believe in Muhammed; therefore they are called *Kāfir Siah Posh* (or black-dressed infidels).

I shall remain in great anxiety till the time I either examine with my own eyes the customs and manners, and the renowned features of this

curious and little known nation of *Siah Posh*, or we receive more authentic information from an European traveller in that country.

If my humble and zealous endeavours are worthy of your approbation, I beg you to send a copy of the journal to my kind friend Dr. MACNIELL, Assistant Envoy at the court of Persia, in Tehran, who was very anxious to learn about the *Siah Posh*, and, at the same time, much interested in the prosperity of your journal, which he was not well aware of till Dr. GERARD shewed him some numbers of it. I have another request to make,—that you will be kindly pleased to transmit a copy to the Committee of the Dehli College, to which I owe all my advantages.

*Jelalabad, 3rd Dec. 1833,*

[We shall have much pleasure in complying with our correspondent's request.—Ed.]

V.—*Abstract of a Meteorological Register, kept at Mozafferpúr, in Tírhút, (Lat. 26° 7' 20" N. Long. 85° 24' 30" E.), by T. Dashwood, Esq. C. S.*

Following up the plan already adopted with former tables, we have now to lay before our readers an abstract of the daily registers obligingly kept at our request by the gentleman whose name appears at the head of this notice, for the period of one year, in order to supply data for estimating the climate of Tírhút. Although unable to find space for the whole of these registers\*, we have extended the detail in some degree by taking the averages every half month, instead of only once a month. The only point on which there appears to be some little doubt is, as respects the diurnal oscillation of the barometer; which, being less than at places under the same parallel, leads us to suspect, that the instrument, being of the mountain construction, was not sufficiently sensible to minute impressions.

Its agreement also with the instrument registered in Calcutta was not noted before dispatching the barometer to Patna.

The prevailing wind at Mozafferpúr is from the east. It blows strong from the west in February and March:—north and south winds are of very rare occurrence.

Table I. is derived directly from the registers, with the exception of the barometer entries for November, which are filled in by interpolation; the thermometer for that month was registered in a tent at or on the road to Hajipúr.

\* The registers for December, 1832, and the two following months, were printed at length in the April number of the Journal for 1833.

TABLE I.—Half-monthly Averages of Observations of the Barometer and Thermometer in Tirküt.

Month.	Barom. at 32°		Ther. in doors.		Ther. out of doors.		Winds.		Weather.
	mean height at		means at		means of		W.	E.	
	9½ A. M.	4½ P. M.	9½ A. M.	4½ P. M.	Maxima.	Minima.	Number of days.	Number of days.	
1832.	inch.	inch.	°	°	°	°			
Dec. 1 to 15	29.650	.574	65.5	67.5	72.6	57.0	10	5	Fogs and drizzling rain.
16 to 31	.659	.574	59.0	62.5	68.5	48.5	13	3	Clear; (one fog in morning.)
1833.									
Jan. 1 to 15	.744	.636	58.6	61.6	69.5	50.6	9	6	Fine sharp weather.
16 to 31	.757	.648	59.7	62.8	70.3	51.2	9	7	Clear; some hazy and cloudy days.
Feb. 1 to 15	.609	.518	63.2	67.0	78.8	54.6	11	4	Cloudy, showers, & violent W. wind.
16 to 28	.641	.530	65.2	69.8	77.8	55.6	10	3	Fair with strong winds.
Mar. 1 to 15	.518	.445	71.0	76.8	85.5	60.5	14	1	Clear with strong winds.
16 to 31	.526	.424	76.8	80.7	90.5	67.7	13	3	Cumuli; (more W. wind than usual;) 1 storm.
Apr. 1 to 15	.467	.370	78.7	81.0	94.2	70.3	4	11	Clear; var. winds; 1 storm.
16 to 30	.360	.279	82.7	84.1	100.	76.0	8	7	Clear; fine weather.
May 1 to 15	.399	.292	82.2	84.1	95.5	74.8	4	14½	Flying clouds; gale from E.
16 to 31	.177	.143	83.5	84.9	94.7	78.2	1	15	Fair; one day rain.
June 1 to 15	.203	.134	85.8	87.5	102.	79.6	4	14½	E. morn. W. even., 2 north-westers.
16 to 30	.156	.091	84.7	86.4	95.9	79.7	4	14½	Hazy sky; 1 north-wester, 3 rain.
July 1 to 15	.154	.089	81.8	86.3	94.2	80.7	3	12	Fair; 3 days rainy.
16 to 31	.156	.100	84.3	86.0	91.7	80.5	0	16	Showery and fair.
Aug. 1 to 15	.165	.109	82.4	84.3	90.0	80.0	6	9	1 N., 1 S., heavy rain and storms.
16 to 31	.251	.168	82.1	83.4	88.7	79.3	2	14	Heavy rain; 8 days fair.
Sept. 1 to 15	.274	.193	82.9	83.7	89.3	79.2	1	14	Fair; 3 days rainy.
16 to 30	.286	.198	84.4	86.0	91.2	80.3	1	14	1 S.; fair; 1 storm; 3 showers.
Oct. 1 to 15	.401	.305	82.3	84.0	89.7	77.5	0	15	Cloudy without rain; fair.
16 to 31	.582	.493	78.6	81.1	88.5	71.3	6	10	Calms; fair; 2 str.
Nov. 1 to 15	.600	.510	76.2	83.6	85.0	64.0	2	13	Fog. morn.; fair day; strong winds.
16 to 30	.630	.540	72.7	81.0	83.5	60.7	8	7	Ditto; earthquake on the 26th.
Means.	29.432	.348	76.0	79.0	87.0	69.1	132½	232½	Moist mild climate.

Table II. is deduced from the foregoing, according to the form adopted for other localities. The range both of temperature and of pressure

is a little less than that observed at Benares, but the mean temperature agrees almost precisely with the quotation for that place.

TABLE II.—*Summary of Pressure and Temperature.*

Month.	Barometer at 32°.			Thermometer.				Wind.
	Average monthly altitude.	Monthly deviation from annual mean.	Mean diurnal oscillation each month.	Average height within the house.	Mean of daily extremes in the open air.	Monthly deviation from annual mean.	Mean diurnal range each month.	
	inches.	inch.	inch.	°.	°.	°.	°.	
Jan.	29.698	+ .308	.111	60.6	60.4	—17.6	19.0	e.w.
Feb.	.575	+ .165	.101	66.4	66.7	—11.3	23.2	W.
Mar.	.479	+ .089	.087	76.3	76.1	— 1.9	23.9	W.
Apr.	.369	— .021	.089	81.6	85.2	+ 7.2	24.1	W.E.
May	.252	— .138	.071	83.7	85.3	+ 7.3	19.5	E.
June	.146	— .244	.068	86.0	89.2	+11.2	19.1	E.
July	.125	— .265	.060	84.6	86.7	+ 8.7	12.3	E.
Aug.	.173	— .217	.070	83.2	84.5	+ 6.5	9.8	E.
Sept.	.237	— .153	.085	84.3	85.0	+ 7.0	10.5	E.
Oct.	.445	+ .055	.093	81.5	81.5	+ 3.5	14.7	E.
Nov.	.570	+ .180	.090	78.4	73.8	— 4.2	21.9	E.
Dec.	.614	+ .224	.080	63.6	61.6	—16.4	17.7	W.
	29.390	range 573	.084	77.5	78.0	rang.28.8	17.9	

VI.—*On the Land Shells of India.* By Lieut. Thomas Hutton, 37th Regt. Native Infantry.

*To the Editor of the Journal of the Asiatic Society of Bengal.*

I have the pleasure to send you a few observations on the land and fresh-water shells of India, which I have had the good fortune to collect since January, 1832, accompanied by specimens, which will serve better than drawings to shew you the species described.

I am sorry I cannot at present offer you a greater number of each, as my collection is not very numerous, but should any of those sent be desirable, I shall have pleasure in collecting for you whenever opportunity may occur.

The same offer I would also extend to the Society, did I think I could be of any use in swelling the treasures of their museum.

Being as yet but a tyro in natural history, and having no works of any great authority by me, I have hesitated in affixing even a generic name to my descriptions, and should these be wrong, I must crave your indulgence and correction\*.

\* We have received Lieut. HUTTON'S Specimens in safety, but have not been yet able to make drawings of them to illustrate his valuable notice; neither have we ventured to alter the generic or specific names given to them by the author, which would require greater knowledge of the subject than we possess. They remain, however, open to any future correction.—ED.

## PART 1.—Land Shells.

Genus CYCLOSTOMA, (*torquata* ?)

Animal unknown to me.

SHELL.—Diameter about  $1\frac{1}{4}$  inch; spire, prominent and pointed; whorls, rounded and six in number; umbilicus, well defined and discovering to the third whorl; aperture circular, margins united, thickened, and reflected: slightly inclined to be angular at the point where the right lip comes in contact with the body whorl; interior of the aperture with a red or deep orange-coloured ring.

Colour of the shell dingy white, with irregular tortoise-shell coloured patches and transverse broken lines on the upper side of the whorls; the under side with longitudinal bands of the same colour, leaving a broad longitudinal white stripe down the middle of the body whorl; operculum horny; concentric lamellar. In some shells the colours are more vivid than in others; I have one in my possession of which the colour is a pale yellowish brown or buff throughout, the markings being very little darker than the ground colour: this however does not appear to have been caused by exposure, as the shell exhibits a very healthy appearance. This is the only specimen with an operculum.

These shells I found at Rajmahl, lying dead among the loose bricks and rubbish by the side of pathways leading among the ruins of the ancient palace. It is probable that they may be found living on the rocks in that neighbourhood, and among the ruins themselves; I had however no time to spare, and was obliged, though reluctantly, to proceed without making farther discovery.

No. 2.—Genus CYCLOSTOMA, (*fasciata* ?)

Animal unknown to me.

SHELL.—Diameter little more than half an inch, or  $5\frac{1}{2}$  lines; whorls five in number, and flattened on the upper side; spire depressed and flattened, even with the whorls; mouth horse-shoe shaped, (not circular,) the margins reflected and partially interrupted by the body whorl, a thin plate alone joining them; colour white, with four or five longitudinal stripes of reddish brown: the first\* or upper stripe being generally the broadest and darkest, and following the whorls from the apex to the margin of the mouth. Umbilicus discovering the third whorl. I have seen no operculum.

These shells I have often found in dry ravines and on the banks of the Ganges, where they were no doubt left by the subsiding waters after the rainy season.

On account of the aperture being horse-shoe shaped, I have placed a mark of doubt to the generic name.

\* In some the second (not the first) stripe is the darkest, &c.

No. 3.—Genus *HELIX* ?

**ANIMAL.**—Dark brown or blackish, with four tentacula, the two superior ones being longest, and bearing the eyes at their summits; tentacula clubbed or forming a button at the tips, retractile; body elongate, with a hooked process on the extremity or tail, pointing backwards: from the right side of the animal proceed two narrow, flat, gradually-pointed filaments or tentacula, which, when the animal is in motion, are kept constantly playing over the surface of the shell, and in all probability give it the high polish it possesses.

**SHELL.**—Thin, fragile, pellucid, with a small pillar cavity, not discovering the previous whorls; whorls six or seven in number; colour pale brownish; shell very glassy, with fine smooth polish; aperture lunated, margins edged and disunited, being interrupted by the body whorl; diameter about one inch; spire flattened, as are also the sides of the shell more or less.

I have placed a mark of doubt to the generic name, because I do not find in the description of the genus *Helix* any allusion made to the process on the tail of my specimen, nor to the two tentacula proceeding from the right side of the animal. I found specimens of these shells, dead, in dry ravines, and on the banks of the Ganges.

They live however in rocky situations, so that their being found in the above-mentioned places must be owing to the mountain streams having carried them off during the rains.

I procured living specimens at Tara, in the range of rocky hills near Mirzapúr, in the month of August, 1832. In wet weather, or more properly speaking, during the rains, they sally forth from their retreats in quest of food, which consists chiefly of vegetable matter. They prefer the early hours of morning to feed in, before the sun has sufficient power to become distressing to them; they appear to require a great deal of moisture, while in motion, without which the slimy matter, which exudes plentifully from their bodies, becomes so thick as to impede the progress of the animal: I observed this to be the case with several which I kept alive for some time; when a few drops of water were sprinkled upon it, the animal put itself in motion, and continued so to do, until the slimy matter became too thick to allow it to proceed without evident exertion. I never found these shells in motion, except on very wet days, and the above circumstance may probably be the reason. At the close of the rainy season, they deposit their eggs in the ground, and retire to some secure retreat, where they remain during the cold and dry seasons of the year, protected from the weather by the dark caves or blocks of stone among which they conceal themselves, shutting up the aperture of the shell with a viscous fluid, which soon

hardens, and becoming like a thick coating of gum, effectually excludes the external air.

The ova are deposited in long strings, and are white.

No. 4.—GENUS *BULIMUS*.

SPECIES. *B. acutus*? Drap. Moll. 77. Also, vide Flemming's British Animals.

ANIMAL.—With four tentacula, bulging and rounded at the summits, and the two longest having the eyes at the tips; body elongate and tapering posteriorly, of a pale colour; the tentacula inclining to pale brown.

SHELL.—Ground colour white, with a longitudinal brown band on the lower side of the body whorl, and many irregular small spots of the same colour; markings of increase distinctly seen; the smaller shells have a tinge of very pale brown in the ground colour; margin of the mouth slightly reflected on the small pillar cavity; whorls eight in number; length  $5\frac{1}{2}$  lines; shell turretted; spire acute; whorls gradually tapering; mouth ovate, longer than broad; right lip edged.

This elegant little shell I first found at a place called Dhuni, in the Jypoor territory, on some large banyan trees\* (burgut) overhanging a tank. They conceal themselves during the dry seasons in holes, and beneath the bark, shutting up the mouth of the shell with a brittle gum-like substance, which enables them to adhere to the wood. I found some of this species also at Neemuch during the late rains, on a *Khajoor* tree†, and also on vines in a garden.

No. 5.—*BULIMUS*?

ANIMAL.—Furnished with four tentacula, retractile, the two upper ones being the longest, and bearing the eyes at the summits; foot elongate, rather rounded posteriorly, truncated before; colour pale yellowish.

SHELL.—Transparent, thin, and pale coloured, or rather colourless; spire gradually tapering; whorls 12; body whorl equal to the two preceding ones; length  $6\frac{1}{2}$  lines; aperture longer than broad, semi-ovate; pillar lip straight and slightly reflected; right lip edged.

This delicately formed shell I found beneath a flower pot at Mirzapoor, in September, 1832.\* They were in great abundance, particularly among the grass growing at the base of the outer walls of my Bungalow. I afterwards found them beneath stones at Futtehpoor Sikra, in December, and also buried deep in the earth with Pupæ at different places in the rocky hills, between Agra and Neemuch. They feed on

\* *Ficus Bengalensis*, vel *Indica*.

† *Phoenix Sylvestris*?

‡ I have only one of this length, the generality being about five lines. It has also 12 whorls, while the others have about 9 or 10.

vegetables, but appear to have no objection to animal matter also. They bury themselves in the earth, descending foot foremost after the manner of the Pupæ, and remain torpid during the dry season.

I had lately a great number of living specimens in a torpid state, buried in a large glass jar full of earth, in which they had lived eight or nine months; most of these I find however to have died, leaving a string of whitish ova in the shell.

No. 6.—Genus PUPA.

**ANIMAL.**—With four tentacula, the upper pair being longest, and bearing the eyes at the summits; animal blackish; tentacula bulging at the tips. Ova-viviparous.

**SHELL.**—About  $7\frac{1}{2}$  or 8 lines long, cylindrical, spire blunt; whorls 9 or 10; aperture roundish or sub-quadrate; margins thickened, and slightly reflected, interrupted by the body whorl, a thin plate intervening. Colour of living specimens, very pale brownish.

The exuvia of these shells is very common in ravines and on banks of rivers, and in these situations the shells are always white from exposure.

They are to be found in abundance in the range of hills between Futtehpoor Sikra, and Neemuch, and it is probable that they are to be met with in the hills near Mirzapoor, and indeed all along that range. They bury themselves deep in the earth, beneath huge masses of rock, the roots of trees, &c. in immense numbers together. They appear indeed to have formed a community, so thickly do they lie upon each other, and to have buried themselves by common consent in a chosen spot. They do not appear to be scattered indiscriminately over the whole rock, but only in selected spots here and there. The aperture of the shell is generally closed with a very thin coat of hardened viscous matter, considerably thinner than fine silver paper.

They appear to be ova-viviparous; I found one shell with four or five young ones in it, all dead, and having 2 or  $2\frac{1}{2}$  whorls. Another with three young ones of three whorls each.

No. 7.—PUPA.

**ANIMAL.**—With four tentacula, buttoned at the tips, the upper pair longest and bearing the eyes at the summits; colour blackish.

**SHELL.**—About  $2\frac{1}{2}$  lines in length; whorls 8; spire rather obtuse; colour brown; aperture rounded, margins reflected and interrupted by the body whorl.

The shell is covered over with a coating of mud. These little shells I found at Beana; they were adhering to the face of a bare and very steep rock; the mouth of the shell is stopped up with a viscous fluid similar to the foregoing descriptions, and this enables them to stick to

the rock with such firmness as to render it difficult to detach them without breaking.

I found one or two buried in the earth, among the preceding species.

From their being covered with clay, I was at first inclined to pass them, thinking they were the nidi of some small species of fly. They were scattered over the bleak face of the rock in great numbers.

The "*Bulimus Obscurus*" is said to cover itself with mud in the manner as here mentioned, but it also changes the materials of this coating according to circumstances; for instance, if on a tree, it makes use of bits of lichen to conceal itself, or if on rocks, it uses clay and so on. Perhaps the above species may be found to do likewise.

#### No. 8.—PUPA.

**ANIMAL.**—With four tentacula, retractile, clubbed at the tips; the superior pair longest, and bearing the eyes. The upper pair of tentacula and a line along the back leading from them are vermilion coloured; the lower tentacula minute, and with the rest of the animal very pale yellow; body elongate, inclining to a point posteriorly.

**SHELL.**—Thin, vermilion-coloured when living, but diaphanous and colourless when cleared of the animal, cylindrical, obtuse at the summit; whorls seven or eight; aperture rather subquadrate, with four teeth, and corresponding indentations externally; length about three lines; margins of the mouth reflected.

These shells I discovered first at Mirzapoor beneath garden pots, and at the base of the walls of my Bungalow, in company with "*Bulimus*" No. 5, in September, 1832. Their habits appear to be the same; they were however very scarce, and I could only find one or two buried with Pupa No. 6, in the rocks between Agra and Neemuch.

#### No. 9.—Genus SUCCINEA.

**ANIMAL.**—With four tentacula, short and thick; the superior pair bearing the eyes at their posterior summits. Colour greenish.

**SHELL.**—Thin, fragile, diaphanous, and colourless; aperture longer than broad, and ovate; margins edged; lines of increase delicate and distinctly seen; spire prominent; whorls twisting rapidly and four in number. The body whorl forming nearly the whole shell. Length of my largest specimen half an inch.

In form these shells are very like the *Lymnææ*. I found them adhering to the face of the rocks at Beana in December, 1832, along with Pupa No. 7. There was a thin coat of a hard gum-like substance closing the mouth of the shell.

I also found a few buried with Pupæ in the earth.

## No. 10.—Genus AMICULA.

Species.—*A. Scarabæus*. Lam.

ANIMAL.—Unknown to me.

SHELL.—Ovate, flattened; aperture with seven teeth; right lip edged and white; left lip pale coloured and partially reflected; whorls eight or nine; close. Colour pinkish chesnut, with a few darker marks here and there. Spire short; body whorl large and forming more than two-thirds of the shell; aperture longer than broad and flexuous. Length about seven lines.

I found this specimen on the banks of the Ganges in 1832. But I do not recollect the place, and I made no memorandum of it at the time. It was lying, however, a very little above the water line, on a sand bank. It is the only specimen I have seen.

In "Burrow's Elements of Conchology," this shell is described and figured under the Linnæan name of "*Helix Scarabæus*," in the following manner.

"Shell ovate, two edged, sub-umbilicate; aperture toothed."

"Specimen brown, variegated with pale spots, outer lip and teeth horny, white; whorls contiguous double convex; aperture narrow, compressed and flexuous; each lip with three teeth; inhabits Asia."

The plate accompanying this description, and taken from a specimen, at once shews it to be identical with the shell in my possession; but the author errs in saying "each lip with three teeth," inasmuch as his plate and my specimen have only one large tooth on the inner lip, three on the right lip, and (in the plate) two large teeth on the body whorl; my specimen has, besides the two on the body whorl, a very minute one arising near the base of one of them, and which, although not noticed by that author, is still nevertheless a distinct and decided tooth.

La Marck says, it is "seven-toothed."

Having now given a slight description of each species of land-shells in my collection, I shall, before concluding my letter, mention a circumstance connected with most of them, for which I have not been able satisfactorily to account, nor indeed have I as yet had an opportunity of ascertaining, whether the fact, hereafter mentioned, may be considered as one of the constant habits of the animals, although from the observations I made at the time, I am strongly inclined to think, it may. My attention was first called to the subject, while searching for Pupæ No. 6.

When proceeding in December, 1832, to join my regiment, my route lay, from Futtehpoor Sikra to Neemuch, chiefly through a range of low rocky hills, and observing great numbers of these Pupæ, dead, in ravines and on banks of nullahs, I naturally concluded that living

specimens might be found in the hills, and accordingly whenever our encampment lay within a moderate walking distance, I set forth, after breakfast, with sundry apparatus for digging up and securing whatever prize I might be lucky enough to meet with.

For the first day or two my search for shells was ineffectual, and I returned to my tents tired, and puzzled to account for my bad success, until at last, we encamped between two detached hills. Here I once more commenced a search, which for several hours proved as unsuccessful as before; but the day being cool, and the surrounding scenery very beautiful, I climbed up the rocks and crossed over to the *eastern* side, where I again commenced a search, which in a very short time was rewarded with a more abundant supply of living Pupæ than I had ever thought of obtaining.

These were buried deep in the earth, where they might undoubtedly have remained, safe from prying eyes, had not a little mouse, fortunately enough for me, selected that very spot, whereon to sink its subterranean retreat, and thus unconsciously betrayed the hidden treasures.

The circumstance of these shells being found only on one side of this rock, induced me to go and examine the one on the opposite side of our encampment, and there also I found Pupæ deeply buried in great numbers, but only on the eastern aspect.

From this time I made a point of inspecting the neighbouring hills, whenever within easy distance, sometimes finding no shells, while at others I found them in abundance, and invariably facing towards the E. or S. E. In company with these, I found at different places a few specimens of *Bulimus* (No. 5), Pupæ (Nos. 7 and 8), and *Succinea* (No. 9).

I now began to recal to mind the situation in which I had found *Bulimus* No. 5, and Pupa No. 8, at Mirzapoor, and they also were decidedly only to be found on the S. E. side of my Bungalow; and moreover, I am nearly certain that *Helix*, No. 3, found at Tara, was also on the eastern aspect. Pupa No. 7, and *Succinea* No. 9, as also numbers of Pupa No. 6, were found on the rocks at Beana, facing to the same direction; and *Bulimus* No. 4, although a few were found elsewhere, were by far more numerous on the eastern side of the trees, than on the others; and this also I observed at the commencement of the rainy season at Neemuch.

Having therefore satisfied myself that all the living species of land shells, which I have collected, were found on or nearly on the same aspect, viz. eastern or S. E.; it only remains to ascertain the cause of such partiality, and as this is most probably connected with the welfare of the animal, it may be concluded that the all-wise Director of nature has imparted an instinct to these tender beings, which enables them to choose the

situation most favourable to their wants and safety. May not, therefore, the fact of their being found on the eastern aspect of the rocks and trees be accounted for, by supposing it to originate in a desire to find shelter from the western blast during the dry heats of summer, and to be in a situation to enjoy the first refreshing and invigorating showers of the rainy season?

I have put the above as a query, because I am not certain that the rains prevail from the eastward or south-eastward, although at this station they have certainly done so this year. I shall however take every opportunity of ascertaining, whether the above is a constant habit of the land shells or not, and in this I hope I shall be assisted by others of your correspondents who may be willing to pay attention to the subject.

#### PART 2.—*On the Fresh-water Univalves.*

##### No. 1.—Genus AMPULLARIA.

AMPULLARIA.—Found in jheels; Mr. BENSON'S description of the animal, as far as I have been able to ascertain, is perfectly correct. Operculum calcareous?

*Var.* With longitudinal brown bands; found with the last, in jheels at Mirzapoor.

I have one large specimen with stripes, which is indeed the only one I have seen, but the young ones are very commonly met with. Operculum calcareous.

##### No. 2.—PALUDINA, *Bengalensis*?

This is a very common shell, occurring plentifully in most jheels and stagnant nullahs. In the Jegu nullah at Chunar they are in abundance, but the first specimens I procured at Humeergurh near Nee-much, in a large jheel. The animal is beautifully studded over with black and orange coloured spots. It is ova-viviparous; from one I obtained 102 young ones. Length of the shell from  $1\frac{1}{2}$  to 2 inches. The young have a ridge or keel on the body whorl, which makes the aperture sub-triangular; this is lost in the mature shell.

The umbilicus of the shell varies much in different specimens, some shewing scarcely any, while others have it very well defined and rather deep.

The shell is covered with an olive-green epidermis and longitudinally striped with brown; on the body whorl these stripes are nine in number, and are placed alternately, a narrow one and a broad one. Operculum corneous.

##### No. 3.—PALUDINA.

In jheels and stagnant nullahs.

This has a broad brown band running longitudinally from the apex to the aperture.

The young are keeled like those of the last species. Length about one inch—aperture with a bleak horny rim. Operc. corneous.

No. 4.—PALUDINA.

Found in a large jheel near Chunar.

The spire very much corroded. Colour pale olive-green. Aperture with a black horny rim. One of these produced 27, and another 87 young ones; they have the ridge and the sub-triangular aperture when young. Length from nine lines to an inch. Animal orange and black. Operc. corneous.

No. 5.—PALUDINA.

Found in the Jegu nullah at Chunar.

Shell solid and thick, pale green, interior white. Little more than an inch in length. Operc. corneous.

No. 6.—PALUDINA.

Found in a very large jhil near Chunar. Colour dark olive-green, and longitudinally striped with 10 black stripes, alternately narrow and broad. Spire corroded; margins of the mouth with a horny rim. This shell is more globular than any I have seen, belonging to the Genus Paludina. I have only two of them, and the animal is unknown to me. Operc. corneous.

No. 7.—VALVATA ?

This is the shell of which a description appeared in the 9th No. of the Journal, under the head of Notes on the Habits of the Paludina.

These shells differ much in the development of the umbilicus, some having it well defined, others having scarcely any. Operc. calcareous.

This I found at Mirzapoor, at the foot of trees, in puddles of water.

No. 8.—VALVATA ?

These I have seen in abundance on the banks of the Ganges and nullahs, but always dead and injured from exposure to the sun. The only living ones I have seen, I found at Dhuni in the Jypoor territory, under a wall enclosing one side of a dirty tank. The spire of these is not corroded like the last species, nor has it any umbilicus; aperture angular above and below. Operc. calcareous.

No. 9.—VALVATA ?

Found with No. 7, at Mirzapoor.

The aperture only angular above.

No umbilicus. Operculum calcareous.

No. 10.—PLANORBIS, *Corneus* ?

These may be found in almost every jheel or stagnant piece of water. Like all the fresh-water univalves, they bury themselves in the mud, as the water evaporates during the hot seasons of the year. I brought a lump of dry clay from the bed of a jheel at Mirzapoor, to Neemuch, and

having kept it for a year, I found on immersing it in water, that the shells imbedded in it, were still alive and healthy. Diameter  $\frac{3}{4}$  inch.

No. 11.—VAR.? PLANORBIS.

These I brought from Mirzapoor, and have marked them as a variety, on account of their form being more regular, than the last; they were found plentifully, and may probably prove the young of Planorbis No. 10.

No. 12.—PLANORBIS.

The whorls in this species are very much flattened.—The aperture opening obliquely and oval—shell thin and diaphanous—whorls 4 or 5 in number—diameter  $3\frac{1}{2}$  lines.

The exuvia common on the Ganges.—They are found in stagnant waters—more frequently in nullahs than in jheels.

No. 13.—PLANORBIS.

Animal blackish. The shell minute, of three or four whorls, which are rounded; aperture oblique; diameter about  $1\frac{1}{2}$  line.

These very small shells I found during the hot winds of 1833, in the earthen pans containing the water for ray tatties. They were drawn from a well in my compound, the bottom of which is hard trap-rock, and also from one other well near my house. How they got into these wells I cannot conceive, as there is no nullah or pond near them. They were not abundant.

No. 14.—MELANIA.

These I found on the banks of the Ganges among exuviae. They are injured by exposure to the sun. They inhabit rivers.

No. 14.

A smaller size. These appear to be the same as the foregoing. I obtained them during the hot winds, from the same well in which the small Planorbis, No. 13, was taken. This is a curious fact, as the bottom of the well is hard trap-rock, and unless the animals burrow into the sides of the well, they cannot possibly find protection at the bottom of it. In this well there is no true spring, it being supplied merely by the water soaking down from the surface during the rains.

No. 15.—MELANIA.

I have one specimen, which was given me by a friend of Mr. BENSON'S, from whom he obtained it. The epidermis is dark olive green. Shell 2 inches long. The body whorl longitudinally tuberculated.

No. 16.—MELANIA.

This species, of which I have only one specimen, is of a blackish colour. Transversely wrinkled on the whorls. Length  $1\frac{1}{2}$  inch.

This I found in a nullah at Chunar, which with the exception of the rainy season, at which time it joins the Ganges, is strictly "stagnant water." The animal was alive, and in soft mud.

I mention this circumstance, because Mr. BENSON has said in No. 13 of the GLANINGS IN SCIENCE, when speaking of Melaniæ, "I have never met them in jheels or standing waters, so that they may be strictly called fluviatile."

I have not yet had an opportunity of procuring any of these shells alive, from rivers: the only two living specimens in my collection were taken—the one from a muddy nullah, the other from a well.

No. 17.—LYMNÆA.

Shell thin, fragile, diaphanous.

Found in abundance in the Jegu nullah at Chunar, also in most jheels.

*Fresh-water Bivalves.*

No. 18.—UNIO?

Found in nullahs at Chunar; also in tanks. Length of my largest specimen  $2\frac{1}{2}$  inches; epidermis greenish brown; beaks decorticated. Interior, beautifully nacreous.

No. 19.—UNIO?

Found at Chunar in nullahs and tanks. Beaks decorticated; epidermis dark-brown. These shells are generally tuberculated interiorly, presenting an appearance of small pearls. The pearly texture of the interior is often coloured with a pinkish tinge.

No. 20.—UNIO?

In rivers, nullahs, and tanks. Plentiful in the Jegu nullah at Chunar. Epidermis yellowish or pale brownish green. Beaks naked. More solid than the preceding, and the interior lustre more brilliant.

No. 21.—UNIO?

Can this be the young of Unio No. 18?

I found them frequently in small pools of water, left in the hollows of sand-banks on the Ganges; they are easily traced by the tortuous furrows which they leave on the sand. They are very slight, and the interior appears to be satiny.

No. 22.—CYCLAS.

Epidermis olive-brown, and in some, of different shades of olive-green. Transversely furrowed; beaks sometimes pale purplish, sometimes decorticated.

Found in the Ganges and other rivers.

No. 23.—VAR.

Epidermis pale yellow, or dirty straw-colour.

In the Ganges at Mirzapoor.

No. 24.—VAR.

Some specimens brownish, others pale yellowish, with longitudinal rays or stripes of brown.

At Mirzapoor in the Ganges.

## No. 25.—NOVACULINA GANGETICA—BENSON.

Found at Mirzapoor in the Ganges.

On stormy days, I generally found plenty of them.

*Note to the Editor.*

These are all I have yet collected.

I have sent a few of each kind, except Nos. 10 of the Land Shells, and 6, 15, 16, and 25 of the Fresh-water Shells. Of some of those sent I have so very few that I could only spare one or two, without making my cabinet very bare. The poorness of the specimens therefore I hope you will excuse for the present, and should you not already possess sufficient, I shall have pleasure in sending more whenever lucky enough to fall in with them.

Should any part or the whole of the present communication be too trifling for the pages of your Journal, do not hesitate an instant in rejecting it. My object in writing, not being for the sake of *seeing myself in print*, but for the purpose of communicating facts, in the cause of truth.

Neemuch, 20th October, 1833.

*List of Land and Fresh-water Shells\*.*

- |  |                                       |
|--|---------------------------------------|
| <i>Land Shells.</i>                    |                                       |
| 1. Cyclostoma, (mih) torquata ?        | 8. Valvata ? .....                    |
| 2. _____ ? (mih) fasciata ?            | 9. _____ ? .....                      |
| 3. Helix, ..... (mih) petrosa ?        | 10. Planorbis, ..... corneus ?        |
| 4. Bulimus, ..... acutus ?             | 11. Var. _____ ? ..... var.           |
| 5. _____ ? .. (mih) gracilis ?         | 12. _____, ... (mih) compressus.      |
| 6. Pupa, ..... (mih) cylindrical ?     | 13. _____, .....                      |
| 7. _____, ..... (mih) coenopicta ?     | 14. Melania, .....                    |
| 8. _____, ..... (mih) bicolor ?        | 15. _____, .....                      |
| 9. Succinea ? ..... oblonga ?          | 16. _____, ... (mih) .....            |
| 10. AuriculaScarabæus, Scarabæus, Lam. | 17. Lynnaea, .. limosa ?              |
| <i>Fresh-water Univalves.</i>          |                                       |
| 1. Ampullaria, .....                   | 18. Unio ? .....                      |
| Var. .... (mih) striata ?              | 19. _____, .....                      |
| 2. Paludina, ..... Bengalensis ?       | 20. _____, .....                      |
| 3. _____, .....                        | 21. _____, .....                      |
| 4. _____, .....                        | 22. Cyclas, .....                     |
| 5. _____, .....                        | 23. _____, .....                      |
| 6. _____, .....                        | 24. _____, .....                      |
| 7. Valvata ? .....                     | 25. NovaculinaGangetica, } Gangetica. |
|  | BENSON, .....                         |

The specific names are given in my cabinet to enable me to distinguish them, and I have here inserted them, for the sake of reference should you notice them. Those marked (mih) I have myself given. The others are those of Authors, and given where I thought they belonged.

\* When we are able to furnish a plate of these shells, the present figures of reference shall be preserved.—ED.

VI.—*A Catalogue of Stars to be observed with the Moon, in March and April, 1834, with the view of determining the difference of longitude of the places whereat they may be observed.* By John Curnin, Esq. F.R.A.S.

Of all the methods which have hitherto been devised for the determination of the difference of longitude of any two places on the surface of the earth, it is now agreed on, that that dependent upon the observed interval of time which elapses between the transit of the moon's limb and of a star, having the same declination as the moon, is the most accurate, certain, and expeditious.

It is the most accurate, because it involves no data but the rate at which the moon's right ascension increases in the interval between its passing over the two meridians: it is the most certain, because it can be put in practice, at least twelve times in each lunation: it is also the most expeditious, because as many stars as may be agreed upon, and as are especially fit for this purpose, may be observed at both observatories on each night; each of which, if a corresponding one has been made at the other observatory, being independent of the others, serves to give an independent estimate of the longitude.

It does not seem necessary that I should give a detailed account of this method of determining the longitude, because that has been ably done by Mr. BAILY in the Memoirs of the Astronomical Society; nor that I should insist on the accuracy and value of this method, as both seem to be attested by the fact, that for the first time a catalogue of moon-culminating stars has been inserted in the Nautical Almanac for this year: but inasmuch as I have ventured to insert some stars in the accompanying catalogue, which are expressly rejected in the report made by the Committee of the Astronomical Society, relative to the improvements to be introduced into the Nautical Almanac, I feel it necessary to insert here that portion of the report, in order that it may be compared with my reasons for deviating from its implied injunction, and which, I trust, will be deemed sufficient by resident observers in India:

“ The Committee strongly recommend the insertion of the list of moon-culminating stars, given in the late Supplements to the Nautical Almanac, as affording one of the best modes of determining the longitude of distant places, when the navigator, furnished with a transit instrument, can obtain a landing. As it is absolutely essential, however, that only one list of such stars should be published for the use of navigators of all nations, and as Professor Encke proposes to discontinue his list as soon as he is assured that the British Government will permanently adopt one, the Committee trust that they may be excused for entering rather more minutely into the mode in which those stars should be selected. They recommend, therefore, that not more than four stars should be selected for one day, two of which are to

precede and two to follow the moon: that the stars thus forming each pair be chosen so as not to be very distant from each other in right ascension, and nearly midway between the right ascension of the moon at the time of her transit on two consecutive days: that the two stars chosen to follow the moon on one day be adopted as the two to precede the moon on the subsequent day: that no star be selected below the 5th, but on no account below the 6th, magnitude: that the stars so chosen should not be situated more than five degrees from the path of the moon's true orbit: and that the list should be continued through each lunation within four days of the new moon: that the apparent right ascension (in time) of the star to two places, and the mean declination of the star to the nearest minute, be given."

In the first place, those stars recommended by the council are intended for universal use, and as being the most likely to be visible in ordinary states of the weather in places having variable climates. The number of these stars seem to me to have been selected with reference to fixed observatories, wherein a few observations being made on each night of every lunation for a considerable interval of time, would eventually assign the difference of longitude between them with the utmost accuracy: whereas, those in India, with one exception, may be aptly called flying observatories. It has seemed to me to be desirable that we should be enabled to determine the difference of longitude of these, in the shortest interval of time; and therefore, for this reason, and from the consideration that the climate will interpose no serious obstacle to their being observed, I have inserted those stars which are so expressly repudiated by that report.

Another motive for forming this extended catalogue has arisen from this consideration, that those stars inserted in the *Nautical Almanac* have been selected with regard to observatories wherein astronomers or their assistants are expected to spend their nights, and who, therefore, are supposed to endure no pain and to forego no pleasure to be prepared to make those especial observations at all hours; whereas, with the exception already referred to, observers here have other duties of a civil, political, or military nature to fulfil, and may, therefore, however willing, be unable at all times to attend at the proper hour of the night to make those observations, and those correlative ones whereby the error of their time-pieces, and the deviation of their instruments from the meridian, may be determined.

For these reasons, and for others, which will easily suggest themselves, I have ventured to draw up the accompanying extended catalogue; but from which it will be observed, that the interval of time necessary to devote to the transit will seldom exceed one hour. If, however, gentlemen would observe those stars which are inserted in the *Nautical Almanac*, and which I may have omitted, they would essentially promote our geographical knowledge in India, as their observation, combined with those

which are sure to be made in Europe, would enable us to fix the longitude of places here relative to the principal observatories in Europe.

With the view of holding out every possible inducement to gentlemen to make these observations, I have inserted the apparent right ascension of the stars, although so far as this method of determining the longitude is concerned, the mean places would have answered equally well; and if inserted, would have saved me much trouble. But as gentlemen in India, for whose use this catalogue is intended, may not have accurate time-pieces, nor sufficient leisure to determine the errors of them, or the deviation of their instruments from the meridian, I have inserted a few stars which it appeared to me could be observed without in any manner trenching upon the time necessary for the other observations, and which if observed would enable us to determine the error of the time-piece and the deviation of the instrument from the meridian at the time of making these observations, and thus to render the kind of watch employed but a matter of secondary consideration.

The certainty with which the longitude can be deduced by this method appears to me so great, as to induce the conviction that many gentlemen would gladly make an extensive series of such observations, if they saw the chance of corresponding observations being made to confer a value upon their labours: and, as they may rest assured that those observations will be cheerfully made by Mr. Taylor of the Madras observatory, they will be sure of having at least one point of reference besides those which their own labours will create. With the view then of affording all the aid which circumstances at present place at my disposal, I send you the accompanying catalogue, and will continue to prepare others for circulation in succession through the same channel, till experience shall have convinced me of the propriety of discontinuing them.

I have but one more remark to make—and that is, that it appears to me to be most desirable that gentlemen should transmit their observations as they are made, which you could arrange in the form of a table, and publish for general information. In this manner all parties would be enabled to compare their own observations with those of others, and assign a cause for any anomaly which these comparisons should point out. To make these observations of permanent value, I shall, I trust, be excused for stating, that it appears to me to be very desirable that the spot whereon they are made should be more accurately defined than similar observations made in other places have hitherto been:—that, in short, an exact measurement of the distance of the observatory from some remarkable and natural objects should be given, so that the position of these, and of the observatory, should be permanently preserved.

## Catalogue of Stars to be observed with the Moon in March 1834.

Mar.	Names of Stars.	Mag	Decn.	A. R.	Mar.	Names of Stars.	Mag	Decn.	A. R.
			o'	h. m. s.				o'	h. m. s.
18	119 Tauri,	(5.6)	+18 27	5 22 28.02	21	63 Cancri,	6	+16 14	8 48 18.22
	121 —,	6	23 55	25 18.14		1 Limb,		20 45	53
	123 —,	(3.4)	21 2	27 42.68		b2 Arg. Car.	5	-58 26	55 21.29
	125 —,	6	25 48	29 25.81		77 Cancrī,	(5.6)	+22 43	59 48.57
	α Columbæ,	2	-34 10	33 37.74		(1117)	6	21 58	9 4 7.79
	132 Tauri,	5	+24 30	38 18.65		wArg. Car.	5	-58 16	6 37.18
	30 Aurigæ,	5	55 39	40 55.44		83 Cancrī,	6	+18 25	9 42.75
	136 Tauri,	(4.5)	27 34	42 52.97		(1135)	5	+82 3	12 47.20
	β Columbæ,	3	-35 50	45 6.21		(1141)(Leo.)	7	20 31	15 25.30
	139 Tauri,	(5.6)	+25 55	47 41.03		4 Leonis,	(4.5)	23 42	22 14.77
	1 Limb,		23 4	49					
	141 Tauri,	6	22 30	51 39.38	22	8 Leonis,	(6.7)	+17 11	9 27 51.84
	2 Geminor.	(6.7)	23 39	56 40.82		h Arg. Car.	5	-58 28	29 39.47
	3 —,	6	23 8	59 38.38		16 Leonis,	6	+14 47	34 41.45
	6 —,	(6.7)	22 56	6 2 14.08		18 —,	6	12 35	37 26.67
	2 Lyncis,	(4.5)	59 4	4 57.34		φ Argus,	4	-53 45	51 4.30
	α Columbæ,	(4.5)	-35 5	10 38.68		1 Limb,		+16 54	56
	13 Geminor.	3	+22 36	12 54.32		30 Leonis,	(3.4)	17 35	58 16.78
						34 —,	6	14 12	10 2 42.31
19	54 Aurigæ,	6	+28 24	29 4.31		(1220) —	6	18 35	7 13.14
	27 Geminor.	3	25 17	33 42.41		41 —,	2	20 41	10 48.97
	(834)	5	77 10	35 43.91		42 —,	6	15 49	12 54.74
	α Can. Maj.	1	-16 29	37 49.73		r Arg. Car.	(4.5)	-40 47	15 14.39
	36 Geminor.	(6.7)	+21 57	41 35.85		36 Urs. Maj.	5	+56 50	19 59.61
	37 —,	6	25 34	45 5.21		46 Leonis,	6	15 0	23 20.56
	1 Limb,		23 49	48					
	42 Geminor.	6	24 27	52 17.25	23	49 Leonis,	6	+9 31	10 26 19.82
	43 —,	4	20 49	54 15.33		p Arg. Vel.	5	-47 20	30 22.14
	23 Can. Maj.	4	-15 23	56 14.61		37 Sextantus	6	+7 16	37 27.05
	47 Geminor.	6	+27 8	7 1 4.56		μ Argus,	3	-46 34	39 39.97
	52 —,	7	25 10	4 32.08		46 Leo. Min.	(4.5)	+35 7	44 1.26
	64 Aurigæ,	5	41 10	6 28.49		56 Leonis,	7	7 5	47 24.62
	(897)	5	-44 53	8 15.31		63 —,	(4.5)	8 15	56 27.40
						1 Limb,		11 47	57
20	α Argus,	4	-42 58	7 23 57.86		52 Urs. Maj.	(3.4)	45 25	11 0 19.72
	74 Geminor.	6	+18 3	29 53.15		(1322)(Leo.)	(6.7)	8 59	5 24.56
	77 —,	4	24 47	34 24.41		(1326)	6	13 46	7 17.92
	81 —,	6	18 55	36 30.14		π Centauri,	4	-53 33	13 28.94
	82 —,	7	23 33	38 37.09		78 Leonis,	4	+11 27	15 16.47
	83 —,	5	27 12	43 19.39		1 Draconis,	(3.4)	70 16	21 31.17
	85 —,	(6.7)	20 20	45 58.24		1 Virginis,	(6.7)	9 4	29 54.57
	1 Limb,		23 4	50					
	χ Argus,	3	-52 32	52 34.15	24	89 Leonis,	(6.7)	4 0	13 25 52.78
	9 Cancrī,	6	23 7	56 27.66		1 Virginis,	6	9 4	29 54.55
	16 Cancrī,	6	18 9	8 2 41.06		3 —,	(4.5)	7 28	37 20.23
	γ 2 Argus,	2	-46 50	4 25.88		Hyd. & Crat.	6	-25 48	40 21.47
	19 Cancrī,	6	+24 33	10 39.18		64 Urs. Maj.	2	+54 38	45 5.38
	1 Ursæ Maj.	(4.5)	61 17	16 24.35		(1383)	7	4 25	49 44.10
	28 Cancrī,	(6.7)	24 42	18 45.33		8 Virginis,	5	7 33	52 22.79
						1 Limb,		5 47	56
21	33 Cancrī,	6	21 1	8 23 6.06		11 Virginis,	7	6 45	12 1 36.92
	39 —,	6	20 36	30 32.92		(1404) —	5	78 33	4 25.81
	(1058) —,	7	20 28	32 17.42		4 Corvi,	3	-16 35	7 17.45
	47 —,	(4.5)	18 46	35 14.52		16 Virginis,	(5.6)	+4 15	11 55.39
	β Argus,	3	-54 5	40 8.32		17 —,	6	6 15	14 5.79
	(1086)(Can.)	7	+18 0	43 50.48		(1434) —,	7	5 20	19 51.62

## Catalogue of Stars to be observed with the Moon in April, 1834.

Apr.	Names of Stars.	Mag	Decn.	A. R.	Apr.	Names of Stars.	Mag	Decn.	A. R.
			° ' " h. m. s.					° ' " h. m. s.	
17	10 Cancri,	(6.7)	+22 4	7 57 58.66	20	4 Virginis,	(5.6)	9 11	11 39 23.09
	16 —,	6	18 9	8 2 40.61		6 —,	6	9 23	46 32.61
	(1013) —,	(6.7)	21 16	10 38.79		9 —,	(4.5)	9 40	56 45.87
	20 —,	6	18 52	13 51.18		8 Centauri,	3	-49 46	59 49.25
	24 —,	7	25 5	16 46.66	21	10 Virginis,	6	+ 2 51	12 1 11.54
	ε Argus,	2	-58 58	19 6.22		8 Crucis,	3	-57 48	6 22.81
	33 Cancri,	6	+21 0	23 5.64		13 Virginis,	6	+ 0 9	10 10.53
	4 Ursæ Maj.	5	64 54	25 37.88		17 —,	6	+ 6 15	14 5.77
	γ 1 Limb,	2	22 5	29		(1434)	7	+ 5 20	19 51.68
	43 Cancri,	5	22 4	33 39.77		γ Crucis,	(2.3)	-56 9	21 54.70
	ο Argus,	4	-52 19	35 32.79		γ 1 Limb,	7	+ 2 48	25
	8 —,	3	-54 5	40 7.47		(1458) Virg.	4	+ 2 47	29 55.57
	(1088) Can.	7	+17 52	46 1.15		γ 1 Virginis,	7	- 0 30	33 15.84
	69 —,	6	25 7	53 0.93		β Crucis,	2	58 45	37 7.69
	77 —,	(5.6)	22 43	59 48.19		37 Virginis,	6	+ 3 59	43 10.83
18	81 Cancri,	(6.7)	+15 40	9 3 12.08		77 Urs. Maj.	3	56 52	46 43.58
	82 —,	6	15 38	6 3.36		44 Virginis,	6	- 2 53	51 7.57
	83 —,	6	18 25	9 42.37		14 Can. Ven.	5	+36 42	57 59.38
	ε Argus,	2	-58 33	12 37.69	22	44 Virginis,	6	- 2 53	12 51 7.57
	(1441) Can.	7	20 31	15 24.87		48 —,	6	- 2 44	55 22.22
	4 Leonis,	(4.5)	23 42	22 14.35		14 Can. Ven.	5	+36 42	57 59.38
	N Arg. in Car	5	-56 17	26 10.17		51 Virginis,	(4.5)	4 37	13 1 22.37
	γ 1 Limb,		+18 55	29		ε Centauri,	3	-35 48	11 19.53
	(1173) Leo.	7	20 57	34 4.15		66 Virginis,	6	4 16	15 55.95
	20 —,	7	21 58	40 32.10		γ 1 Limb,		- 3 33	22
	φ Argus,	4	-53 45	51 3.58		79 Virginis,	4	+ 0 16	26 15.58
	(1200)(Leo.)	7	+12 26	55 14.76		ε Centauri,	3	-52 35	29 27.90
	30 Leonis,	(3.4)	17 35	58 16.50		82 Virginis,	(5.6)	- 7 50	32 55.44
19	32 Leonis,	1	+12 47	9 59 31.62		1 Centauri,	5	-32 10	36 18.90
	34 —,	6	14 12	10 2 42.07		μ Centauri,	4	-41 37	39 40.69
	37 —,	6	14 34	7 46.21		3 —,	(4.5)	-32 8	42 18.32
	42 —,	6	15 49	12 54.47		10 Draconis,	(4.5)	+65 33	46 36.04
	r Arg in Vel.	(4.5)	-40 47	15 14.00		93 Virginis,	(4.5)	+ 2 22	53 13.24
	45 Leonis,	6	+10 37	18 52.98		11 Draconis,	(3.4)	+65 11	59 56.46
	46 —,	6	15 0	23 20.33		99 Virginis,	4	- 5 11	14 7 20.19
	γ 1 Limb,		14 30	28		10 Draconis,	(4.5)	+65 33	13 46 36.74
	r Arg. in Vel.	5	-47 20	30 21.72	23	v 2 Centauri,	5	-44 46	51 26.24
	52 Leonis,	6	+15 5	37 37.65		(1601) Virg.	7	- 8 26	55 35.61
	53 —,	6	11 26	40 31.99		94 —,	6	- 8 4	57 31.80
	v Arg. Car.	5	-57 57	46 49.26		96 —,	(6.7)	- 9 31	14 0 11.31
	α Ursæ Maj.	2	+62 39	53 26.64		98 —,	4	- 9 28	3 44.19
	63 Leonis,	(4.5)	8 15	56 37.25		16 Bootis,	1	+20 4	8 6.42
	70 —,	3	16 21	11 5 31.66		100 Virginis,	4	-12 34	10 9.29
20	63 Leonis,	(4.5)	+ 8 15	10 56 27.25		2 Librae,	6	-10 55	14 30.59
	52 Urs. Maj.	(3.4)	45 25	11 0 19.45		γ 1 Limb,		- 9 43	20
	(1322) Leo.	(6.7)	8 59	5 24.43		27 Bootis,	(3.4)	+39 3	25 24.93
	77 Leonis,	4	8 57	12 34.77		(1651)(Lib.)	(6.7)	-11 34	28 13.63
	78 —,	4	+11 47	11 15 16.36		α Lupi,	3	-46 39	30 58.12
	1 Draconis,	(3.4)	70 16	21 31.21		34 Bootis,	(4.5)	+27 15	36 8.33
	19 Hyd. Crat.	4	-30 55	24 51.45		7 Librae,	(5.6)	-13 26	40 14.83
	γ 1 Limb,		+ 8 58	27		13 —,	6	-11 11	45 23.54
	1 Virginis,		9 4	29 54.49		β Lupi,	(3.4)	-42 26	47 43.47
	2 —,	5	9 12	36 43.46		18 Librae,	7	-10 27	49 56.54

## VII.—Miscellaneous

*Anniversary Meeting of the Royal Asiatic Society, Saturday, 11th May, 1833.*

The Report of the Proceedings of the Tenth Annual Meeting of this prosperous Institution has just reached us, and we hasten to put our readers in possession of such parts of it as must be interesting to those engaged in kindred researches and pursuits in the country whence the literary food of all Asiatic Societies is alike provided. The proceedings themselves are as usual on such occasions but a string of unanimous thanks for services, great or small, rendered during the past year. We are sorry to see that Mr. GRAVES C. HAUGHTON had been obliged to resign the office of Secretary, from ill health; he has been succeeded by Captain HENRY HARKNESS. The Right Honorable C. W. W. WYNN continues to be President, and Lieut.-Col. J. TOD, Librarian.

Economy has been the standing order in the financial department, not without good effect, since a debt of £160 has been cleared, and a balance accumulated of nearly £400 from the contributions of the year, after a payment of £300 for printing, and £900 for house rent, taxes, and establishment.

The Society has 232 paying members, at 2 and 3 guineas per annum; it admitted 23 new members in 1833, paying five-guinea admission fees. We observe among the sources of income a yearly donation of one hundred guineas from the Court of Directors, besides many valuable presents, and a hundred pounds from the Oriental Translation Fund:—a lamentable contrast all this to the state of things in the parent Society of Bengal, which has received, at least in these latter days, but little indeed of the fostering aid and patronage either of the local Government or of the Honorable Court; and has itself subscribed (from the contributions of only about fifty paying members) a hundred pounds yearly to the Translation Fund; and yet cannot even attempt to print a volume in promotion of the professed objects of that useful institution on the responsibility of a resident committee of the fund! We remark that the composition for the subscription of an elected resident member of the Royal Asiatic Society is thirty guineas, and for a non-resident, twenty: the same scale might, we think, be advantageously adopted into our own rules.

There is another new rule equally worthy of imitation; namely, “that the resignation of no member shall be received until he has sent in a written declaration, and has paid up all his arrears of subscription.”

We remark with pleasure the acknowledgment of several literary contributions from native corresponding members in the Madras presidency, the result we would hope of the extension of English education in the peninsula: the same good effect is already visible in our own pages, and it is a part of our ambition, as it is of the Royal Asiatic Society, “to become an active and useful instrument in calling forth the great but almost dormant talents of the natives of India. It is by urging the singularly intellectual races of that country to make known through themselves the result of their ancient and steady civilization, that it hopes to make manifest to the philosophic inquirer into human nature the character of the remarkable and interesting people who have not merely been the authors of their own improvement, but who have steadily preserved, by the force of primeval institutions, their sacred language, their literature, and their laws, in spite of the anarchy and misrule consequent on the invasions of many barbarous nations by which they have been either subjugated, or their country laid desolate.”

The obituary list of 1832 is of melancholy extent, it comprises many of the élite of the Orientalists of Europe: their memory and their achievements belong to India, and we cannot render a pleasanter service than in extracting at length from

the Report before us, the epitome of the deeds of those among them who were the most conspicuous for their learning and talent ; passing by such names as the Raja of Tanjore, whose merits, however great, were those of a patron rather than a labourer in the field of Oriental research.

“ Dr. ADAM CLARKE was born in the county of Derry, in Ireland, about the year 1760, and commenced his studies as a minister in the Wesleyan connection, at the age of eighteen. It was not till long after this period that his attention was turned to the study of Oriental literature ; but he eventually acquired a profound knowledge of the Hebrew language and its sister dialects, ample proof of which is afforded by his highly esteemed commentaries on the Old and New Testaments. This was his principal work, and it extended to eight volumes quarto. Another work of great research and value has been published since the death of Dr. CLARKE, with a continuation by his son, the Rev. J. B. B. CLARKE, containing a view of the succession of sacred literature, from the invention of alphabetical characters to the year 1300.

“ On the return of Sir A. JOHNSTON from Ceylon, in the beginning of 1818, he brought with him two young priests of Budd'ha, who were anxious to increase their knowledge by a visit to England ; and on their arrival in this country, they were placed by that gentleman under the care of Dr. CLARKE, who had very liberally offered to receive them. They remained with him for two years, when they returned to their native country.

“ The life of Dr. ADAM CLARKE has been so fully detailed in the auto-biography which has been recently laid before the public, that it is unnecessary to dwell more particularly on it in this place. He continued attached to the study of Oriental literature to the latest years of his life, which was brought to a termination in the autumn of last year, by an attack of cholera.

“ As Secretary to the Madras Auxiliary Society, the connexion of Mr. JAMES LUSHINGTON with this body was of an intimate and important character. When, on the arrival of the late Governor of Madras at that Presidency, he proceeded forthwith to carry into effect the suggestions with which he had been furnished by this Society for the re-organization of the Literary Society of Madras, his private secretary and second son, the subject of this notice, was selected for the situation of Secretary to the Asiatic department of the Institution ; and the manner in which the duties of that office were performed amply proved the propriety of the choice. To the possession of talents of no common order, he united great industry and zeal. The active share he took in the promotion of an object which this society had much at heart, namely, the continuation and completion of the Historical and Antiquarian researches of the late Colonel MACKENZIE, cannot easily be forgotten ; and the Council has to regret that by his death an interruption has occurred in the prosecution of this design. He expired at Lulpettah, near Vellore, on the 12th of September 1832, after a tedious and painful illness, at the early age of twenty-eight years.

“ The late Lieutenant-Colonel JOHN BAILLIE entered the service of the Honourable the East-India Company in the year 1790, and arrived in India in 1791. He applied himself with great diligence to the study of the learned languages of the East ; as a proof of which, it may be mentioned, that in the year 1797, at the desire of the then Governor-General, (Sir JOHN SHORE, now Lord Teignmouth,) he undertook the translation from the Arabic of a copious digest of Muhammedan Law, so arranged as to comprise the whole of the Imaea code, as applicable to secular matters. This work it was originally contemplated would extend to four volumes in quarto, but of these the first only was ever published, and that without the preliminary discourse or table of contents. It comprehends only the laws of commercial transactions.

“ On the establishment of the College of Fort William, Colonel BAILLIE was appointed professor of the Arabic and Persian languages and of Muhammedan Law, a post which he filled with high credit until the year 1807, when he was appointed resident at the court of the NAWAB VIZIR of Oude, in place of Colonel COLLINS. During the period

of his professorship, Colonel BAILLIE was twice called into active service as political agent to the Governor General in Bundelkhand, and for the zeal and ability displayed by him in this capacity, he was honoured with the public thanks of the Government. In the year 1801, he published a series of sixty tables, elucidatory of the first part of his course of lectures at the college, on the inflexions of Arabic grammar; and in 1802, he published the two first volumes of his edition of the original texts of the five most esteemed works on Arabic grammar, namely, the *Miut Amil*; *Shurhu Miut Amil*; *Misbah*; *Hedayet un Nuhvi*; and the *Kafeea of Ebn Hajeb*. In consequence of his employment in Bundelkhand, the work was not completed till 1803; and his intention of publishing an English version of the third volume, and indeed all further literary exertion, appears to have been put a stop to by his appointment to Lucknow, where he remained till 1815. In 1818, he retired from the service, and in 1823, succeeded the late Mr. COTTON as a Director of the East-India Company.

"M. ABEL REMUSAT was born at Paris on the 5th of September, 1788, and was consequently in his fifty-fourth year at the time of his death. He was originally designed for the medical profession, and applied himself successfully to the requisite studies; but at the same time he indulged in a taste for Oriental literature, and selected as his principal object of pursuit in this direction the almost inaccessible language of China. He was unassisted in this task either by grammars or dictionaries, for none at that period existed in print; yet, in spite of this disadvantage, he persevered, and succeeded in overcoming the difficulties opposed to his progress; for it was not until after he had published his *Essays on the Chinese Language and Literature*, that he became possessed of the *Dictionarium Latino-Sinicum*, in manuscript, of the French Mission at Peking. The talents thus signally displayed at this early age by M. REMUSAT secured him exemption from the law of conscription, so rigidly enforced throughout the French empire. In connection with the Chinese, M. REMUSAT studied the Mandchu and Tibetan languages; and when in the year 1814, at the suggestion of the BARON DE SACY, two professorships were founded in the Royal College of France, for the more effectual cultivation of the Sanscrit and Chinese languages, M. REMUSAT was nominated to fill the latter, and this honourable post he maintained till the period of his decease. In 1820, he published the first volume of his *Recherches sur les Langues Tartares*, a work in which the literature of these nations is ably discussed. The sequel to this work, intended to contain the original texts of which translations had appeared in the first volume, has never been published. In 1822, he produced his *Grammar of the Chinese Language*: a work arranged in a lucid and methodical manner, which has reflected high credit on his abilities and acquisitions. M. REMUSAT contributed many papers of value to the *Memoirs of the Academy of Inscriptions*; and the notices of and extracts from the Oriental MSS. in the *Bibliothèque du Roi*. A few years back, he published his translation of the Chinese novel entitled *Yukiao-li*; or, the *Two Fair Cousins*. He has left behind him three important works in MS., two of which, however, are unfinished: one of these is a *Philosophical Dictionary of the Budd'hist Religion*, translated from one published at Peking, in Sanscrit, Tibetan, Mandchu, Mongol, and Chinese: the second is a translation of the *Travels of the two Chinese Priests of Budd'ha*, in Tartary, Thibet, and Persia, which he had undertaken to prepare for publication by the *Oriental Translation Fund of Great Britain and Ireland*, when death, from a disease in the stomach, intervened, and prevented the fulfilment of this intention. The third is an account of the *Natural History of the eastern countries of Asia*; and in this laborious enterprise he was to have been assisted by the powerful aid of the first naturalists of France, and indeed of Europe, for among them may be recorded the names of CUVIER, BROWN, CORREA DE SERRA, PETIT THOUARS, JUSSIEU, VALENCIENNES, &c. &c.

"On the retirement of the venerable and illustrious BARON DE SACY from the President's chair of the Asiatic Society at Paris, he was succeeded by M. REMUSAT, who retained it until his decease; and the BARON DE SACY has since resumed the office thus left vacant, at the earnest solicitation of the Society.

M. REMUSAT possessed a mind of the highest order. Every thing he produced was done with facility, and was remarkable for its luminous and profound character. His loss cannot easily be supplied, and Oriental literature will long have reason to deplore the untimely death which carried him off, when his judgment and acquirements might be supposed to have only just reached their highest maturity.

"One of the most illustrious scholars reared under the auspices of M. REMUSAT was JEAN ST. MARTIN, who, from an attack of cholera, followed his former master to the tomb at the brief interval of thirty-seven days.

"While ABEL REMUSAT devoted himself to the investigation of the philosophy, history, antiquities, and natural history of China, Tibet, and in general of all those countries where Budd'hism and Chinese manners prevail, ST. MARTIN occupied himself with researches into the ancient history of Persia and the adjacent countries. He had for this purpose studied particularly the Semitic family of languages, the difficult idiom of Armenia, and the Zend and Pahlavi. The extent and value of his investigations may be judged of from the Memoirs on Armenia, which he published in two volumes: they are full of erudite and ingenious matter, and their appearance fully established his character as an Oriental scholar and critical antiquary.

"The chronology of ancient nations was his favourite object of study, and he aimed at elevating it to the rank of one of the exact sciences. Unfortunately but few of his works in this path are printed, and the same remark applies to several valuable essays on the ancient history of Africa, and other subjects, which were read before the Académie des Inscriptions. In February, 1822, he published his opinion, that the Egyptian tablet, generally known under the name of the Zodiac of Dendera, was a work of comparatively modern date, and but few months had elapsed when the discoveries of Champollion proved it to be even more recent than the era assigned to it by M. ST. MARTIN, the monument itself, with the other erections of Esne and Dendera, being referable to the reign of the Emperor Claudius.

"To M. ST. MARTIN must be attributed the suggestion of an archæological journey into the East, which was subsequently undertaken by that able and lauded scholar, Dr. SCHULTZ, at the expense of the French Government. His design was to collect Zend and Pahlavi MSS., antiquities, and medals, and to make fac-similes of all the cuneiform inscriptions. The specimens he had succeeded in obtaining previous to the melancholy termination of his existence by assassination were placed in the hands of M. ST. MARTIN, and enabled him to complete an alphabet of the cuneiform character, published a few months before his decease, by M. KLA PROTH, in his "APERÇU des diverses Ecritures," &c. Besides the literary labours noticed above, and many others which the Council is precluded from mentioning here, M. ST. MARTIN was the principal conductor of the journal published by the Asiatic Society at Paris; and to his care and exertions its high character, as a repository of Oriental literature, must be in a great measure ascribed. In conclusion, it may be said of M. ST. MARTIN, that he was not less respected for his strict integrity and ardent adherence to truth, than admired for the composure of his mind under the trials of adversity.

"Scarcely had the dreadful scourge which had spread from Asia to Europe removed ST. MARTIN, ere it struck another eminent Orientalist, of whom France might be justly proud; in the latter end of the month of August, M. ANTOINE LEONARD CHEZY fell its victim in the sixtieth year of his age. To Monsieur DE CHEZY belongs the glory of having attempted and succeeded in laying open the rich stores of Sanscrit literature, at a period when no assistance was to be derived from grammars, or even the communications of others who had been tempted to explore the same path. Before the studies of Mr. VALENTIN and Sir WILLIAM JONES were known in Europe, M. DE CHEZY had penetrated, with no other key than the imperfect outlines of P. de St. FRANCIS BARTHELEMY, into the closed portals of Brahmical lore. The principal work which he has left behind him, is an edition and translation of the well-known Sanscrit drama entitled Sacountala. A short time before his death he finished transcribing another called the Dhourta Samâgama; the MS. of which is in the hands of the BARON DE SAOY, and will probably be printed. An analysis of the celebrated

poem of the *Râmâyana* is also spoken of as having been prepared by him : this, with a small essay on the theory of the *Shloca*, or Sanscrit heroic metre, comprises his principal productions. He also published the poem of *MĀJNOON* and *LEILA*, from the Persian, which was remarkable for the elegance of his diction ; and in 1831 an abstract and translation of the century of erotic verses by the poet *AMRU*. That the productions of his intense and unremitting study were not more numerous is deeply to be regretted, and must be ascribed to the unfortunate state of his health for many years, exasperated by the occurrence of some mortifying circumstances. *M. CHEZY* was remarkable for the amiability and gentle playfulness of his disposition, qualities which ensured him the devoted attachment of his friends and pupils.

"The two professorships left vacant by the death of *MM. REMUSAT* and *CHEZY* have been filled by *M. JULIEN* and *M. BURNOUF*. Both these able scholars are foreign members of this Society, and would satisfy every wish that could be formed for these important chairs being worthily filled, if we could forget the rare endowments of the eminent men whose loss we have had to deplore.

"At the general meeting of the Society, held on the 1st of December, a donation of an edition of the *Fables of LOCMAN*, and two small works on the language of Iceland, was laid on the table from Professor *EMANUEL RASK* ; and it was then announced, there was reason to fear, that the highly distinguished scholar from whom they were received had died since he had despatched them to this country. This intelligence was shortly afterwards confirmed ; and in the death of Professor *RASK* the study of Oriental literature has lost one of its most able and indefatigable adherents. The peculiar branch of research to which he had devoted himself rendered his investigations particularly interesting ; and his numerous publications illustrative of the languages and literature of the ancient inhabitants of Northern Europe, combined with the knowledge which he had acquired of the most important languages and literary antiquities of the East, fully attest his qualifications for the task of comparing, showing their agreement and distinction, and illustrating them.

"Among his numerous philological works may be mentioned grammar of the Italian, Spanish, Anglo-Saxon, and Icelandic languages, treatises on the Phonics of India, and the Literals of Europe ; tracts on the Zend language and the Zend Avesta, and many others.

"In the course of the session of 1832, a communication addressed by Professor *RASK* to the Bombay Literary Society, containing his remarks on the last-mentioned subject, was read before this Society, and has been ordered to be inserted in the Transactions.

"Professor *RASK* was remarkable for the facility he evinced in the acquisition of different languages. In the year 1822, it is stated that he was acquainted with no less than twenty-five. His knowledge of English was extensive and correct. He spent some years on a literary mission in Persia, India, and Ceylon, where he procured many valuable manuscripts, and acquired much sound information on those points to which his attention was more especially directed. From his temperate habits of life, approaching indeed to abstemiousness, the vicissitudes of climate and season had no apparent effect on his frame, and he gave promise of many years' continuance in his favourite pursuits, when the insidious effects of consumption prematurely terminated his useful and laborious career. His mild and gentle manners endeared him to his friends and acquaintance ; and he combined, with an extent of acquirements not often equalled, a remarkable diffidence and modesty.

"Professor *RASK* was keeper of the Oriental MSS. in the Royal Library at Copenhagen, and had recently been appointed a commissioner to prepare measures for the amelioration of the condition of the Danish colonies in Guiana. He was elected a Foreign Member of the Royal Asiatic Society in the year 1826."

*Dr. ALEXANDER TURNBULL CHRISTIE*, and *M. VICTOR JACQUEMONT* are also honorably mentioned in the Report ; but we observe nothing more than is already known to our readers in the sketch of their career.

Meteorological Register, kept at the Assay Office, Calcutta; for the month of February, 1834.

Day of the Month	Barometer reduced to 32° Fahr.				Thermometer in the Air.					Depression of Moist-bulb Thermometer.				Hair Hygrometer.		Rain.	Wind.			Weather.			
	A. M.	At 10 A. M.	At 4 P. M.	At 10 P. M.	Minimum at 4 A. M.	At 10 A. M.	Max. by Reg. Ther.	At 4 P. M.	At 10 P. M.	At 4 A. M.	At 10 A. M.	At 4 P. M.	At 10 P. M.	At 10 A. M.	At 4 P. M.		Inches.	Morning.	Noon.	Evening.	Morning.	Noon.	Evening.
1		.881	.884	.944	68.1	73.8	83.7	79.5	71.3	7.1	4.2	4.6	2.3	.97	.92					clear.	cumuli.	clear.	
2	.967	.984	.943	.996	67.5	73.0	85.9	76.2	70.0	1.7	10.2	14.1	6.9	.83	.73					do	clear.	do	
3	.966	.985	.977	.946	61.2	70.3	82.7	74.0	67.4	11.7	14.6	10.6	7.8	.70	.70					do	do	do	
4	.964	.985	.977	.946	62.0	71.2	83.2	75.4	70.0	5.9	12.0	13.6	10.0	84	76					do	cumuli.	do	
5	.984	.984	.964	.964	64.0	72.0	83.3	76.4	67.8	3.7	9.5	12.2	5.7	.82	.82					do	clear.	do	
6	.962	.962	.965	.927	61.2	71.2	85.7	74.4	66.3	4.6	10.4	14.8	11.5	.85	.73					do	do	do	
7	.980	.984	.849	.843	61.6	68.4	87.1	74.9	66.2	4.6	9.1	14.1	5.9	.85	.76					do	do	do	
8	.903	.904	.849	.843	63.2	71.3	84.2	76.0	69.3	3.5	9.6	12.1	5.2	.82	.84					do	do	st. fog.	
9	.902	.904	.849	.843	63.1	73.6	85.7	77.5	73.0	3.1	7.4	10.1	3.5	.97	.90					do	do	do	
10	.942	.930	.857	.853	63.1	73.6	85.7	77.5	73.0	3.1	7.4	10.1	3.5	.97	.90					do	cumuli.	clear.	
11	.920	.968	.870	.921	68.2	75.8	86.1	79.8	72.4	1.8	5.5	7.8	1.9	.98	.93					do	do	strata.	
12	.903	.970	.814	.918	70.2	75.5	88.1	79.3	75.0	0.4	3.5	6.3	5.5	.97	.91					do	do	cumuli.	
13	.863	.964	.854	.892	70.5	74.4	79.0	77.2	66.3	2.5	8.0	10.4	4.5	.93	.87					do	nist. cl.	clear.	
14	.931	.991	.886	.910	69.0	74.7	86.2	77.2	66.2	2.8	6.5	6.3	1.2	.95	.94					do	clear.	overcast.	
15	.872	.947	.845	.820	69.3	70.9	79.6	74.3	67.8	0.3	4.9	10.9	6.0	.83	.83					do	clear.	rainy.	
16	.914	.947	.945	.911	62.0	71.0	78.4	72.2	66.2	7.0	9.9	11.7	7.5	.82	.75					do	clear.	clear.	
17	.963	.963	.892	.952	61.0	71.0	86.0	75.1	69.0	3.9	9.9	13.0	9.0	.93	.71					do	do	do	
18	.914	.944	.762	.826	64.1	72.4	83.0	76.2	69.0	4.0	7.4	11.7	7.8	.96	.81					do	do	do	
19	.779	.968	.742	.821	63.1	73.7	80.3	77.9	72.1	4.1	5.8	12.8	9.2	.92	.77					do	do	do	
20	.793	.847	.742	.860	64.8	74.0	86.1	76.3	71.1	2.8	6.9	15.4	7.1	.88	.72					do	do	do	
21	.890	.917	.833	.891	65.4	74.8	88.2	81.6	75.5	4.3	6.3	16.9	11.3	.83	.69					do	do	do	
22	.862	.954	.928	.876	70.1	77.2	89.1	81.0	74.4	7.6	11.2	13.9	7.7	.92	.77					do	do	do	
23	.831	.900	.775	.834	67.8	75.4	89.7	79.8	73.2	3.8	3.9	13.3	3.6	.91	.73					do	mist do.	do	
24	.809	.881	.756	.865	72.5	77.5	91.1	81.8	73.0	0.1	2.7	13.5	2.0	.95	.72					do	mist cl.	do	
25	.848	.894	.898	.984	72.1	78.8	89.2	82.2	74.1	0.5	4.9	9.8	6.9	.93	.87					do	do	do	
26	.965	.968	.960	.904	73.2	79.3	84.1	81.5	76.2	2.8	6.2	9.9	6.9	.95	.88					do	do	do	
27	.943	.984	.880	.883	72.6	78.6	79.5	78.6	73.1	2.1	5.1	15.1	6.7	.95	.88					do	do	do	
28	.931	.980	.790	.860	67.2	78.1	79.0	82.4	71.0	1.1	6.5	11.8	3.0	.90	.90					do	do	do	
Mean,	29.903	.962	.864	.919	66.5	74.0	84.7	77.8	70.6	3.3	7.3	11.6	6.2	.90	.81	0.41				gentle and variable.		pleasant weather.	

The instruments for 10 A. M. and 4 P. M. are suspended in the free air of the Laboratory, those for 4 A. M. and 10 P. M. in the south veranda of a third story near the cathedral. The register thermometer for extremes is also in the same veranda.

JOURNAL  
OF  
THE ASIATIC SOCIETY.

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No. 27.—March, 1834.

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- 1.—*A Description, with Drawings, of the Ancient Stone Pillar at Allahabad called Bhim Sen's Gadá or Club, with accompanying copies of four inscriptions engraven in different characters upon its surface. By Lieut. T. S. Burt, Engineers.*

[Read at the meeting of the 26th December 1833.]

IN compliance with your request made some time since, that I would prepare copies of the characters engraven on an ancient pillar lying in the Fort of Allahabad, I have much pleasure in forwarding them, together with a geometrical and an explanatory drawing of the stone, (Plate III. *ct. seq.*), which shew the situations occupied by each of the characters on the upper surface, as well as sections and elevations of the capital, which lies detached near to the top of the shaft.

The column tapers from the base to the capital from a diameter at the former of three feet two and quarter inches, to two feet two inches at the latter; the circumference of the first mentioned part is about ten feet one inch, and of the last, six feet six and a quarter inches. This was about the size of the Delhi *lath* of FIROZ SHAH, which is stated to be ten feet four in circumference, and thirty-seven feet long. [see *As. Res.* vol. VII. p. 178;] the shaft of this one being thirty-five, and its total length, including the base, forty-two feet seven inches.

It appears to be a hard kind of r sandstone, nearly approaching to freestone, (and not granite,) and bears a kind of ~~shaly~~ bed in it, which accounts for its having peeled off at several places as hereafter noticed.

The common legend of the natives states the pillar to be the *gadá* or staff of BHIM SEN. It may be hardly necessary to state, that BHIM

SEN was the second brother of Raja YUDHISTHIRA, or YUDHISTHIR, (Shakespear's Hindoo Dictionary, page 149, of the year 1817,) whom KISHN or BISHN protected; now KRISHNA, the Apollo of the Hindoos, appears from page 599 to have lived, according to Colonel WILFORD, about 1300 years before Christ.

It is said to be the staff, with which he ground his bhang, and that the *bundi* or vessel in which the bhang was ground, was thrown into the Jumna on our taking possession of the fort. It is reported that this pillar was formerly standing near to its present position in the circular ring facing the gateway on the inside of this fort, and that it was taken down on the Fort undergoing alterations, which appears to have occurred in the 44th year of the reign of SHAH AULUM, when the plan of the fort is stated to have been altered by the English; [see page 34 of Shakespear's Hindustani Selections from the *Khelâsat-ul-tawarikh*, or Abridgment of History;] SHAH AULUM the second, came to the throne in A. D. 1761 (Hamilton's India, volume I. p. 410) so that by adding 43 years we shall bring the date of the transfer up to 1804, which was then the period of alteration of the Fort, and as is reported, of pulling down the pillar, but I have lately heard that this took place in 1798 or 99.

The capital of the column (shewn in the accompanying drawings) appears to have formerly borne a four-footed animal sitting upon it, and the slight traces remaining have the appearance of the Bull which is generally attendant upon Mahadeva. The animal must have been evidently "couchant," for the remains of the body as well as of the legs are connected to the stone itself.

The capital has a circular hole in it, probably to allow of the entrance of a point bar for fixing it on the top of the shaft, in the centre of which a similar hole is cut for that purpose.

The base of the shaft has a couple of projections similar to the trunnions of a piece of ordnance, intended probably as a place of fixture for the ropes which might be used in erecting it, or otherwise as a hold when built into its bed of masonry.

Taking the specific gravity of the block at less than that of marble and hard stone, 2.650, the weight of it will be found on calculation to be about 17 tons, 12 cwt. or 493 *mans*.

It is to be regretted that so handsome a column should be allowed to lie as it now does "unnoticed and unknown," when the outlay of about two thousand rupees would place it upon a neat pedestal in a more appropriate position, as it is represented to have stood formerly in the sketch in the Asiatic Researches. The pedestal should of course be constructed entirely after the native method of architecture, and have nothing Eu-

ropean at all in its composition, unless an incongruous effect were the desideratum of architectural beauty\*.

My brother of the 64th regiment, was kind enough (for it was a work of labor) to make a copy of so much of the various characters as is situated on the present upper surface of the stone (or *gadda* as it is named by the natives). Lieut. BURR having to rejoin his corps before the stone could be removed, I have employed a moonshee in effecting a copy of the part which remained under ground, for the stone was buried about a foot in the soil, partly from the effect of its weight, and partly from the pathway having been added to from time to time with road material. I have examined each of the copies (with the stone?), and corrected the shapes of those letters which appeared to require it both in the first copy and in its transcript.

The Persian inscription is so far peculiar, that in reading it upon the stone, the lower, or second line, is to be read first, so as to preserve the gradation of the nine Emperors of Delhi mentioned in it, TIMUR being the first, and JEHANGIR the last, in whose time it would seem to have been engraved. The year mentioned is 1014 (see compartment 2 from the left, vol. VII. page 180, Asiatic Researches), which appears on reference to Mr. SMITH's Chronological Table, at page 447 of the same volume, to have been the year in which JEHANGIR was crowned at Agra.

I do not send an exact copy of the ornament surrounding the Persian inscription, as that shewn in the volume referred to is so much more neatly done than any I could obtain that I beg to refer you to it: only one or two of the Persian letters differ from the copy now sent; they are in alto relievo, beautifully cut, and still appear as if newly executed upon the pillar.

The Persian letters being in alto relievo upon the central band of the stone, induced me to think that they must have been cut or left upon it on its first removal from the quarry, or in A. H. 1014 (A. D. 1605), as above noticed; but subsequent inspections induced me to think differently, for although the letters themselves are in alto relievo, or projecting far beyond the belt or zone upon which they rest, yet the plane of that belt or zone is excavated so deeply in the periphery of the stone that its depth is exactly equal to the height of the letters themselves, which shews without contradiction that the Persian inscription could have been engraved subsequently to the writing in the Sanscrit character, every letter of which is cut into the stone, and consequently has no projection whatever, excepting what the surface of the periphery pre-

\* Major IRVINE, Engineers, C. B. states that in 1826, he sent in an estimate to put it up for about 1800 rupees, but the Governor General, Lord AMHERST, objected to the expence on the grounds of its inutility!

sents at the interstices of the letters, whereas; if the ~~sunken~~ zone did not exist upon which the Persian characters stand prominently forth, and if the letters stood out beyond the general surface of the column itself, it might be reasonably assumed that the projecting Persian characters were coeval with the extraction of the stone from the quarry, or at least with the date of its receiving the final smoothing and polishing from its rough hewn state.

Measuring with a string I have perceived that the writer's name in Persian, ABDULLAH, in alto relievo in a separate compartment is likewise situated below the general surface of the stone: moreover, that it has been cut out at a part where the ancient inscription No. 2 had evidently peeled off before the Persian was written. This establishes the prior existence of the engravings Nos. 1 and 2, of which however, and without this proof, there could be no doubt. The same remark applies to the whole of the Persian inscription.

The Persian inscription runs thus, in the original, and rendered into Roman characters; each compartment of letters being read first from the lower line, as before explained.

الله اكبر \* نورالدين محمد جهانگير بادشاه غازي \* ياحافظ \* ابن اكبر  
 بادشاه غازي \* ياحفيظ \* ابن همايون بادشاه غازي \* ياحي \* ابن بابر  
 بادشاه غازي \* ياقيوم ابن عرشيد ميرزا \* يامقدر \* ابن سلطان  
 ابوسعيد يانور \* ابن سلطان محمد ميرزا \* ياهادي \* ابن مير  
 انشاه \* يابديع ابن امير تيمور صاحب قران \* يافادر \* احدالهي  
 شهر يورماه \* موافق ربيع الثاني 1014

*Allah Akbar—Nooruddin Muhammed Jehangir Badshah Ghāzi—ya hāfiz—Ibn Akbar Badshah Ghāzi—ya hafeez—Ibn Humāyun Badshah Ghāzi—ya hay—Ibn Bābar Badshah Ghāzi—ya kayum—Ibn Umar Shaikh Mirza—ya Mukladir—Ibn Sultan Abu Said—ya nur—Ibn Sultan Muhammed Mirza—ya hadi—Ibn Miran Shah—ya badia—Amir Timur Sahib-kiran—ya kadir—ahad illahi, sahr—yur shahr muafik rabiussani, 1014 (A. H.)*

#### Translation.

(God is great !)—The light of the religion of Muhammed, the Emperor JEHANGIR, victorious over infidels;—(Oh! Preserver)—son of the Emperor AKBER, conqueror of infidels;—(Oh! Protector)—son of the Emperor HUMAYUN, victorious over infidels.—(Oh! Giver of Life)—son of the Emperor BABER, victorious, &c.;—(Oh! Eternal)—son of UMAR SHAIKH MIRZA;—(Oh! Almighty)—son of Sultan ABU SEID;—(Oh! Light)—son of Sultan MUHAMMED MIRZA;—(Oh! Guide)—son of MIRAN SHAH;—(Oh! Wonderful)—son of Amir TIMUR, Lord of happy destiny;—(Oh! Omnipotent)—In the month *shahr yur*, in the 1st *Ilāhi*, corresponding with *Rabiussani* A. H. 1014\*.

\* The *Ilāhi* year should be 49, for the era of AKBER commenced with his reign, in the 5th *Rabi-ussani* 963 (= 1 March, 1605); therefore the word *احد* must be a

With respect to the specimen of the inscription on the pillar at Allahabad (shewn at page 180, volume VII. As. Res.) I beg to say that, that part which originally, or when it was copied in June 1797, was adjacent to the Persian writer's name "ABDULLAH," no longer exists, and has evidently peeled off; some of the letters I can find to agree, both of the stone and the specimen, but only a few, as most of the others are manifestly incorrect, as may be seen by comparing the specimen with the full copy now sent; the former should therefore be only looked upon as a partly correct and partly incorrect specimen of the character chosen here and there, and not as an exact copy of any part of the inscription; indeed, the line in this character which is situated above the Persian in Captain HOARE'S specimen, does not now appear upon the column at all.

The inscription No. 1, (which is evidently of the same character with that upon the *lat, h* at Delhi,) is in many parts illegible, chiefly because the outer surface of the stone has peeled off to the depth of one-eighth or one-fifth of an inch from those parts, caused probably in the first instance by the effect of the hammer and chisel, or other instrument used in engraving the inscription, so as to have either cracked or loosened the general surface to the depth of the letters cut; which surface, although not at the time apparently injured, might have become, in suffering frequent alternations of heat, cold and damp, so loose in some parts, as at last to peel and fall off in flakes.

The natives state, some that the unknown character is Marhatta, others that it is Punjābi, and that although no one at this place can now read it, a traveller from Bombay took a copy of it some years ago, and said that he could read and decipher the character; I requested my brother to make inquiries at Benares, and I have also written to Cawnpur, near to which the Mahratta Prince BAJEE RAO is stationed, with a hope of procuring information, but without effect.

The size of the letters of the ancient Sanscrit character No. 2, was about an inch in height and an inch more or less in breadth, and of the unknown character No. 1, nearly the same.

One part of the unknown character No. 1 similar in every respect to that on the Delhi *lat, h*, is situated above the Persian writing on the left hand side of the drawing No. 1. and consists of but a small portion of the different letters engraven on the stone.

wrong reading for ११. *Shahryur* is the 6th month, and falls in August. The Hijri also, *Rabi-us-sani* 1014, corresponds with the same month. *AKBER* died on the 13th of *Rabi-us sani* 1014, (= 21 August, 1605;) he inscription therefore must have been cut within a few days of this event;—the coronation of *JEHANGIR* did not take place till *Jamādi* 2, or two months later.—ED.

Sir C. MALET, at page 384, vol. vi. *As. Res.* speaks of Hindoo symbols in Bombay, does he thereby refer to the characters of the inscription? It is not impossible indeed that they may be of a numerical or astronomical character, as hidden to our knowledge as are the Egyptian hieroglyphics, for the square, triangle, circle, mercury, are to be frequently met with in the character No. 1.

My brother in passing Benares sent a specimen of the character No. 1, to the secretary of the Hindoo College here; but that officer was unable to give any assistance in deciphering it. Lieut. B. from Benares says, "I have made every inquiry regarding the inscription, No. 1, on the pillar, a specimen of which I took with me from Allaha-bad; but neither the head pundit of the Pátsála here, nor any others to whom I have shewn it, are able to decipher it, or to tell me of what character it is composed."

It is very evident that the inscription, No. 1. is of exactly the same kind as that shewn in Plates X. XI. XII. XIII. and XIV. of the 7th volume *As. Res.* p. 180, as existing on the Delhi pillar, the translation of which will not I trust be considered as hopeless; but of No. 2, to which the Gya inscription is so near an approximation, Dr. MILL, Mr. CSOMA DE KÖRÖS, or any other Sanscrit scholar, will most probably be kind enough to supply the translation.

The Devanagari character, No. 3, has been also copied and is sent herewith, but it is by no means so neatly engraven on the stone as the other characters, nor is it in many places at all legible, although as an assistance in the operation we threw common red soc:kee or brick-dust into the hollows which compose the letters, and then wiped off the particles that rested on the projections, between them, with a wet or rather a damp piece of cloth, which rendered the letters more distinctly visible.

This third inscription, No. 3, occupies the greatest part of the surface of the stone, and lies above the Persian. It is supposed to have been written by various persons, who in paying visits to the pillar from distant countries, left impressions of their names and actions upon the face of it. This is the native idea on the subject, but the point may be set to rest upon the character being translated. I have not made much inquiry about the legibility of the last mentioned character, as the native account took away from the interest that it would have otherwise occasioned: the letters are badly cut, and in many places almost illegible. This character, No. 3, contains some dates which I have marked: one of the year Samvat 1562, which as this is 1890 of the same era of Vikramajit, must have been written 328 years since; another of Samvat 1663, or 327 years; another 1515, or 368 years; another Samvat 1639, 261 years; another

1640, or 250 years; another 1762, or 128 years; another 1863, or 27 years; another *Samvat* 1638, or 252 years since.

On examining all the 18 volumes of the *As. Res.* I am happy to say I have found, or at least partly found a key to the character No. 2, in the transcript and interpretation of an ancient inscription at Gya, by Dr. WILKINS, vol. I. page 279. This will evidently serve as a guide, by which nearly half of the letters can be made out, as is evident on inspection; and it may therefore be assumed as likely that Dr. WILKINS at home, or any Sanscrit scholar in this country, has in his possession means of reading and translating the whole of this at present unknown inscription, No. 2; which from what the Doctor says as applied to the Gya inscription will probably prove to be composed of fine Sanscrit, and to be more than 1800 years old. It may indeed have a still greater age, because some of the letters of the character No. 2 appear of a more illegible nature than those of the Gya sculpture, although manifestly of the same description. It must therefore have been engraven upon the column long before the two Persian lines before spoken of, which bear a date no farther back than 228 years, or A. H. 1014.

In the description of the Ellora Caves, in the 6th volume *As. Res.* no specimens of the inscription are given, but on reference to the fac similes of some of these in the 5th volume, I find that a few letters correspond with No. 2.

There is also I think a resemblance to the character No. 2, on a pillar at Buddal, which has been translated by Dr. WILKINS in the 1st volume *As. Res.* page 131, and a still greater similarity strikes me in the Monghir inscription, also translated by the same learned scholar in that volume.

I have thought it necessary to send a copy of part of the Gya inscription, which has been translated, together with the modern character written beneath it, as given by Dr. WILKINS in page 178, in order that it may be compared with the inscription No. 2, of this pillar. It seems to me to be exactly the same character, but perhaps less antique. Mr. HARRINGTON says, the pundits at Benares could not read the Gya inscription, but Dr. WILKINS has read it. Mr. HARRINGTON observes, that another inscription of one line only exists there, of a different character, and unintelligible. Perhaps this may be similar to No. 1, and it would be interesting to ascertain the fact through the aid of some of the correspondents of the *Journal*. Query. Has it any connection with the Greek character, to which No. 1 bears some similitude, in the Greek letters  $\lambda \nu \sigma \epsilon \Delta \Gamma \Phi$  some of which are mentioned by Mr. STRANGE, at page 312, *As. Res.* volume XV. viz. the "ou, sigma, lambdu, chi, delta, epsilon, and

a something closely resembling a figure of the digamma\*." The *Khandgi* inscription appears to resemble the Allahabad character exactly in my opinion.

Dr. W. says of this inscription No. 2, "The character is undoubtedly the most ancient of any that have hitherto come under my inspection;—it is not only dissimilar to that which is now in use, but even very materially different from that we find in inscriptions of eighteen hundred years ago; but though the writing be not modern, the language is pure Sanscrit, written in a long verse called *Sardoola vikrīta*, and consists of four pauses of nineteen syllables each, in this form,"—(which the Doctor gives)—they appear to be feet consisting of a molassas, a pyrrhic, a tribrach, a molassas, a bacchias, and an iambus. The Doctor states that the metre was no small help in deciphering the words, and this will probably be found to be the case in the Allahabad inscription, as the letters composing the character, are chiefly equidistant from one another, without the appearance of stops. I have strong reason for thinking No. 2 to be verse, because several lines end with the same letter, which appears indicative of rhyme. It is probably of a mythological character. See also p. 357, recording the translation of a partly similar inscription found at the fort of Tanna.

The character at page 500 of this volume (xv. As. Res.) is not far different from the one line of inscription, No. 5, copied, as it appears, on the stone, viz. at right angles to the rest of the character, for both bear a peculiarly square appearance. See Alphabet of the same at p. 506, furnished by Mr. H. H. WILSON, from which this also may perhaps be deciphered†.

In the As. Res. vol. vi. page 447, Captain JOHN MACKENZIE sends a copy of the inscription found by him at Ceylon on a block of stone much corroded by time, but which he made out by tracing chunam, or lime water on the hollow characters indented in the rock, which rendered them legible on the dark ground of the stone. I think it would be a better plan in a similar case to pass a cloth or brush damped in lime-water, rapidly over the general surface of the stone, for when the lime dries white, every dark letter will appear distinctly contrasted with the white surface, because the letters themselves are not to be wetted, but only their projecting interstices.

The Ceylon inscription is probably old Sanscrit also, as it resembles No. 2 in some of the letters.

\* See note at the end of this paper.—Fn.

† See Plate vi. at the right hand near the bottom.





Classification of the ancient character, No 1

Reference	Simple letter	united with the vowel marks					with ॐ	other forms occurring
		ॐ	॑	॒	॒	॒		
1	ॐ 32	ॐ 3	ॐ 11	ॐ 3	ॐ 2	ॐ 1	ॐ	ॐ ॐ ॐ ॐ ॐ ॐ ॐ ॐ ॐ } written by Lt Burt
2	॑ 30	॑ 12	॑ 12	॑ 15	॑ 1	॑ 2	॑	
3	॒ 2	॒ 2	॒ 12	॒ 5	॒ 1	॒ 2	॒	
4	॑ 30	॑ 11	॑ 4	॑ 6	॑ 4	॑ 1	॑	॑ ॑ ॑ ॑ (ॐ 2 with ॑) ॑ ॑ ॑
5	॑ 26	॑ 12	॑ 12	॑ 10	॑ 2	॑ 1	॑	
6	ॐ 1	ॐ 1	ॐ 1	ॐ 2	ॐ 2	ॐ 1	ॐ	
7	॑ 27	॑ 6	॑ 19	॑ 3	॑ 7	॑ 1	॑	॑ ॑ ॑
8	॑ 29	॑ 8	॑ 8	॑ 17	॑ 4	॑ 1	॑	॑ ॑
9	॑ 17	॑ 8	॑ 7	॑ 22	॑ 3	॑ 2	॑	॑ ॑ ॑ ॑
10	॑ 20	॑ 6	॑ 10	॑ 4	॑ 3	॑ 3	॑	(॑ in Burt)
11	॑ 21	॑ 7	॑ 2	॑ 4		॑ 1	॑	॑ ॑ ॑ ॑ ॑ ॑
12	॑ 24	॑ 1	॑ 1	॑ 1	॑	॑	॑	
13	॑ 17	॑ 2	॑ 1	॑ 2		॑ 2	॑	॑ ॑
14	॑ 20	॑				॑ 9	॑	॑ ॑ (the ॑ run effaced)
15	॑ 11	॑ 6	॑ 2	॑ 7	॑ 2	॑ 2	॑	॑ ॑ ॑
16	॑ 4	॑ 2	॑ 1	॑ 2	॑ 1	॑ 1	॑	॑ ॑ ॑
17	॑ 9	॑ 4		॑ 7	॑ 2	॑ 1	॑	॑ ॑ ॑
18	॑ 5	॑ 2	॑ 4				॑	
19	॑ 6	॑ 1	॑ 1	॑	॑		॑	॑ ॑
20	॑ 5	॑ 6	॑				॑	॑ ॑ ॑
21	॑ 3			॑	॑			same as 21
22	॑ 2	॑		॑	॑	॑		doubtful ॑
23	॑ 1	॑		॑	॑	॑		॑ ॑ ॑ ॑ ॑ ॑
24	॑	॑	॑	॑	॑			॑
25	॑ 4	॑ 3		॑ 1	॑ 1			half size
26	॑	॑		॑ 1	॑	॑		ditto
27	॑ 2			॑		॑		ditto
28	॑ 1	॑ 3	॑	॑ 2			॑	॑ do
29	॑	॑	॑	॑				
30	॑	॑	॑					

Compound of ॑ + ॑

The Initial word of 2 inscriptions on this ॑  
 ॑ ॑ ॑ ॑  
 ॑ on the Delhi Column As Rus VII 100

¶ The figures against each sign show its frequency of occurrence on the stone  
 11 del



In the inscription at Mahabalipuram\*, As. Res. volume v. p. 75 to 80, a very few letters correspond with those in No. 2. Captain WILFORD, p. 135, says he was shewn a Sanscrit book containing many ancient alphabets, qr. at Benares?

Captain COLIN MCKENZIE states that there are unknown inscriptions on the pagoda at Perweettun, page 314, volume iii. Page 167, et seq. contain two translations, by Dr. WILKINS, of inscriptions from the Vindhya Mountains, but no specimens. Page 383 of ditto, is an inscription in the Malaga language engraven upon a silver plate, which was found in a cave near Islamabad by John Shore, Esq. (now Lord Teignmouth) but no specimen appears, which is to be regretted.

Volume iii. page 39. contains a specimen and translation, by Sir WILLIAM JONES, of a Sanscrit inscription from the Carnatic, not much like No. 2.

Mr. COLEBROOKE says at page 401, that Mr. WILKINS ascertained the date and scope of a Sanscrit inscription at Cintra in Portugal: see page 422, also, where the Canara language is stated to be mixed with Sanscrit in an inscription found in the Upper-Carnatic, some of the stanzas being supposed to be Pracrit; also that the junction of the three languages, Telinga, Mahratta and Canara, takes place some where about Beder. It is strange that a few of the natives here should say that No. 1, is Mahratta, and some that it must be Carnatic writing.

Page 224. "The ancient Canara has gone so much into disuse, that it was with difficulty I could get people to read it. An Alphabet will be yet communicated, as several books and ancient inscriptions are written in this character." Page 398 et seq.

The No. for August, 1833, of the As. Soc. Journal, shews in pages 387 et seq., several characters of the *KAH GYUR* similar to No. 2; see also vol. i. Journal Asiatic Society, page 276, where some Tibetan characters assimilate with it.

I have thus endeavoured to afford as much information as was in my power on the subject of the Allahabad pillar and inscription, and wish it could have been more satisfactory or ample; but I trust my endeavours will be considered in a favourable light, should the opinions I have expressed differ from those of others who must be so much better acquainted with the subject than I am.

A specimen of the stone accompanies.

\* See note by Capt. TROUEN: the Mahabalipur inscription is in the same character nearly as No. 2, and was of great use in deciphering it.—ED.

II.—Note on Inscription No. 1 of the Allahabad Column. By James Prinsep, Sec. &c.

When I requested the author of the preceding description to undertake the task, which he has so faithfully and carefully executed, I had but little anticipation of the valuable historical information that would reward the labour of transcribing the almost illegible inscriptions covering the surface of the Allahabad *lath*. Aware indeed that the only accurate data we possessed for adjusting the chronology of Indian princes were those derived from ancient monuments of stone; inscriptions on rocks and caves; or grants of land engraven on copper-plates, discovered accidentally in various parts of the country;—I could not see the highly curious column lying at Allahabad, falling to rapid decay, without wishing to preserve a complete copy of its several inscriptions: for the specimen of them, published in the seventh volume of the *Researches*, comprised but two or three lines; and was professedly intended to give only an idea of the different characters of the three (or, with the Persian, four) inscriptions. It is indeed greatly to be regretted that the task was not accomplished twenty or thirty years ago; for the ravages of time, or rather climate, have probably in that short period committed greater injuries on its surface, than during an equal number of centuries antecedent:—“The line in the printed specimen, near the Persian name Abdullah, is no longer to be seen on the stone,” says Lieut. BURT. The horizontal position of the pillar allows the rain to settle in the cavities of the letters, and soak into the stone itself, and this action alternating with the fierce heat to which it is exposed from the sun’s rays, has caused the outer surface of the stone to split and peel off in many places. Lying half buried in the ground also, the saltpetre, or other salt with which the soil is impregnated, must have had its share in the ruin of the prostrate monument. Many of the sandstone buildings in Benares, and indeed all over the country, exhibit the influence of this destructive agent; at the height of a few feet from the ground their surface is seen to peel off in thin flakes\*, while the higher parts remain sharp and uninjured for ages. The Moghul emperor JEHANGIR was contented to engrave his name and proud descent in a belt through the middle of the most ancient inscription;—the English would rightly deprecate such profanation, but their own passive neglect has proved in a few short years even more destructive than the barbarous act of the Muhammedan despot.

\* The effect may be produced by the crystallization of the deliquescent salt lodged on the stone at that height, and marked by a zone of damp; the heat of the day would evaporate the moisture, and cause the salt to crystallize, which would split the stone just as the freezing of water in cold climates produces the same injury to buildings.

We have however before us what remains at this time of its interesting contents, and must hasten to make them known for the satisfaction of the antiquarian and the Sanscrit scholar. There are, as Lieut. BURT has fully described, three principal types of inscription, exclusive of the modern Persian sculpture.

The two first and most important I have carefully reduced from the facsimiles presented to the Asiatic Society, so as to suit the pages of the Journal.—The third, No. 3 of Lieut. BURT, consists merely of detached names and dates in modern Nagari, Bhaka, Marhatta, &c., and though the longest, is the least interesting, and is not worth the trouble of transcribing. A few of the dates are enumerated in the foregoing account.

No. 2, as pointed out by Lieut. BURT, is identical in character with the Gya inscription decyphered by Dr. WILKINS. It was made over at the meeting of the Society to Captain TROYER, Secretary of the Sanscrit College, who has been fortunate enough, with the aid of MADHAVA RAY PANDIT, the librarian, to decypher many parts of it; and their examination has developed the names of several princes, and particularly of CHANDRAGUPTA, perhaps the one most earnestly desired by the Indian antiquarian, because of its connection with an epoch in the histories of the western world. Dr. WILKINS had imagined the Gya character to be as ancient as the Christian era, which will be confirmed, if the CHANDRAGUPTA spoken of be the same of whom ARRIAN speaks. Some doubt may again arise from the discovery of his name on a monument at Allahabad, with regard to the position of his capital, a point that has only lately been considered to be set at rest by the identification of Palibothra with *Pataliputra* or Patna. The name of SAMUDRAGUPTA as a fourth descendant of CHANDRAGUPTA is not found in the Hindu catalogues of the MAURYA dynasty, although there can be no doubt of the reading on the column. I have extracted the name and titles of CHANDRAGUPTA, and placed them in the plate under the alphabetical key, to shew that it has been faithfully rendered by the pandit.

One other Raja of the same name occurs among the Ajmeer or Rajputana princes in the seventh century, but here also the descendants are of different appellations. The only argument which occurs to me as favoring the latter date, is the great similarity between the Sanscrit character of the inscription and the Tibetan, (noticed also by Lieutenant BURT): the alphabet of which, according to Mr. CSOMA DE KOBOS, was adopted from the Sanscrit in the seventh century. Many letters are indeed identical and of the same phonetic value, as will be evident on comparing the following with the alphabet in plate VI:—

ॠ *kh*, ॡ *g*, ॢ *ch*, ॣ *ch* '। *j*, ॥ *t*, ० *d*, ॡ *n*, ॣ *p*, ॣ *ph*, ॣ *b*, ॣ *v*, ॣ *h*, ॣ *h*, ॣ *y*, ॣ *l*, ॣ *sh*: also the whole of the vowel marks <sup>ॠ</sup> *i*, <sup>ॡ</sup> *u*, <sup>ॢ</sup> *e*, <sup>ॣ</sup> *o*: the sub-

joined letters *r* and *y*; as,  $\xi$  *dra* and  $\eta$  *pya*, and the *vasur* or subjoined *w* or *v*, as  $\tilde{a}$  *dv* or *do*.

Other similarities might be pointed out, but these are the most striking: the mode of expressing the long *a* also at that period, by a short dash at the top of the letter, may explain the omission of this character in the Tibetan alphabet. Captain TROYER notices the omission of many letters\* (*gh, jh, &c.*) which are equally wanting in the Tibetan alphabet. However, the identity here noticed does not necessarily detract from the antiquity of the inscription, or prevent its applying to the earlier CHADRAGUPTA; since the same character was probably in use for many centuries. When or where it gave place to the more modern Nagari would be a curious and interesting subject of investigation.

However ancient the inscription No. 2 may be, it is very certain that the character No. 1 boasts a still higher antiquity. This may I think be proved—first, by the position it occupies on the Allahabad column, as well as on that of Delhi, called *Feroz's lath*: in both it is the principal, and as it were the original inscription, the others being subsequently added, perhaps on some occasions of triumph or visit to the spot. Secondly, the simplicity of this character and the limited number of radicals, denote its priority to the more complicated and refined system afterwards adopted; while thirdly, the very great rarity of its occurrence on ancient monuments, and the perfect ignorance which prevails regarding its origin in the earliest Persian historians, who mention the lath of FERUZ SHAH, confirm its belonging to an epoch beyond the reach of native research. The only other inscriptions identical in character which have been met with in India, are I believe that of the lath of BHIM SEN in Sarun†, and that of the Khandgiri rocks in Orissa, of which a facsimile is given by Mr. STIRLING in the *Researches*, vol. xv. page 314. The Ellora and other cave inscriptions appear to be considerably modified from it, and in fact more to resemble No. 2 of the Allahabad column; and the latter inscription has so many points of resemblance, that it may be fairly traced to a derivation from the former.

It is not yet ascertained, whether the language this character, No. 1, expresses is Sanscrit. The rare occurrence of double letters, the omission of the initial *Sri*; the want of any symbol with a subjoined *y* to correspond with  $\eta$ , the inflexion of the possessive case which occurs so repeatedly, and is so distinct, in the Sanscrit text No. 2; are arguments against the supposition: but the similarity of the character and of the vowel marks are as much in its favor.

\* See page 118.

† Has any copy of this inscription been published? Mr. STIRLING mentions it, but I do not find it in the *Researches*.

Mr. STIRLING has suggested as a remarkable circumstance that many letters of the No. 1 type resemble Greek characters, and he instances the "ou, sigma, lambda, chi, delta, epsilon, and a something closely resembling the figure of the digamma." This resemblance is, however, entirely accidental, and the genus of the alphabet can I think be satisfactorily shewn to have no connection whatever with the Greek. To enable us to determine this point, I have taken the trouble of analyzing carefully the whole of the inscription from Lieut. BURN'S manuscript, classifying those forms which seemed to be derived from the same radix.

Proceeding in this manner I soon perceived that each radical letter was subject to five principal inflections, the same in all, corresponding in their nature and application with the five vowel marks of the ancient Sanscrit No. 2. This circumstance alone would be sufficient to prove that the alphabet is of the Sanscrit family, whatever the language may be. In the accompanying plate (Pl. V.) I have arranged the letters and their inflections so as to exhibit every form which occurs on the column, placing numbers against each, expressive of the frequency of its occurrence. From a cursory inspection of this plate it will immediately be seen that the supposed *sigma* is but the first inflection of the 13th letter: the *epsilon* and *digamma*, are the same inflections of the 18th and 11th characters: while the *ou* and *lambda* (1 and  $\rho$ ) are themselves subject to all the inflections like the rest, and are consequently primitive or simple letters, of a system quite different from the Greek.

The number of alphabetical symbols is small, compared with those of modern systems founded on the Sanscrit: of the thirty, several have not been found subject to inflection; these may be initial vowels. The circle, square, and triangle are of a smaller size in general than the rest, and may be affixes: but of this and of the powers of the letters, I cannot pretend to offer any conjectures at the present moment. Many of the literal forms undoubtedly bear a close resemblance to those of No. 2, and to those of the Mahabalipur alphabet, decyphered by Dr. BABINGTON; and one might almost be tempted to point out successively the *s*, *d*, *dr*, *v*, *b*, *ch*, *j*, *g*, *t*, *l*, from their analogy to the known letters in the foregoing scheme. It is better however to say nothing on this head, until we are prepared to apply the scheme to the unravelling of a portion of the legend. For this purpose, one word offers a very convenient test: it is the initial word of both parts of the Allahabad inscription (see pl. V.);—of all the four inscriptions on the Delhi column; and it also occurs a second time on the east side. I have inserted it at the foot of Plate VI. It will probably be found to be some term of invocation, though essentially different from the *Sri* of the Hindus.

As one mode of aiding the investigation of the powers of the unknown alphabet, supposing the language expressed to be Sanscrit, I had the letters in a page of the *Bhatti Kāvya* classified and counted, to compare with the enumeration in Plate VI. They were as follows :

न	93 times	म	33 times	व	9 times	भू	3 times	ड	0 times
य	57	प	30	र	9	दू	3	डू	0
ज	51	रू	25	वू	6	द	2	ड	0
र	51	क	22	ड	6	ख	2	ड	0
क	45	य	15	व	5	ख	1	न	0
व	44	ख	14	च	9	फ	1	ड	0
दू	43	न	12	ख	5	ड	1	अ	0
व	41	व	11	अ	3	ख	1		

I also made the same classification of one page of the *Feroz lath* inscription, which I found to agree pretty well with the table prepared from that of Allahabad. There is one marked difference, which may be due perhaps to the copyist :—I allude to the separation of the words in the former, which does not appear to be the case in Lieut. BURT'S transcript.

It would require an accurate acquaintance with many of the learned languages of the East, as well as perfect leisure and abstraction from other pursuits, to engage upon the recovery of this lost language ; but when its simplicity of vocables is compared with the difficulties of the Persepolitan, or cuneiform character, lately decyphered by GROTEFEND and St. MARTIN, or the more abstruse hieroglyphics of Egypt attempted by YOUNG and CHAMPOLLION, it seems almost a stigma on the learned of our own country that this should have remained so long an enigma to scholars ; and the object of the present notice is to invite fresh attention to the subject, lest the indefatigable students of Bonn or Berlin should run away with the honor of first making it known to the learned world.

### III.—Remarks upon the second Inscription of the Allahabad Pillar. By Captain A. TROYER, A. D. C. Sec. Sanscrit College, &c.

[Read at the Meeting of the 20th March.]

An alphabet of the inscription No. 2, copied from the Allahabad pillar, compared with the Deva-nagari, was compiled by MADHAVA RAO, the head Librarian of the Sanscrit College. It will be seen from the annexed copy of it, (Plate VI.) that eight of the consonants, namely, व (g'h), क (j'h), अ (n), ड (t'), ड (t'h), ड (d'), ड (d'h), and three of the vowels इ ई ऊ (i, i, u), could not be found.

The alphabet of the Allahabad inscription offers certainly a great apparent similarity to that of a part of the Gya inscription, examined by Dr. WILKINS, [As. Res. vol. i. page 279,] as pointed out by Lieut. BURT, of the Engineers. It almost entirely coincides with that of some inscriptions on the rocks of Mahámalaipur, (vide Trans. of Royal As. Soc. vol. ii. part 1, Plates 13, 14.) Notwithstanding this similarity common to a great number of Indian alphabets, it is not yet easy to fix the value of each letter of an ancient writing, in such a manner as to preclude the possibility of a doubt.

It was principally the alphabet of the Mahámalaipur inscriptions that enabled MADHAVA RAO to transcribe in Devanagari characters, the remains of the inscription copied from the pillar at Allahabad. This consists of 30 lines. More than a moiety of the first 13 lines is entirely peeled off; the other 17 are fuller, but evidently more or less cut off at the right extremity, and all with many intervening chasms.

An even slight examination of the transcript made in Devanagari characters is sufficient to find a number of Sanscrit words, and the whole inscription may without hesitation be pronounced to be Sanscrit. In the accompanying paper, the translation of the Sanscrit words, which could without difficulty be found in each line, is given. Scarce any change has been made in the words of the transcript, except in a few instances, such a correction as is too often indispensable even in not inaccurate manuscripts. These few changes are marked above the lines.

As the frequent and wide disjunction of words, the terminations of which are mostly wanted, renders it impossible to fix the relative sense of each word, as well as to determine the general purport of the whole, any conjectural labour in changing vocables and supplying deficiencies would have been hopeless.

So much only appears indubitable from the words themselves, that they are encomiastic epithets of a Raja, the name of whom, if satisfactorily made out, might furnish an historical datum of no small importance.

Names are really found in the 17th, 18th, and 21st lines which seem insignificant; not so those in the 25th and 26th line, which happen to be more complete and connected than the others: thus we have in the twenty-fifth line;—" of the great-grandson of SRI CHANDRAGUPTA, the great Raja, of the grandson of the great Raja SRI YAGNAKACHA, of the son of the great Raja, the first (supreme) Raja (Adhiraja) SRI CHANDRAGUPTA : " and in the twenty-sixth line, " of the son of the daughter of LICHA, DE'HA VIKRITI of the family of MAHADIVYA KUMARA—of the great Raja, the supreme Raja SRI SAMUDRAGUPTA, whose fame caused by the conquest

of the whole earth, increasing and expanding throughout the whole ground of the earth, was equalling TRIDASAPATI (INDRA)."

The name of CHANDRAGUPTA repeated here twice, as that of the great-grandfather, and that of the father of a Raja, cannot fail to excite attention.

According to the Hindee genealogies of the *Vishnupurana* and other books, CHANDRAGUPTA, a son, or at least a relative, of NANDA, founded a dynasty (called by his name, and also the *Maurya* dynasty, from his mother MURA), of 10 kings, who reigned during 137 years from the year 1598 to 1735 of the *Kaliyug*, (from 1504 to 1367 before our era,) in *Magadha*, the capital of which was *Palibothra*. It needs scarce be repeated that the Indian name CHANDRAGUPTA (the moon-protected) was found to be the same with SANDRA-COTTUS, or SANDROKRYPTOS mentioned by the Greek historians. It is also known that from the similarity of these names, an identity of the persons of the contemporary of ALEXANDER and ally of SELUCUS NICATOR, and of the before-mentioned founder of the Indian dynasty of that name was supposed, and that a whole system of Indian chronology was made dependent upon this supposition.

No disquisition upon this important and extensive subject will here be expected, so much less as the imperfect remains of the inscription here examined furnish no vestige of a date, nor any other data which may lead our conjectures towards, if not fix, a historical fact. It would be adventurous to assert that the CHANDRAGUPTA of line 25th, was the founder of the *Maurya* dynasty: all that appears in the inscription is, that a Raja SAMUDRAGUPTA (the sea-protected) was a descendant in the 4th generation of a CHANDRAGUPTA.

It is further to be remarked, that the name of the second CHANDRAGUPTA and that of SAMUDRAGUPTA are joined with the title *Adhiraja*, supreme Raja, and not with that of *Chakravartti*, or emperor of the world, always assumed by the ruler of India. We may therefore infer that the *Adhirajas* of the inscription did not pretend to universal, although but titular, sovereignty; but may have been only counted among the many Rajas who at all times divided India among themselves. It was probably by their flatterers that the conquest of a few provinces was made the conquest of the whole world; in which expression, found entire among the ruins of so many others, nothing else but a monument of empty vanity was preserved.

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*Translation of Sanscrit Words of the Allahabad Inscription.*

LINE I.

— II.—1. minding sacrifice of the gods. 2. for the sake of a better state.

— III.—3. counting the low. 4. knowing good qualities. 5. in heaven. ..

6 and 7. enjoying a poet's fame and a kingdom. .. ..

- LINE IV..... 8. with servants and family.....
- V..... 9. said by his son.....
- VI.—10. in his actions of a never changing mind.....
- VII.—11. Most valiant,..... whose foot approaching duly I salute.
- VIII.—12. in the battle,..... with his own arm vanquishing always.
- IX.—13. with high.. .. expanded—minds.....
- X.
- XI.
- XII.—14. fame as seen by men (illumed) by the rays of the moon...
- XIII.—15. active in the road, a poet's intellect and power proceeding. ....
- XIV.—16. of Brahma... of the dextrous in hundred avatars—his own arm's mighty strength ..... praised.
- XV.—17. arrow..... 18. family .... 19. good name. ....
- XVI..... 20. MAHENDRA's worshipper.. 21. MAHENDRA's mountain.
- XVII.—22. NILARAJA to be known by words.. preserver of elephant's armor.
- UGRASENA, DEVARASHTA.. 23. from DHANANJAYA down all southern chartered kings taking. . . . .
- XVIII.—24. VAMATILANA GADATTA CHANDRA VASU .. .. .
- .. .. 25. all giving rent. . . . .
- XIX. . . . . 26. by neighbouring kings. . . . .
- XX.—27. destroyer of PRACHANDA SASANA (of a terrible commander)..
28. Destroyer of a kingly family,.. .. . 29. whose fame is spread throughout all countries, son of a god.
- XXI.—30. all .... governing his own humble faith. . . . .
- giver of one hundred thousand.
- XXII.—31. ground of battle, ..... fame of kings,.. .. 32. Of unparalled faith, .. who by the strength of his own arm conquered more than one king.
- XXIII.—33. Lord of the unfortunate.. . . . 34. of him who was inaugurated the most eminent of poets.
- XXIV.—35. sharp intellect, high understanding.. Gandharva—TRIDASAPATI (INDRA) ..... 36. By heavenly poetical works composed by learned men of him who was inaugurated the most eminent of Rajas .. 37. of a magnanimous conduct. . . . .
- XXV.—38. of him whose mind is formed by time and action only in the palace of the world .. of the great-grandson of CHANDRAGUPTA, of the grandson of the great Raja SRI YAGNAKACHA, and of the son of the great Raja, the first (supreme) Raja (Adhiraja) SRI CHANDRAGUPTA.
- XXVI.—39. of the son of the daughter of LICHA-CH'HA VIKRITI, of the family of MAHADIVYA KUMARA .. . of the great Raja, the supreme Raja (Adhiraja) SRI SAMUDRAGUPTA, whose fame caused by the conquest of the whole earth increased and expanded throughout the whole ground of the earth was equalling TRIDASAPATI, (INDRA.)
- XXVII.—40. going to the house.. . . . 41 gift by arm's strength, favor, weapons, words increase over and over, all-serving, jewel destroying fame
- XXVIII.—41. PASUPATI (SIVA) purifying the three worlds. . . . .
- XXIX. .... 43. Of the son skilled in peace and war young prince. . . . .
- XXX.—44. the supreme king ..... 45. the chief of punishment (literally the chief of staffs, perhaps police-officer)' by TILAHMADANTA.

Transcript of the Allahabad inscription, No. 3. in Deva-Nagari characters.

LINE

- 1 (the first line illegible.)
- 2 मर्यादा यमचेतस्यमनसः मर्यातराद्यंन. . . स. . . स. . . नि
- 3 यनीयिज्ञां धाना यमचित्तं मुह्यन्ततमेचक्रत् . . . वर्योके स्य कवतकीर्तिं राष्यंभुनक्तौ
- 4 गुप्तुम भवपरमैवजन्त. . . नरैमभिः सभ्येसि सभ्यत्प्राकुसजमननवां
- 5 स्याउव्य. . . तेन. . . च. . . मउहत्तनिचिह्नवचस्यः पुत्रभिहितोनिचिकनिनि
- 6 ककस्यमेकन्यमनसह. . . मन्यद्भुतोऽङ्गिकउर्ध्वमैरासदधन. . .
- 7 वीर्येणम शिकच सरसम पगत यस्याहतेप्रश्नेपरि. . .
- 8 संप्राप्तेसखभुजविजितनित्यममवामकराः. . . सचोमानप्र. . .
- 9 तो. . . तुङ्गेःस्फार. . . रारसस्यउपलक्षितैर्भोभिः पुष्पपुव. . .
- 10 रेहेलोदत्. . . रविचंद्र. . . सुदेकेनायिन . . . . . ननमिसुध
- 11 साधयमेचकौतुकुसज . . . . . यत्तेहपाद
- 12 च इचोर नःमशिकिरह स्यः कीर्तयसुप्रतंनरईशते कश्चप्रगम्य
- 13 सक्तमार्गःकविमतिविभवोत्तरहं चपुकवकोमस्य . . . . नय्य
- 14 वेचसःपर मतावतरहहस्य सभुजवलपराक्रमर. . . न. . . प्रससितोमर
- 15 भस्यपु नाराच वेतसि कस्या नक प्रहरह विज. . . कुक. . . न. . . शुभनाम  
दायवदितकनासरव . . . चकवि . . . वसुक्तक
- 16 स. . . सरक. . . महेन्द्रमचकनारक. . . या. . . राजक राजकम राज पराक महेन्द्र  
मरिक. . . रकसमरभिरा. . . पत्तकरासनकसनप्रहजमितप्रत न हभाग्यस्य
- 17 नीश्वराजवाज्ञेय कश्चक्षिबर्षपासककोपसनहवराष्टककु. . . रकोस्यलपरक धनञ्जय  
प्रभति सर्वहृदिह पहराजपचच. . . तः परिचकीकतसर्व्य विकराजस्य
- 18 . . वामतिसमानाहहचचन्द्र. . . म . . . चतिसामग माशुतमन्दि सवस्यसनकार्यवर्गं  
राजप्रस. . . हर. . . मप्ररोचमउरिकादिभिग्य सर्वकरदान . . . करप्रथमानमन
- 19 समत द्भक कामजपनदासकतपुसंप्रत्यन्त चप्रतिभि. . . सव. . . नयव द्यमाद्रक  
र. . . ससनक. . . क. . . कवि सदानसहिकम. . . सः . . सस्यक . . . निज . . .







- LINE 27 28  
 20... परिकथितप्रचक्षशासनस्य .. कभू .. रा सुमराजस्यप्रति च तमिवो  
 डि 29  
 मंतयसःइवपुन .. सुरधरणी नास्य .. इथिवाप्तप्रतिरस्य
- 21 सर्वे .. पवसिमिरात्मनिवादनक कोदयनदानमस्यस्य सविनयमक्तिमासन  
 चनददोय.... चकनस्य प्रवन तिमाप .. नो .. एषदुदयस्यनकल्पुवतोनक  
 30  
 इतसचप्रदायिन
- 22 .. इतसंलतनकगुह्य .. सिमि .. रचतकप्र .. न्यनरपतिकीर्तिःस सतिद्वप्रस  
 31 31  
 इत्यहः पदस .... एभक्त्यासनस्य स्वभुजस्यविजितमकरपतिवि ...  
 32 42 T  
 .... वप्रत्य नित्यवप्र .. चकपदस्य
- 23 .. दीनमय .. रजनइरस्यमादो .. अयमममस्यविपद्यवतादाकनस्यस्यस्य  
 33  
 चन .. कःप्रतिष्ठितकविराजश्रेष्ठस्य सचिर .. तस्यतनक इतोदाचरितस्य
- 24 निश्चित विदा यमतिक माधवं लक्षितो कीरीत निदशपति गाह... उभिद्व  
 35 35 35  
 26 म T T  
 .. द्विद्वानंशेय नाककयक्तिथमिः प्रतिष्ठितराजश्रेष्ठस्यसचिरा .. तस्यतनक  
 37  
 तोदाचरितस्य
- 25 ... समयक्तिथ नविधान माचमानस्य लोकधाजी .. वस्य .. महाराज श्रीगुप्त  
 38 38  
 प्रपौचस्य महाराजश्रीय कचपाचस्य .. महाराजाधिराज श्रीचक्रगुप्त पुत्रस्य  
 39 च तनदौहित्रस्य T 39
- 26 किम्ब्रिह्रिचस्यमहाद्वकुमारद्वयान .. नास्य महाराजाधिराज श्री सुभद्रगुप्तक  
 सर्वइथिवीविजय जनितोदयव्याप्त निधिवावनीतस्य कीर्तिमितविदशपतिः  
 40 41
- 27 भवनममनवप्रस .. तसुसविचरसमाच .. सः । वभुवोमा रयसु तस्यस्यस्य प्रदान  
 42  
 भुजविक्तम प्रथम सस्य वाकोदय उपसुपरिसर्वा सक्ति मनिक्तमार्गस्यः  
 42 T
- 28 पुनाति भुवनस्यं यभुपतं . नभइतिरोधपरिमा .. निवपुस्यमप्रच .. तवकाच  
 .. स .. वभंजनपादानुदासस्य .. सभपुपरिस .. वनप्र .. हितमतिः
- 29 अह .. पुक्तिस्समहादस्यनाचक .... वभूति .. पुत्रस्यसन्निविधसिक्तकुमारामा  
 43  
 त्यम ..... कडरि ..... सस्यवभूतस्यस्यस्य
- 30 समक्षितच परममहाक पदान तस्य इच्छनायकतिसुभदंतेन ।

[The figures in the interlineations point out the words (~~below~~ them) translated in the foregoing page: the letters similarly situated are suggested corrections of the text.]

IV.—*Extracts from a Journal kept by Captain F. T. Grant, of the Manipur Levy, during a Tour of Inspection on the Manipur Frontier, along the course of the Ningthee River, &c. in January 1832\*.*

*Marching Stations and Distances.*

*Tuobal*, 11 miles ; a depôt of grain.

*Huerok*, 8 miles ; inhabitants came from Tiperah 100 years ago.

*Muchi*, 9 miles ; a Naga village on the most western range of Murung hills.

*Kolbang*, 12 miles ; hence three roads lead to the *Kuboo* valley. Violent hoar frost on the 15th January. Lieut. PEMBERTON has described this road from actual survey.

*Kantabee*, 10 miles ; good road. Supari nut and cocoa nut trees were planted here by the raja's grandfather.

*Khondong*, 5 miles ; very good road. The people of *Kuboo* escaped from the opposite side of the *Ningthee*.

*Maylung nala*, 9 miles ; road passes through a forest of keoo, teak, saul, cotton, and other trees : innumerable and recent tracks of the wild elephant, tiger, rhinoceros, bear, boar, cattle, and deer of various descriptions. Six wild elephants came to the *nala* together to drink ; they were of a very large size.

*Namhookam nala*, 7 miles, east of the first range of *Angoching* hills.

*Num-sing-yeet*, 8 miles ; a *nala* east of the second range.

Source of the *Helao nala*, 13 miles ; road good : crossed the highest range of the *Angoching* hills.

*Helao*, 12 miles ; on the banks of the *Ningthee*.

The foregoing route across the *Angoching* hills, I consider equally good with those to *Mulphoo* and *Sunayachil*, and it might with very little trouble be made practicable for every description of cattle. Not having been travelled for many years, and never before by Europeans, it is at present impeded by large trees, which have fallen across it, and also by bamboos which unite from both sides in many places, at about

\* The above journal was some time since placed in our hands by Mr. GEORGE SWINTON, late Chief Secretary to Government. The new facts which it communicates to the geography of *Ava* and *Manipur*, are, the journey along the bank of the *Ningthee* for a space of about 40 miles between two points already well known ; viz. *Mulfoo*, on the north, and *Saway Chit*, opposite to the Burmese post *Gendah*, on the south, which place is connected with *Ava* by Dr. RICHARDSON'S route, published in the second volume of the *Journal*, page 59. The navigation of the river between the same points is also new, and the return route through the *Moflong nala*, which connects the *Kuboo* valley with the banks of the *Ningthee*, finding its way through the *Angoching* hills, which form the eastern boundary of the valley, separating it from the *Ningthes*.—ED.

seven or eight feet high above it ; and through which my elephants were obliged to break a passage for themselves. It possesses an advantage over the before-mentioned routes in a more abundant supply of water. The whole of the hills throughout this route to the Ningthee are covered with a dense bamboo jungle, which grows to an immense size. In that part of the last day's march where the road runs along the bed of the Helao nala, there is a second road on the bank just above, which is at present so overgrown with forest and jungle as to be impracticable. Just opposite Helao, a large nala called the Moo, Num-moo, or Muwa, falls into the Ningthee, in the bed of which the Kubos tell me, gold is more abundant than in the latter : the Kubos also say that gold is found in the sands of all the small streams which join the Ningthee on its eastern side. The road from Tum-moo direct to Helao joins this one at about two miles distance from the latter village : it is much shorter, but so very bad as to have obtained the name of the " Noong-chongbi Lumpee," (stone-leaping road :) loaded coolies can however manage to travel it. Some who left Tum-moo, the day after I left Khondong, with grain, arrived the day before me at Helao, being only three days on the road.

Halted the 23rd, 24th, and 25th January. Visited the cultivation, which is extensive in proportion to the number of inhabitants. They are now busily employed in transplanting their cold-weather crop : they have two crops in the year, one in the rains, and one in the cold season ; the former is close to the hills, to which the annual inundation of the Ningthee does not extend : the latter in the valleys, (if I may so call them,) formed by the bends of the river, by which they are annually overflowed, leaving large jheels on its retiring, that at the present time of the year are sufficiently dried up to allow of their being cultivated. On the evening of the 25th, went to see the process of washing the sands of the Ningthee for gold : it occupied two men for about a quarter of an hour, and the quantity found was about a grain troy-weight.

The road from Helao to Mulphoo, about 36 miles, or four marches, runs along the valley of the Ningthee, and might also be made available for all military purposes : elephants have travelled the whole way from Manipur.

31st January. Sent my elephants and coolies round to meet me at Sunayachil, intending to proceed myself to that place by water, as no boats larger than canoes are procurable ; two of these fastened at about four feet apart by small timbers, and a bambu platform built over the whole, form a raft sufficiently large to hold sixty men ; on which I mean to proceed. A raft of this description would answer well to cross troops, were boats not procurable. The current of the Ningthee, at the

present season, is very slow, certainly not much more than a mile an hour.

1st February.—Kneesung, which I reached in five hours. A short distance below Mulphoo a small range of hills crosses the river, composed of a reddish sand, with layers of pebbles running across it: in the rains the river saps the bottom, and carries away portions of the whole face annually; the greater the portion of the hill thus carried off, the more abundant is the gold found at Chanda-sneek (ghat), a short distance below it. A number of Kubos were busily employed in washing for gold, when I passed the latter place. Gold is only found in the sand, where mixed with pebbles and gravel. For the number and names of villages passed this day, see the sketch.

2nd—Halted. Received a visit from the Burmese commandant of the stockade on the opposite side of the river; his object was to see the English Bo-meng, never having seen such a monster before! He was very inquisitive as to the object of Captains JENKINS and PEMBERTON'S trip. I made him a few presents, with which, particularly a couple of bottles of brandy, he was delighted and took his leave. Another chief passed down during the day with two boats and about thirty followers; he had been called up to Sumjok in consequence of my visit to this quarter: there were piled in the boats a number of what I at first took to be muskets, but which I, with the assistance of my telescope, discovered to be nothing more than branches of trees and bamboos made to resemble them; the actual number of muskets being only three. My coming it appears has created considerable alarm, and given rise to the most exaggerated reports; amongst others that I intended to place Manipur thanas at the Noajeri hills: on my trip up to Mulphoo, I could hardly discover a soul on the opposite side of the river; they appear now however to have got over their alarm, and I am visited by persons from all the villages as I pass down. A dozen large boats, which were detained above Mulphoo for some days, until my intentions were ascertained, also passed down in full sail. A considerable traffic is carried on between the capital of Ava and the villages on the Ningthee up as far as the Sing-Phos; the latter giving grain in return for bunats, coral beads, &c. &c.

Whilst some of my people were in the village on the opposite side of the river, a woman was carried off from the centre of it by a tiger: the inhabitants say it is the fourth occurrence of the kind which has taken place within the last two months. The Kubos do not appear at all alarmed at the vicinity of these animals, as they say the instances are very rare of their attacking or destroying human beings; if however such once happens, it is almost certain to be continued, and the only al-

ternative is to quit the vicinity of the place where it occurs ; they do not attribute the recurrence to a relish for human flesh required from having once tasted it, but to the displeasure of the "Lae" (Deity) of the place ; they endeavour to deprecate his anger by offerings on the first occurrence, but on a second taking place, they conclude he is implacable, and take it as a warning to remove. The village in question is only waiting to collect in the crops now on the ground and fit.

3rd—Mung-ya, two and a half hours. Passed a small nala on the Burmese side of the river, called Khywook-ma-Kywoong, at the mouth of which a number of people were employed washing the sand for gold. Was visited during the day by nearly the whole of the inhabitants, men, women and children, of the village, on the opposite side of the river ; who came, as they said, to see the wonder ! an European. Much cannot be said in favour of the modesty of the Kubos. I saw both this day and yesterday numbers both of men and women bathing at not ten paces distant from each other, with not so much covering even as a fig leaf. Unmarried girls observe, I am told, some little decorum in dress ; married women, none !

4th—Helaoo five and a half hours. The current in one or two places somewhat more rapid than yesterday.—Passed three parties washing for gold, one at a place called Nan-yen-sneek on the Burmese side of the river, and two on the Manipur one, near Eng-da-baoong.

5th—Maloo, seven hours. Immediately below Helaoo the Ningthee is joined by a river of considerable size, called the Moo, Nummoo, or Muwa, coming directly from the east and Neojeri hills. Gold is said to be more abundant in it than in the Ningthee, in this neighbourhood ; but not equal to the quantity found in the more northern parts of the latter, in the Sing-Phos country. The Kubos say that gold is not sought for in the Ningthee itself, below Helaoo, but only in the different hill streams which fall into it on the eastern side. As usual, since I left Mulphoo, I was visited by numbers of the inhabitants from the different villages as I passed down : my communications with these people leave not a doubt on my mind but what they would be happy to change their masters : indeed many of them took opportunities of silyly telling me so, and expressed disappointment at my not proceeding to the Neojeri hills to place thanas.

6th—Brought to at a small nala called Khywook-kan-khywoong, six hours, no village. The current generally very slow, in some places almost still. Passed but one village during the day, and on the opposite side of the river ; it belongs to the knight of the "branches and bamboos," who passed down ~~when~~ I was at Knesung. At a short distance below this village is an extraordinary hill called Swe-

ba-leng, the residence of a Laee or Deity, and by the Kubos's account a most jealous one he is : on approaching it, my Kubo boatmen put on their dhoties, being previously literally naked ! and warned my Manipurees against making use of improper or obscene language, or spitting in the river whilst passing the precincts of his godship's residence. The infringement of these warnings they assured them might be attended with the most serious consequences to the whole party, and many were the instances of ship or rather boat wreck which they adduced to prove it. They also requested the Manipurees to give over a game, at which they were amusing themselves, as continuing it would doubtless be offensive. The Manipurees, who are not a jot less superstitious than the Kubos, implicitly followed the advice given, and put on the most serious countenances ; indeed the greater part of them had previously heard the fame of Swe-ba-leng. The hill, on which are several small temples, rises abruptly from the bed of the river, forming a natural wall of about three hundred feet perpendicular height, and is of a yellowish sand formation, based on rocks of hard grey sandstone : it appears the sudden commencement of a range, differing from the other hills in its vicinity, being free of trees, with which the others are overgrown, and running in a succession of cones to the south-west, as far as the eye could reach. No continuance of any of a similar appearance to the south-east. The face of the hill turns the river suddenly from a southerly to a westerly direction, in which it does not continue for above two hundred or three hundred yards, when the hills cause it again suddenly to resume its former course. The river is here very narrow, and just previous to its resuming its course to the south, a tremendous block of rock juts nearly half across, which repels the stream backwards and causes in the rains a whirlpool, which the Kubos say may be heard roaring at some miles distance, and which they attribute to the pranks of the " Laee ;" not the sudden checks which the current meets. In the rains the navigation past this spot must be very dangerous to any but a Kubo acquainted with its localities ; at the present season, however, it is a perfect mill pond. Some lime kilns were in the neighbourhood, but whether the lime-stone is procured from the Swe-ba-leng hill, or where, no person in the boat could inform me. I did not land to examine them, they being on the Burmese side of the river. No visitors during to-day, which is owing no doubt to my having now entered Ningthee-Rakha's jurisdiction. The village just above Swe-ba-leng is called Tan-beng-goong ; the chief of it is extremely very anxious to appear formidable in my eyes : he had hastily run up a loose fence of bamboos, plantain trees, and such like along the river front of his village, which he no doubt thought I would take

for a strong stockade, he also made a tremendous hubbub with songs, trumpets, &c. whilst I was passing; the village is a good-sized one, containing about eighty houses.

Eleven hours more brought me to Sunayachil. At this season the current is very trifling. On the eastern side sand-banks extend for four hundred yards into the bed of the river, offering favourable points for the crossing of troops, which at this season of the year might be effected on rafts, were boats not procurable. Both sides of the Ningthee are overgrown with dense forests, except on the sides of villages: the high road from Gendah to the present capital of Sumpok runs to the east of the small range of hills, which skirts the Burmese bank of the Ningthee.

10th February—Embarked in my dingy, accompanied by two others, to return up the Ningthee to Yuwa, where it is joined by the Maglung. I was rather confined for room; indeed, regularly packed, being unable to move hands or feet after once being seated in the boat. Reached Wegadza in six hours, where my people ran up a covering, for me to pass the night, of branches and leaves: a precaution rendered necessary as a protection against the heavy dew which soaks through every thing exposed to it. The fogs which continue till 9 A. M. are also so heavy as to render indistinct, objects at fifteen or twenty paces distance.

11th—Reached Yuwa in three hours, being in all nine hours from Sunayachil; or only two hours more than it took the boat to go the same distance with the current. Two men were all that rowed the boat up. This will give an idea of the slackness of the stream. After proceeding up the Maglung for three hours, put to for the night. The Maglung discharges itself with some force into the Ningthee, and as before observed, a boat or raft coming out of it would be carried without any exertion nearly to the opposite side of the latter, in which there is no perceptible current. After once getting fairly into the Maglung, the current is moderate, and the waters shoal, not more than two feet in depth; its course during this day nearly from west to east. Put to for the night on the sand-bank and enjoyed a coal fire, of which mineral there was abundance lying about. The tracks of wild beasts of every description were numerous and recent in the sand.

12th—At day-light this morning, was roused by a loud but not very harmonious concert, the performers being elephants, tigers, bears, boars, and deer. About three hours after starting reached the site of a village named Yang-num, at which was formerly a Manipur thana; near the site of the thana is a peepul tree, planted, the Kubos say, by the Manipurees, another proof that Kubo belonged to them at a former period. I landed for the purpose of examin-

ing salt wells in this village : the springs are copious and in full play, sufficiently so to feed a small stream which flows from them into the Maglung ; the water in the centre of the well is nearly as salt as brine, and on the sides, where it has been exposed to the sun for any time, fully so : in the bed of the river, immediately opposite the village, are also salt springs, which rise in bubbles to the surface of the water. The village, though not inhabited for many years, is perfectly free of grass and jungle, the salt wells rendering it a favourite resort for wild animals. In two hours from the village, reached the site of the second Num-mo, where also are salt springs ; and in another hour, the junction of the Tadoi Khyngong nala, where I put to for the night; from hence to where the road to Sunayachil crosses the Tadoi Khyngong is five hours' journey. The current during the day generally very slow. Passed three rapids, each of about thirty yards continuance, but the fall so trifling as not to render it necessary to unload the boats: some of my people were generally walking and amusing themselves in searching for turtles' eggs, which are so abundant that the boat might have been almost loaded with them. In several places found an ore containing a light-coloured metal, of what nature I have not skill enough to determine, but have kept specimens (iron pyrites) ; coal also abundant. The Kubos say it is petrified charcoal of teak, in which opinion I am inclined to agree, as I saw several blocks of that wood, which were undergoing the change, parts of which were burnt and appeared the same as the coal : total time travelling this day six hours.

13th—Roused by a concert similar to that of yesterday morning ; a bear, which had been growling nearly the whole night on the opposite side of the river, came in the morning to have a look at us. Before I could get my gun ready to salute him, he walked off. Three hours after leaving yesterday's halting place, reached a rapid called Khyuk-taeng, where the boats were obliged to be unloaded ; and after about three hours more, a second, where a like precaution was necessary. Neither of these rapids is of a greater length than 40 yards : the last which is named Chum-ka-te, is the worst, being, as far as I could judge, a fall of about 10 feet ; its difficulties are increased by large and loose rocks, over which it rushes. The obstacles offered to the navigation of the Maglung by these rapids might I conceive be overcome by digging small canals, for which there is sufficient room : even as it is, however, the river is perfectly practicable for dingees, such as the one I am embarked on, and would be more so were the rocks in the bed removed, which I understand the raja intends doing : the only precaution necessary is to unload and carry the loads for about 40 yards. Immediately above and below the rapids the river is as still nearly as a

pond. A short distance above the last rapid, reached the site of a village called Chum-ka-te, and put to for the night: here also are salt springs. Total time moving this day, eight hours.

14th—Reached the junction of the Kumbut and Maglung rivers without meeting any impediment from rapids; the point where the above rivers unite is about eight miles east of Wetup, and in the Kubo valley. The village of Mo, from whence is the ascent of the pass leading to Pa-tche-ne, across the Angoching, is distant from hence about one and a half mile. East at the last-named village are most extensive salt springs, which supply the whole of the southern division of Kubo, and Nga villages to the west of it, with salt. Total time moving this day, seven and half hours.

N. B.—The general width of the valley of the Maglung is about two miles, that of the river about 120 yards: its course upward nearly east and west, except where it rounds the bases of the different ranges of hills, which it does by turning for a short distance to the north; in places throughout its course it is confined by a steep or abrupt face of rock. The hills from both sides terminate at, and slope gradually down to, its bed, leaving a gap for its egress to the Ningthee\*. I have no doubt a road might be made through the valley: it must necessarily, however, be very circuitous, and the river crossed frequently; drawbacks which would more than counterbalance the advantages to be derived from it. That the river might, with great advantage, be made available for transporting grain and other stores by boats from the Kubo valley to the Ningthee, my trip up it places beyond a doubt. The shore on either side is covered to the water's edge with a forest of teak, saul, keú, cotton, (semul,) wood oil, (gurjun,) and other noble trees, similar to those of the Kubo valley, and actually swarms with wild beasts, of the descriptions already mentioned in this journal; throughout the whole course of the river through the Angoching hills, there is not a space of ten yards free of paths made by them down to the water, which gives the idea of a crowded population. In the neighbourhood of the Ningthee, fish are most abundant; the Manipurees (inordinate fish-eaters), who accompanied me, were regularly satiated with it: amongst others, I recognized the roo muchlee, cutla, mirga, kulbause, poonter, large and small, bowali, soli, mullet, pufta, gurri, and various others of which I know not the names; but all of which my Bengalee servants recognised as similar to those found in the Surma at Sylhet. I had also prawns of an immense size brought me, and porpoises were amusing themselves in the Ningthee.

\* It is to be regretted that the course of the Maglung was not given in the sketch map from which Plate VII. is lithographed.—Eh.

15th—Wetup, about eight miles west; road good, and similar to that throughout all parts of the Kubo valley. Just after starting I was joined by my suwaree elephant, the mahout still trembling from the effects of a fright he had received about three hours before. His story was, that being tired with riding, he had dismounted to recreate himself with a walk, having put his coolie to supply his place on the elephant; he had got about twenty paces ahead, and was jogging along merrily, when he heard a rustling in a thick bush on the road side: thinking it caused by a deer, his curiosity led him to take a peep, and pushing aside some of the branches, a deer was there sure enough, but it was a dead one, and also a live tiger, which he was not prepared to expect; the latter on being disturbed at his meal, gave a growl and raised his phiz to within a few inches of that of the terrified mahout, who retreated as fast as his fright would permit to the elephant, and took up a position on its tusks. The coolie also saw the tiger, and was in an equal fright with the mahout. The parties remained reconnoitring each other for about five minutes, when some sepoys and Kubos coming up, the tiger retreated, casting many an anxious look towards the bush which contained the remains of the deer, which were seized on as a good prize by the Kubos. The deer could only have been killed a few hours, as it was perfectly fresh and still warm. The tiger had made a breakfast on one hind-quarter and part of the other; a tolerable lunch, however, as the deer was a very large one of the species called in Hindustan "Bara Singhi."

16th—Num-muldah nala; this road, having already been frequently reported on by Lieut. PEMBERTON, renders it unnecessary for me to say any thing about it.

17th—Pausa ditto; ditto ditto. A village has been established here, since visited by Lieut. PEMBERTON, of six families, or about forty inhabitants. Just previous to my arrival, a poor Naga had been frightened *entirely* out of its wits, and *half* out of his life, by a tiger; he was on his way from the hills to the village, close to which he had arrived, when he was surprized by a smart slap from behind on his most prominent and fleshy part, and at the same time a basket which he was carrying pulled from him. On turning round to see who it was that was taking such liberties, he saw a tiger walking off with the basket; he did not stop to reclaim it, but made the best speed he could to the village, bearing marks of the truth of his story on the part before mentioned. The head-man of the village told me, with a very serious face, that he was fearful the "Laee" was displeased in consequence of some omission of the proper respect and attention due him, and took this means of showing it: but he hoped to be able to appease him by

proper offerings; which he proceeded forthwith to prepare in the shape of some of the best rice and vegetables procurable, cooked with great care and many prayers. The mess when ready he placed under a banyan tree on the outside of the village. If the "Lae" partook of it within the two succeeding days, it would be a sure sign his anger had evaporated. As he knew I was anxious, he said, regarding the welfare of the village, he would let me know in a day or two how matters stood.

18th—Tummoo; here I was detained for three days in deciding a case, or rather three cases of witchcraft! Motives of humanity induced me to undertake the business, as persons labouring under such an accusation become regular outcasts; whom no village will receive within its precincts; with whose children, male or female, no other family will intermarry; the whole of whose property is seized by the village from which they are expelled. Exclusive of the above, the husbands of two of the women who were accused had been of the utmost service to me as guides in my different trips through Kubo, and otherwise useful from their intelligence and knowledge of the country. The favour with which I consequently treated them was I doubt not one of the causes of their misfortunes, and induced a wily old Kubo to intrigue to get them out of the way of his own prospects. Part of the penalties had already been inflicted previous to my arrival; they had been turned out of the village, and the greater part of their property seized. On the morning after my arrival I assembled the whole village, the accused being also present, and tried to reason with them on the absurdity and folly of believing in witchcraft. I was laughed at for my pains, and told by one or two of the elders that I might as well try to convince them, there was no sun in heaven, as no witches. Finding all remonstrances and arguments were vain, I proposed the ordeal by water usual on such occasions, and called on the persons who were suffering under the supposed witches' incantations to stand forth, that they as well as the witches, as is customary, should undergo it. This caused a demur and whispering, which ended in a request, begging me to defer farther proceedings till next day, to allow them to consult together on the subject, in which I acquiesced. I was almost assured that the same superstition which led to the belief in witchcraft would prevent any persons from coming forward to stand the proposed test, as the accuser, they say, unless actually convinced in his own mind of the truth of his accusation, is sure to draw down signal punishment on himself and family for having made it; ~~and~~ he is heavily fined by the village, should the result of the ordeal be contrary to his assertion. Even were I disappointed in the hope, that no per-

sons would come forward, I had no doubt the result of the ordeal would be favourable to the witches, as I should be present at it to see fair play. On the next morning, the villagers avowed that none of them would undergo the ordeal, and that consequently the accusation was unfounded: they returned all their property to the accused, re-instated them in their houses, paid a small fine for having brought forward the charge without sufficient grounds, and gave a written acquittal, which I signed, to the supposed witches. Thus the matter was settled satisfactorily to all parties, except the old rascals who originated it and were obliged to return their ill-acquired spoil. I thought the persons who were accused would of course agree with me as to the absurdity of believing in witchcraft. I was however mistaken, as even they expressed their firm conviction of its existence with others, though themselves innocent. The ordeal on such occasions is as follows: The accuser and accused are bound separately, hands and feet, together, so as not to have the power of moving either; they are placed on the inner edges of two canoes, which are placed a foot separate; after some formalities, prayers, &c., are gone through, the canoes are suddenly pulled from under them; if the accused be really a witch, she floats, and the accuser sinks: the case is reversed should the accusation be false. One end of the rope with which the hands and feet are bound, is sufficiently long to allow of its being held by a person in the boat, in readiness to pull up the party that sinks.

The route from Tummoo to Manipur has already been reported on by Lieut. PEMBERTON; it is only therefore necessary to observe, that since he travelled it, villages have been established at most of the places on the line of road, for the purpose of facilitating the communication.

V.—*Note on the Chiru Antelope.* By B. H. Hodgson, Esq.

[Read at the meeting of the 20th instant.]

Having recently received a fine female specimen of the Chiru Antelope of Tibet, besides two more very complete spoils of the male of the species, I conceive I cannot do better than throw into the form of a synopsis character (to avoid prolixity) all the leading and distinctive marks of this most rare and singular animal.

Genus ANTILOPE.

Subgenus GAZELLA, *H. Smith.*

Species, *G. HODGSONII, Abel.*

The Chiru of North-East Tibet.

Gregarious on open plains.

Angoching Mountains



SKETCH  
of the Ningthee River  
from Mulphoo to Sanayachil  
Scale of Miles

Sanayachil  
Munphoo



C. HODGSONII. Length of the male, from snout to rump, four feet eight inches: height, before, two feet eight inches; behind, two feet 10 inches: horns, with a sinus in the core, from 22 to 27 inches long, slender, black, sub-erect, sublyrate, inserted between the orbits, approximated at bases, and strongly compressed; towards the points round and turned forwards, 12 to 20 annuli, which are round-edged, independent, very prominently displayed to the front, striated to the sides and back; large inguinal p<sup>r</sup>yses, as in *Dorcās*; no suborbital sinus; nose perfectly clad, broad, bristly; aperture of the nostrils wide, and furnished on the outer side with an accessory enlargement or intermaxillary pouch: ears, short, pointed, substriated: tail, short and full: hoofs, low and compressed forwards, spread and padded behind; fur very thick and porrect, of two sorts, hairy and woolly: the hair, quill-like and brittle; the wool spare, applied to the skin, and very fine; no bands on the flanks, nor brushes on the knees; no congenital callosities on knees or sternum; rarely artificial ones on the former: size medial, with very compact structure, full of grace and vigour; the limbs cast in the finest mould: colour, above, bright rufous; below, white: the face and fronts of the limbs, entirely brown-black. The female, smaller, hornless; inguinal purses less than in the male; two teats; no marks on the face or limbs. In both sexes the palate is colourless, but the naked skin of the lips and nostrils, jet black.

Major H. SMITH having provisionally ranged our animal with the *Oryges*, with a conjecture that it might be found to belong to the Reduncine group, it is proper to add that the *Chiru* cannot, with any propriety, be classed under either of those *racemi*, as designated by himself, and that this species belongs unquestionably to his Antelopine or to his Gazelline subgenus. Hornless females would give it to the former. But lyrate horns, no suborbital sinus, and ovine nose, affine it rather to the latter, under which, accordingly, I have disposed it.

The *Chiru*, however, with his hollow-cored horns, his intermaxillary pouches, and his bluff bristly nose, united to a figure and manners resembling exactly those of the beauteous Gazelles and Antelopes proper, is, in many essential respects, a conspicuous novelty, and, but that I apprehend the prevailing disposition of the day is to carry classification beyond the limits of accurate knowledge, I would have placed the *Chiru* in a new subgenus created for his reception, and denominated *Pantholops*. The Byzantine writers so called the supposed unicorn, and we all know how resolutely the Tibetans insisted for years that such was their *Chiru*.

Should any one object to my synoptical character, that it contains some distinctive points of a generic or even larger quality, I have only to observe that until our classification be amended, the thing cannot be helped, without omitting essentials. For example, the genus *Antelope*

has been separated from *Capra* and from *Damalis* by the circumstance of the cores of the horns being solid in the former and sinused (so to speak) in both the latter. Nevertheless, I am well acquainted with three\* species, besides the *Chiru*, in which the cores of the horns are *not* solid, though the whole four are still retained (and of necessity) in the *Antelope* genus. It would be easy to multiply instances, from the best and most recent works, of new sub-genera, which have been set up upon the strength of diagnostics of far from *general* prevalence, that when you come to examine carefully, the several species classed under any one of them, the rule too frequently turns out to be the exception! For example, the subgenus *Næmorhædus* is chiefly designated by the presence of the intermaxillary pouch: but of the three species contained in it, two are perfectly familiar to me (*Ghoral* and *Du Vaucellii*), and neither has a trace of any such organ.

*Nipal*, 25th February, 1834.

#### VI.—Comparative Section and Tonnage of English and Indian Boats for River Navigation.

The advantage to the internal commerce and agriculture of this country, likely to arise from the improvement of the communications both by land and water, are too well known to require pointing out: but the means of effecting this improvement appear to be very much neglected; and the object of the following observations therefore is to shew to those interested in the inland navigation of Bengal, the manner in which they may benefit themselves by reducing the cost and facilitating the conveyance of goods by water carriage.

The alteration in the present system recommended is a better construction of the boats, both in their proportions and in the manner of building them; and, as examples are more satisfactory to general readers, than theory or calculations, a table is given, containing the dimensions of several boats used for river and canal navigation in England, and for the sake of comparison, a few boats now in use on the Hoogly river.

Names of Rivers.	Dimensions of the boat.			Burthen.				Remarks.
	Length feet.	Breadth feet.	Drght. feet.	Tons.	Bazar mds.	Greatest section. sq. feet.	Ratio of burthen to sec.	
Thames, . . . . .	70	12	3	45	1215	32½	37	
Thames and Severn Canals, } Severn, . . . . .	66	16	5	75	2025	70	29	
Cam, . . . . .	80	12	3½	56	1512	37	41	
Canal boats, . . . . .	120	18	5	100	2700	79	34	
	45	9	2-8	18	486	19	25	
	70	6-10	3	27	729	20½	35	mean 35
	34	14	3		1230	61	20	
Hoogly river, } } }	26	12	3½		450	38	12	
	28	8½	3½		360	25	14	
	22	9½	2		270	17	16	mean 15½

\* Viz. *Thar*, *Ghoral*, and *Vaucellii*.

The few examples stated in this table have been taken indifferently from a collection of the dimensions of boats used in twenty different rivers in Europe, and from an equally numerous list of country-boats.

The resistance that a boat meets with in passing through the water being proportional to its greatest section immersed, the last column in the table has been added for the purpose of shewing the number of maunds the boat can carry for each square foot in its greatest section. This column is the best criterion by which an opinion may be formed of the comparative advantages of the proportions of any two boats; their burthen, and the proportion between their resistance and their greatest section, being the same.

*Dimensions of Boats proposed for the Navigation of the Rivers of Bengal.*

Burthen in bazar mds.	Length, feet.	Breadth, feet.	Depth, feet.	Crew, one mangle & dandies.	Greatest section, sq. feet.	Ratio of section to burthen.	Remarks.
1500	72	12	3 f. 1.	11	32	48	The weight of a boat with its crews & stores on board is about one-third of the load that it will carry. The size of the sail is usually 30 sq. feet for every foot of greatest section of the boat.
1200	66	11	2 9	9	26½	44	
900	60	10	2 6	7	22	40	
650	54	9	2 3	6	17½	37	
460	48	8	2	5	14	33	
310	42	7	1 9	4	10½	29	
190	36	6	1 6	3	8	25	
110	30	5	1 3	2	5½	21	
57	24	4	1	1	3½	16½	

From the last column of the first table it appears, that the average load of a country-boat is  $15\frac{1}{2}$  maunds for each foot of section, while the average of the English boats is 35 maunds; and if one tracker is allowed for every three feet of section, or six or seven men to track 100 maunds in a country-boat, the same work can be equally well done by three men in a boat of the improved proportions. This comparison is not strictly correct, as the boats compared are not of the same burthen: but if the country-boats in the first table be compared with boats of equal burthen in the last table, the proportion will be found to be as  $15\frac{1}{2}$  to  $32\frac{1}{2}$ . This comparison shews how a saving of half the crew may be made. The economy of using large boats instead of small, is in like manner pointed out by the last column of the second table. It may be here necessary to remark, that the stability, and of course the safety, of boats of this proportion, when under sail, will exceed that of country-boats, as much as the former exceeds the latter in length, the section of both being the same, and the size of the sail bearing such proportion to the greatest section as has been already remarked.

Economy is not the only point to be considered in the conveyance of goods; regularity, certainty, and expedition are of equal importance:

from a want of these essentials the hire of a country-boat is 100 per cent. per annum, on the capital expended, or the price of the boat and stores; and the insurance of a four months' voyage is more than that to England. As an example, it may be stated, that a boat that can carry 500 maunds of goods, will, if in constant employment, earn 360 rupees a year, while the same boat may be purchased for 200 or 300 rupees. If 12 per cent. per annum is allowed for the interest of capital, and the boat requires repairs equivalent to replacing it every five years, 360 rupees a year will allow of 1125 rupees being expended in the construction of the boat. For this money, the boat could be built in such a superior manner, and the supply of stores made so complete, as to set at defiance the ordinary risks attending the navigation of the Ganges, and the insurance would in consequence probably not exceed  $\frac{1}{4}$  per cent. per mensem. T.

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VII.—*Climate of Seringapatam.* Latitude  $12^{\circ}45'$  N. Long.  $76^{\circ}51'$  E.

Being desirous of including within the pages of the Journal all the data necessary for a meteorologist, to judge of the contingencies of pressure and temperature on the whole continent of India, we extract the following results of a meteorological journal, kept for two years at Seringapatam, from Brewster's Edinburgh Journal of Science, No. 5.

The original registers were kept by Mr. SCARMAN in 1814 and 1816. They were abstracted and reduced to order by Mr. J. FOGGO, Junior.

The mean temperature of the whole year is by observation 77.06. The mean at sunrise is  $63^{\circ}.17$ : at 3 P. M.  $90^{\circ}.95$ :—of the day,  $84^{\circ}$ , of the night,  $70^{\circ}.11$ . The average daily range of temperature  $27^{\circ}.7$ . The curve of mean temperature has two convex summits, in May and October, corresponding with the sun's passage twice over the latitude of the place. The highest temperature is  $115^{\circ}$ , and the lowest,  $48^{\circ}$ .

The mean temperature of the river Caveri, observed every day at 6 A. M. and 6 P. M. is 77.2 agreeing exactly with that of the air.

The average height of the barometer is 27.568, whence the elevation of Seringapatam may be calculated to be 2412 feet above the sea, assuming the sea level, 29.88, and the temperature of the intercepted column of air,  $78^{\circ}$ .

The average diurnal tide between the hour of 10 A. M. and 4 P. M. is 0.074 inch. During the prevalence of the south-west monsoon, the extent of the variation is diminished. The monthly variation also proceeds with great regularity, the whole range being 0.262. For the last three months of 1816, the register was extended to the hour of 8 P. M. and the average height of the barometer at that hour is 0.006 lower than at 4 A. M.

The prevailing winds are the north-east and south-west, or the general monsoons of the Indian Ocean. The south-west sets in during the month of April. When it commences, its reciprocation with the north-east wind interrupts the serenity of the weather; and during its continuance, thunder storms occur almost every day, with heat-lightning at night. This is the rainy season, but the monsoon having deposited its superabundant moisture upon the ghats, very little rain falls at *Seringapatam*. During the north-east monsoon, which begins about the end of October, the weather is settled and fine, with heavy dews before sunrise.

*Range of the Thermometer, &c. in 1816.*

Months.	Mean tem- perature at sunrise.	Mean tem- perature at 24 P. M.	Mean daily range of tem- perature.	Mean monthly tem- perature.	Monthly dif- ference from annual mean.	Evaporation.	Rain.	Proportion of winds.		
								n. e.	s. w.	var.
January,	54°	84°	30	69°	—6.7	inch.	inch.	30	1	0
February,	58	91	30	74	—1.7	10.17	0.30	24	5	0
March,	59.5	100	43.5	79.7	+4.0	15.05	0.01	12	17	2
April,	66	100	34	83	+7.3	14.52	2.47	4	26	0
May,	66.5	100.5	34	83.5	+7.8	15.00	5.46	3	28	0
June,	65.2	90.5	25.2	77.7	+2.0	9.27	5.85	1	29	0
July,	64.5	82	17.5	73.2	—2.5	6.60	1.86	0	31	0
August,	62.5	85.5	23	74	—1.7	8.77	1.37	0	31	0
Sept.,	62.2	89	26.7	75.5	—0.2	9.36	0.80	0	30	0
October,	64.5	88.5	24	76.5	+0.8	9.30	4.07	17	13	1
Nov.,	61.5	82.5	21	72	—3.7	7.35	1.51	26	4	0
Dec.,	57	85	28	71	—4.7	8.92	0	28	3	0
Mean,	61.7	89.8	28.1	75.7		123.12	23.7	145	218	3

*Range of the Barometer, in 1826.*

Months.	Mean Height of the Barometer at				Mean monthly pressure at 32°.	Difference from mean annual pres- sure.	Daily tide from 10 A. M. to 4 P. M.
	4 A. M.	10 A. M.	4 P. M.	8 P. M.			
January,	27.715	27.763	27.677		27.614	+ .169	0.086
February,	.648	.687	.608		.527	+ .082	.079
March,	.638	.664	.571		.486	+ .041	.093
April,	.569	.614	.499		.411	— .034	.115
May,	.539	.559	.478		.373	— .072	.081
June,	.498	.509	.458		.354	— .091	.051
July,	.498	.507	.471		.372	— .073	.036
August,	.502	.514	.470		.372	— .073	.044
September,	.536	.545	.483		.392	— .053	.062
October,	.592	.621	.634	27.578	.461	+ .016	.087
November,	.588	.630	.559	.587	.484	+ .039	.071
December,	.616	.650	.563	.613	.497	+ .052	.087
Mean,	27.578	27.605	27.531	27.592	27.445	range 0.260	0.074

## VIII.—Catalogue of Stars to be observed with the Moon in May, 1834.

May	Names of Stars.	Mag	Decn.		A. R.		May	Names of Stars.	Mag	Decn.		A. R.		
			°	'	h. m. s.	h. m. s.				°	'	h. m. s.	h. m. s.	
17	52 Leonis	6	+15	5	10	37 37.33	20	21 Bootis	4.5	+52	9	14	10 18.52	
	53 —	6	11	26		40 31.68		104 Virginis	6.7	-5	20		18 42.87	
	46 Leo. Min.	4.5	35	7		44 0.68		7 Centauri	3	41	24		25 1.72	
	α Arg. in Car	5	-57	57		46 48.51		β Urs. Min.	4	+76	27		28 4.07	
	63 Leonis (1318)	4.5	+8	15		56 26.96		21	2 Libræ	6	-10	55	14	14 30.73
	▷ 1 Limb	7	15	19	11	3 1.48			23 Bootis	4	+52	38		19 32.76
	73 Leonis	5.6	14	14		7 10.52			7 Centauri	3	-41	24		25 1.69
	α Centaur.	4	-53	33		13 27.96			(1651) Lib.	6.7	11	34		28 13.81
	78 Leonis	4	+11	27		15 16.11			α Lupi	3	46	39		30 54.41
	85 —	6	16	21		21 2.40			5 Libræ	6	14	14		36 50.61
	1 Virginis	6.7	9	4		29 54.23			7 —	5.6	13	26		40 15.04
	2 Virginis	5	9	12		36 43.25			13 —	6	11	11		45 23.77
18	1 Virginis	6.7	+9	4	11	29 54.25	▷ 1 Limb						12 32 48	
	3 —	4.5	7	28		37 19.50	β Urs. Min.		3	+74	50		51 20.97	
	5 —	3.4	2	43		42 3.29	α Lupi		5	-46	22		53 53.28	
	64 Urs. Maj.	2	54	38		45 3.66	21 Libræ		6	15	35		57 23.82	
	7 Virginis	5.6	4	36		51 26.89	ξ Lupi	4	51	26	15	0 27.47		
	9 —	4.5	9	40		56 45.69	27 Libræ	2.3	8	44		8 6.22		
	▷ 1 Limb		5	38		59	29 —	7	14	55		11 46.26		
	11 Virginis	7	6	46	12	1 37.15	30 —	6	14	30		13 48.36		
	δ Crucis	3	-57	48		6 22.35	51 Bootis	4	+37	58		18 14.45		
	16 Virginis	5.6	+4	15		11 55.28	13 Urs. Min.	3.4	72	26		21 6.73		
	17 Virginis (1434)	7	6	15		14 5.69	37 Libræ	4	-9	28		25 7.89		
	γ γ Crucis	2.3	-56	9		22 2.44	22	32 Libræ	6	-16	6	15	18 56.02	
5 Draconis	3.4	+70	43		26 22.58	34 —		6	16	1		21 20.22		
31 Virginis	6	7	14		33 33.11	35 —		6	16	16		23 34.14		
19	8 Canis Ven.	4.5	+42	17	12	25 51.66		38 —	4.5	14	12		26 16.66	
	25 Virginis	6.7	-4	53		28 16.20		41 —	6	18	44		29 23.22	
	γ —	4	0	30		33 15.73		43 —	5	19	7		32 25.09	
	38 —	6	2	37		44 42.27		44 —	4.5	15	7		34 45.98	
	77 Urs. Maj.	3	+56	52		46 42.02		45 Libræ	5	19	39		43 43.73	
	44 Virginis	6	-2	53		51 7.50		▷ 1 Limb					17 32 47	
	▷ 1 Limb		0	30		54		9 Libræ	5.6	16	1		51 2.40	
	51 Virginis	4.5	4	37	13	1 22.71		δ Scorpii	2	19	19		55 49.35	
	ε Centauri	3	-35	48		11 19.59		14 —	4	19	0	16	2 23.16	
	65 Virginis	6	4	1		14 44.47	(1861) —	7	19	40		7 19.42		
	74 —	6	5	22		23 21.35	4 Ophiuchi	5	19	37		14 25.48		
	79 —	4	+0	16		26 15.59	7 —	5	18	3		17 25.50		
ε Centauri	3	-52	35		29 28.29	23	9 Ophiuchi	5	-21	5	16	22 19.88		
20	74 Virginis	6	-5	22	13		23 21.34	15 Draconis	4.5	+69	8		28 24.08	
	80 —	6	4	31			26 54.45	24 Scorpii	5	-17	24		32 0.27	
	ε Centauri	3	52	35			29 27.85	18 Ophiuchi	6	24	19		39 40.39	
	82 Virginis	5.6	7	50			32 55.47	(1924) Scor.	6.7	20	7		43 29.15	
	(1561) —	7	6	46			36 16.27	24 Ophiuchi	6.7	22	52		46 49.28	
	88 —	7	5	59			39 38.33	▷ 1 Limb					21 18 49	
	(1885) —	7	7	13			46 18.16	29 Ophiuchi	6	18	37		52 10.79	
	▷ 1 Limb		6	44			50	28 Scorpii	6	21	19		56 19.48	
	(1601) Virg.	7	8	26			53 35.70	(1958) Oph.	6.7	17	22		58 38.31	
	95 —	6	8	29			57 57.54	22 Urs. Min.	4	+82	18	17	3 20.70	
	96 —	6.7	9	31	14		6 11.40	(1974) Oph.	6	-23	52		8 0.41	
	98 —	4	9	28		4 4.30	42 —	3.4	24	49		11 50.75		
99 —	4	5	11		7 20.31	(1990) Scor.	6	21	16		14 48.04			
						75 Hercules	4	+37	18		17 58.85			
						51 Ophiuchi	5	-23	49		21 19.27			

IX—*Proceedings of the Asiatic Society.*

*Thursday Evening, the 20th March, 1834.*

The Rev. Principal W. H. MILL, Vice-President, in the chair.

Read the Proceedings of the last meeting.

Mr. ALEXANDER CSOMA DE KOROS, proposed by Mr. TREVELYAN, seconded by Mr. J. PRINSEP, was elected an Honorary Member.

The Secretary announced that a vacancy had been caused in the office of Vice-President, by the departure of Sir JOHN FRANKS, when a ballot was held, and the Right Reverend the Lord Bishop of Calcutta was declared unanimously elected.

Read a letter from G. MONEY, Esq. expressing his wish to withdraw from the Society.

Read a letter from Rev. W. YATES, stating that he would prefer publishing his Translation of the Nalodaya in this country, on his own account, under the patronage of the Asiatic Society, with the hopes that the Asiatic Society would, in addition to their own subscription, forward the specimens to the Oriental Translation Fund, with a recommendation that they should also patronize the work, or adopt it on the list of their publications. *Referred* to the Committee of Papers.

Read a letter from the Assignees of MACKINTOSH and Co. forwarding proposals for a lottery of the household property of the late firm, and soliciting the Society as a creditor to invest a portion of its claim in the same, at 2,000 rupees per ticket, there being 2,500 tickets, and 14 prizes, valued at a total of 5,20,000 rupees.

Moved by Mr. BAGSHAW, seconded by Mr. HARE, and resolved, that the Society cannot entertain the proposal.

Read a letter from J. ROBISON, Esq. Secretary to the Royal Society of Edinburgh, expressing the thanks of the Society for the present of the XVII. Vol. of their Transactions.

Read a letter from Mr. C. E. TREVELYAN, presenting for the Museum, on behalf of His Excellency the Right Hon'ble the Governor General, a native picture representing the interview between His Lordship and the MAHARAO and RAJ RANA of Kota, which took place at Ajmere in January, 1832.

*Library.*

The following Books were presented :

Proceedings of the Royal Society of Edinburgh for the years 1832-33, Nos. 1 and 2—*by the Society.*

Transactions of the Batavian Society, vol. 15—*by the Society.*

The letters of T. on the employment of the English language as a medium for Native Education—*by the Author.*

The Indian Journal of Medical Science, Nos. 2 and 3—*by Messrs. J. Grant and J. T. Pearson, Editors.*

Ceylon Almanac, for 1834—*by his Exc. Sir E. W. Horton, Gov. Ceylon.*

[This volume, like the preceding vol. for 1833, contains much original and valuable information on the ancient history, antiquities and geography of Ceylon.]

Madras Journal of Literature and Science, No. 2—*by the Madras Literary Society.*

Abstract of Proceedings of the Cape of Good Hope Association for Exploring Central Africa, drawn up for publication—*by J. C. Chase, Esq. Secretary.*

Map of various routes between Europe and India, comprehending Western and Northern Asia, together with Asia Minor and Egypt—*by Mr. J. B. Tustin.*

Meteorological Registers for January and February, 1834—*by the Surveyor General.*

Translation of Proverbs and Ecclesiastes into the Madagascar language—*by the Madagascar Mission.*

Journal Asiatique, Nos. 67, 68 and 69—*by the Asiatic Society of Paris.*

The following were received from the Booksellers :

Lardner's Cabinet Cyclopaedia—Greeks and Romans, 1st vol.

Foreign Statesmen, 1st vol.

*Physical.*

Read a letter from Sir R. COLQUHOUN, expressing Mrs. HERBERT's desire that the Geological Specimens belonging to the Estate of the late Captain HERBERT should be presented to the Museum of the Asiatic Society.

A further collection of Fossil Bones from the bed of the Jumna works were presented on the part of Captain E. SMITH, Engineers.

The skin and skeleton of a large Rhinoceros were presented for the museum, by Mr. J. H. BARLOW, C. S.

Read a letter from Colonel WATSON, advising the dispatch of 30 maunds of Coal from the new seam discovered by Mr. CRACROFT and himself in the Kasia hills, for trial at the Presidency.

This coal agrees in composition with No. 12 of the table published in the 3rd vol. GLEANINGS, page 283. The seam is from 16 to 20 feet thick, and spreads six square miles in area ; indeed it extends through the whole district.

Colonel WATSON explained the particulars of the locality to the Meeting, and exhibited the model of an apparatus on the principle of a suspension rail-ropes for the conveyance of the coal down the hill. The height is 4000 feet, and the longitudinal distance  $1\frac{1}{2}$  mile, over a very rugged rocky country, where the construction of a road would be attended with great expence.

Read a letter from Major JAMES WILKINSON, Governor General's Agent, Hazaribagh, forwarding a small specimen of coal picked up near Bhullea, a village in Ramghur, 14 miles south of Hazaribagh.

This coal resembles the *Oogadony* lignite, in having an infiltration of white matter (silice?) in its natural crevices. It is a rich lignite : sp. gr. 1.325.

Further specimens of the Aeng coal were forwarded by Mr. WALTERS, commissioner, Arracan.

Read a note on the Chiru Antelope of Nepal, by B. H. HODGSON, Esq.

[This paper appears in a foregoing page.]

*Geographical.*

1. Journal of the Route from Dera Ghazi Khan, through the Veziri country, to Cabul, by Dr. MAXIM HONIGBERGER, communicated by Captain C. M. WADE, Political Agent at Ludiana.

The following extract from Captain WADE's letter was read.

"This is the route used by the Lohani merchants, the great carriers of the trade between India and the countries beyond the Indus, and it has never to my knowledge been before traversed by an European traveller.

Dr. HONIGER is a native of Transylvania and a man of education and science. He has travelled through Turkey, Asia Minor, Egypt, Bagdad, and thence come to the Punjáb in 1827, by the way of Sindh. While in the Punjáb he entered the service of Maharaja RUNJIT SINGH, and was of great use to him in shewing his people an improved method of making gun-powder, and in giving his physicians some lessons in pharmacy; but as he did not think the Maharaja placed sufficient value on his services, he applied for his discharge, which was reluctantly granted; and he is now on his way to Europe by Bokhara and Khiva. During his stay at Cabul, he has been employed in company with Mr. MASON in exploring the antiquities in that neighbourhood; he has sent me an account of their labours, which I shall have the pleasure to translate and communicate hereafter."

[The Journal will be printed as soon as the route-map can be prepared.]

#### Antiquities.

Read some remarks upon the ancient inscription (called No. 2, by Lieut. BURT), on the Allahabad pillar, by Captain A. TROYER, Secretary, Sanscrit College, &c.

[This paper is printed in the present number.]

A short note by the Secretary on the subject of the oldest inscription, No. 1, was also read.

The Secretary exhibited to the members present the valuable and interesting collection of reliques and coins discovered by M. LE CHEVALIER VENTURA, General in the service of Maharaja RUNJIT SINGH, on opening the T'ope of Manikyala in 1830, and presented by that officer to himself some months since. They were obligingly conveyed to Calcutta under charge of Colonel Sir J. BRYANT, Mem. As. Soc.

[The description of these precious antiquities must unavoidably be postponed until drawings can be prepared to illustrate them in a becoming manner.]

### X.—Scientific Intelligence.

#### 1.—Royle's Illustrations of the Botany of the Himalaya Mountains. Part I.

The first number of Mr. ROYLE'S vast undertaking has made its appearance within little more than a year from the arrival of the author in England. It contains ten excellent lithographic plates, coloured; one of Zoology (the Alpine hare) and nine of Botanical subjects\*, including 15 plants of Upper India and Cashmere. The letter-press description of these is postponed, to allow space for a copious preliminary memoir on the natural history and climate of Upper India and the hills, the field of the author's labours and observations.

\* *Anemone discolor*; *Ranunculus polypetalus*; *Isopyrum grandiflorum* and *microphyllum*; *Delphinium Cashmerianum*; *Aconitum heterophyllum*; *Cimicifuga frigida*; *Meconopsis aculeata*; *Corydalis* *Cass.* and *gouiana*; *Tauscheria desertorum*; *Viola serpens*, *reniformis* and *Kanawurensis*; *Grewia elastica*.

From these we would fain make more ample extracts than our limited space will allow, and we can confidently assure all who would be acquainted with the features, the climate,—botany,—mineralogy of the hills, that they will be well rewarded by a perusal of the whole essay. The Court of Directors have placed at Mr. ROYLE'S disposal the portion of Dr. WALLICH'S collection, which he had not himself the opportunity of publishing; Major General HARDWICKE also put into his hands ten volumes of drawings made in the plains of Upper India, and while travelling 30 years ago in the Himalayas; but neither of these have been broached as yet, owing to the ample and novel stores accumulated by himself.

Of the vegetable productions of the neighbourhood of Shahrūnpūr, its *khadir* and *bangur*, or high and low land; and of the *Dehra Dun*, we have a correct view from the author's own pen, in the first volume of the Journal\*. To this he has on the present occasion added very largely, particularly in the part relating to the hills themselves: dividing the slope of the Himalaya into three several belts, and treating each separately. The first belt extends to 4 or 5000 feet of elevation, and comprehends most of the Flora of temperate climes, with some remains of tropical forms, *Butea frondosa*, *Carissa sepiaria*, *Justicia adhatoda*, *Nyctanthes arbor tristis*, *Grislea tomentosa*, *Sterculia villosa*, *Kydia calycina*, and *Leea aspera*. *Nerium Oleander* is found at the base of these mountains, as in Syria and Barbary, along the banks of streams. The mango and the *gloriosa superba* attain an elevation of 4000 feet.

The second belt embraces the space between 5 and 9000 feet; the limit to which the herbaceous plants of tropical genera extend. The third, thence to the highest limits, to which snow melts away on the southern face of the Himalaya. The bounds are necessarily but ill defined, and differ greatly on the northern aspect of the mountains.

The arboreous vegetation of the mid region corresponds almost entirely with that of temperate climates;—*Quercus*, *Acer*, *Ulmus*, *Carpinus*, and the different pines; of smaller trees, there are species of *Cornus*, *Benthamia*, *Euonymus*, *Rhamnus*, *Rhus*, *Ilex*, *Andromeda*; of shrubs, *Berberis*, *Buxus*, *Daphne*, *Cratægus*, and *Coriaria*, &c.; of fruit trees, *Juglans regia*, *Armeniaca vulgaris*, *Persica vulgaris*, and *Punica granatum*, with species of *Pyrus*, *Cerasus*, *Rubus*, and *Morus*. But it is quite impossible to excerpt any thing like a complete catalogue of the riches of this genial clime, where man, as DE CANDOLLE observes, attains the greatest perfection.

The splendid pines and cedars form the ornaments of the highest range at 11,000 feet elevation. *Quercus semicarpifolia* is the principal forest tree at the highest limits—below, other species of *Quercus*, with *Taxus*, *Betula*, *Acer*, *Cerasus*, and *Populus*. The smaller trees of highest resort, and shrubs, are *Juniperus*, *Salix*, and *Ribes*.

It is remarkable that one of the bamboo tribe is found at elevations of 10,000 feet;—it is allied to the *Chusquea* of Quito. Of the cultivation at this elevation, Dr. GERARD and Capt. WEBB have furnished particulars. Buckwheat and barley flourish at 11,600 feet.

In addition to the author's former observations on the plants collected by his emissaries in the valley of Cashmere, we find the following note derived from M. JACQUEMONT'S visit:

“The valley of Cashmere, situated between the 34th and 35th parallels of latitude, in the most northern part of the Himalaya, and to which we descend from the

\* Account of the Shahrūnpūr Botanic Garden, i. 41.

snow-clothed summit of Peerpunjal, is described as being of an oval form, encircled by mountains clothed with vegetation, which are themselves girded by a higher range covered with snow. The level of the valley is of considerable extent, being about 60 miles in length, and 40 in breadth; its elevation is estimated by the late lamented traveller M. JACQUEMONT to be 5248 to 5576 feet; he, however, states that the beauty of this valley has been much exaggerated, both by his countryman, BANNIER, and by Mr. FORSTER. But there is no doubt that in consequence of its being copiously watered by numerous streams, lakes, and canals, there is considerable moisture both of soil and climate, and almost constant verdure; [he knew not of the late famine:] while the numerous gardens, and the great variety of fruit trees, and of beautiful flowers, must always strike visitors from the arid plains of India, whether Europeans or Asiatics, as Abul Fuzl. From the mixed nature of the cultivation, the climate must evidently be mild and temperate, for even in the warmest months of summer, the breezes which descend at night from the mountains are always cool and pleasant: the periodical rains consist of gentle showers, and the snows which fall in winter cannot remain long on the ground. The Flora of Cashmere has a great resemblance to that of European countries, but the moisture of the climate and its mild temperature in the season of vegetation, causes so great an extension of the herbaceous parts, as well as of the flowers of plants, that many of them rival in luxuriance those of tropical countries." The mildness and moisture are indicated by the culture of rice, melons, gourds, and cucumbers. The kidney-bean thrives well—also the egg-plaut, capsicum; marsh-tree mallow, wheat, barley, saffron; turnip, raddish, beet-root; clover, &c. Of trees, the walnut, aspen, poplar, plane, and willow are named as most common. Fruit trees are so common as to constitute a jungle.

The author passes under review, also, the valley of Nipal—the several river valleys and passes of the great chain—Kunawar, Bussahir, &c. He even digresses to the Neelgherries of the peninsula, to show that a similarity exists in its vegetation and climate with that of the lower ranges of the northern chain; but we must now close our imperfect sketch of the contents of this first number, regretting only that we are from our ignorance of the science so little able to select and set before our readers the points which must have the greatest value in the eyes of a Botanist. Every Botanist in India will, however, possess the work; and possessing, prize it.

2.—*Analysis of the Edible Moss of the Eastern Archipelago.* By W. B. O'Shaughnessy, M. D. Asst. Surg. H. C. S.

The third number of that meritorious work, the India Journal of Medical Science, contains an able analysis of this curious delicacy of the Chinese materia culinaria, the substance of which we venture to transfer to our pages, as coming properly within the scope, to which the motto on our title page confines, or rather extends, our investigations.

The edible moss is a small and delicate fucus, of a white colour, and flattened filiform shape. The longest of the separate individuals in the specimens examined by Dr. O'S. did not exceed two inches from the ciliary processes, corresponding to the root, to the extreme of the ramifications, which were not very numerous or regular. Dr. O'S. names it the *fucus amyloides*, from its remarkable and important peculiarity of containing a large proportion of pure starch.

Digestion in cold water for 24 hours separated a portion of gum, and the soluble alkaline salts:—this branch of the analysis proved it to differ from the Iceland

moss in containing no bitter principle. Another portion was cut into very minute shreds, and boiled for 24 hours in distilled water, which was renewed as fast as it evaporated. On cooling, the liquid gelatinized, holding suspended an abundance of the undissolved ligneous shreds. The jelly was transparent and colourless; neither acid nor bitter; gave no precipitate with tincture of galls, and only a transitory blue tinge with iodine. The ligneous fibre yielded a trace of wax on boiling in alcohol; after which, ground to a fine powder, and boiled in distilled water, the solution struck a fine deep blue with iodine, from the starch present: scarcely a particle of the starch can be taken up by simple boiling until after trituration. The woody fibre incinerated gave a small residuum of earthy salts and iron. The quantitative composition deduced from Dr. O'SHAUGHNESSY'S analysis is as follows:

Vegetable jelly,.....	54.5
True starch, .....	15.0
Wax, a trace,.....	0.5 ?
Ligneous fibre, .....	18.0
Gum, .....	4.0
Sulphate and muriate of soda,.....	6.5
Sulphate and phosphate of lime,.....	1.0
Iron, a trace,.....	0.5 ?

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100.0

With regard to the best mode of rendering the moss available as an article of diet, we extract the following judicious observations:

"In the first place, from the tendency of *pectin* or vegetable jelly to form insoluble compounds with saline and earthy bases, it is necessary to steep this fucus for a few hours in *cold rain water* as the first step in its preparation. This removes a large portion, if not the entire, of the sulphate of soda, leaving all the gelatine and starch. It should next be dried by the sun's rays, and *ground to a fine powder*: I say *ground*, for cutting or pounding, however diligently or minutely performed, still leaves the amylaceous globules so mechanically protected, and so closely involved in an external sheath of tough ligneous fibre, that scarcely a particle of the starch can be extracted by boiling, even though the decoction is prolonged for several hours. When *ground*, boiling for 25 minutes or half an hour dissolves all the starch and gelatine. The solution while hot should be passed through muslin or calico, and thus the ligneous fibre is removed; lastly, the strained fluid should be boiled down till a drop placed on a cold surface gelatinizes sufficiently.

"With milk and sugar, and flavoured with lemon juice or sherry, this substance when prepared as I direct, would afford the invalid a pleasant article of diet, especially at sea, where other jellies or their materials cannot be so easily preserved. As I am informed that this fucus is found abundantly on the eastern coast of Bengal, I entertain considerable hopes of its being hereafter found available also in several processes of art and in various manufactures."

The wide field of vegetable chemistry has been hitherto nearly untrodden in India; and yet there is no country where it offers a richer harvest of curious and novel results. We owe Dr. O'SHAUGHNESSY'S talents, once directed to the subject, will be fixed on this difficult branch of chemical analysis. He has already acquired in England the peculiar skill and experience in recognizing and separating the numerous and complicated principles of which organic substances are composed, that alone can give confidence in such analyses, and ensure their general acceptance by chemists.

## XI.—EUROPEAN SCIENCE.

*De Candolle's Theory of the Rotation of Crops.*

It is a well-established fact in the practice of husbandry, that a succession of the same kind of crops on the same piece of ground, deteriorates not only the ground, but the crops. Thus, a successive crop of wheat, barley, or oats, on the same land, destroys the stamina of the ground, and renders each successive crop less in produce and value. A succession of wheat, barley, and oats, frequently repeated, will produce the same effect, though not so quickly. Even a succession of green crops will affect both the crops and the soil in a similar manner, in a given time.

This deterioration of soil and crop, is most perceptible when there is no intermediate application of manure. Manure will, no doubt, protract the period of greatest deterioration; but manure cannot constantly maintain a profitable return from a succession of the same kind of crop. Besides, it is impossible to obtain a sufficient quantity of manure for frequent intermediate applications, in order to counteract all the effects of deterioration. The impossibility of maintaining to perfection the same kind of vegetable on the same piece of ground in a well cultivated garden, illustrates, in a striking manner, the limited powers of manure. In the field, where the cereal crops always ripen their seed, the power of manure is still more limited. These evil effects, arising from what is emphatically and properly called *over-cropping*, have, therefore, been established beyond doubt.

To obviate the serious evil of deterioration of soil and crop, which neither labour merely, however dexterous, nor manure, however well prepared, can prevent, the adoption of a succession of different kinds of crops has been attended with beneficial results. Thus a green crop, such as grass, turnips, or potatoes, was made to succeed a corn crop; and when this alternation of crops was substituted for a successive series of corn or grain-crops, experience soon discovered that less deterioration affected any crop of the series, or the land itself. It was also found, by this arrangement, that a longer period might elapse, than by the former, between the applications of manure, without diminishing the gross produce of the intermediate crops.

In the progress of experience, this beneficial arrangement of cropping was discovered not to bestow all the advantages of which the alternate system was capable. It was well to cause the gentler sway of the green crop to succeed the severer energies of a corn one; but it left the important question undecided, whether the particular corn crop selected was the most proper one by nature to follow its predecessor. Thus, it would be an improvement on the old series of cropping, to make wheat follow grass, barley after potatoes, and oats succeed turnips; but is wheat the best successor to grass of any of the corn crops? and, in like manner, a similar question might be asked of the rest of the series. Experience again suggested, that a better arrangement might be followed. It said, let wheat follow a bare fallow, potatoes, or beans; let barley succeed the turnip, and let oats be taken after the grass.

The trials of experience suggested yet better arrangements, to secure the greatest produce of the different kinds of crops. It was soon discovered that all kinds of soils were not adapted to the most luxuriant growth of all the kinds of crops. Thus a clay soil was found to suit wheat better than barley; a bare fallow better than turnips; and beans better than potatoes. A gravelly soil on the other hand, was most suited to those crops which were rejected by the clay soil.

All these different changes and alterations suggested by experience, in the succession of crops, and the soils which are best suited to them, produce this irrevocable result :—that a particular corn crop shall succeed a particular green crop, on the soil that is best adapted to them ; and that manure shall be applied, at given intervals, with one of the green crops, or with bare fallow. Thus, on strong soils, wheat must follow a manured fallow, grass after wheat, oats after the grass, then beans after oats, and wheat to precede the manured fallow after the beans. On weak soils, barley succeeds to turnips which have been manured, grass follows the barley, and oats precede the manured turnips.

Experience having proved that these successions of corn and green crops, on their respective soils, are best suited to insure the greatest produce, it is requisite that one series of successions shall follow another, in regular order, on its respective soil. These series of successions are called the "*Rotation of crops.*" Should any alteration be desired in the rotation, it can only consist of a substitution of one corn crop for another, or one green crop for another ; for the corn and green crops must always stand in the same relative position to each other. But this substitution of one crop for another will generally be attended with a sensible deterioration in the crop or soil, if the deterioration be not counteracted by an additional quantity of manure. A modification may be effected in the rotation by extending the time which it occupies. Thus the rotation on strong soils, which embraces six years, may be extended to seven or eight ; and that of four years, on weak soils, may be extended to five or six years. The extension of the length of the rotation must be effected alone through the gentle, or the green, and not the severe or corn class of crops ; and that not by means of any of the green crops indiscriminately. Thus the extension must not be effected by a repetition of any of the corn crops ; for, we have already observed, such a proceeding would hasten their own deterioration ; nor by adding an alternate green and corn crop to the end of the rotation, for that would be a mere attempt to deteriorate the soil by delaying the application of manure ; nor by repeating the turnip or potatoe crop, for neither can be raised without manure ;—but it must be effected by allowing the grass to remain as many years longer as it is desired to extend the term of the rotation. The period of grass crop can alone be extended without trouble.

Experience again steps forward to check speculation in the endurance of the grass crop. On strong soils it is inimical to the grass crop to prolong its existence beyond one year, and hence annual grasses and the six years' rotation is best suited to that class of soils ; whereas, an extension of the existence of grass on the weaker soils, serves to strengthen the energy of the soil. Two at least, or perhaps three years of grass confers a lasting benefit on such soils. Having thus fixed upon the length of rotation which is best adapted to the soil, let it be irrevocably adhered to.

In the establishing of this beneficial system of cropping, experience alone has discovered the progressive steps which have led to its completion. The rationale of the system has never been inquired into by those who have administered its rules or benefited by their application. The investigation of causes is the duty of the philosopher, and not of the farmer, who has only to deal with effects ; but the happiest results may be anticipated from the combined efforts of both ; when the former directs his mind to establish the principles upon which the experienced operations of the latter depend.

Among the important practices in husbandry, that of the rotation of crops is the most important ; for by an attentive adherence to it, the utmost regularity of

work will be maintained through every department of labour. To a steady adherence to this practice is justly ascribed all the improvements on land which have attracted the admiration of every lover of this country : to it is properly attributed the regular apportionment of an invariable extent of land, which is annually devoted to the growth of culmiferous crops ; and which regularly checks, as far as human means can, injurious fluctuation in the supply of the first necessary of life : and to it is accurately imputed the supply of the immense numbers of high-fed live-stock which daily grace our markets.

To the intelligent agriculturist it is delightful to learn that the discoveries of science tend more and more to develop those principles which his practice illustrates. That practice has hitherto kept " the even tenor of its way," by the guidance of unerring experience, amid the contempt of scientific reproach. It now receives its justification in the confession of scientific error.

Various reasonings have hitherto been employed by men of science to account for the necessity of a rotation of crops. It has been thought sufficient to explain all the phenomena to state, that different plants absorb different juices from the same soil, and, therefore, though the ground may be exhausted by one class of vegetables, it may be rich enough for another. But it is well known to botanical physiologists, that plants absorb all the soluble substances which the soil contains, whether injurious to their growth or not. It has also been stated as an explanation, that the roots of different plants, being of different lengths, extend into different layers of the soil, and thus derive from it adequate nourishment. But the roots of all plants must be in the same stratum at the period of germination, and it is besides probable that all the arable part of the soil is homogeneous. It is known that plants of the same family, such as clover and lucerne, do not prosper in succession, although their roots are of different lengths. These theories are therefore not satisfactory.

BRUGMANS stated that a portion of the juices which are absorbed by the roots of plants, are, after the salutiferous portions have been extracted by the vessels of the plant, again thrown out by exudation from the roots, and deposited in the soil. This idea has been more fully pursued by DE CANDOLLE, who sees in it the true theory of the rotation of crops. He thinks it probable, that it is the existence of this exuded matter, which may be regarded in some measure as the excrement of the preceding crop of vegetables, that proves injurious to a succeeding vegetation. He has compared it to an attempt to feed animals upon their excrements. The particles which have been deleterious to one tribe of plants, cannot but prove injurious to plants of the same kind, and probably to those of some other species, while they furnish nutriment to another order of vegetables. Hence why one kind of corn crop is insured by immediately succeeding another of the same kind ; hence why different kinds of crop may with advantage succeed one another ; hence in short, the propriety of a rotation of crops.

To subject these theoretic views to the test of experiment, M. I. MACAIRE has made many experiments to prove that vegetables exude matter from the roots, and which are related by him in a memoir inserted in the Transactions of the *Société de Physique et d'Histoire Naturelle* of Geneva\*. After various attempts to raise plants in pure siliceous sand, pounded glass, washed sponge, white linen, he decided upon pure rain-water. After cleansing and washing the roots thoroughly, he placed them in vials with a certain quantity of pure water. After they had put forth leaves, expanded their flowers, and flourished for some time, he ascertained, by the evaporation of the water, and the use of chemical re-agents, that the water

\* See Edinburgh New Philosophical Journal, No. xxviii. p. 225.

contained matter which had exuded from the roots. He satisfied himself that this is the fact with respect to nearly all those plants which display their flowers.

" Several plants of *Chondrilla muralis*, perfectly clean, were placed with their roots in pure water. At the end of a week, the water was yellowish, and emitted an odour like opium, and had a bitter taste. Subacetate and acetate of lead produced a brownish flocculent precipitate, and a solution of gelatine disturbed its transparency. As a proof that this matter was an exudation from the roots, it was found that neither pieces of the root nor of the stem, when macerated in the water during the same time, occasioned either taste, smell, or precipitate.

" To prove that plants employ the excretory power of their roots, in order to get rid of hurtful substances which they may have imbibed, the following experiments were made. Some plants of the *Mercurialis annua* were washed in distilled water, and placed so that one portion of their roots dipped into a weak solution of acetate of lead, and another branch of the same root into pure water. Having vegetated in this manner very well for several days, the water was tested by hydro-sulphuret of ammonia, which proved, by the black precipitate which it formed, that a notable portion of the lead had been absorbed, and deposited by the branch which dipped into the water. Groundsel, cabbage, and other plants, gave the same results. Some plants grew very well for two days in acetate of lead. They were then withdrawn, their roots well washed with distilled water, which being afterwards tested, was found to contain no lead, and then placed to vegetate in rain water. In the course of two days this water was found to contain a small quantity of acetate of lead.

" The same experiments were made with lime-water, which, being less injurious to plants, is preferable to lead. The roots being partly placed in lime-water, and partly in pure water, the plants lived well, and the pure water soon showed the presence of lime by the oxalate of ammonia; and the plants which had grown in lime, and were then transferred with every precaution to pure water, soon disgorged into it a portion of lime.

" Similar results were made with a weak solution of marine salt, and with a like result. There can be no doubt, then, that plants have the power of rejecting by their roots, soluble salts, which are injurious to vegetation. Experiments also proved, that the roots exuded a greater excess of matter under night, than in the day. As it is well known that the light of day causes the roots to absorb their juices, it is natural to suppose that, during the night, absorption ceases, and excretion takes place."

Some of the inferences which M. MACAIRE would deduce from his experiments, are, that the greater number of vegetables exude by their roots substances unfit for their vegetation; that the nature of these substances varies according to the families of plants which produce them; and that some being acrid and resinous, may be injurious; and others, being mild and gummy, may assist in the nourishment of other plants.

But the most interesting experiments to an agriculturist, were made by M. MACAIRE, with the bean, wheat, and potatoe.

The bean lives in pure water, which continues quite clear, but assumes a yellow colour. Chemical tests and evaporation detect a matter in this water, very analogous to gum, and a little carbonate of lime. It was found that the water in which the bean had lived, was well charged with excrementitious matter. Fresh plants of beans did not live well in it; but to ascertain whether this arose from want of carbonic acid in the fluid, or from the presence of exuded matter which

they repelled, plants of wheat were placed in the water. They lived well; the yellow colour of the fluid became less intense, the residuum less considerable, and it was evident that the new plants absorbed a portion of the matter discharged by the first. Hence the practice of cropping wheat after beans is justified by this experiment.

Wheat, rye, and barley were subjected to experiment. They do not live well in pure water, probably from the quantity of mineral substances, particularly siliceous matter, which they contain. The water in which they vegetated was clear, transparent, without colour, smell, or taste. It contained some salts, alkaline and earthy muriates and carbonates, and only a very small portion of gummy matter. As gummy matter appears to be a good preparation for wheat, which was illustrated in the experiment of the bean, corn-crops which do not give out gummy matter, ought not to succeed each other. And as M. MACAIRE thinks that plants of corn reject scarcely any thing but the saline matters foreign to vegetation, it is probable that any preparation but by their own kind, would be acceptable to several plants. The practice of preparing soil for corn-crops, by the culture of green-crops, is thus countenanced by experiment.

The potatoe lives well in water, and puts forth its leaves. The water is scarcely coloured, leaves little residuum, gives but little taste, and induces the belief that this is one of the plants whose roots secrete little or nothing of a decided character. This experiment of the potatoe, M. MACAIRE observes, was made upon a plant at an early stage of development. Experiment would lead to the inference that the potatoe is not a very good preparative for corn-crops, which is known to be the case in practice, unless it is assisted by an extraordinary quantity of manure. All these facts tend to prove the theory of rotation suggested by M. DE CANDOLLE.

We hope the chemists of our country will prosecute these interesting investigations of M. MACAIRE; and we beg to suggest the following course to be pursued.

Let wheat, barley, and oats, be each subjected to a separate suite of experiments. Let it be ascertained whether the potatoe or the turnip affords the best nourishment to the succeeding corn-plants. Experience indicates the turnip as the best. Then determine which of the three corn-plants will best follow the potatoe and turnip respectively. Experience prefers wheat after the potatoe, and barley after the turnip. The oat is not a favourite after either. Let red and white clovers and rye-grass collectively, be tried after all the corn-plants. Experience points to barley as the best nurse for these grasses, as they may be termed, according to ordinary phraseology. Let it be also ascertained whether the potatoe or the turnip is the better preparative for the grasses. Experience is partial to the turnip. Then let it be determined for which of the corn-plants the grasses make the best preparation. Experience decidedly says the oat. It may be proper to try the grass-plants singly, and from one to three years old. We presume the value of the bean and the pea has been already sufficiently ascertained by M. MACAIRE. Should any eminent chemist direct his attention to this interesting subject, we shall be happy to insert the details of the experiments.—*Quarterly Jour. of Agriculture.*

We can but repeat the injunctions and the offer of the Editor of the London Journal of Agriculture, should any of our friends be inclined to pursue the inquiry in this country. The effects of the mixed crops, to which the natives are so partial, would be a fertile subject for investigation.—*Ed.*

Meteorological Register, kept at the Assay Office, Calcutta, for the month of March, 1854.

Days of the Month.	Barometer reduced to 32° Fahr.				Thermometer in the Air.				Depression of Moist-bulb Thermometer.				Hair Hygrometer.		Rain.	Wind.			Weather.				
	At 5 A. M.	At 8 A. M.	At 4 P. M.	At 10 P. M.	Minimum at 5 A. M.	At 10 A. M.	Max. by Reg. Ther.	At 4 P. M.	At 10 P. M.	At 5 A. M.	At 10 A. M.	At 4 P. M.	At 10 P. M.	At 10 A. M.		At 4 P. M.	Inches.	Morning.	Noon.	Evening.	Morning.	Noon.	Evening.
1	30.0	30.1	30.0	30.0	74.5	79.6	87.8	83.7	77.1	1.0	4.3	8.5	2.4	93	90	S.	S.	S.	cum. strat.	clear.	clear.		
2	30.0	30.0	30.0	30.0	75.5	80.0	91.8	85.0	79.2	1.9	5.0	9.0	2.2	96	88	S.	S.	S.	clear.	do	do		
3	30.0	30.1	30.0	30.0	73.1	80.2	91.0	86.3	77.2	1.0	5.2	10.0	2.0	95	87	S.	S.	S.	mist at 8 A. M.	do	do		
4	30.0	30.0	30.0	30.0	76.0	82.3	93.5	86.7	77.0	1.9	6.1	10.1	1.9	96	86	S.	S.	S.	clear.	clear.	do		
5	30.0	30.0	30.0	30.0	78.1	82.5	94.2	90.6	79.1	0.1	6.5	12.0	2.7	96.0	85	S.	S.	S.	do	clouds.	do		
6	30.0	30.0	30.0	30.0	76.7	83.5	90.0	87.0	79.2	1.7	6.7	9.5	3.9	95.0	89	S.	S.	S.	do	do	do		
7	30.0	30.0	30.0	30.0	70.0	80.9	86.9	84.6	78.2	3.7	9.5	11.4	5.7	87.0	86	n.	var.	n.	do	cumuli.	clear.		
8	30.0	30.0	30.0	30.0	79.7	86.9	96.9	83.2	78.2	8.3	13.5	5.2	11.4	77	74	n.	w.	n.	do	clear.	do		
9	30.0	30.0	30.0	30.0	78.2	80.7	91.0	85.9	77.1	2.0	6.5	5.1	5.1	74	68	n.	n.	n.	do	do	do		
10	30.0	30.0	30.0	30.0	77.0	81.4	94.2	87.6	77.2	2.9	5.8	11.3	2.6	95	84	n.	n.	n.	do	do	do		
11	30.0	30.0	30.0	30.0	78.9	83.7	94.1	87.1	77.0	1.8	6.5	17.6	2.2	92	66	S.	S.	S.	do	do	do		
12	30.0	30.0	30.0	30.0	73.1	84.0	91.5	87.3	81.0	2.9	7.0	19.3	3.8	94	61	S.	S.	S.	do	do	do		
13	30.0	30.0	30.0	30.0	83.0	84.0	94.0	88.0	79.6	2.2	6.2	9.8	4.6	94	92	S.	S.	S.	do	clouds.	high wind.		
14	30.0	30.0	30.0	30.0	77.0	83.0	89.1	86.9	79.6	2.2	6.0	13.0	3.5	94	80	S.	S.	S.	do	clear.	nwr. dry.		
15	30.0	30.0	30.0	30.0	77.2	84.8	89.1	86.9	79.1	5.2	6.9	9.6	4.8	93	98	S.	S.	S.	do	clear.	gathering.		
16	30.0	30.0	30.0	30.0	77.1	84.0	87.0	84.5	76.8	2.5	6.7	9.3	2.8	93	92	S.	S.	S.	do	clear.	thg. brd. rn.		
17	30.0	30.0	30.0	30.0	76.3	82.0	89.8	81.5	79.3	1.7	6.0	7.7	2.3	94	92	S.	S.	S.	do	cum.	nim.		
18	30.0	30.0	30.0	30.0	79.2	87.9	99.2	83.2	78.3	0.8	5.5	14.2	4.3	94	75	n.	sw.	n.	overcast.	cumuli.	clear.		
19	30.0	30.0	30.0	30.0	74.3	81.5	92.0	89.0	77.2	2.7	7.9	16.8	5.3	94	70	n.	n.	Se.	clear.	dull.	do		
20	30.0	30.0	30.0	30.0	73.1	83.0	91.6	86.2	74.2	1.7	6.4	16.5	4.7	91	70	n.	n.	Se.	misty.	clear.	do		
21	30.0	30.0	30.0	30.0	73.3	80.8	93.0	87.1	81.2	1.3	5.3	18.4	4.7	94	63	S.	sw.	S.	clear.	circum. rn.	heavy. rn.		
22	30.0	30.0	30.0	30.0	74.0	82.5	91.0	86.3	79.5	3.0	13.5	10.9	9.5	76	86	S.	var.	S.	do	cloudy.	drri.		
23	30.0	30.0	30.0	30.0	75.6	82.5	95.0	84.4	81.2	3.1	11.4	16.9	11.0	81	68	n.	n.	S.	misty.	clear.	storm. rn.		
24	30.0	30.0	30.0	30.0	76.5	83.1	93.0	87.2	78.4	5.7	13.7	18.7	10.7	79	67	n.	n.	S.	clear.	clear.	misty sky.		
25	30.0	30.0	30.0	30.0	73.4	82.4	93.8	87.2	78.0	1.7	9.8	17.0	6.7	78	67	n.	n.	S.	clear.	hazy.	clear.		
26	30.0	30.0	30.0	30.0	73.5	83.5	95.0	87.7	78.1	1.6	8.0	16.1	4.5	88	72	e.	S. w.	n.	dull.	hazy.	do		
27	30.0	30.0	30.0	30.0	76.0	83.0	90.0	88.1	79.8	2.0	6.7	9.5	3.5	92	69	n.	n.	S.	do	dull.	do		
28	30.0	30.0	30.0	30.0	78.4	84.0	90.0	89.4	81.0	2.3	5.3	10.3	4.5	94	80	S.	S.	S.	thick.	clear.	do		
29	30.0	30.0	30.0	30.0	78.4	84.5	92.1	90.7	79.1	2.7	6.7	9.2	2.0	92	90	S.	S.	S.	clear.	do	do		
30	30.0	30.0	30.0	30.0	78.4	85.0	93.0	88.9	75.2	3.0	6.0	9.0	6.0	93	91	S.	S.	n. e.	do	do	circ. cam.		
31	30.0	30.0	30.0	30.0	73.7	83.9	89.0	85.7	78.4	3.7	7.3	9.4	4.6	92	85	S.	S. w.	S.	do	do	storm. rn. clear.		

Mean, 29, 788 30.0 787 82.3 75.0 82.3 91.7 86.7 77.8 2.8 7.5 12.2 5.3 90 80 1.77 S. monsoon. squally - hazy sky.

The instruments for 10 A. M. and 4 P. M. are suspended in the free air of the Laboratory, those for 5 A. M. and 10 P. M. in the south veranda of a third story near the cathedral. The register thermometer for extremes is also in the same veranda.

# JOURNAL

OF

## THE ASIATIC SOCIETY.

No. 28.—April, 1834.

I.—*Memoir on the Ancient Coins found at Beghram, in the Kohistán of Kábul.* By Chas. Masson.

[Read at the Meeting of the 30th instant.]

[We hasten to give to the world the results of Mr. MASSON'S successful researches in the Numismatology of Bactria, for the communication of which to this Journal we are mainly indebted to Dr. J. GERARD, who was for some days in company with the author at Kabul, and had an opportunity of inspecting his large and valuable collection of coins, and of certifying, that the drawings of those selected to illustrate the present memoir are faithful and accurate.

We are most happy to comply with the author's request in sending copies of the memoir to the several officers and gentlemen indicated.]

It will be unnecessary in this place to enter upon a detail of ALEXANDER'S conquests in central Asia, the rise and fall of the Greek Bactrian monarchy, and other events, which, as they have lately become a topic of popular attention, are daily receiving more familiar illustration. I shall therefore proceed at once to the subject of this memoir.

In July of the present year (1833), I left the city of Kabul, to explore the districts north of it, at the base of the mountains Hindoo Kúsh, with the primary object of identifying the site of Alexandria ad Caucasum. Although upon this question I defer a decision, until I can consult the ancient authorities, there being many spots which would agree therewith in a local point of view,—I was recompensed by the discovery of numerous interesting objects, and among them of the site of an ancient city of immense extent, on the plain now called Beghram, near the confluence of the rivers of Ghorbund and Ghorshahr, and at the head of the high road leading from Kábul to the tree of Kohistán, to Nijrow, Taghow, Lughman, and Jalábad. I soon learned that large numbers of coins were ~~discovered~~ found on the plain of

Beghran, and my first excursion put me in possession of about eighty, procured with difficulty, as their owners were suspicious of my motives in collecting them. The coins were of such a type and description, as naturally increased my ardor in their research; and, succeeding in allaying the mistrusts of the finders, I obtained successive parcels, until up to this time (November 28th, 1833), I have accumulated 1,865 copper coins and fourteen gold and silver ones, the latter Brahminical and Cufic. Of course many of these are of no value, but I persevered in my collection, under the hope of obtaining ultimately perfect specimens of every type and variety of coin; in this I have but partially succeeded, so great is the diversity of coins found at this place, that every fresh parcel of 100 or 150 coins yields me one or more with which I was not previously acquainted.

I may observe, that, on my return to Kabul, from my first excursion, I found two persons there, busy in the collection of coins. I left them the field of the city, and confined my attentions to the more distant and ample one of Beghran. Besides, as my object was not merely the amassing of coins, but the application of them to useful purposes, I hailed with satisfaction the prospect of obtaining a collection from a known spot, with which they would have, of necessity, a definite connection, enabling me to speculate with confidence on the points they involved.

I suppose that no less a number than thirty thousand coins, probably a much larger number, are found annually on the *dusht* or plain of Beghran, independently of rings, seals, and other trinkets. Gold and silver coins occur but rarely. If we allow a period of five hundred years, since the final extinction of this city, (and I have some idea that negative proof thereof may be adduced,) and if we allow, as I presume is reasonable, that the same or not a less number of coins has been annually extracted from its site, we have a total of fifteen millions, a startling amount, and which will not fail to excite curiosity as to this second Babylon. The antique treasures of Beghran, until their partial diversion this present season, have been melted in the mint at Kabul, or by the coppersmiths of that city and of Chareekar. The collection of them is made by Afghan shepherds, who sell them by weight at a very low price to itinerant *misghurs* or coppersmiths, who occasionally visit their tents, and these again melt them down themselves, or vend them at a small profit to the officers of the mint.

The coins of Beghran fall into five grand classes, viz. Greek, Indo-Scythic, Parthian, and Chinese, Brahminical, and Muhammedan, and each of these classes contains many varieties or series. I have ventured to

attempt their arrangement, and if my plan be found correct, the classification I should hope will materially assist the study of these coins, and their application to historical elucidation. In this memoir I shall only treat of the two first classes, as I have not leisure to include the three other classes—the study of which, however useful and necessary, is more obscure, and cannot be conducted without the assistance of historical reference, which of course I cannot command here. Of the Greek coins, which are found in considerable numbers, it may be generally observed, that the conquests of Arsaces Mithridates will explain their appearance in these countries; but I incline to think we may recognize a distinct Parthian dynasty, which may possibly have been founded by some enterprising viceroy under his successors. I sometimes indulge the hope of identifying a Parthian metropolis in the neighbourhood of Kabul. As Sassanian coins are also discovered, it would seem probable that these countries were also at some period dependent on the princes of the house of SASSAN. The Brahminical coins, that is, such as are clearly so from their Nagree inscriptions, I calculate may chronologically be placed in succession to the Sassanian ones; and that they formed the circulating specie of these countries at the period of the Muhammedan invasion, is proved by coins with Nagree legends on the one side, and Cufic on the other.

*General Observations.—Class, Grecian—Series No. 1.*

*Coins of the Recorded Kings of Bactria.*

The Greek coins found in these countries are naturally the most interesting. Of the recorded kings of Bactria, we find at Beghrum the coins of three only, viz. MENANDER, APOLLODOTUS, and EUCRATIDES the 1st or Great. It may sometimes happen that a medal of EUTHYDEMUS is to be met with at Kabul, but it must always be considered an importation from Balkh. The coins of the two first Bactrian princes, THEODOTUS I. and THEODOTUS II. we ought not to expect here, as it is certain that their rule did not extend south of the Caucasus, the present Hindoo Kush. EUTHYDEMUS, the third prince, we may conjecture profited by the diverted attention of ANTIOCHUS the Great from his eastern provinces to the Roman invasion, and passed this mountain range; but the absence of his coins leads us to infer that he may have died before he had effected a settlement of the countries invaded by his arms. Of the celebrated MENANDER, we have numerous coins; the features on most of them, those of youth; on none of them, those of age. The legend of no one coin describes him as king of Bactria and India, nor is the epithet ΝΙΚΑΤΟΡ to be found, as applied to him by Strabo, but that of ΣΟΤΗΡ. His recorded conquest of a great part of India must therefore have been subsequent to his ascending the throne in Bactria.

Colonel TOD observes, that he could not fix the period of the conquest of Bactria by MENANDER; leading us to infer that he was a prince of the Greek dynasty on the Hyphasis; it would appear certain however that MENANDER was a king of Bactria, who extended his conquests very far into India, according to the direct testimony of PLINY—which is corroborated by PLUTARCH, who, in his valuable and honorable mention of him, styles him MENANDER, a king of the Bactrians.

Of APOLLODOTUS we have several coins, and their discovery in these countries proves the fact of his having reigned in them, which has been doubted by some, who have alike referred him to the dynasty on the Hyphasis.

It must be confessed, that our views are not at present quite clear relative to the reigns and successions of the Bactrian princes: if the chronological data of SCHLEGEL be correct, we have from the ascension of APOLLODOTUS to sovereignty 195 B. C. to that of EUCRATIDES 181 B. C., but an interval of 14 years, which may have been very naturally filled by the reign of the former, while we have the names of three princes, MENANDER, HELIOCLES, and DEMETRIUS, who have claims more or less to be considered kings of Bactria. Fortunately, we have other kingdoms to which to assign them, should their pretensions to that of Bactria be found inadmissible. These points, and some others will shortly receive much elucidation, when we become acquainted with the nature of the coins found north of the Hindoo Kúsh.

The coins of EUCRATIDES I. or Great, are very numerous, and of very spirited execution. I believe they are not to be found east of Kabul, which, if ascertained to be a fact, yields grounds for the hypothesis, that in his time, an independent Greek kingdom existed west of the Indus, whose capital was the ancient Nysa, or near the modern Jelalabad. That such a kingdom existed at the later period, we have the satisfaction of being able to demonstrate to a certainty.

We have discovered no coins of DEMETRIUS, supposed to have been a son of EUTHYDEMUS; it is fair to infer then that he never ruled in these countries. Colonel TOD assigns him to the dynasty on the Hyphasis, of which he has some claims to be considered the founder, and which we may credit until farther researches may confirm or controvert the opinion.

We are alike without any evidence of HELIOCLES, whose claim to be reputed a sovereign of Bactria appears to have been advanced by MIONNET, on the authority of a single medal.

We find no coins of the last of these kings, EUCRATIDES II. although his reign was not a short one, (twenty-two years, according to SCHLEGEL.) As he ascended the throne by the murder of his father,

it is not unlikely that the parricidal act was followed by anarchy and the dismemberment of many of his provinces;—the absence of his coins at Beghrām would seem to countenance such an opinion, and the distracted state of his affairs was probably favorable to the inroads of the Getae, who destroyed his empire.

The coins of the kings of the regular Bactrian dynasty are of excellent workmanship, and have monograms or eras, from which an accurate estimation of their reigns may, it is hoped, be adduced. The inscriptions or legends of the reverses are invariably Pehlevi, which proves it to have been the current language of these countries at the period of the Macedonian conquests. The Greeks, as conquerors, inserted on the obverses, their own characters, and by them we recognize their princes, after a lapse of twenty centuries. Under the auspices of the present viceroy of India, the English language seems likely to become generally known throughout the eastern empire; and should this splendid purpose be effected, at some remote period, when the natural revolutions of political authority may have placed the natives of India under their own government, or that of other conquerors, they may still retain a fond and grateful remembrance of their former rulers, while they cherish their language and literature.

*Class, Grecian—Series No. 2. Coins of ANTIAAKIAOZ and ATZIOZ*

These coins I have classed as a distinct series, and introduced them here, because independently of the beards, which are not borne by the Bactrian kings, or by the early monarchs of the Nysæan dynasty, it is impossible to allow that the sovereigns were Grecian, both from their names and epithets—while the fine execution of the coins, and the pure Greek characters of the legends, seem to place them at a period synchronous or nearly so with the Bactrian monarchs. The conical emblems on the coins of ANTIAAKIAOZ we fortunately detect by a single specimen to have been also adopted by EUCRATIDES; and this circumstance establishes a connection, if merely that of descent or succession. My opinion of these coins is, that they belong to princes of an inferior dynasty, who ruled in the mountainous districts of Caucasus, consequent to the destruction of the Bactrian empire, and until their subjugation by the Nysæan rulers. Their metropolis may have been Alexandria ad Caucasum. In the districts where that city is naturally to be looked after, viz. in the Kohistan of Kábul, we find every indication that a capital has existed, which has varied its position and name, in much the same manner as Babylon. These coins have fortunately monograms, which may contribute to their better explanation.

*Class, Grecian—Series No. 3. Coins of ATAOZAHZ, NANTAΛEON, &c.*

This singular description of coins fortunately presents us with the name of the princes, although we are denied the satisfaction of beholding

their features; and no data are furnished on which we may fix the dynasty to which they may have belonged. Setting aside the curious form of these coins, their designs are well executed, and the obverse legends expressed in pure Greek characters. This circumstance induces me to insert the series here, and I should consider the dynasty a distinct one, perhaps under nearly the same circumstances as the preceding. The consideration of the coins with the legend ΒΑΣΙΛΕΩΣ ΠΑΝΤΑΛΕΟΝΤΟΣ made me at first hesitate whether to regard ΑΓΑΘΟΚΛΕΟΥΣ as a name, or, an epithet; as both descriptions of coins, from the coincidence of obverse and reverse, seem to refer to the same prince. A series of uncouth formed coins I have included under this series, from the agreement of the obverses: the reverses exhibit elephants. These Leonine coins have no legends, but figures, which may be their monograms.

*Class, Grecian—Series No. 4. Coins of the Nysæan Dynasty.*

We now come to a series of coins, which it is gratifying to identify as belonging to Greek princes, whose seat of empire was at the ancient city of Nysa, or Dionysiopolis, founded agreeably to Sanscrit and Greek records by Bacchus or Dionysius. Hercules, the tutelary Bactrian deity, is represented on some of these coins, and a horseman, alike a Bactrian emblem, on others. These coins, with respect to their type and execution, exhibit many incongruities: on many, while the bust is well executed, and the features well delineated, the Greek characters of the legends are very corrupt. Happily, the Pehlevi legends are generally fair and distinct. The princes of this dynasty would seem to have been numerous, probably of more than one family; it is to be hoped, we shall be enabled ultimately to identify all of them: at present we have three if not four princes of the same name ΕΡΜΑΙΟΣ; a ΣΑΤΗΡΚΕΥΑΣ; and an ΤΝΑΔΕΡΡΟΣ\*. We have the coins of others, the legends illegible.

*Class, Grecian—unarranged Coins.*

These coins I have not referred to distinct series, as it is probable that legible specimens will enable us to refer them to some of the preceding ones. The coins of ΕΡΜΑΙΟΣ have a similarity in nomenclature with those of the Nysæan dynasty, but it will be noticed, that the quadrangular form is not adopted with the latter—another of the coins has the figure of Hercules, and another, the epithet ΜΕΓΑΛΟΥ, the former a Bactrian and Nysæan emblem, the latter only observed on the coins of ΕΥΚΡΑΤΙΔΗΣ I.

Among the supplementary coins which were not found at Beghras, and are not in my possession, the coins with the horseman on the obverse are certainly Nysæan; on the reverse is the figure of Ceres; these coins are remarkable for their fair circular form, the pure Greek

\* We follow the ms.: but the second of these names is evidently ΣΑΤΗΡ ΜΕΓΑΣ, see further on.—Ed.

characters of the legend, and for being generally plated over with silver. They are found generally, I believe exclusively, in the neighbourhood of Jelalabad.

*Class, Indo-Scythic—Series No. 1. Coins of KANHPKOZ, &c.*

The coins of KANHPKOZ exhibit two varieties as to the reverse. The one representing a figure standing to the right, with the legend in Greek characters NANAIA, the other a figure standing to the left, with the legend HAIOC. This species of coin has been supposed by the Editor of the Journal of the Asiatic Society in Bengal, to belong to KANISHKA, a Tartar conqueror of Bactria. It is gratifying to be able to conjecture somewhat plausibly, that the capital of the prince whose coins are now the subject of our discussions, was at Kábul, a fact which may confirm or destroy the opinion of his having been KANISHKA. M. CSOMA DE KOROS, from Tibetan authorities, informs us, that a prince KANISHKA reigned at Kapila, supposed to have been near Hurdwar: and Mr. WILSON endeavors to fix the birth-place of SAKYA at Kápila, which he places in Oude. If the locality of Kapila rest on supposition only, and we be allowed the latitude of reading Kabila, and we find from Mr. WILSON'S notice that the name is actually so written in one dialect and Kimboul in another, we have a great approximation to Kábul or Kabool—the question will be nearly set at rest, and KANISHKA may have been the prince here designated KANHPKOZ. But if Kapila cannot be allowed to represent Kabul, then we may doubt whether these coins refer to KANISHKA. But certain will it be that they belong to a prince whose metropolis was Kábul. As I find very plausible reasons are advanced for bringing the epoch of KANISHKA to agree with that of the overthrow of the Bactrian monarchy, and consequently for inferring, that, that event was effected by him, the remark forces itself from me that Bactria was conquered from the north by the Getæ, and not from the east or north-east by the Sacæ. That the Getæ and Sacæ were distinct Scythian nations, was too well known to the ancients, to allow their historians and geographers to confound them: we find even the Latin poet Horace aware of the distinction. I doubt whether the Getæ at the period of their inroad upon Bactria made any settlement, assuredly not a permanent one, in the countries now called Afghanistan; nor do I feel certain, that, the Greeks did not rally and recover their authority in Bactria. A better acquaintance with the country will enable us to judge more decisively on these points. The barbarians appear to have proceeded southerly, and to have settled themselves, in Kuchee, Sind, and the Punjab, where they probably absorbed the Greek kingdom on the Hydaspes. In the countries named, their descendants still form the great part of the population, and pre-

serve their ancient name, Jet. The Greek kingdom of Nysa may have sprung up on the subversion of that of Bactria, or, may have been coeval with its latter existence; be this as it may, we are warranted in the belief, that, it flourished for a long subsequent period: and it is only after its extinction that we can consider the coins of ΚΑΝΗΡΚΟΞ chronologically, as we cannot suppose sovereigns reigning synchronously at Nysa, or Jelalabad, and Kábul. The type and general appearance of these coins favor all these suppositions, and while we identify them as belonging to a dynasty whose metropolis was at Kábul, we may conclude it to have succeeded the Greek one of Nysa. Whether the Nysæan government was subverted by ΚΑΝΙΣΗΚΑ I cannot determine, but if so, his era must have been considerably later than about 130 B. C.

The king on these coins appears in the double character of king and priest. My acquaintance with Buddha literature is too slight to enable me to affirm that such was the character of their princes. The altar we can by no means allow to be a fire altar, that is, as connected with the worship of ΜΙΘΡΑ; it is simply an altar, to which indeed fire is a general accompaniment, or at least when incense is to be offered, in the act of which the king here appears to be employed. This altar very fortunately occurs, as it permits us to connect at least five distinct varieties of coins without the possibility of error.

*Series No. 2. Coins of ΚΑΔΦΙΗΘ, &c.*

The exact coincidence of the costume and position of the king, with the presence of the incense altar on these coins, can leave no doubt of their connection with those of ΚΑΝΗΡΚΟΞ, and establishes the fact of the sovereigns belonging to the same dynasty. A tope opened at Kábul by M. M. HONIGSBERGER proved to be the sepulchral monument of ΚΑΔΦΙΗΘ and from it was extracted a basin of factitious metal, with a gold coin, the legend on which was ΒΑCΙΑΕΤC ΚΑΔΦΙΗΘC-ΟΟΗ (a representation of this coin is given as a supplementary one). This discovery is of eminent importance, as fixing the capital of the sovereigns of this dynasty beyond doubt. The copper medals of ΚΑΔΦΙΗΘ, are of very fair execution; the legends on the obverses corrupted, but very legible Greek. They ally with the gold medal, have the same monogram ΟΟΗ, which may be of much assistance. I incline to place the series of ΚΑΔΦΙΗΘ before that of ΚΑΝΗΡΚΟΞ in a chronological point of view.

*Series No. 3.*

This series may very safely be placed in succession to the two former, while the absence of the altar proves them distinct. I have not leisure to offer many remarks, which these coins suggest; but as the legends are evidently Greek, intended for such, I trust that eventually we shall be able to appropriate them with certainty.

The princes, whose coins constitute the two grand classes, just noted, excluding those of the recorded Bactrian monarchs, may, I conclude, be supposed to fill up by their reigns the period between the overthrow of the Bactrian empire and the subjugation of the provinces west of the Indus by ARSACES MITHRIDATES. The former event occurred about 130 years A. C. and the latter without means of reference I cannot determine\*. The coins of Beghrum are by no means exhausted, and fresh collections will doubtlessly put us in possession of many new ones; indeed, I have now a few unintelligible coins, both Greek and Indo-Scythic, whose types although unrecognizable are certainly different from those described. The princes whose coins are found on any known spots or site, may fairly be held to have reigned there. In the first or Grecian class, the Beghrum collection yields us two princes of Series No. 2, two at least of Series No. 3, eight at least of Series No. 4, or the Nysæan princes, and two at least of the unarranged coins—making a total of fourteen Greek kings. The Indo-Scythic class yields us at least nine princes; if the reigns of the whole of these princes be averaged at fifteen years each, the total gives a period of a hundred and forty-five years, which would bring us to about 25 A. D. New discoveries will certainly carry us to a much later period.

I shall now close these brief and general remarks on the Greek and Indo-Scythic coins of Beghrum, which I had intended to have made public, at a future period, and in a more formal manner, in England, had I not been apprized of the intense interest excited by recent discoveries in this species of antiquities. I write from a country particularly interesting, and the neighbouring regions are perhaps as much so, at least to the antiquarian and historian, as any in the world. The Hindoo Kúsh alone intervenes between us and Badakshán, where if we may not be so sanguine as to allow its princes even the honor of a bastard descent from ALEXANDER the GREAT, we may be gratified in beholding the posterity of OXARTES, his father-in-law, and of SISYMITHRES, his benefactor and friend, or of those who govern in their seats; also of solving the geographical problem as to the source of the Oxus, by ascertaining whether it issue from a glacier as represented to Mr. ELPHINSTONE, or whether it emanate from a lake as recorded by PLINY.

For the last six or seven years, I have directed my attention to the antiquities of Central Asia, particularly to the vestiges of its Grecian conquerors and rulers. In spite of conflicting circumstances, I have made many discoveries, which one day, by the favor of the Almighty, I shall make public. I shall not regret my labors; notwithstanding

\* VAILLANT places this event in the year 144 A. C. and the final subjugation of Bactria by the Scythians in 126 A. C.—ED.

the inevitable casualties of time, notwithstanding the defect of historical records, notwithstanding the merciless and destructive ravages of Muhammedan conquerors, I think, I trust, we have sufficient evidences and indications still remaining, to enable us to decide with certainty, or to arrive at plausible conjectures on, most of the interesting points connected with these countries, from the period of the Macedonian conquests to the introduction of the Islam faith.

P. S. *Remark on the Etymology of Manikyala.*

General VENTURA proposed as the etymology of *Manikyala*, "the City of the White Horse." Mr. WILSON, very properly dissatisfied with this explanation, substituted that of "the City of Rubies." I beg to propose another which appears to me to be the correct one, and peculiarly appropriate to the building being a Buddhist monument. We find the term *Manya* or Lord and King, applied to Sakya and other Buddhist princes; thus *Sakya Manya*, "our Lord Sakya;" *Abhi-Manya*, our Lord Abhi. *Kyala*, signifying "a place," that is of any kind, why should we not read *Manikyala*, "the place or grave of our Lord or King," that is "the King's Grave;" a simple etymology, coinciding with the purpose of the monument, truly Buddhist\*, and which will prevent us from bestowing on a city, a name, I suspect, it never had. It is singular and deserving of notice, that of all the topes so numerous found in various parts of these countries, that of *Manikyala* alone should have preserved its original Buddhist name.

*Enumeration of Coins collected from Begham. by C. M.*

Class Grecian—Series 1. Recorded Kings of Bactria:

Menander, .....	39	
Apollodotus, .....	19	
Eucratides, .....	70	
		128
Series 2. Antilakides, .....	8	
Ausius, .....	6	
		14
Series 3. Agathocles, .....	10	
Pantaleon, .....	2	
Coins without legends,.....	20	
		32
Series 4. Hermæus, I. ....	34	
Hermæus, II. ....	136	
Hermæus, III. ....	10	
Sotereagas, .....	171	
Unadpherros, .....	19	
Coins with horseman on the obverse, ..	8	
Coins as Fig. 41,.....	6	
		384

\* On Mr. BURNES and myself visiting *Manikyala*, his Munshi or surveyor instantly remarked the similarity of the structure to that of Buddha monuments in Bombay.—J. G. GERARD.

Unarranged, Hermeus, .....	2	
Single specimens, .....	8	
		10
		Total, Greek Coins, 568
Class Indo-Scythic—Series 1, Kanerkos, .....	24	
As fig. 3 and 4, .....	22	
As fig. 5, .....	6	
As fig. 6 and 7, .....	16	
		68
Series 2, Kadphises, .....	37	
As fig. 3, 4, and 5, .....	254	
		291
Series 3, As fig. 1 to 6, .....	56	
As fig. 7 to 9, .....	56	
As fig. 10, .....	9	
As fig. 11, .....	113	
		234
Unarranged and ambiguous, .....	12	
		605
		Total, Indo-Scythic Coins, 1173
Guebre Coins, Parth. and Sass. ....	161	
Nagree, .....	34	
Cufic, .....	122	
		1490
Unintelligible and useless, chiefly Indo-Scythic, as Figs. 3, 4, & 5, of		
Series, No. 2, .....	375	
		1865
Grand Total, Copper, .....	1865	
Gold and Silver, Cufic, &c. ....	14	
		1879

*Analysis of the Beghram Greek Coins with reference to Plates.*

Plate VIII. Series 1st—Recorded Kings of Bactria.

MENANDER.

Fig. 1. *Obverse.* A helmed head with Greek legend ΒΑΣΙΛΕΥΣ ΕΩΤΗΡΟΣ ΜΕΝΑΝΔΡΟΥ.

*Reverse.* A figure of victory standing to the left, the right-hand stretched holds a wreath, the left-hand depends by the side, and holds a palm branch, legend Pehlevi.—Monogram  $\text{H} \overline{\text{H}} \text{B}$ .

This is one of fifteen quadrangular coins in my possession. I selected it for a specimen, both on account of its superior preservation, and of the youthful appearance of the king. They all essentially agree, excepting that on the others the figure of victory is standing to the right. The monograms vary, HE and HE. On these coins the features of the celebrated Menander display the various transitions from youth to manhood.

Fig. 2, *Obverse.* Head of elephant, with legend as preceding.

*Reverse.* A lengthened figure (with ?) legend Pehlevi.—Monogram H A.

Fig. 3, *Obverse* and reverse as preceding.—Monogram appears to be A P.

Fig. 1, is one of twenty-one copper quadrangular coins in my possession, with the same monogram, although struck at various times and with different dies.—Fig 2 is given on account of the variance, in the form of the elephant's head, and of the monogram; it is the only one of the coinage I have met with.

Fig. 4, *Obverse*. A helmed head with usual Greek legend.

*Reverse*. Figure of owl—legend Pehlevi—monogram **M**

This is a unique specimen—a beautiful coin. The owl, it is well known, was an emblem of Minerva, and, figuratively, of Wisdom.

#### APOLLIDOTUS.

Fig. 5, *Obverse*. Figure of Apollo, standing to the left, his right-hand holding a dart or arrow; left resting on a bow—the legend ΒΑΣΙΛΕΩΣ ΑΠΟΛΛΟΔΟΤΟΥ ΣΩΤΗΡΟΣ.

*Reverse*. Emblem with two supports, in an oblong square, defined by dots or points—legend Pehlevi—on the right of the emblem is an ambiguous character, which may be the monogram.

Fig. 6, *Reverse*. Emblem with three supports. (Oracular tripod of Apollo at Delphos ?)—legend Pehlevi—monogram to the left of the emblem and ambiguous. The obverse of this coin resembles the preceding, therefore not given.

Fig. 7, *Obverse*. Figure of Apollo standing, facing the front—legend the usual one.

*Reverse*. The same tripodical emblem, differently designed—legend Pehlevi—monogram **ϕ**.

These are three from nineteen copper quadrangular coins in my possession, and will shew the various types of the coins of Apollodotus. Figures 5 and 7 are single specimens. The omission of the prince's bust will be here noticed, and the substitution of the deity Apollo, to whom he was probably consecrated on his birth, whence his name Apollodotus, or the gift of Apollo.

#### EUCRADITES.

Fig. 8, *Obverse*. Helmed head—Greek legend ΒΑΣΙΛΕΩΣ ΜΕΓΑΛΟΥ ΕΥΚΡΑΤΙΔΟΥ.

*Reverse*. Two horsemen in charge, with spears couchant, and palm branches—legend Pehlevi—monogram **↑**.

Fig. 9, *Obverse*. As preceding.

*Reverse*. As preceding—monogram **M E**.

There are two specimens from sixty-six copper quadrangular coins in my possession. They are all of excellent workmanship, and the figures in spirited relief:—the features of the king are so clearly and strongly delineated as to impress us with the conviction of the fidelity of the portrait, and we recognize therein, a sovereign worthy of his epithet "The Great." The monograms vary from the two noted above, to **M**, **ϕ**, **ϕ** and **ϕ**; the most prevalent is **ϕ**.

Fig. 10, *Obverse*. Helmed head—legend ΒΑΣΙΛΕΩΣ . . . . . ΕΥΚΡΑΤΙΔΟΥ.

*Reverse*. Two conical emblems with palm branches—legend Pehlevi.

This is one of two copper quadrangular coins in my possession. The letters ΕΥΚΡΑΤΙΔΟΥ being indubitably distinct, can only refer to a prince of the name Eukratides, while the epithet ΜΕΓΑΛΟΥ obliterated on this specimen, being legible on the other, we may safely appropriate them. The conical emblems resembling bee-hives are here first noticed, which is to be remembered, as they are also adopted on the coins of a prince to be next noticed.

Fig. 11, *Obverse*. Helmed head with usual Greek legend.

*Reverse*. Female deity sitting, with turreted crown like Cybele; to the

right one of the conical emblems—beneath the figure a straight scalloped line.

This, specimen is unique, the obverse in fine preservation; the reverse a little defaced.

Fig. 12 *Obverse*. Helmed head.

*Reverse*. Two horsemen in charge. Legend ΒΑΣΙΛΕΩΣ ΜΕΓΑ . . .

An unique specimen—form oval :—although the name is not to be found here, from the horsemen on the reverse, and the epithet, we can have no doubt of its belonging to “Eucratides the Great\*.”

Plate IX. Series 2.—ANTILAKIDES.

Fig. 13, *Obverse*. Bearded bust, with fillet or wreath around the head, a palm branch or similar emblem projecting from behind the neck. Greek legend . . . ΦΟΡΟΤ ΑΝΤΙΑΚΙΑΟΥ.

*Reverse*. Two conical emblems, with two palm branches, Legend Pehlvi. Monogram K.

Fig. 14, *Obverse*. Bust—legend ΒΑΣΙΛΕΩΣ ΝΙΚΗΦΟΡΟΤ ΑΝΤΙΑΚΙΑΟΥ.

*Reverse*. As preceding—monogram obliterated.

These are two from eight copper quadrangular coins in my possession. The first is of very spirited design, and the venerable features of the king are those of a Homer or a Socrates. The beard on these coins is somewhat singular, as it is not observed on the coins of the early Greek princes. The legends are in pure Greek characters. The conical emblems on the reverse, we have, as noted before, been so fortunate to discover on a single coin of EUCRATIDES, proving that they are Bactrian. On two other coins we have distinctly the monogram ΚΣ.

AUSIUS.

Fig. 15, *Obverse*. Bearded bust, with wreath round the head—hair terminating in a pad—palm branch projecting from behind the neck. Greek legend. ΑΣΙΑΕΩΣ ΑΝΙΚΗΙ . . . ΤΣΙΟΥ.

*Reverse*. Figure of elephant—legend Pehlvi.

Fig. 16, *Obverse*. Bearded bust, as preceding. Greek legend ΒΑΣΙΛΕΩΣ ΑΝΙΚΗ-ΡΟΤ† ΑΤΣΙΟΥ.

*Reverse*. Figure of elephant—legend Pehlvi—monogram ΚΣ.

These are two from six copper quadrangular coins in my possession—all of fine workmanship and design—the legends are in pure Greek characters. I read the name AUSIUS; should the first letter by any chance be Λ in lieu of Α, it will become LUSIUS, equally a Grecian name. It is curious that the monograms on these coins should be the same with those on some of ANTILAKIDES; it may be that the year expressed by ΑΣ was the last of the reign of ANTILAKIDES, and the first of that of AUSIUS, who from his aged features will not have been the son, but the brother, of the former, a supposition which the great resemblance in features, similarity of costume, &c. tend to confirm. The elephant on the reverse I suspect has no particular or mystical meaning: it was necessary to place some figure, and this was fixed upon, to let mankind know that the monarch was potent, and had such animals at command. The elephant, for like reasons, is to be seen on some of the coins of SELEUCUS, which I have procured at Bagdad. Why these two princes affected the beard and barbarian head-dress in preference to the warlike helmets of

\* I have a similar coin, presented by Captain WADE, in which the name ΕΥΚΡΑΤΙΔΑ.. is perfect.—ED.

† Probably ΑΝΙΚΗΤΟΥ, *invicti*.—ED.

the Bactrian princes, is difficult to decide, and although their high sounding epithets make us desirous of being better acquainted with them, I apprehend we shall only be enabled to allow them a limited sway in the regions south of the Caucasus; probably, as I have hinted before, their capital was Alexandria ad Caucasum.

*Series 3.—AGATHOCLES.*

**Fig. 17, Obverse.** Lion standing to the right. Greek legend ΒΑΣΙΛΕΩΣ ΑΓΑΘΟΚΛΕΟΥΣ.

*Reverse.* Female deity, with flower in right-hand. Legend Pehlevi.

This is one of ten copper quadrangular coins in my possession.

These coins, I presume, are sufficiently interesting; and fortunately, the pure Greek characters of the legend leave no doubt as to the name of the prince. The same AGATHOCLES occurs in history, having been borne by the celebrated tyrant of Sicily;—by one of ALEXANDER'S generals;—and by his grandson, the illustrious son of LYSIMACHUS, king of Thrace, put to death by his father on account of the base and false information of his step-mother ARSINOE, the sister of PROLEMY SOTER, king of Egypt. He was killed about 283 B. C. While we are at a loss to assign the epoch of the prince, whose coins we now consider, we may be assured that he flourished near that of the Bactrian dynasty; or ere the Greek arts and perspicuity of language had declined. The deity on the reverse has no positive marks by which to identify her. If it be a flower she holds in her hand, she may be Flora; if heads of wheat, she may be Ceres, or perhaps Proserpine the daughter of Ceres;—the evidence is too slight, however, even to authorize an opinion.

PANTALEON.

**Fig. 18, Obverse.** Lion standing and facing to the right. Greek legend ΒΑΣΙΛΕΩΣ ΠΑΝΤΑΛΕΟΝΤΟΣ.

*Reverse.* Female deity with flower in right-hand. Legend Pehlevi\*.

This is one of two copper quadrangular coins in my possession. The exact coincidence of the figures on the obverses and reverses make us fain to consider these coins as referring to the same prince as the preceding, notwithstanding the variation in the Greek legend. PANTALEON signifies in Greek "in all things a lion," that is, always brave. I know not whether to consider this term an epithet, or a name, nor do I remember whether as the latter it occurs in history†. These coins have no monograms.

**Fig. 19, Obverse.** Figure of lion standing to the left, over the back the character ♃.—under the head, another of this form, ♃.

*Reverse.* Figure of elephant—over the back the character ♁.

This is one from twenty copper quadrangular coins in my possession, the character noted on the reverse, not plain on the coin here represented, is supplied from another where it is distinct. These coins are mere massy lumps, the obverses struck with a square formed die in the bulk of the metal, the obverses rising in relief above the surface. It must be owned, that the absence of legends renders their appropriation difficult‡, and I have included them in this series only from the

\* The characters of the legend on this and on the following coin, resemble very closely those of the inscriptions on the Allahabad column, No. 1, (see page 112.) It will be important to trace them further.—ED.

† A PANTALEON occurs as a name of Pisa, who presided at the Olympic Games A. D. 524.—ED.

‡ Some light will I think be thrown on these coins by Captain CAUTLEY'S discovery near Sehâranpur.—ED.

coincidences of the lion, the clumsy form of the coins, and the peculiarity to be observed in the sunken character of the obverses. The monogrammatical characters, it is feared, are too obscure to allow much to be gained from them.

*Series 4.—Nysæan Princes, HERMÆUS I.*

**Fig. 20, Obverse.** Bust with wreath around the head; hair dressed in curls, with fillets hanging down behind. Legend Greek, nearly obliterated.

**Reverse.** Figure of male deity, probably HERCULES, sitting on a throne, right hand extended and holding a wreath. Legend Pehlevi. Monogram .

This is one from twenty-eight copper coins in my possession; it is represented here from the fine preservation of the bust, which enables us to become admirably acquainted with the features of the prince.

**Fig. 21, Obverse.** Same as preceding. Greek legend ΒΑΣΙΛΕΩΣ ΣΩΤΗΡΩΣ ΕΡΜΑΙΟΥ.

**Reverse.** As preceding.

This is one of six copper coins of the same size, on which the whole of the legends are clear and distinct. On the larger coins they are always imperfect, from the dies having been too large for them. By a comparison of these also, no doubt remains as to the intended legend. The coins of this prince are remarkable for the fair execution of the bust; the Greek characters are pure, but vary in regularity of form on many specimens, as they may have been struck at various periods, and by different dies. The position of HERCULES on the reverse reminds us of the coins of EUTHYDEMUS. From every circumstance connected with these coins, we must place HERMÆUS very nigh the Bactrian epoch. In setting him at the head of the Nysæan princes, I must confess I have only negative grounds, and incidental conjectures. We cannot identify him with the Bactrian series; his name forbids it. That he was a prince of power and talent, his coins attest, and his portrait so happily preserved on them, convinces us. That he governed at Nysa is proved by his medals being found there; I therefore, in absence of more direct evidence, consider him a prince of Nysa, perhaps the founder of the dynasty there. All his coins agree in the same cast of features, those of a prince of fifty to sixty years of age. On a comparison of the Nysæan coins, we may suppose him the father of the youthful HERMÆUS, whom I call the 2d; and that his epoch was anterior to HERMÆUS, whom I call the 3d, is evident from the decline in the execution of the coins of the last, and from the corruption of the Greek characters on their legends. The adoption of the same name by these three princes seems to prove a connection of descent and lineage, so does the figure HERCULES on the coins of HERMÆUS the 3d. That this prince ruled at Nysa, we have the best evidence, because we have his sepulchral monument there.

*HERMÆUS II.*

**Fig. 22, Obverse.** Bust with diadem, fillets depending behind. Greek legend, illegible.

**Reverse.** Female deity (?)—legend Pehlevi—monogram ambiguous.

**Fig. 23, Obverse.** Bust as preceding. Greek legend, portion legible, ΒΑΣΙΛΕΩΣ ΕΡΜΑΙΟΥ.

**Reverse.** As preceding. Monogram .

These are two from ten copper coins of the same size and type in my possession, the legend on the obverse, had the size of the coins allowed its full exhibition, would obviously have been ΒΑΣΙΛΕΩΣ ΕΡΜΑΙΟΥ.

These coins are well executed, the figures in good relief, and the artist has done justice to the features of the youthful king; there are some points of coin-

evidence between these coins and those of HERMÆUS I. which deserve to be pointed out. The figure on the obverse, I could wish had been a male, (but fear it is not,) as its position agrees with that of HERCULES on the coins alluded to. The monogrammic characters agree on both, or nearly so, and the style of the Greek characters is precisely the same. Thus in the coins of the preceding series, we have noted the epithet ΣΩΤΗΡΟΣ, has the O in the final syllable; in those of HERMÆUS I, we first note the substitution of Π, and it is continued in those before us. If the letters ΣV be the epoch, we have 74 probably of the Nysæan dynasty. These would seem to require other sovereigns before HERMÆUS I. and if it be necessary, our conjectures may supply them.

## HERMÆUS III.

Fig. 24, *Obverse*. Bust, with diadem and fillets. Greek legend, portion legible ΒΑΣΙΛΕΩΣ ΣΤΗΡΟΣ ΕΡΜ . . .

*Reverse*. Figure of HERCULES, with club. Legend Pehlevi.

Fig. 25, *Obverse*. Bust, as preceding—Greek legend—the characters visible, confused from the use of dots or points at their angles.

These are two specimens from sixty copper coins of the same size and type in my possession, besides which I have seventy-six smaller ones. These coins display a decline in style and execution, although in neither point of view absolutely bad. The smaller specimens are much inferior, many of them even wretched. The difference in size between the dies and the coins, here also prevents us from obtaining any one specimen with the entire legend, but the letters ΕΡΜ of the name distinct on a few, allow us to read the whole ΕΡΜΑΙΟΥ as the preceding ones. On the reverses, the figure of HERCULES is not to be mistaken. The legend on these coins from a general comparison will appear to be ΒΑΣΙΛΕΩΣ ΣΤΗΡΟΣ ΣΕ ΕΡΜΑΙΟΥ. If ΣΤΗΡΟΣ or ΣΤΗΡΟΣΣΕ have no signification as an epithet, I may suggest that ΤΗΡΟΣ be read ΣΩΤΗΡΟΣ and ΣΕ be understood as the epoch, which will be fortunate, as in numerals it will be 75, and the coins of HERMÆUS II. give us ΣV or 74\*. That he died young may be inferred from our meeting with none of his coins on which he has a more aged appearance than the one found present. The coins now considered are very numerous. I am not quite certain whether we may not eventually find on some of them, other names than that of HERMÆUS. It is fortunate that the Pehlevi characters on the reverses are in much better style than the Greek characters; a natural circumstance, as the artists were probably no longer Greeks, but natives, whose vernacular language was the former.

Satisfactory it is to be enabled to assert that the burial place of HERMÆUS the III. was near the modern Jelalabad, near which I feel convinced was the celebrated city of Nysa. A tope called Janni Tope in its neighbourhood was opened by M. MARTIN, who extracted therefrom three small boxes of stone, containing trinkets and other trifles more curious than useful; also, loosely lying among the earth, were found between twenty and thirty of the copper coins of HERMÆUS, rusty and defaced indeed, but easily recognizable as of the same type as those here described.

## SOTEREAGAS†.

Fig. 26, *Obverse*. Bust, with diadem and fillets behind hair in rows of curls; rays

\* The Greek numerals must then be read ME and MA.—ED.

† I have left this as it stands in the MS. but there can be little doubt that the title is ΣΩΤΗΡ ΜΕΓΑΣ as read on the coins described and depicted by myself in the second volume of the Journal, (plates ii. and xiii.) but with these plates before him, the author still finds reason to read the inscription ΜΕΓΑΣ.—ED.

of glory around the head; right-hand holding a sword, mace, or emblem of command. Behind the head, a trident or symbol of supreme authority.

*Reverse.* Horseman, the ends of his turban flowing in the wind; his right hand extended, and holding what may be a short sword; horse caparisoned, and apparently furnished with saddle; before the horse a trident symbol. Legend Greek, portion visible, ΘΩΤΗΡΗΓΑϸ ΒΑϸΙΑΕΥ ΒΑϸΙΑΕ... .

Fig. 27, *Obverse.* Bust, as preceding, sword or mace in right-hand, adorned with ribbons.

Fig. 28, *Reverse.* Horseman, as in Fig. 26. Legend Greek ΒΑϸΙΑΕΥϢ ΒΑϸΙΑΕΩΝ ΞΩΤΗΡ.

Fig. 29, *Obverse.* Helmed head, looking to the left; before the figure a symbol difficult to explain, behind it the usual trident.

Figures 26, 27, and 28, are from fifty-five copper coins of the same size and type in my possession; Fig. 29 is from an unique specimen. Besides these I have one hundred and fifteen smaller copper coins of the same type. The whole of these coins are distinguished for the bold relief of the busts and figures.

That the prince, whose medals are now before us, ruled and died at Nysa, is established by the fact of twenty-seven (I think) of his copper coin, similar in type to Fig. 26, having been extracted from his sepulchral monument in the neighbourhood of Jellalabad by M. MARTIN. When we learn that this monarch's coins are found generally over the Punjab and north-western provinces of India, even to Benares, we form high notions of his extended empire, and conceive exalted opinions of his talents, which are confirmed by the manly portrait disclosed on his medals. We feel a pride in drawing from obscurity a line of princes, whose edicts emanating from Nysa, would seem for a considerable period to have influenced the political destinies of a large part of Asia.

There are many points connected with these coins which deserve attention. On the obverses we first observe the king's head, surrounded with rays; we also here first observe the trident; an emblem to be found on all the succeeding coins of this class we have to notice. I presume this to be an emblem of supreme authority, but nothing more; as such I believe it was borne by NEPTUNE and other gods of the Grecian mythology. On the reverse we have a horseman, a Bactrian Greek emblem, and on many of the coins, as Fig. 26, the Greek characters of the legend are much corrupted. On earlier coins of this prince, as Fig. 28, the legend is in fair Greek, and varies, as not comprising the ΗΓΑϸ to be found in the first noted. The earlier coins have also a much younger appearance, as Fig. 27.

I hesitate whether to consider ΩΩΤΗΡΗΓΑϸ, a name or an epithet, or a compound of both. I incline to the latter, considering that ΩΩΤΗΡ be understood an abbreviation of ΩΩΤΗΡΩϸ and that ΗΓΑϸ is the name of the prince: accordingly on some of the coins as before noted, we find the legend only ΒΑϸΙΑΕΩϸ ΒΑϸΙΑΕΩΝ ΞΩΤΗΡ\*. On the other hand, on the coins of a prince hereafter to be noticed, we find ΩΩΤΗΡΗΓΑϸ inserted apparently as an epithet. This prince however we can scarcely suppose Greek. Persons more conversant in the Greek language than I am, must decide this point.

Fig. 29, is a spirited and valuable coin; we observe to behold the warlike king helmed after the manner of his Bactrian monarchs. On this we first observe a

\* This might have taught the author the real meaning of the inscriptions, but we purposely avoid correcting the text.—ED.

singular emblem which whatever it may be, serves to connect the next coin we notice with the Nysæan ones. On the coins of SOTEREAGAS, the title king of kings is first to be observed, borrowed probably from the Partians.

The reverse of this coin is not given, so exactly corresponding with that of the first figure, even as to the corrupted Greek characters, that it would appear to have been struck with the same die.

Fig. 30, *Obverse*. Horseman. Legend Greek, but defaced.

*Reverse*. Figure (female?) looking to the right; behind her an emblem, the same as noted in Fig. 29; in front another singular globular emblem.

This is an unique specimen, which, until legible specimens be procured, must remain unappropriated. That it refers to the Nysæan princes is proved by the horseman, which here forms the obverse, and by the singular emblem before alluded to—the new emblem, no less curious, alike serves us in the arrangement of the three next coins which follows:

Fig. 31, *Obverse*. Horseman.

*Reverse*. Figure standing to the left, with globular emblem.

Fig. 32, *Obverse*. Horseman, with trident.

*Reverse*. Figure standing to the right, with globular emblem.

Fig. 33, *Obverse*. Horseman. Legend Greek, portion legible ΔΕΩΣΒΑΣΙΑΕΩΝ.

*Reverse*. Figure standing to the left, with globular emblem.

These three coins, from the types and symbols, we can pronounce Nysæan; perhaps Fig. 31 and 33 may be the same—on the latter the Greek characters are pure and distinct.

#### UNADPHERROS.

Fig. 34, *Obverse*. Bearded bust, with diadem and fillets behind, jiker on head. Legend Greek, portion legible, ΑΓΙΑΕΛΞ ΣΩΤΗΡΩ.

Fig. 35, *Obverse*. Bust. Legend Greek, portion visible, ΦΡΡΡΩΤ ΒΑΓΙΑΕ...

Fig. 36, *Reverse*. Winged figure of victory standing to the right, with wreath; legend Pehlevi.

There are three from nineteen copper coins of the same size and type in my possession. The figure of the prince is somewhat remarkable, but I hesitate not to believe him Greek, notwithstanding his beard; neither do I doubt of his connection with Nysa. From a comparison of the united specimens, the Greek legend is undoubtedly ΒΑΣΙΑΕΩΞ ΣΩΤΗΡΩΞ ΤΝΑΔΦΕΡΡΟΥ. The tufts on the head I have considered the jiker, a plume of feathers worn to this day by Asiatic princes as an emblem of royalty. The Sadu-zye princes of Afghanistan were wont to wear four jikers, and such of their grandees or officers whom they wished to distinguish by their favor, they allowed the permission of wearing one, or even two. The reverses of these coins have the figure of victory, also to be seen on those of MENANDER.

Fig. 37, *Obverse*. Bust, with diadem and fillets behind; row of pearls beneath diadem.

*Reverse*. Horse standing to the left, with forefoot raised. Legend Greek, but obscure, ΒΑΓΙΑΕΑ legible.

This is one from six copper coins in my possession. I at first considered it Nysæan, from the horse on the obverse, as well as from the beardless bust of the prince; but although I have inclinations there, I now very much doubt; and am even more inclined that it may not be Pehlevi—if any of the princes of that line are to be found without a beard. The legend is written in straight lines in place of the

usual Greek peripheral form:—from a comparison of the six specimens, it will appear to be ΒΑΣΙΑΕΑ. ΗΑΗΑΕΥ ΗΑΗΑΙΥΗ: the last letter I am not clear whether it be not intended for Ν. Two or three larger copper coins of this prince have been found in Kabul, on which the head is most preposterously large, the legend on these is still more unintelligible: a representation of one of these is given in the supplementary coins, fig. 48.

*Unarranged Greek Coins.*

Fig. 38, *Obverse.* Bust. Legend Greek ΒΑΣΙΑΕΩΣ ΣΩΤΗΡ ΕΡΜΑΙΟΥΤ.

*Reverse.* Horse standing to the right, forefoot raised—singular character Ⓢ under his belly. Legend Pehlevi.

This is one from two copper coins in my possession—the pad on the head is here to be noticed—the name ΕΡΜΑΙΟΥΤ is beyond doubt, but I could not class this coin with those of Nysa, as the Greek characters of the legend refer to an antecedent period; the quadrangular form of the coinage also forbids it.

Fig. 39, *Obverse.* Figure obscured by time. Legend Greek, but illegible.

*Reverse.* Macedonian infantry soldier probably of the phalanx, standing to the left, his right-hand extended and holding a wreath, armed with spear, sword, and shield. Legend Pehlevi.

This is an unique specimen in my possession; another was procured in Kabul, which I have represented in the supplementary coins, fig. 43; by this it will be seen that the figure on the obverse is that of HERCULES with his club. The legend, here more intelligible, is unfortunately not sufficiently so, as to allow the identification of the coin.

Fig. 40, *Obverse.* Figure obliterated. Legend Greek, but nearly effaced.

*Reverse.* Figure apparently female, seated on a throne. Legend Pehlevi.

This is an unique specimen in my possession; another was procured at Kabul, represented in the supplementary coins, fig. 44, which shew that the figure on the obverse is one standing to the left, with a trident staff in the right-hand. It also shews that part of the Greek legend is ΒΑΣΙΑΕΩΣ ΜΕΓΑΛΩΤ. The epithet it will be observed was that adopted by EUCRATIDES I. I doubt whether these coins can be referred to him from the presence of the characters ω and τ in the legends, which indicate a later period.

Fig. 41, *Obverse.* Lion rampant. Legend Greek, but defaced.

*Reverse.* Humped cow. Legend Pehlevi.

This is an unique specimen in my possession—the figures are in high relief.

Besides the coins here noticed, I have five other single specimens, which, although unintelligible, are certainly Greek. Among them is a curious hemispherical coin. On the convex obverse is manifestly the delineation of a head; on the reverse that of some animal. I give not the representation of this and the others, because nothing is gained from them, but the knowledge that our collection of Greek coins is not completed, and that farther discoveries remain to reward research.

*Supplementary Greek Coins.*

Fig. 42, *Obverse.* Helmed bust. Legend Greek, ΒΑΣΙΑΕΩΣ ΣΩΤΗΡΟΣ ΜΕ-  
ΝΑΝΑΠΟΥΤ.

*Reverse.* Warrior, in right-hand holding a dish of grapes or fruit, the left-hand upraised, holding a bundle of darts. Legend Pehlevi.

This is a beautiful silver drachma, procured at Kabul, by M. MAURY. The figure on the reverse admirably illustrates the ideas which influenced the illustrious sovereign in his government. We are indebted to M. MAURY for introducing any token

which renders us more familiar with the youthful, the beautiful, and beloved MENANDER.

Fig. 43, *Obverse*. Figure of Hercules, with club. Legend Greek.

*Reverse*. Macedonian infantry soldier. Legend Pehlevi.

Fig. 44, *Obverse*. Figure with tridental staff. Legend Greek.

*Reverse*. Figure seated. Legend Pehlevi.

These coins have before been alluded to, they were procured by M. MARTIN.

Fig. 45, *Obverse*. Horseman, with Greek legend, portion legible, ΒΑΣΙΛΕΩΣ ΒΑΣΙΛΕΩΝ

*Reverse*. Figure of Ceres. Legend Pehlevi.

Fig. 46, *Obverse*. Horseman. Greek legend, portion legible, ΒΑΣΙΛΕΩΣ ΒΑΣΙΛΕΩΝ.

*Reverse*. Figure probably of Ceres. Legend Pehlevi.

Fig. 47, *Obverse*. Horseman. Legend Greek, but obscure.

*Reverse*. Figure of Ceres. Legend Pehlevi.

These coins evidently refer to the Nysæan princes, they were procured at Jelalabad by M. MARTIN—the inscriptions are in pure Greek characters. These coins were originally coated over with silver.

Fig. 48, *Obverse*. Bust.

*Reverse*. Horse with fore-foot raised. Legend Greek, but obscure.

This coin has been before alluded to, it was procured by M. MARTIN I believe at Jelalabad.

*Class Indo-Scythic—Series No. 1.*

Fig. 1, *Obverse*. Figure of prince sacrificing on altar. Legend Greek, but partially preserved, portion visible, ΛΕΥC ΒΑ ΙΛΕΩΝ ΚΑ

*Reverse*. Female figure standing to the right: before her, a four-pronged symbol. Legend Greek, NANAIA.

This is one of seven copper coins of the same size and type in my possession, the legend is unquestionably from a comparison of the specimens ΒΑΣΙΛΕΥC ΒΑΣΙΛΕΩΝ ΚΑΝΗΡΚΟC or "The King of Kings ΚΑΝΕΡΚΟC." These coins have attracted much attention. I have taken the liberty of making my remarks generally on them in the former part of the memoir. With reference to the legend ΝΑΝΑΙΑ, I may observe, that, there are numerous shrines in these parts of Asia, called by the Muhammedans, the *Zedrats* of *Bibi Nanni*, or, "the Lady Nannee." Hindus also resort to them, and each claim the shrine or Zedrat as peculiarly his own. The most celebrated of these is at Hingohl, as called by the natives, (the Hinglutz I believe of our maps,) on the coast of Lus, in Belochistan, near the junction of the Puralli river with the sea. Another famous shrine of *Bibi Nanni* is on the river Bolan, in the pass leading from the Dusht Bedoulet to Kyrta—two or three are in the vicinity of Kabul. I am not sure whether the Hindus do not refer these shrines to their deity PARBATI. If ΝΑΝΑΙΑ should have been the distinctive epithet applied to any of the Greek female deities or nymphs, she will be identified with the Hindu deity PARBATI, or the one whose shrine is visited at Hingohl, &c., and the Muhammedans in ΝΑΝΝΙ, may have preserved the Greek name ΝΑΝΑΙΑ.

Fig. 2, *Obverse*. Figure of prince sacrificing on altar. Legend Greek, ΒΑΣΙΛΕΥC ΒΑΣΙΛΕΩΝ ΚΑΝΗΡΚΟC

*Reverse*. Female figure standing to the left, in her front four-pronged symbol. Legend Greek ΗΑΙΟC.

These coins from fourteen copper coins in my possession of the same type, the legend agrees them of the same origin as the former coins considered. The

legend HAIOC in Greek signifying the sun, the figure may be considered a priestess of PNEUS or APOLLO.

Fig. 3, *Obverse*. Prince sacrificing on altar, legend corrupted Greek.

*Reverse*. Figure standing to the left, with wreath in right-hand. Legend corrupted, illegible Greek.

Fig. 4, *Obverse*. Prince sacrificing on altar. Legend Greek.

*Reverse*. Figure standing to the left. Legend Greek.

These are two from twenty-two copper coins of the same size and similar types: they have an evident connection, notwithstanding the legends appear to vary. They are too obscure to allow me to attempt to decipher them until I have perfect leisure.

Fig. 5, *Obverse*. Prince sacrificing on altar.

*Reverse*. Figure in a running or dancing attitude.

This is one from six copper coins of the same size and type in my possession. This species is easily distinguished by the Bacchanalian, (it may be inspired,) posture of the figure on the obverse.

Fig. 6, *Obverse*. Prince standing.

*Reverse*. Figure standing to the right. Legend corrupt Greek—may be intended for NANAI A.

Fig. 7, *Obverse*. Prince standing.

*Reverse*. Figure standing to the left. Legend corrupted Greek—may be intended for HAIOC.

These are two from sixteen copper coins of same size and similar types in my possession. I have introduced them into this series, of which the coins of KANERKOS take the lead, notwithstanding the omission of the altar, as they agree in one grand feature marking this series, viz., of the prince standing on the obverse, and of a figure or deity standing on the reverse; if my conjectural reading of the legends be admitted, they should follow the coins of KANERKOS, or they may even belong to him.

#### Series No. 2.

Fig. 8, *Obverse*. Prince standing and sacrificing on an altar, a club or other emblem to his right; also a four-pronged symbol to his left, a trident staff, the symbol of majesty. Legend Greek, portion legible, BACIAEVC BACIAEY..... OOHKAAΦICHC.

*Reverse*. Female figure standing by cow, which looks to the right. Legend Pehlevi, but obliterated.

Fig. 9, *Obverse*. As preceding. Legend Greek, BACIAEVC BACIAEYHN CWTHPHEΓAC OOH KAAΦICHC.

*Reverse*. As preceding. Pehlevi, legend more distinct.

Figure 8, is one of eight, and Fig. 9, one of twenty-nine copper coins of similar sizes and types in my possession. Happily the legend is clear, and happily we are able to announce that the king of kings KADPHISES was buried at Kabul, where his sepulchral monument was opened by M. MARTIN, and one of his gold medals extracted, a representation of which is given as a supplementary coin. The word CWTHPHEΓAC occurring on the legends, somewhat perplexes me\*—the letters OOH, if the era, and denoting 800, may be of some importance, as it may be Budhist, and that of SAKYA; if the era of GOUTAMA be loosely taken at 500 A. C. that of KADPHISES will be about 200 A. D. Now of Greek princes who must have ruled in these countries before him, and subsequent to a knowledge of that of the overthrow of the

\* It is evidently *σωνη* again.—Ed.

Bactrian monarchy, about 130 A. C. we have the coins of at least fifteen, without reckoning unappropriated ones—and if we suppose KANERKOS to be KANERKA, and that he and his image preceded KADPHISES, we have three if not four princes here; allowing upon an average fifteen years for the reign of each of the nineteen princes we have a total of two hundred and eighty-five years, which calculating from 130 B. C. brings us to 155 A. D.: the remaining 45 years may very readily be granted to unidentified Greek princes, and we shall have fair grounds for presuming the era HOO to be that of SAKYA, and that KADPHISES reigned at Kabul about 200 A. D. Figs. 10, 11, & 12, *Obverses*. Princes sacrificing on altars. Legends corrupt Greek.

*Reverse*. Figure standing before cow, which looks to the left.

These are three from two hundred and fifty-four copper coins of various sizes but similar types in my possession. I have not leisure to note all the observations which arise from a consideration of these coins. That they refer to the series of KANERKOS and KADPHISES is evident from the presence of the altars, and if they be Indo-Scythic, so are also these. While I so far agree with SCHLEGEL and Col. TOD, I must differ from them in considering the figures on the reverses to represent "SIVA and his bull NANDI." I know not what the bull may be, but the figure is certainly female. These are the most numerous types of coins found in these countries. I think it probable they may be ultimately found to include those of several princes. They vary in point of execution from tolerable to wretched; the earliest specimens, such as fig. 10, are of fair workmanship.

*Series No. 3.*

Figs. 13, 14, 15, 16, 17, & 18, *Obverses*. Princes standing. Legends corrupt Greek.

*Reverse*. Figures on elephants. Legends corrupt Greek.

These are six specimens from fifty-six copper coins of similar sizes and types in my possession. The elephant on the reverse of these coins renders them easily recognisable. On these coins, although the costume and attitude of the princes are essentially the same with those of the two preceding series, yet the absence of the altars suffices to arrange them distinctly—the legends appear to vary, but I think there can be little doubt but that the characters are intended for Greek. On the coins of this and the other Indo-Scythic series the exclusion of Pehlevi will be noted—the trident staff and four-pronged symbol are continued on this and the succeeding coins to be noticed.

Figs. 19, 20, & 21, *Obverse*. Princes standing.

*Reverse*. Female figure seating on throne (?).

These are three from fifty-six copper coins of various sizes and similar types in my possession—these coins evidently refer to the same line of princes as the former; and the legends are as manifestly intended for Greek.

Fig. 22, *Obverse*. Prince standing.

*Reverse*. Sitting female deity on clouds (?).

This is one from six copper coins of similar size and type in my possession.

Fig. 23, *Obverse*. Princes standing.

*Reverse*. Female deity on throne, circles of glory around her feet.

This is one from one hundred and thirteen copper coins of similar type in my possession. These coins, although so numerously found, afford no specimens more perfect or intelligible than the ones here represented, which will suffice to give a fair idea of the type.

There is no doubt but all these coins will be ultimately deciphered; at present the reverses enable us to note four distinct sets, it may be they will have to be subdivided hereafter.

CLASS GREEK Series I.

Coin of the recorded Kings of Bactria

Menander the Saviour

Fig 1



Fig 2



Fig 3



Fig 4



Apollodotus the Saviour

Fig 5



Fig 6

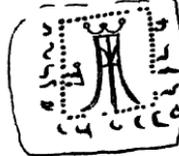


Fig 7



Eucratides the Great

Fig 8



Fig 9



Fig 10



Fig 11





CLASS GREEK Series 2.  
Antialkides.

Fig. 15.



Fig. 14.



Fig. 16.

Ausius.

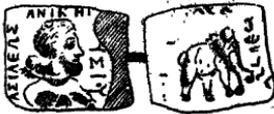


Fig. 17.



Series 3.  
Agathocles. &c.

Fig. 17.



Fig. 18.

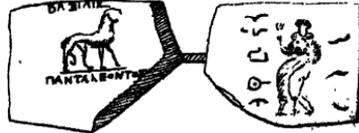


Fig. 19.



Series 4. Coins of the Greek Nysæan Kings.  
ΕΡΜΑΙΟΥ.

Fig. 20.



Fig. 21.



Fig. 22.

ΕΡΜΑΙΟΥ.





CLASS GRECIAN. Series 4.  
Coins of the Greek Mysian Kings.

ΕΡΜΑΙΟΥ.

Fig. 25.



Fig. 26.

ΗΕΓΑΣ

Fig. 27.

Fig. 28.



Fig. 29.

Reverse

Fig. 30.

Obverse



Fig. 31.

Fig. 32.

Fig. 33.



Series 5.

ΥΝΑΔΕΡΡΟΥ

Fig. 34.

Fig. 35.

Fig. 36.





CLASS GREEKIAN Series 5  
Coins unidentified

fig 38



fig 39



fig 40



fig 41



fig 42

Supplementary Greek Coins

fig 43



fig 44

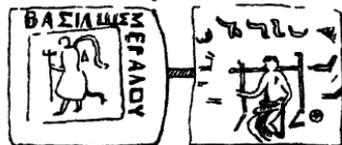


fig 45



fig 46



fig 47



fig 48





CLASS INDO-SCYTHIC. Series 1.

Coins of ΚΑΝΗΡΚΟΥ &



Series 2. Coins of ΚΑΔΦΙΧΗΣ &





CLASS INDO-SCYTHIC Series 5.



fig. 13.



fig. 14.



fig. 15.

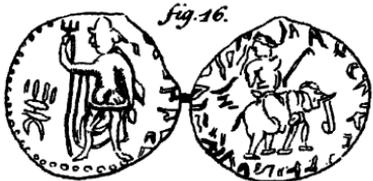


fig. 16.



fig. 17.



fig. 18.

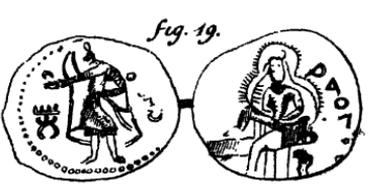


fig. 19.



fig. 20.



fig. 21.



fig. 22.



fig. 23.



Supplementary Gold Medal of KAPATHIC.





## Supplementary Indo-Scythic Coins.

Fig. 26. Obverse.

Bust. Greek legend ΒΑΣΙΛΕΥΣ ΟΟΗ ΜΥ ΚΑΑΨΙΘΗ

Reverse.

Standing figure, naked, with three tails; staff in right-hand—left hand holds a ball—in the left, four-pronged symbol. Legend Pehlevi.

This is a representation of the gold medal found in the sepulchral monument of the king at Kabul—on the legend we have besides ΟΟΗ—the letters probably ΜΥ or ΜΤ; if these be also numerals, they may express the years of his reign or of his dynasty.

Kabul, 28th Nov. 1833.

II.—Journal of a Route from Dera Ghazi Khan, through the Veziri Country, to Kabul. By Dr. Martin Hombergger, in a Letter to Captain C. M. Wade, Pol. Agent at Ludiána. Plate XIV.

[Read at the Meeting of the 20th March.]

The annual *kafila* of the *Lohánis* was very late in assembling at *Dera bend* this year. We did not leave that place until the 18th of May, and reached *Kabul* on the 28th of June. The heat of the weather during our journey was excessive. It was greater than that of *Lahor*. In tents the thermometer rose to 38 Reaumur. Several persons perished from the effects of the heat, as well as a horse belonging to me.

It has proved an arduous and fatiguing journey. The road through the hills was extremely difficult, and strewed over with large stones. It was so narrow in some places as not to admit the passage of a loaded camel. They were constantly falling down precipices with their *kafawas*, and a good deal of property was sacrificed on the road from these accidents. No exertions were made with success at the time to recover it. On reaching the halting place, people were seen complaining in every direction of the loss of something; but those who formed the last part of *kafila* generally collected the property lying on the road, and delivered it to the owners on their arrival.

From the time we entered the hills, until we reached *Demand*, we were in constant alarm of the *Veziris*. They did not however show themselves in such force this year as they usually do, yet they did not forego their habitual depredations, and notwithstanding the vigilance of the armed men of our party, who were to be seen flourishing their arms and beating *nakiras* along the line, the *Veziris* succeeded in carrying off several camels. Those that they could not take away, they killed on the spot, and made the best of their way to their fastnesses in the hills.

At night they would descend and visit our camp, when if they found that our guards were not on the alert, they would steal any property that they could lay their hands on. The prestige of population where we were infested by these plagues consequently the mer-

chants who frequent this route provide themselves with a stock of provisions sufficient to last them through the *Veziri* country before their entrance into the hills.

As soon as we had passed the limits of the *Veziri* tribe, we came in contact with the *Suleiman kheil*, who resemble the *Veziris* in their predatory habits, and like them have the virtue not to take the life of their victims. When a man falls into their hands, they strip him of every thing they find about him, and let him go. On the same principle of forbearance, if any of these freebooters fall into the hands of *Lohanis*, they spare his life, but inflict every other kind of injury on him, such as stoning and beating with clubs, pulling off his beard, and setting it on fire. In fact, they use almost every species of torture short of death. On the arrival of a *kafilá* among the *Suleiman* tribe, they come and barter ghee, curd, ropes, and such like articles, with the merchants, for clothes, which enables them to see and ascertain the situation of the property belonging to a *kafilá*, and as the night falls, and the travellers retire to rest, these pests come to the camp and carry off such things as they have previously marked for their prey.

There is a singular custom among these people: their women form their hair into ringlets, which they throw over their head, so as to cover their eyes, and half of the face; and when these damsels wish to use their eyes, they raise their heads backwards, so as to move these ringlets from the line of sight. The *Lohaní* women invariably have a Venetian gold coin suspended on their forehead, and the generality of these people wear black-coloured clothes. Their tents are of the same colour. They speak the *Afghaní* language, which is very harsh and uncouth, compared with the Persian; but the mercantile part of the tribe, who resort to *Kabul*, *Hindustan*, and *Bokhara*, have a knowledge of *Hindustani*, *Persian*, and *Turki*. Their wives are of great use to them. They share their toils, load their camels, pitch their tents, and perform every other domestic duty. On their journeys they travel in *kajawas* two and two on each camel. During the hot season, these people leave their homes and move towards *Gheznín*, to pass their time in the neighbouring mountains, which possess a cool and temperate climate from their superior elevation. They generally pass two months on this migratory excursion, and remain the rest of the year at *Déra bend*. There may be altogether about one thousand families of these *Lohanis*, four hundred and fifty of which reside at *Selkhir*, a place which they inherit from their forefathers, and the others live at *Kará búgh*. They maintain a standing force of one hundred horse, besides a portion of foot soldiers. About one hundred of them separated from us at the fortress of *Kheratí*, and went towards *Bandahar*. They have altogether ten

thousand camels of burden belonging to them, and trade in all the productions of *Hindustán*. Large quantities of indigo are exported annually by them from *Muktán*, *Bhádwpur*, *Déra Ghází-Khán*, to *Khorásan* and *Bokhára*. Four lakhs of rupees is the estimated amount of duties which they pay every year to different branches of the *Cabul* Government, according to the following details, viz. two lakhs at *Cabul*, one lakh at *Ghezná*, and one lakh at *Bamián*.

In the course of my journey I intended to have made a collection of scarce botanical specimens, but partly owing to the extreme heat which had parched the vegetation, and partly to the ravages of locusts, I could not collect many, but have obtained a few, which I preserve. I wished very much to visit the *Gúl* mountain, for the purpose of collecting plants. It is said to be remarkable for the richness and variety of its vegetation; but I was advised not to make the attempt, as the *Hazáras*, to whom the district of *Kará-bágh* belongs, are in a state of rebellion. The *Hazáras* are a very extraordinary people, and have very uncommon features; they have little eyes, small noses, and thick ugly lips, with scarcely any beards: those who have any, merely possess a few scanty hairs.

When I was leaving *Déra Ghází-Khán* and *Damán*, the people had reaped their spring crops. On arriving midway at *Ghezná*, I was surprised to find that the grain had only just begun to spring up. In *Damán*, the thermometer stood at 38 Reaumur, and on ascending the range which forms the proper limit of *Khorásan* in this direction, it fell to 27, which is nearly as cold as *Simla*. The difference in the climate of the two places is distinguished by a great change in their vegetable productions. The sugar-cane, which grows at *Damán*, is not produced here. On approaching *Khorásan*, we began to feed our camels on a herb which is called "*türk*," produced in abundance in this quarter.

There has been an extraordinary fall of snow this year in *Cabul*. The oldest inhabitants of the city do not remember ever having witnessed such a severe winter. On the 5th of June, the thermometer at *Cabul* ranged from 15° to 25° Reaumur, (66° to 89° Fahr.)

It was my intention on my arrival at this place to accompany a *káfila*, bound to *Bokhára*, which was ready to start the next day, but Nawáb *JABBAR KHAN* would not let me depart without spending some days with him. He informed me that *BEDERUDDIN*, the great merchant who conducts the trade between *Cabul* and *Bokhára*, would set out for *Turkistán* in a short time, and I could proceed with him. I have accordingly deferred my departure.

There is an European here by name *Mason*. He was several years in the Punjab. It appears that he has been in *Herat*, and has lately come to *Cabul* by the way of *Belochistán*. He was some time at *Bamián*.

an, where he amused himself in making excavations, and has succeeded in finding several idols. At *Cabul*, he has been engaged in the same kind of pursuit, and has been rewarded here also by his discovery of several idols quite entire. Among his discoveries is an inscription on a piece of paper made of the leaf of a tree, but which unfortunately is so worm eaten and injured by the lapse of time as not to be legible.

The recommendatory letter which you wrote to SYED KERAMET ALI, respecting me, has been delivered to him; he frequently visits me, and shows me every attention in his power. A *káfila* from *Bokhara* is expected here either to-day or to-morrow. NAWAB JABBAR KHAN is very anxious to procure some platina, for making experiments in alchemy; the mysteries of which, the credulous natives of this country labour in vain to discover.

I send you herewith a rough map of the country lying between *Cabul* and *Déra Ghizí-Khán*, which we traversed, and hope that it will be acceptable, notwithstanding its imperfect execution from my want of skill as a draughtsman. (See the accompanying Plate.)

III.—On the Aptitude of the Himálayan Range for the Culture of the Tea Plant. By Dr. H. Falconer, Supt. of the H. C. Bot. Garden, *Seharunpur*.

[Extracted from a Letter to G. J. Gordon, Esq. Secretary to Committee of Tea Culture.]

The most productive tea districts in China, according to all accounts, lie in the maritime provinces of *Fokien*, *Kyanti*, and *Kyang-nau*, chiefly between  $27^{\circ} 30'$  and  $31^{\circ}$  N. lat. and long.  $112^{\circ}$  to  $117^{\circ}$ . One kind, *Lungau-cha* (a superior sort of Hyson) is said by the Jesuit missionaries to be produced so high north as  $38^{\circ}$  and E. long  $100^{\circ}$ , and another, *Paoul-cha*, brought from the province of *Yunnan*, is said to be procured from mountains in the lat. of  $25^{\circ}$  on the frontiers of *Ava* and *Pegu*. The tea plant is grown on the sloping sides of mountains or in valleys, but chiefly at the foot of mountains. It is also produced in level tracts, but less advantageously. Besides the explicit information given by Dr. ABEL, from actual examination of one district, it is sufficiently certain that the rock formations in most of the tea districts, are chiefly primary, from their being productive of metals which are only found in such formations. The best tea soils are said to be light, gravelly, sandy, and whitish (*blanchatre* in DUHALDE, probably calcareous), with little accumulation of vegetable mould. LE COMTE says, the best Tea is produced in a gravelly soil, the next best in a light or sandy soil, and the inferior in a yellow (possibly clayey) soil. It is admitted on all hands that the tea plant thrives best with an open exposure to the south.





The climate of the whole of China is remarkable in respect of temperature, and it must be duly weighed when the acclimatization of any of its peculiar vegetable productions in another country is concerned. Latitude alone is here no guide, the mean annual heat being much under what is observed in most other countries at an equal distance from the equator. Peking, lat.  $39^{\circ} 54'$ , nearly at the level of the sea, has a mean annual temperature of  $54.86$ ; calculated for the latitude theoretically by a formula\* of very general application for the distribution of heat according to latitude without reference to other modifying causes, we get  $62^{\circ} 5'$ ;—a difference of about  $7^{\circ}.5$  above the observed mean temperature of the year. But it is in the excesses of the summer and winter seasons that the climate is most remarkable. It has a winter temperature of  $26^{\circ}.42$ , or nearly that of Upsal in lat.  $59^{\circ} 51'$  ( $20^{\circ}$  further north) and a summer heat of  $82^{\circ}.58$ . Its winter climate is that of Copenhagen, and its summer heats are as scorching as at Cairo. Between the mean temperature of the hottest month in summer and the coldest of winter, there is a difference of not less than  $59^{\circ}$  of Fahr., a climate of excesses almost without parallel in any part of the globe except Quebec in Canada. This condition, which is owing to the vast accumulation of land, extending from the arctic pole on through eastern Asia to China, is not confined to the northern provinces. It extends to Canton within the tropic, but modified there by the equalizing effect of a now tropical ocean about it. The mean annual heat of Canton, lat.  $22^{\circ} 10'$ , calculated theoretically for this latitude, gives  $75^{\circ}.5$ , Fahr.; reduced from a register in the Transactions of the Medical Society of Calcutta, the observed mean temperature is  $73^{\circ}$  nearly. The mean of the coldest winter month is  $54^{\circ}$ ; of the hottest summer month  $85^{\circ}.5$ . I am not aware that any determination has been made of the climate in the provinces between Peking and Canton, and I have not access to the later writers on China. But an approximation may be made to the temperature of the tea districts from the facts known regarding Peking and Canton. Assuming that the most productive tea districts extend from  $27^{\circ}$  to  $31^{\circ}$  N. lat. and taking  $29^{\circ}$  as the central tract, by calculation for this latitude we get  $71^{\circ}$  Fahr. for the mean annual heat at the level of the sea. Assuming further, that the refrigerating influences on the climate of China, which have been seen to be  $7^{\circ}.5$  at Peking and  $2^{\circ}.5$  at Canton, amount to  $5^{\circ}$  Fahr. in the parallel of  $29^{\circ}$  lat., and deducting this from  $71^{\circ}$ , we get  $66^{\circ}$  for the mean annual temperature. The elevation of the tracts of tea cultivation above the sea will form another abatement on this sum. But on this point I have no grounds to ~~say any thing~~ like a precise

\* Mean temperature= $81$  Cos. Lat.

† Vol 6th, by Mr. PEARSON.

conclusion. It is stated by DUHALDE that the tract from which one of the finest green teas, *Song-lo-cha*, is brought is a mountain in the district of *Whey-choo-foo* of the province *Kyang-nau*, of no great height or extent (*peu de hauteur et d'étendue*). Supposing that the Tea cultivation reaches the height of 3000 feet above the sea, and making a reduction for this altitude, the resulting mean temperature might be a range of 56° to 64°. What the range of temperature between the cold of winter and the heat of summer is, it may be difficult to say. The heat of summer cannot be less than at Pekin, which is 10° higher north : and it has been seen that the difference between a summer and a winter month at Canton within the tropic is 30°, while at Pekin N. lat. 40°, it is 59° Fahr. ; it may therefore be assumed that in the lat. of 28° the range of the thermometer from the mean of summer to that of winter is not less than 40° Fahr.

In regard to the moisture of the climate, there is little precise information, and what is known is chiefly as confined to Canton. The rains are not regularly periodical, as is the case on this side of the continent of Asia, within the same parallels ; rain seems to fall all months of the year, although heaviest from August till October. The mean fall of rain, as entered in the above quoted Canton register, is for 1829, 42 inches ; 1830, 50 inches ; 1831, 70 inches. Average of the three years 56 inches. In the tea districts the quantity must be less, excepting at the greater elevations. At the northern limit, snow falls abundantly during the winter. At the southern limit, in the province of Canton, where large quantities of the inferior teas are produced, snow is never seen. It is probable that it falls occasionally in the centre districts on the higher elevations.

The circumstances of climate therefore, in regard of temperature and moisture, under which the tea plant is cultivated in China, may be stated thus : that the tea is produced, over an extent of country where the mean annual heat ranges from 73° to 54° 5' Fahr. : where the heat of summer does not descend below 80°, and the cold of winter ranges from 54° to 26° ; where the difference between summer and winter heat is on the northern limit 59°, and on the southern 30° Fahr. ; that it is cultivated in highest perfection where the mean annual heat ranges from 56° to 64°. That rain falls in all months of the year, and that the moisture of the climate is on the whole moderate.

The foregoing remarks will apply in a great measure to Japan, in some parts of which excellent teas are produced. Without entering on details, it may be sufficient to say, that at *Nangosa-ki* the mean temperature of the year is 60° ; the greatest observed heat in summer, 98° ; the temperature of January, the coldest month, 35° ; that rain falls

periodically about mid-summer; that in the higher parts of the country heavy snow falls in winter, with intense frost; that the mean temperature of the summer is 83°, and that of winter, 39°.

It may now be worth considering the countries into which the tea plant has been introduced and failed.

At Penang, close to the line, with a mean annual heat of 80°, and equable climate the whole year round, and an excessive fall of rain, amounting to nearly 80 inches for the year; the climate is in every respect so much in contrast with that of China, that the tea could not be expected to be grown. The same is the case with St. Helena, where although the mean heat for the year is 73°, the thermometer does not fall in winter below 55°, and the climate is moist and cloudy. Of the causes of failure in Java I am less able to judge, but they are likely to be found in its low latitude, 6° 9', the excessive moistness of the climate, and the great fall of rain during the year. At Rio Janeiro, tea was tried under a colony of Chinese, and failed, perhaps from being within the tropic, and its too great heat, with a moist and generally equable climate. It has been twice attempted by the French in the Carribee Islands. The first occasion in Martinique was a failure. I do not know the result of the second, but a lat. any where between 11° and 19°, with the kind of climate consequently implied, gives little chance of success.

There is perhaps no part of the Company's territories in India which supplies all the conditions of the tea districts of China, in respect of climate. But there are situations which approach it so nearly, as strongly to bear out the conclusion, that tea may be so successfully produced in this country as to be an object of high commercial importance. It appears to me that this can be expected in no part of the plains of India. The mean annual heat of the climate from 30° N. down to the parallel of Calcutta, is much beyond that of the tea cultivation in China. We have in addition to an excessive summer heat, with either hot winds or a close scorching air during the day, a barely temperate winter cold, and heavy periodical rains. We certainly get some Chinese fruits, such as the lechee, the loquat, and the wampec to grow, but the tea plant appears to require a greater cold to thrive in. It has been seen that the annual heat of the southern limit of tea cultivation in China, assumed to extend to Canton, is 73°\* Fahr. At Sehárunpur, which may be considered as at the northern limit nearly of the plains of Hindustan, 8° of lat. higher and 1000 ft. above the sea, the mean temperature of the year is 73° Fahr.; the temperature of June, is 90°, and of January, 52°.

\* At the level of the sea.

As we go south towards Calcutta, the temperature increases, although not uniformly, as may be seen from the observed heat in

Futtygurh,	Benares,	Ghazipur, and	Calcutta.
77°. 5	77°. 81	77°. 36	78°. 3

In the Himálaya mountains, the case is widely different: excepting periodical rains, all the conditions of a temperate climate are here found, and, here above all parts of India, we may look for the successful cultivation of tea. Our not possessing mountain territory below 29° may alone exclude the consideration of the fitness of the southern tracts. My personal knowledge of the hills is chiefly confined to the tract between the Ganges and Jumna. In consequence of being tied to Seháranpur, from having the medical duties of the station to attend to, in addition to the Botanic Garden, I have not been able hitherto to see much of the mountains: but, as the rock formations and the configuration of the hills are the same along an immense tract, the remarks which I have to make will apply very generally to the hills.

The Himálayas have a direction running from N. W. to S. E. They consist, on this side of the snowy range, chiefly of primary rocks, inclined at a considerable angle. The dip of the strata is to the E. of N. and their abutment to the W. of S. On the flank of the great range there is a line of low hills, the Sewálik, which commence at Roopur, on the Satlej, and run down a long way to the south, skirting the great chain. In some places they run up to, and rise upon, the Himálayas; in others, as in this neighbourhood, they are separated by an intermediate valley. Between the Jumna and Ganges they attain their greatest height, which Captain HERBERT estimates at 2000 feet above the plains at their foot; or 3000 above the sea. Seháranpur is about 1000 feet above the sea. About 25 miles north are the Scwálik hills. They are here about six or seven miles wide. To the east of the Ganges and west of the Jumna, they gradually fall off. They have the same direction with the great chain, and agree generally in dip; their slope being towards the north and abutment to the south. They rise at once against the plains, with an abrupt mural front. They are serrated across their direction, forming a succession of scarcely parallel ridges, with a steep face on one side, and slope on the other. The strata are inclined at an angle of 25° to 30°. They are of recent tertiary or alluvial formation, and consist of friable sandstone or gravelly conglomerate, agglutinated by a calcareous cement, containing subordinate beds of clay: the upper strata are entirely gravel. Beyond these hills lies the valley of Dehra, 1200 or 1400 feet above the sea, and then the great chain of the Himálayas. The following rude sketch will perhaps give you an idea of the whole better than description; the distances are not in proportion in the section.



(a) level of the sea at Calcutta ; (b) level of Scháranpur, 1000 feet above the sea ; (cc) the Sewálik hills ; (c'c') the strata of sandstone and conglomerate ; (c''c'') strata of gravel ; (dd) the valley of Déhra ; (ee) strata of the Sewálik hills, in some places rising on the Hímálayas ; (ff) outer ridges of the Hímálayas ; (gg) primary strata ; (h) the valleys or hollows between the ridges.

I regard these hills as an upheaved portion of the plains at the foot of the Hímálayas, and that they are formed of the debris of the mountains washed down by streams, and other natural causes. They are covered with vast forests of saul, toon, and fir, and are uninhabited.

The soil of the Sewálik hills and of the valley of Déhra takes the character of the rocks. It is dry sandy or gravelly, with a considerable quantity of calcareous matter, and it appears to me to possess the character indicated for the tea districts in China.

The great chain of the Hímálayas rises in a ridge with an abrupt steep face against the plains of about 6000 feet in height ; there is then a slope from the crest of the ridge towards the north. This is the general character of the Hímálayas : the mountains on the side of the snowy range consist of a series of nearly parallel ridges, with intermediate valleys or hollows. They throw off spurs in all directions into the hollows, forming subordinate valleys. There is nothing like table-land (perhaps in the whole of the mountains, with the exception of Nípal), and the valleys are rather broad, wedge-shaped chasms, contracted at the bottom to a mere water-course, than anything else ; in fact, the ridges and intermediate valleys, as a general law, form a series of salient and re-entrant angles, as seen in the sketch. In consequence the quantity of level or nearly level ground to be met with is most inconsiderable. From the dip or slope being towards the north, and the abutment to the south steep, the great mass of vegetation has a northern exposure, and the southern faces of the mountains are generally naked.

The formations are primary ; the first towards the plains consist of vast strata of limestone, lying on clay-slate, crowned by slate, greywacke, or sandstone. Beyond the limestone tract, gneiss, clay-slate, and other schistose rocks occur. Granite, so far as I know, is not found in the outer ridges. It occurs in the mountains nearer the snowy range. I have not gone that length, and have not yet seen granite in situ. The igneous rocks, which have been concerned in the upheavement of the outer tracts, are of the green-stone trap series, and are very generally met with in

dykes intersecting and rising through the regular strata. The formations have a remarkable feature:—the strata are in all directions fractured or comminuted: the slaty rocks are broken into small fragments, as if they had been crushed; and the limestone rocks are vesicular or cavernous, and broken up into masses.

The arrangement and nature of the soil take their character from the rocks. From the high angle at which the latter are inclined, and the northern direction of the slope, the soil is chiefly accumulated on the northern sides, where is also the vegetation. From the prevalence of schistose strata, and limestone, the soil under-lying the vegetable mould is clayey and calcareous, or limestone gravel. There is little sandy soil, or sandy gravel. From the extreme richness of the vegetation undisturbed for ages, and the moisture of the climate, there is usually a great accumulation, on the northern slopes, of vegetable mould; on the southern faces, the great steepness leaves little room for the accumulation of soil; where it occurs, it is in patches, and consists of clays or limestone gravel, mixed up with vegetable mould. There is here also little sandy soil. Towards the crest of the slopes, the soil is usually dry, from the moisture running speedily off; but lower down, and wherever the ground is tolerably level, the soil is quite damp, and perhaps it is rarely dry in the most parching seasons.

Cultivation is laborious and difficult. From the absence of table-land, and the angular and contracted shape of the bottom of the valleys, there is little or no level ground. The most favorable slope is taken, and besides the usual tilling of the ground, it has to be divided into patches, which are built up into inconsiderable terraces, rising the one above the other like the steps of a stair. These circumstances might make the cultivation of tea scattered, and prevent it from being produced in any great quantity on one spot.

The climate of the *Himálayas* is decidedly damp. The periodical rains commence about the middle of June, and continue till the end of September. They are greatly heavier than in the neighbouring plains, and continue at times for many days without intermission; occasional rains occur in most months during the year. The mean annual fall has been estimated by Mr. TRAILL, Commissioner of Kemaon, at *Hewálbágh*, near *Almora*, about 4000 feet above the sea, and lat.  $29^{\circ} 30'$ , at from 40 to 50 inches. But this I imagine is too little. From the middle of November, till the end of February, occasional falls of heavy snow take place, down to the level of 6000 feet above the sea; on the outer ridge of the mountains, and lower down within the hills, perhaps to 3500 feet. It is a great cause of the richness of vegetation and dampness of soil. In the poorer tracts (such as the district of *Jounsar*) if snow does not fall during the winter, the subsequent crop invariably fails.

From the end of February till the middle of June, and from October till the middle of November, the sky is generally clear and unclouded. During these months, in consequence, very heavy dew is deposited during the night: so that as a general fact, it may be stated, what with rain, snow, and dew, that moisture in one shape or other falls abundantly, every unclouded day during the year: and the cloudy days without rain do not amount to a month in the year.

In respect of heat the climate of the Himálayas, lat.  $29^{\circ} 30'$ , at an altitude of 4000 feet above the sea, is temperate; the hot winds cease, and the vegetation takes on a European character. In those parts of the mountains, such as Masúri, where the outermost ridge rises at once from the plains to the height of 5000 or 6000 feet, the climate is perhaps equal to any thing known. About three hours after sun-rise, the heated air of the Dún or valley, particularly during the hot months, rises and establishes a current upwards. It gets rarefied, and consequently cooled, and causes a cool fresh breeze across the hills towards the interior, which diminishes the effects of intense solar radiation at this season. It is as regular as the sea-breeze of a tropical island. At Masúri, 6000 to 7000 feet above the sea, the mean annual heat is  $57^{\circ}$ ; the hottest months June and July, have a mean temperature of  $67^{\circ}$ ; the coldest months are December and January, the mean heat of January is  $42^{\circ}$ . At Hawulbagh, below Almora, nearly 4000 feet above the sea, the mean temperature for the year, deduced from Mr. TRAILL'S\* register, is  $60^{\circ}$ ; that of January is  $41^{\circ}$ , and of July,  $70^{\circ}$ , giving a range of  $39^{\circ}$  between the coldest and hottest months of the year. Between the temperature at 7 A. M. in January and 2 P. M. in July, there is a difference of  $53^{\circ}$ . On one occasion, the thermometer stood at  $18^{\circ}$ , shewing a range of not less than  $60^{\circ}$  between the greatest observed extremes of summer and winter.

In the valley of Dehra, according to the Honorable Mr. SHORE, the mean temperature of the year is about  $70^{\circ}.5$ . The mean of the hottest month is  $84^{\circ}$ , and of the coldest  $53^{\circ}.2$ . The greatest observed heat was in June  $101^{\circ}$ , and the maximum cold was in January  $37^{\circ}.7$ . The greatest range of temperature in a month was in April, the maximum being  $93^{\circ}$ , and the minimum  $53^{\circ}$ , a difference of  $40^{\circ}$ ; the least range was in August, the maximum being  $90^{\circ}$  and the minimum  $72^{\circ}$ , a difference of  $18^{\circ}$ . The extreme difference for the year was  $63^{\circ}.2$ ; shewing one of the most "excessive" climates known. Speaking generally, it may be stated of the Dún, that the cold weather commences earlier, and lasts longer than in the plains in the neighbourhood; and that the cold of winter is greater: that the hot winds of the plains are shut out by the Sewálik lower hills, on the S. W. of the valley. A partially hot wind is at times felt, but the European residents do not use tatties for

\* Transactions, Asiatic Society, vol. xvi.

refrigeration. No register of the fall of rain, so far as I know, has been kept, but it may be said that more falls than on the plains near the Dún, and less than on the mountains above it. According to Mr. SHORE, the average of three years was 112 rainy days in 365. The climate is decidedly damp, and remarkably so in contrast with the plains. This is a necessary consequence, from its situation between the Himálayan mountains and the Sewálik Hills, and from the great quantity of jungle with which it is still covered. In the hot winds, on entering the Dún, after leaving the parched and withered aridity of the plains, the eye is filled with a refreshing vista of luxuriant verdure. Parasitical orchidæ or air plants, which require a combination of great moisture and heat to thrive in, cover the trees in the greatest profusion: while at Shéranpur, they are kept with difficulty alive, under a constant supply of artificially afforded moisture. Very rarely, perhaps once or twice in the memory of man, snow falls in the Dún. Mr. SHORE records an event of this kind as having occurred in Feb. 1814.

From what has been mentioned above, it appears to me that there is a great similarity between the climate of the tea districts of China, and that of the lower heights, or the outer ridges of the Himálayas, in the parallel of 29°30'. The chief difference is perhaps more moisture in this country. How extensive a range of temperature may be had will be seen by collating in a tabular form, the temperature of four places already given, as below :

	Annual mean heat.	Summer heat.	Winter heat.
Shéranpur, 1000 feet above the sea, plains,	73°	90°	52°
Dehra valley, 12 to 1400 feet do. Himalayas,	70°·5	84	53 ?
Hawulbagh, 3887 feet do. do.	60	70	41
Masúri, 6500 feet do. do.	57	67	42

By varying the altitude the temperature could be graduated to any point that might be desirable, and as temperature is the mean condition, I am of opinion that tea might successfully be cultivated in this part of India. It is an experiment which can be conducted properly only by a Government. On an extensive scale, the risk would be too great for private speculation, and on a small one, the advantage too inconsiderable. There remains now to consider what situation is best adapted for a trial. Besides fitness of climate, there are other circumstances to be taken into account as affecting a favorable experiment:—such as abundance and cost of labor, facility of communication, and distance from the plains.

Three stations in the mountains within the Company's territories might be thought of, Almora, Subáthu, and Masúri. The hills about Almora, although favorable enough in climate, are separated from the plains by a broad belt of Terái, which is only passable at certain seasons of the year: and it is so unhealthy as to be unsafe at all times to pass through. The population in the neighbouring hills is scanty, and a great portion of the Terái is uninhabited. Were the tea cultivated, be-

sides a permanent establishment, at the season of gathering, a number of additional hands would be required, which could only be advantageously provided where labour was plentiful and cheap. On these accounts, I am inclined to think, that Almora would not be an eligible district to make a trial in.

Of Subáthu I cannot speak from personal observation, but I imagine it would be a good situation. It is immediately over the plains. There is some level ground about it; there is no Terái jungle in front of it, and the country at the foot of the mountain is inhabited. The valley of Pinjôr, in the neighbourhood, is populous. The climate is like that of corresponding heights on the hills north of the Dún.

I am inclined to think the best ground would be near Masúri on the hills north of the Dún. The district lies between the Jumna and Ganges, which are navigable till within a few marches from the foot of the hills. The communication with the plains is open almost all months of the year, and the valley of the Dún is inhabited. There might be had here within a short distance a great variety of situations in respect of soil, climate, and exposure. I imagine that the best position would be a tract on the southern face of the outermost ridge, situated from 3000 to 6000 feet above the sea, or where the hot winds cease, up to the limit of winter snow. On the northern slope, it should be at a lower level, and perhaps here the finer sorts of tea might be produced. The valley of the Dún has a gravelly or sandy soil, which appears closely to resemble what is described as best for the tea cultivation in China, and the climate is such that it is probable that the inferior kinds of tea, such as are grown in the province of Canton, forming perhaps a large proportion of the article exported to Europe, if not superior teas, might be produced in it. In some places, as at Nahu, the rocks and soil of the Sewálik hill formation rise upon the Himálayas to the height of 3000 feet, and in situations of this sort all the most favorable conditions of soil and climate are combined.

I shall conclude by stating compendiously the opinions in this letter:

1. That the tea plant may be successfully cultivated in India.
2. That this can be expected no where in the plains from 30° N. down to Calcutta.
3. That in the Himálaya mountains, near the parallel of 30° N. notwithstanding some circumstances of soil and moisture of climate, the tea plant may be cultivated with great prospect of success; that a climate here may be found similar in respect of temperature to the tea countries in China; that in the direction and great slope of the hills, the absence of table-land or elevated valleys, and the contracted figure of the existing valleys, are the chief difficulties in the way of cultivation, which may prevent tea from being produced in great quantity on any one spot.

4. That the most favourable ground for a trial is a tract on the outer ridges, extending from 3000 feet above the sea, or the point where the hot winds cease, up to the limit of winter snow.

5. That in the valley called the D h ra D n, if not the better, the inferior sorts of tea might be produced.

IV.—On the Efflorescence of *Kh ri N n*, or Sulphate of Soda, as found native in the soil of *Tirh t* and *Sarun*, in the province of Behar. By Mr. J. Stephenson, Supt. II. C. Saltpetre Factories, &c.

The first time I had an opportunity of observing the efflorescence of this salt, took place in the month of January, 1831, between the villages of *Mow* and *Jandaha*, in *Tirh t*. I was travelling between the first place and *Singhea*, a distance of 40 miles. It being night time, and my bearers having stopped to refresh themselves, I looked around and was surprised to find the ground covered white in all directions. Being then a stranger to this part of the country, and the weather very cold, I thought the white appearance might be caused by frost rind\*, or a shower of snow; but on further examination, I found it to be an efflorescence of saline matter, covering the earth to the depth (in some places) of a quarter of an inch. In a few minutes, I collected a sufficient quantity for future examination, and I subsequently subjected the same to analysis. The result I found as follows:

*Examination by tests.*

Litmus test paper, .....	No change.
Turmeric do. ....	Do. do.
Oxalic acid, .....	No precipitate.
Prussiate of potass, .....	No change.
Muriate of barytes, .....	Copious precipitate.
Nitrate of silver, .....	Precipitate not very copious.

The two last precipitates being carefully washed, dried, and weighed, gave on the scale of equivalents, a percentage of

Sulphate of soda, .....	58
Muriate of do. ....	22
Insoluble matter, .....	20

100

Several other samples, which I tried, varied in the quantity of insoluble earthy matter, but very little in the composition of the saline contents. Of course the insoluble matter will vary according to the care taken in collecting the sample at the surface of the ground, the upper part of which is the purest.

I have during a three-years' residence had many opportunities of observing (in my frequent journeys in *Tirh t* and *Sarun*) the efflores-

\* A circumstance of no unusual appearance in Behar during the cold season.

ence of this salt, which is in almost inexhaustible abundance during the dry season of this country. The natives collect and manufacture it into a salt called by them *khári nún* (bitter salt,) which is given to cattle as a medicine, and used in the process of tanning, or rather dressing and preparing the hides to be tanned. It forms a considerable native article of commerce in these districts, and as the process of making it differs somewhat from that of saltpetre, I shall on a future occasion attempt a description of the native manufacture. An examination of the water from about 20 wells at different distances from each other, on the road between *Singhea* and *Mow*, (about 20 coss,) produced the following amount of saline matter, contained in a standard English gallon :

Sulphate of soda, . . . . .	26.4 grains
Muriate of do. . . . .	11.2 do.
Nitrate and carbonate of lime, . . . . .	12.8 do.

Total of saline mater in solution, . . . . . 50.2 per gallon.

The above samples of water forming an average from 20 wells was taken in the month of April, 1833, and forming a line of considerable distance east and west through the south part of *Tirhút*. This result is a tolerable approximation to the contents of the saline nature of the soil.

A sample of the water of the river *Gandak*, taken from the stream opposite *Singhea*, this present month, gave me nearly 2 grains of muriate of soda in 16 oz. or a pint measure. The tests did not indicate any other kind of saline matter in solution. It is worthy of remark, that the water of the river *Són* at this time is perfectly pure, at least I could not detect any saline matter in solution by various re-agents. It ought in consequence to be used in preference to any other at this season by every one, even at a distance, who can afford the expense of carriage. I have ventured an opinion, that the tumours or swellings of the throats of the natives dwelling on this side of the Ganges are caused by the saline nature of the water they are under the necessity of using at this season of the year. Be this as it may, the hint may not altogether be uninteresting to the medical gentlemen of these districts, and who may hereafter establish as a fact what I have merely hinted as a crude opinion.

In conclusion, I have to remark that the above efflorescence of sulphate of soda may hereafter, when European skill and capital becomes more abundant in these productive districts, be converted into a valuable article of commerce; for it is manufactured in England and France at a great cost from the muriate of soda, by sulphuric acid, and was valued in the London market in the year 1833, at from £8 to 10 the ton. It is almost unnecessary to add, that there is a sufficient quantity of this article in *Tirhút* and *Sarun* to supply the whole of India with Glauber salts to be used in cooling wines, and water, or along with other salts used for the purpose.

V.—*Meteorological Register for 1833, kept at Bancoora, by J. McRitchie, Esq.*

Month.	Ther. Low-est.	Ther. High-est.	Bar. Noon.	Bar. 10 P. M.	Rain.	Wind.	Av. Rain 4 years.	Strs.	Gen. Remarks.
January,	62.1	67.6	29.75	29.86	...	w.	.41		6 days observation—fine and dry; the outside, 7 A. M. 42.
Feb. ....	...	...	...	...	.550	w.	1.068		Sometimes cloudy, generally dry.
March, ...	...	..	...	...	...	w.	1.340		Strong westerly winds; very hot; eddies.
April, ....	89.1	95.2	.56	.55	.550	N. w.	2.109		Occasionally variable winds; showers two and three, with thunder and lightning.
May, ....	86.6	92.6	.45	.46	6.803	s. w.	4.197	21st 1 sevr.	Winds variable after 21st; very hot and close.
June, ....	93.	97.5	.37	.36	7.513	w. v.	9.359		7 days' observations—awfully hot till 10th; rains set in with slight showers.
July, ....	86.2	90.	.34	.33	7.171	s. w.	11.470		Heavy showers first, lighter afterwards.
Augt. ....	85.5	88.8	.39	.38	10.235	w. N. W.	11.250		26th, 4 past 11 P. M. two shocks; rn. very heavy occasionally.
Sept. ....	85.7	90.1	.40	.40	7.011	s.	7.584		Some heavy showers, light towards the end of the month.
Oct. ....	81.5	86.	.61	.77	1.606	s. E.	3.587		Generally hot, cloudy weather; partial showers.
Nov. ....	75.	81.	.80	.78	...	N. w.	1.384		Fine throughout
Dec. ....	70.5	75.	.72	...	2.198	w.	.909		Cloudy, with a good deal of rainy weather.
Ther. and Bar. aver.									May 21st, rain fell 3.285 in.
1833.	77.5	82.6	29.57	29.59	43.633	wy.	54.451	Oct. 7 one sev.	Var. in Bar. .26
1832.	76.9	82.1	.59	.57	...	w. N. W.	...	Oct. 31 one very sev.	Oct. 7th, rain fell 3.895.
1831.	76.1	82.2	.80	...	...	...	...		Var. in Bar. .480
									Oct. 31st, rain fell 4.460.
									Var. in Bar. 700.

NOTE.—We have omitted the columns of rain for 1830, 1831, and 1832, which will be found already printed in the Journal—(see volume I, page 154, and vol. II, page 183.)—Ed.

VI.—*Experiments on the Preservation of Sheet Iron from Rust in India.*  
By James Prinsep, Sec. &c.

The proposed extensive employment of iron steam boats for the navigation of the Ganges, rendered it a desideratum to ascertain what varnish or composition would best preserve the exterior surface of such vessels from the rapid corrosion to which iron is so peculiarly subject in a hot climate. A series of experiments was undertaken with this view by myself at the requisition of Government; and it may perhaps be useful to record the principal results in a journal of science.

Two sets of six wrought-iron plates, each measuring three feet by two feet, were fixed to two iron triangles, the plates being prevented by studs from coming into contact with each other. The same varnishes were applied to both sets, one being intended for entire submersion under water, the other to be only half immerged, in order to feel the united influence of air and water.

The following were the coatings applied :

1. Common coal tar, laid on hot, and the plate heated.
2. *Theetsee* varnish of Ava, one coat. This took a very considerable time (two months) to dry, kept first in a cool-room, and afterwards in a room heated by furnaces\*.
3. Native *Dhāna*, applied to the iron hot, in a thick uneven coat.
4. Best white-lead paint, three coats; allowed to dry and harden for nearly three months.
5. Coach-makers' varnish, two coats; dried rapidly.
6. Spirit varnish, several coats; warmed.
7. White wax, melted on the surface.
8. White wash, of pure lime water.
9. The surface of the iron plate cleaned and guarded with an edging of zinc soldered on.
10. The natural surface of the rolled iron sheets, covered with its usual hardened grey oxide.

Many of the foregoing were employed from curiosity only, especially No. 6, the spirit varnish, which had on many occasions proved quite ineffectual in preserving the surface of polished iron and steel from rust in the atmosphere of Calcutta.

The two frames were suspended as above described, one under water, the other half immersed, from one of the unused dredging boats near the Chitpur lock gates of the Circular canal, where they were left undisturbed for three months, during a period of the year, when the water of the canal was only slightly salt.

\* Major BURNES states, that three or four days are sufficient for the varnish to dry when laid on wood, (Journal, Vol. I. p 172.) I had not a damp vault in which to expose the plate as recommended by that officer, and that may partly account for the delay in drying; but all varnish and paint takes longer to dry on metal than on wood, from its non-absorbent nature.

They were then taken up for examination, and presented the following appearances.

No.	Varnish.	Plates under water.	Plates half above water.
1	Tar.....	Perfectly preserved and free from rust.	A few dots of rust between wind and water.
2	Theetsce, ...	Perfectly uninjured in appearance.	A line of rust at the level of the water.
3	Dhooa, ...	White and pulverulent; soft and easily rubbed off while wet: rust here and there.	Large cracks from the contraction of the part exposed to the sun, whitened where thick, black where thin; plate preserved, above water.
4	Paint, .....	Almost wholly disappeared, and blotches of rust on the surface.	Paint uninjured above water mark, and plate preserved, but below water entirely removed.
5	Copal varnish,	Whitened, pulverulent, and soft; but not much oxidated.	In air less, whitened spots of rust breaking out every where.
6	Spiritvarnish,	Whitened and very rusty.	Very much corroded.
7	Wax, .....	No trace of wax left, and very rusty.	This plate was all under water.
8	Lime, .....	Flaky; peeled off, and very much corroded.	In air remains on and acts pretty well.
9	Zinc, .....	The clean iron excessively corroded and bad: the zinc also oxidated.	Much more rusty in the air than under water, where a kind of crust was formed.
10	None, .....	The natural surface was a little whitened and pretty well preserved.	Rusty on the edges or where it had been scraped; elsewhere little injured.

The superior preservative power of the coal-tar to all the substances tried, with the exception perhaps of the theetsce, was evident; the Burmese varnish laboured under the disadvantage of being a single coat, otherwise it would doubtless, from its hardness, its firm adherence, and its inalterability by water, prove fully equal as a lacquer to the coal-tar: the latter has on the other hand the advantage of drying and hardening as soon as laid on.

The change effected on the resinous varnishes is produced by an actual chemical combination with the water; the soft pulverulent matter is analogous to the white powder obtained by the addition of water to an alcoholic or of acid solution of rosin.

The failure of the zinc guard, which was expected to act as an electro-positive protector to the iron, may I think, be attributed to its being adulterated with lead, which being negative with respect to iron, would cause, as was actually the case, a more rapid oxidation of the latter metal: (the impurity of the zinc was afterwards fully proved.)

The wax and the white paint had entirely disappeared from the surface of the metal under water before the plates were taken up; it is impossible therefore to say in what way their removal was effected.

The bituminous (coal-tar) coating was finally adopted, and it has been successfully applied to the iron steamer, the Lord William Bentinck, lately launched under Captain JOHNSTON'S superintendence.

VII.—*Proceedings of the Asiatic Society.**Wednesday Evening, the 30th April, 1834.*

The Right Reverend the Lord Bishop, Vice-President, in the chair.

Read the Proceedings of the last meeting.

Messrs. Wm. MARTIN and THOMAS SPIERS, were proposed as members by Mr. BAGSHAW, seconded by Mr. J. PRINSEP.

Also, Captain W. FOLEY, proposed by Mr. PRINSEP, seconded by Dr. WALLICH.

Read letters from Messrs. N. CARLISLE, Secretary to the Society of Antiquaries, and J. C. MORRIS, Secretary to the Madras Literary and Auxiliary of the Royal Asiatic Society, expressing the thanks of those Societies for the xvii. volume of Transactions.

Read a letter from M. JULES DESJARDINS, Secretary of the Mauritius Natural History Society, acknowledging his election as an Honorary Member of the Society. Mr. CHARLES TELFAIR, President of the same Society, died before he became acquainted with the honor the Asiatic Society had equally intended for him. Mons. J. DESJARDINS forwards a 5th Annual Report of the Mauritius Society in manuscript for the Asiatic Society's Library.

Read a letter from the Committee for concentrating Government offices, inquiring on behalf of Government, whether the Asiatic Society would feel disposed to afford space in their rooms for, and undertake the charge of, the books belonging to the College Library, upon their removal from Writer's Buildings at the close of the Charter, reserving the proprietary right of the books with Government.

It was the opinion of the Committee of Papers that the College Library could not be properly accommodated without some additions to the museum on the north of the building: this perhaps the Government might consent to make, as the books were to remain public property: in other respects the measure appeared highly desirable and the offer should be accepted. The subject was dropped on an intimation that an arrangement had been made, subsequent to the Committee's letter, for retaining the library in the premises it now occupies.

*Library.*

The following Books were presented:

The Indian Journal of Medical Science, No. 4.—*By Messrs. J. Grant and J. T. Pearson, Editors.*

Madras Journal of Literature and Science, No. 3.—*By the Madras Literary Society.*

RAMCOMUL SEN's English and Bengalee Dictionary, 2nd part, translated from Todd's edition of Johnson's Dictionary.—*By the translator.*

Lieut. J. BRADDOCK's Memoir on Gun-powder.—*By the Author.*

Proceedings of the Natural History Society of Mauritius, from July 1833, to January 1834.—*By the Society.*

Report on the Inland Customs and Town Duties.—*By Mr. C. E. Trevelyan.*

Illustrations of the Botany and Natural History of the Himalayan Mountains, &c. Part 1st.—*By J. F. Royle, Esq. F. L. S. G. S. and M. A. S. &c.*

Mr. BAGSHAW stated that it would be a great convenience to Members have a revised catalogue of the library: whereupon, finding that the

former edition was nearly expended, it was *Resolved*, that a new catalogue be printed, comprising also the objects in the Museum.

MR. J. T. PEARSON, inquired whether any steps had been taken regarding the matter of compounding for subscriptions: *Resolved*, that a report be requested from the Committee appointed on the 26th June last, to consider the subject.

#### *Physical.*

Read a letter from Major BURNLEY, Resident of Ava, forwarding a collection of mineralogical specimens, consisting of:

Ores of lead, copper, antimony, iron and arsenic: and rock specimens, from the Shan country to the east of Ava.

Sulphate of lime, from the petroleum wells at Yenangyoung.

Specimens collected by Captain MACLEOD in a journey to Manipúr: of copper ore from Laypadoung on the Khyendwen river:—also of hornblende, volcanic rocks, and saline efflorescence from a sulphureous lake called *Myouk dwen* (northern well) near Lemye on the left bank of the Khyendwen.

Also, coal from the Angoching hills, fossil wood from Taroup myo, left of the Irawadi river; and the sand from which gold is washed at Kenau immediately above Kendat on the Khyandwen river.

Waters from the lake above mentioned and from a well in the neighbourhood (unexamined), and a root from Shan, smelling like celery, used with clothes to give them a scent.

Major BURNLEY writes:—"During my last journey up here I collected a good many fossil specimens near Yenangyoung, and particularly teeth of the Mastodon, and Elephantoides. Captain MACLEOD also during his late journey by water to *Kendat* (Gendah of our maps) found much of the country in that quarter indicating the presence of fossil remains, and picked up several portions of the jaws of the Mastodon, and Elephantoides with teeth. The Burmese ministers have ordered their officers at Yenangyoung to gather all the fossil bones they can for me, and as soon as I procure a large collection, I will send the whole to you for examination."

A series of geological specimens from Southern India, was presented by Lieutenant BRADDOCK on the part of a gentleman at Madras.

They consisted principally of:

Gneiss, greenstone, laterite, and magnetic iron ore from the Neelgirís.

The garnet-gneiss, of Coimbatcor and Salem.

The decomposing mica-schist, and gneiss; yellow earth;—felspar with magnetic iron, and quartz with ochreous clefts;—all which are washed (with or without previous burning) for gold, in the large gold district of Mysore.

Two handsome varieties of porphyry from Seringapatam.

Shell limestone from 12 miles W. of Pondicherry used for ornamental purposes.

Sandstone, slate-clay and other rocks of the Southern diamond formation, which have been fully described by Dr. HEYNE and VOYSEY.

Specimens of the volcanic mud from Kyook Phyoo, presented by Captain WARDEN.

#### *Antiquities.*

The Secretary submitted a translation of the inscription in the Pál and Burma character on the large monumental stone from Arracan, presented

to the Society by H. WALTERS, Esq. in May, 1833; the notice of which at the time was deferred in expectation of receiving a translation and account from the donor.

The translation has been made by a native Christian of Ceylon named RATNA PAULA, who is well versed in the Burma language, and who prepared the catalogue of Burma MSS. in the Society's library.

The inscription (although very recent) is of considerable interest as describing the early history of the introduction of the Buddhist religion into Arracan from Ceylon, and the reform of various abuses in dress, and corruptions in the holy texts which had from time to time crept in. The principal object, however, is to commemorate the erection of a temple called *Kalyani Simtokri at Romavaté* in the island of Yanhya Koyan, in the year of Sakha raj 1148, (A. D. 1786.)

Read, letters from Captain CAUTLEY, forwarding a further supply of coins and other relics discovered in his occasional visits to the site of the subterranean town at *Behat*, with a plan of the neighbouring country, and an explanatory notice by the discoverer.

[This will be printed in our next.]

Captain CAUTLEY's last letter notices that on a revisit to the spot at the Kalawala pass, where he had in 1827 made the discovery of what was then supposed to be a bit of fossil wood\*, but which proved on Dr. FALCONER's examination to be bone, he has been so fortunate as to find another silicified bone, some teeth and a number of other remains, all apparently belonging to the Saurian family. Dr. FALCONER has also made further discoveries in the Timli pass, and we are led to expect an account of the whole shortly from the pen of the latter gentleman.

A memoir on the ancient coins discovered at *Beghran* in the *Kohistan* of *Kabul*, by CHARLES MASSON, was read.

[Printed in the present number.]

This highly interesting paper was communicated by Doctor J. G. GERARD, who fell in with the author at *Kabul*, on his return from *Persia*. Doctor GERARD founded upon the very successful issue of Mr. MASSON's researches a distinct proposition addressed to the "President of the Meeting of the Society."

The Right Reverend the Vice-President, proceeded to read Dr. GERARD's paper to the meeting; whence it appeared that two offers were laid before the Society:

1. To employ Mr. MASSON, on the part of the Society, to continue the prosecution of his researches in *Afghanistan*.
2. To secure by purchase the possession of the valuable relics he has already collected.

The two questions, as connected with the present means of the Society, were referred to the Committee of Papers for consideration and report.

A Memoir on the *Topes* of *Afghanistan*, by Doctor J. G. GERARD, also addressed to the Presiding Member of the meeting, was laid on the table.

A paper by Mr. B. H. HODGSON, Resident at *Kathmandu*, entitled *Classification of the Néwars, or aborigines of Népal proper*, preceded by a legendary account of their early history, was also submitted, but not read on account of the lateness of the hour.

\* See Asiatic Researches, Vol. xvii.

VIII.—*European Science.**On the Longevity of Plants, and the Means of Ascertaining their Age.*

[Translated for the J. A. S. from the Original of Professor de Candolle, at Geneva.]

A tree may be considered in two points of view, either as an assemblage of as many individuals linked together as there are buds developed on its surface; or as a single being, analogous to what is called an individual when speaking of an animal. According to the first, which is probably the most rational view, it cannot be astonishing that, while new buds are incessantly being added to the old, there should be no necessary term to the existence of the aggregate body. By the second, which is the most common, it must be allowed that, as in the greatest number of trees a fresh layer of wood, and in general new organs, are formed every year, there cannot exist in the vegetable world that hardening or that obstruction of the old and permanent organs which produces death from old age properly so called, and that consequently trees should never die but from accidental causes. By either of these hypotheses it is equally shewn that trees do not die of old age in the real sense of the phrase; that there is no definitive term to their existence; and that consequently some may be found that have attained an extraordinary age. But it is not sufficient to advance such an opinion; we must endeavour to prove its truth. Already two remarkable examples have been quoted; that of the *Baobab*, which ADANSON by ingenious and plausible calculations, has proved to be 5150 years old, and that of the *Taxodium* (*Cupressus disticha*, Lin.) which from analogous reasoning may be considered still older. (See the notice on these trees by Mr. ALPH. DE CANDOLLE in the *Bibl. Univ.* April, 1831.) Other, though less remarkable cases, seem to confirm the idea that there still exists in the world trees of prodigious antiquity, that have witnessed perhaps even its last physical revolutions. It is easy to imagine that many errors may creep into calculations of this sort; and that they can only be depended on as correct, when multiplied cases of vegetable longevity shall be discovered to confirm the fact. I have long occupied myself with this subject, as the publication of the Principles of Botany, inserted (in the year 1805,) in the first volume of the *Flore Française*, will prove; but the life of man is too short for such researches: opportunities are rare; and examples should above all be sought for in those countries which are not subject either to frost or to the destructive hand of man. The methods also of proving the age of old trees is not perhaps sufficiently known to travellers, or to those who interest themselves in these kinds of inquiries, and I am therefore induced to call the attention of the public to the subject by means of this pamphlet.

A considerable degree of interest would attach to the longevity of certain trees were it only from curiosity. If we consider all the other documents of antiquity as precious, surely we cannot lightly pass over the knowledge that such a tree is contemporary with the oldest times; in some instances, this knowledge might throw light on the history of monuments, as in like manner the history of monuments may assist our inquiries into that of their neighbouring trees. This question might even become of great utility in the history of the globe. If the certified number of these veterans in the vegetable kingdom were to become very considerable; if in the course of time their age were ascertained with greater certainty; might we not find in these facts some means of fixing the approximate date of the last revolutions of the earth? If inquiries of this kind were made in volcanic or

*madreporic* islands, might they not give some idea of the date of their origin? But ceasing our conjectures on subjects of such magnitude, if we reflect on the means of attaining the solution of the question, we shall see that they are all founded on an exact appreciation of the laws which govern the growth of trees; and this knowledge may throw light on many parts of vegetable physiology and of the forester's art. I believe therefore that such researches may become useful; but even should they prove but curious, I should still not think them unworthy of being offered to the public; for curiosity is an insatiable appetite that the mind of man takes pleasure in satisfying, in proportion to the quantity of food which has already been provided for it.

It is well known that plants destined to attain the character of trees may all be classed under two heads. The first, which are the most numerous, have the trunk composed of a body of wood coated with bark; they grow by the annual addition of a new layer of wood, which is produced outside the old wood, but within the bark; these layers of the young wood being the most exterior, the name *exogenous* has been given to such plants when speaking of their growth, and that of *dicotyledonous* when alluding to their germination. Under the second head are placed, on the contrary, all those plants whose trunks, being sensibly cylindrical and generally unadorned by branches, show only a body of wood without any bark properly so called; of which the exterior fibres are the oldest and most hard, and the interior fibres the softest and youngest. They have obtained from this last circumstance the name of *endogenous*, by which they are distinguished when alluding to their growth, and which is synonymous to that of *monocotyledonous*, used when speaking of their germination. We will rapidly examine the means of ascertaining the age of individuals belonging to these two classes, and will afterwards add a few remarks on vegetables more humble in their appearance, but whose duration offers matter for special consideration.

Almost all trees that are natives of the temperate zones, and consequently of the most civilized parts of the world, are *exogenous*: their nature and history have therefore been examined much more closely than any others, and may afford us the most interesting data.

It is now ascertained beyond a doubt, that *exogenous* trees increase annually by a new layer of wood, and consequently the number of concentric zones visible on the transversal or horizontal section of a trunk may give an idea of the number of years that have elapsed since the part of the tree under examination began to vegetate. It follows that a slice cut at the bottom of the branch will give the age of the branch; another made at the bottom of the trunk, or at the neck, will give the age of the tree. If, as has been asserted, irregularities may occasionally occur, and this is a very doubtful point, it may at least be affirmed, that the probability of deviation from the law are so slight, that we may boldly argue on the hypothesis that a given number of layers indicates the same number of years' growth; consequently, whenever a clean section of the trunk can be attained, this very simple criterion is sufficient to discover the age of a tree. But the inspection of these concentric zones ought to be made with greater care than has hitherto been bestowed on it. The zones, by their number, give the age; but by the proportion of their thickness they give the mean rate of increase. It is not sufficient therefore to count them, they must be measured. The following is the very simple means I made use of to attain this end. When I met with a clean cut of an old tree, sufficiently healthy to observe its layers, I placed on the branch a slip of paper, reaching from the

centre to the circumference; on this slip I marked with a pen or pencil the meeting of each zone, the size of the pith, and that of the bark; writing on it the name of the tree, the country to which it belonged, and any particular which deserved notice. My collection of these slips, (which have no small resemblance to the measures preserved in a tailor's shop) gives me an exact estimation of the different growth of different trees, and the means of comparing one with another. I take the precaution of marking in a more decided manner every tenth ray, which gives me the average rate of increase for every ten years growth.

My measure, being taken from the centre to the circumference, expresses the radius. I double it, if I require the diameter; I take six times if I wish to have the circumference of the woody substance. It is not so useful, except in some particular instances, to make these observations on young trees; for in working on the older ones, of which every species may be procured, there is the advantage of being able to judge of the trees in every stage of their growth. As it would be inconvenient to publish an exact copy of these slips of paper, which are sometimes several feet long, I shall give an idea of their results, by the following table: [We have converted the French lines into English measures.—Ed.]

*Table of the growth of some exogenous trees, as measured by their increase of diameter in periods of ten years, expressed in inches and tenths, English.*

Years of age.	Oak (pedunculata) aged 130 years.	Oak (Sessilis- Morta) aged 210 years.	Oak (ditto.) aged 333 years.	Larch, aged 257 years.	Elm, aged 333 years.	Fir, aged 120 years.	Yew, aged 71 years.
1 to 10	4.8	0.9	1.6	4.2	1.4	3.6	0.7
10 to 20	5.5	1.1	2.9	5.4	3.8	4.7	1.0
20 to 30	4.8	2.0	3.4	5.1	5.1	4.6	1.1
30 to 40	5.3	1.1	3.3	6.4	6.4	3.9	0.9
40 to 50	4.2	1.2	2.1	4.0	7.7	3.0	0.6
50 to 60	3.9	1.3	1.1	5.0	6.8	3.1	1.1
60 to 70	4.9	1.0	0.8	4.0	6.9	1.6	0.7
70 to 80	3.9	1.0	0.8	2.6	5.8	1.5	
80 to 90	2.8	0.8	0.7	2.6	5.2	1.2	
90 to 100	2.8	0.8	0.7	2.2	3.9	1.2	
150 to 160		0.7	0.7	1.9	1.7		
200 to 210		0.8	0.7	2.0	3.0		
250 to 260			0.7	1.8	2.1		
300 to 310			0.8		1.4		
320 to 330			0.7		1.9		

It results from these observations, that in the advanced periods of their life, trees continue to form layers which do not yield in thickness to those of a middling age; that every species, after having grown rapidly in its youth, appears at a certain age to attain a stated and regular growth. In fact, a tolerably good reason may be assigned for these differences, by assuming, that during the first period, that is to say, before 60 or 80 years, the roots and the branches of forest trees, not being confined by their neighbours, grow freely; but that, after that age, they grow less rapidly, on account of their encountering the roots and branches of neighbouring trees; finally, that inequalities of growth are owing either to the quality of the zone or stratum of earth from which the main portion of the roots are drawing their nourishment, or to the circumstance of the neighbourhood of the tree being more open and clear at some periods. Such calculations made on a great variety of species, and on individual trees of every species, would give the most interesting results regarding the progress of vegetation:

1st. They would establish for each species an *average* of its annual increase, so that by knowing the circumference of an exogenous tree, its age might be also pretty accurately ascertained. It must be kept in remembrance that great variations take place during the first period, and that afterwards a more uniform growth is established.

2ndly. The mean growth and mean solidity of any species of wood being given, the thickness of the layers of an individual specimen will enable us to judge, whether it possesses all the natural qualities belonging to its species; thus it may be inferred, that the oak No. 1 of the table, is very inferior to the oaks 2 and 3, because the thickness of the layer is too great for the wood to have acquired its full hardness.

3dly. If the law I have assumed is true, that at a certain age (60 or 80 years for oaks) every tree ceases its more rapid growth, and assumes a more regular progress, then we may deduce precise rules as to the most suitable period for cutting down certain trees. I am inclined to believe, therefore, that tables of horizontal cuts would be of very great use, and I recommend their preparation as well to travellers as to those engaged in extensive timber-works and building concerns.

2. When the transverse section of the stump cannot be obtained, a second method presents itself, by which the growth may be determined; which is, to look for the old individuals of every species of which the date is ascertained, to measure their circumference, to deduce from thence their average growth, and to make use of this to calculate the age of other trees of the same species; bearing in mind, that, except in local circumstances, a measure taken from a young tree always produces too great a result for the growth, and too small a one for the age, of old trees. EVELYN mentions, that a Dane, named Henri Ranjovius, planted in *Ditmarches*, in the year 1580, a certain number of trees of various kinds; that he placed near each a stone recording its date, that posterity might know their age. It would be very interesting to ascertain, whether these trees are still in existence, and if so, to know their circumference; in fact, it would be interesting to have the circumference of every ancient tree the origin of which is known. I invite all who have such particulars, either to publish them, or to communicate them to me; for such observations can only prove useful by comparing them with other recorded facts.

3. For trees of slow growth (*séculaires*), it is useful to have their circumferences at different known periods, so that they may be compared one with another, or with other measures of the same tree which may be taken sooner or later; these comparisons would afford means for better calculating the law of growth, and of appreciating the influence of differences in age; thus, for example, the cedar in the garden at Paris, which was measured when 83 years old, was 113 inches in circumference, which would indicate an average of nearly 0.44 in. growth in the year, but it was measured when 40 years old, and had then already 84 in. circumference; from which it seems that it grew 0.66 in. a year during the first 40 years, and only 0.23 during the following 43 years: consequently if the age of a very old cedar were required to be calculated, we should not probably go far wrong in taking this last number as a multiplier; thus the cedars at Liban measured in 1660, by MAUNDRELL and POOCK, which were 12 yards and six English inches in circumference, must have been about 609 years old; and in 1787 when they were again measured by Mr. LABILLARDIERE, about 800 years. But the calculation is doubtful since it only rests upon a single example: it would become more certain in proportion as the number of instances becomes greater.

4. It would moreover be useful to take the circumference of very old trees, whenever met with, even when their date is not known. These measures repeated

at certain intervals would show the law of increase in the diameter of old trees, and compared with other measures, would afford approximate means for estimating their age. Thus we find from EVELYN that there existed in 1660, an immense oak at Welbeck-lane, which was 33 feet 1 inch in circumference, (nearly 11 feet diameter); this same oak, though mutilated, still existed in 1775, and had a diameter of 12 feet; it had grown 12.6 in. in 120 years, a little more than a tenth of an inch yearly. From whence it may be concluded, that the law of increase, indicated by the oak in my table which was 333 years old, holds nearly good for a tree of much greater age: therefore, if the oak of Welbeck-lane be calculated by the tabular data of the oak of 333 years, it will be found that, in EVELYN'S time, it must have been nearly 1300 years old; and more than 1400 years old, in 1775.

5. Finally, in cases where it is impossible to obtain the transversal cut of an old tree, there may be opportunities of making a slight incision on the side and discovering how much it has grown in a given number of years, and thus providing a minimum of its mean growth. This is the method by which ADANSON discovered the age of the Boababs. He saw how much these trees had grown in three centuries, and knowing at the same time the growth of young trees, he was able, by an *average*, to estimate the general law. The age of the Taxodium of Chapultepec in Mexico might be examined in the same way.

By following out the five methods indicated above, either separately or unitedly, the age of old exogenous trees may be ascertained in a manner which will sufficiently answer the subject of this inquiry. Let us now point out the trees to which our attention ought principally to be directed. The greatest longevity in the vegetable kingdom ought to be found, 1st, in trees which by their hardness, their incapacity of decay, or their size, are the best able to resist destructive agents; 2nd, in countries which are not liable to frost or to other causes which too frequently tend to kill large vegetables.

Among European trees, we may mention the following examples:

1st. The young Elm, as is known, grows to a large size; but its growth is tolerably rapid. The particular one which I have marked in the table above grew near the town of Morges: the observation of its layers, and the account of its fall, was kindly communicated to me by Mr. ALEXIS FOREL; its section shewed it to be 335 years old; it was at the period of its fall perfectly healthy, and had grown in a humid and light soil: its stem was 17 feet 7 inches in diameter at the neck, 30 feet circumference below the spring of the branches, at 12 feet from the ground; and one of the fine large branches attained 16 feet in circumference; the tree fell in fine weather, the soil having been probably injured by the waters of Lake Leman. It had grown at an average 0.3 in. a year, but if the period be divided into centuries, it will appear that it grew .33 a year during the first century, .23 during the second, and .25 during the third; these calculations accord with those which are generally afforded by young elms planted in front of the French churches by order of SULLY. It is important to distinguish the progress of increase in elms *with large* from the rate in those *with small leaves*; the latter are most long-lived and appear to grow more slowly.

2nd. I saw in 1814, at Gigean, near Montpellier, an Ivy tree the stem of which near the ground was six feet in circumference, and which attracted attention by its extraordinary size. Another ivy, 45 years old, was only 7½ inches in circumference. Were this to be taken as an example, the ivy at Gigean must have been 433 years old in 1814, and must now be about 450 years old, if, as I hope, it still exists; it is pro-

table, if there be the same degree of error in this as in the following instances, that I have made too low a calculation of the age rather than otherwise.

I have given in the above table the measure of a Larch 255 years old. On its authority, we may believe that there exist some which are five or six hundred years old, but the measures of their layers must be increased in number before the fact can be decided.

4th. The Linden (*Tilleul*) is a tree of Europe; which up to a certain period appears capable of acquiring a very great diameter. That which was planted at Fribourg in 1476, in commemoration of the battle of Morat, is now 13 feet 9 inches in diameter, which shews an increase of diameter of about .20 in. yearly. This ratio, equal to that of the oak, appears to me to shew that the tree had not encountered very good soil, and I am inclined to believe that we should be nearer the truth if we allowed an average of .35 in a year. As there are in Europe a great number of large lindens, it would be interesting to note the circumference of those, the dates of which are known. I shall mention, on account of their size, the following trees:—that of the Castle of Chaillé, near Melles, in the département of Deux-Sèvres, which in 1804 was 49.2 feet in circumference, and which was I imagine then about 538 years old; that of Trons in the Grisons, known so early as 1424, which in 1798 was 54 feet in circumference, and I imagine 583 years old; that of Depeham near Norwich, which was 8½ yards in circumference in 1664; that of Newstadt in Wurtemberg, which was large enough in 1550 to require support, and which in 1664 was 37 feet four inches in circumference, &c. Should any attention be hereafter bestowed on lindens, those with large and those with small leaves ought to be carefully distinguished; the former appear to grow more rapidly than the latter.

5th. The Cypress is certainly, among the trees which belong to the South of Europe, one which lives to the greatest age, and the usual custom of planting these trees in church-yards has gained for them a degree of respect, and preserved them conveniently for our present object. Hunter says that in 1776, there was one in the palace garden at Grenada which had acquired celebrity at the time of the Moorish kings, which were then called *Cypresses de la Regna Sultana*, because a Sultan there met with Abencerage. But I can discover nothing certain regarding the growth of these trees, which I therefore point out for the attention of naturalists.

6th. Chestnuts appear capable of attaining a very great age; but I do not found this opinion on the celebrated *châtaigner des cent chevaux* on Mount Etna. Mr. SIMOND and Mr. DUVAÏ have communicated to me particulars regarding this tree, which appear to prove that its circumference, which is 70 feet, is owing to the union of several trunks in one. The growth of this tree must be calculated on single stems: there were several very large ones on Mount Etna. PÆDERL mentions having seen one of fifty feet circumference in the county of Gloucester, which was believed to be 900 years old. It would be desirable to possess accurate information regarding the growth of this species.

7th. The East Indian Plane-tree (if it may be numbered among the European trees) is certainly one of the largest, but the law by which its growth is governed is not known. There is in the valley of Bujuk-déré, three leagues from Constantino-ple, a plane which reminds us of the one on which Pliny has conferred such celebrity; it is 150 feet in circumference, and has a central cavity of 80 feet circumference. I would beg travellers to prove first, if this forms a single tree, or whether it be formed by the union of several. Secondly, how much it has grown during a certain period?

this may be determined by a lateral cut which will allow the layers to be counted. Thirdly; what law governs the increase of plane-trees for the first century of their growth?

8th.—The Walnut tree is also worthy the examination of observers. The architect, mentions having seen at St. Nicholas in Lorraine a table made of a single piece of walnut wood, which was 25 feet in width, and at which the Emperor Frederick III gave a celebrated repast. No conclusion can be drawn as to the age of such a walnut, seeing that the progress of the growth of these trees when old is unknown; this might however easily be verified.

9th.—The Orange and Citron are among the number of trees cultivated in Europe, which grow the most slowly, and arrive at the greatest age. It is asserted that the orange tree of the Convent of St. Sabine at Rome was planted by St. Dominique in 1200, and that of Fondi by St. Thomas D'Aquin in 1278. The measure of these trees, and the verification of these traditions, might give an approximation as to the annual growth of the *Agrumi* of Italy.

9th.—The Cedars which I have already mentioned, though they appear to me younger than they are believed to be, are still worthy the attention of observers.

10th.—Oaks certainly stand among the veterans of Europe, but their study is still involved in much uncertainty, either because this tree is one of those which according to the acknowledgment of all foresters are the most modified by the soil, or because the wood of the *Quercus pedunculata*, which grows quickly and runs to a great height is almost always confounded with that of the *Quercus sessiliflora*, which grows more slowly, and becomes harder and more crooked. The result of this confusion, is an impossibility of making comparisons from the documents we already possess. In EVELYN'S *Sylva*, a valuable work, from which I have frequently taken useful hints, many examples may be seen with regard to the size which oaks may attain. I have reason to believe that there still exist in our own country, oaks from 1500 to 1600 years old; but it would be desirable to have these dates verified by further careful inquiries.

11th.—The Olive is also a tree possessed with the power of growing to an astonishing age in countries where it is not subjected to the pruning knife. Mr. de CHATEAUBRIAND in his *Itineraire*, says, that the eight olives in the garden of the same name at Jerusalem only pay one *medin* each to the Grand Seigneur, which would tend to prove that they already existed at the time of the Turkish invasion, for those planted since that period, pay the half of their fruit. The largest olive in Italy, mentioned by PICCONI, is at Pescio: it is 25 feet in circumference. If we admit the estimate given by MOSCHETTINI that the olive grows 0.13 in. yearly, it must be about 700 years old; but this estimate taken from younger olives must be below the truth.

12th.—The Yew appears to me, of all European trees, the one which lives to the greatest age. I have measured the layers of an yew, 71 years old; ORLHAFEN, of one of 150 years old; and VEILLARD, of one of 280 years: these three measurements agree in proving that the yew grows a little more than 0.10 in. a year during the first 150 years, and less than a 0.1 from the age of 150 to 250. If we allow an average of one-tenth a year for the oldest yews, it is probable that this exceeds the reality, and that by considering the number of their years to equal the number of lines in their diameter, they will be pronounced younger than they really are. Now I find four measures of remarkable yews in England; those of the ancient Abbey Fontaine near Reppron, in the county of York, known in 1133, were in 1770, according to Pennant, 1214 lines diameter, or more than 1200 years old.

Those in the church-yard of Crowhurst in Surrey were in 1660, according to Evelyn, 1287 lines in diameter. If, as is asserted, they still exist, they must be 1400 years old.

That at Fotheringale, in Scotland, had in 1770 a diameter of 2588 lines, and is consequently 25 or 26 hundred years old.

That in the church-yard of Braburn in Kent had in 1660 a diameter of about 2580 lines, and if it still exists, it must be 3000 years old.

I point out these trees to the botanists and foresters of England, in order that they may confirm their measurements, and if possible, prove the law which governs the increase of diameter, for it is in England that the veterans of European vegetation are to be met with.

With the same motive, I recommend to those who may have an opportunity of doing so, to study the law of growth, and the dimensions, of the following trees;—the Indian Date, the Box, the Carob tree, the Beech, the *Phylliræ*, the *Cercis*, the Juniper, &c. regarding which we have little information.

Among the exogenous trees in countries between the tropics, the two following have been mentioned, the *Cheirostemon*, (because there is a tree at Toluca, which has been known since 1553,) and the *Ceiba*, which has attracted attention from its size; but it is not probable that trees with such soft wood should live to a great age. I confess however that the instance of the *Boabab*, which although not a very hard tree, exceeds 5000 years, according to ADANSON, shews the necessity of circumspection in making this assertion. I would rather draw the attention of travellers to large trees with hard wood, such as the mahogany, which generally attains seven feet diameter; the *Courbaril*, which it is said acquires a diameter of 20 feet in the Antilles; its great hardness is an argument for its very slow growth. The different trees known by the name of Iron-wood, the *Pinus Lambertiana* of California, which is said to be from 150 to 200 feet high, and has a circumference of from 20 to 60 feet; the fig trees of the Indian pagodas, &c. I would especially recommend travellers to examine all that regards the *Tarodiums* (*Cupressus disticha*, L.) of Mexico. The immense tree of Chapultepec, which is said to attain 117 feet 10 inches circumference; is it really a single tree or formed by the union of several others? Has it a hollow cave at its base like those of Louisiana, which is said to belong to the same species? Has its measure been taken above this cone, as probably ought to be done, if the cone exist? I recommend a fresh examination of this gigantic tree: it concerns perhaps the oldest tree on the globe.

The age of *indogenous* trees is more difficult to ascertain than that of *exogenous*, both from the country to which they belong having been less studied, and on account of the absence of the woody layers, and the preservation of the same diameter at different periods, which renders their examination more difficult. *Indogenous* trees generally appear under two forms; the first, such as palms, have, almost all, the trunk *single* and marked, at least during the greater part of their life, with circular rings placed at very nearly regular distances; the others, such as the *Dracena*, have the trunk adorned with branches and are without rings. The age of palms may be estimated in two ways, very analogous to each other, namely; 1st, by the height which the trees reach at, compared with the experimental knowledge of the rate of growth of each species; 2nd, by the number of rings, and their mean distance compared with the length of the trunk. These two methods rest chiefly on the knowledge of the height of trees, as the study of the age of exo-

genous trees depends on their thickness. It is necessary then in the first place to recommend travellers to note exactly the circumference of the trunk of every species of palm. It should also be required of them to determine the height of palms of every species, and to decide from observation, whether the rings visible on the exterior really indicate, as is asserted, the annual growth, or any other definite period.

The first method applied to the Date-palm appears to give results which are conformable to truth. Thus in 1809, at Cavalaire, in Provence, a date was known that had been sown in 1709; it was then 50 feet high; the greatest height of those of Egypt and Barbary, is 60 feet, and the Arabs consider their longest life to be from 200 to 300 years. It would be necessary to ascertain in what proportions the rapidity of growth decreases at different periods.

By allowing that the rings on the outside of the trunk mark the years, the approximate age of the palms of Brazil might be discovered according to the principles furnished by M. de MARRIUS, in his magnificent work, as follows:

	Height of trunk.	Diameter of trunks.	Distance of Rings.	Probable age.
	feet.	inches.	inches.	years.
<i>Cenocarpus Batavia</i> .....	80	12	7	134
<i>Euterpe oleracea</i> .....	120	8 at 9	4 at 5	300
<i>Euterpe edulis</i> .....	100	6 at 7	4 at 5	300
<i>Iriartea exorrhiza</i> .....	80 to 100	12	4 at 6	250 to 300
<i>Gulielma speciosa</i> .....	80 to 90	6 at 8	4 at 5	250 to 300
<i>Cocos oleracea</i> .....	60 to 80	12	1 at 2	600 to 700
<i>Cocos nucifera</i> .....	60 to 80	4 at 12	3 at 12	80 to 233

I give these approximations to travellers as mere indications, and to induce them to verify my theory.

As to endogenous trees, which are covered with branches, and are without regular rings, no means have yet been discovered by which to calculate their age, and the entire problem must be left for the solution of local observers. It is known that some trees belonging to this class live to a very great age; such is the celebrated Dragon-tree (*Dracæna draco*) in the garden *Franchi* at *Orotava*, in the Island of *Teneriffe*, which was considered remarkable in 1402, at the time of the discovery of the island, and which was even then an object of veneration to the people. Mr. *ВЕРТМЕЛОР* (*Mem. cur. Nat. vol. 13, p. 781,*) who has published a good description of this tree, says that in comparing the young neighbouring *Dragoniers* with this giant tree, the calculations which he had made regarding the age of the latter have more than once astonished him. In 1797, according to M. *LEDRU*, it was 65 feet in height, 42 in circumference at the middle, and 78 at the bottom. Since then the hurricane of the 21st July, 1819, has reduced its height very much.

I am inclined to believe that among the perennial grasses and the shrubs there are many much older than they are generally believed to be, but no inquiry has been made on this subject. I may cite a few imperfect facts, which may lead observers to turn their attention to the duration of life in these humble plants. I mentioned, in my work on the *Organography of Vegetables*, the "herbaceous willow," which growing on the thin soil of the Alpine rocks, at the foot of a declivity, gradually lengthens its stem as the earth fills up, so as just to enable it to shew its head above the soil, the top of the tree resembling a grass-plot of several yards diameter. I have tried to lay open the stem of this singular tree, but I never could reach its base: the length laid bare, compared with the extreme slowness of its growth, already indicated a very advanced age.

In the downs of the South of France, the perennial stalks of the *Eryngium* and the *Melinocephora* lengthen as the level of the ground rises: I never could succeed in extracting their real root, and I incline to believe that these plants are sometimes contemporaneous with the downs themselves: the runners of the nymphæa, the shave-grass, and various ferns, ought also to furnish examples of extraordinary longevity, but I know no certain method of appreciating it.

I will even descend to plants of a still lower class. M. VAUCHER watched a lichen for 40 years, without observing any sensible change of size. How know we that among the patches of moss which envelope our rocks, some may not be coeval even with their birth or elevation? and thus in the beds of certain rivers, some weeds may have been existing ever since their waters began to flow!

But setting aside these obscure objects, and confining ourselves to the noble trees whose history is a matter of general interest, we must acknowledge the solution of the problem, above proposed, to be full of curiosity. Let us hasten to do it before the progress of industry, the calculations of the timber merchant, the change of property, the development of civilization,—have united to destroy the objects of our search. The change of religious opinions, and the extinction of many respectable, though superstitious, feelings, are quickly tending to diminish the veneration that certain old trees were wont to inspire in our ancestors. Let us hasten then to record the dimensions and the dates of those that are still left, and if it be possible, preserve the monuments of ages gone by. I raise my voice on behalf of these medals of antiquity.—I would preserve them from sacrilegious destruction—whether as historical monuments, or as pleasing memorials for the imagination to dwell on. I address myself to the forester, the naturalist, the traveller, the artist; to all public authorities of all nations: I call on them to measure all the oldest trees in their neighbourhood, by the process I have pointed out.—All who have the power of publishing, should at once commit their researches to the press, the only lasting medium of record in our days;—to those who have not, I offer to make the record myself in their names, when possessed of the facts, in a work expressly on the age of trees, for which I have collected materials. Those travellers who are not sufficient botanists to give the right name to a tree, should forward a dried specimen of a branch in flower, to which a few specimens of the wood itself may be added, to serve as the means of measuring the ratio of annual increase.

NOTE. We have for some time sought to give this highly interesting memoir to our readers in its entire shape, because India seems to be peculiarly adapted for the species of research which the author so zealously enjoins. The ancient forests of India, in all ages venerated and fostered by the Hindús, may still contain trees under which RAMA abode in his banishment, or HANUMAN assembled his monkey ranks! Let us hasten to determine the age of those within our reach. The celebrated banian-tree in Tirhút, for instance, has lost its parent stem, but taking the outermost offset now become a large tree, and tracing the period of its taking root, and applying the same calculation to all the intermediate dependents, we shall doubtless find a very high antiquity for the original tree.

A young friend in the Midnapúr district has already commenced the inquiry on other trees: the following is an extract from his letter.

“The largest tree I have met with was a *pípal* at Chilianá. It measured 53 feet in circumference at the ground, and 37 at the height of 6 feet. I cut into it and measured 7 rings in 3 inches: now at Midnapur the *pípal* trees give a circumference of 6 feet 1 inch on an average of about 15 to 20 years growth, deducting the bark, 11 inches radius; therefore the Chilianá tree in being 6 feet in radius, should be about 160 years old, which is not much after all.” The *pípal* is a loose grained wood, and easily liable to decay.—ED.

## IX.—Miscellaneous.

1.—*Note on the description of the Iron Suspension Bridge near Sagur.*

In our account of Major Presgrave's bridge, vol. II, page 538, there are a few typographical errors, and inaccuracies of expression, which those interested in similar works may desire to see corrected.

In page 540, in lieu of "the tension, to be sustained at each point of suspension would be 85.632 tons, including the load," we should have said, following the authority of the printed account of the work, that the "tension of the bridge and chains unloaded at either point of suspension, is estimated to be 95.632 tons while supposing the clear portion of the platform, 190 feet by  $11\frac{1}{2}$ , or 2,185 square feet, to be crowded with men, at 69 lbs. per superficial foot, the loaded bridge will have a weight of 120 tons; and the tension on each point of suspension will result, 217.674 tons. This gives 10 tons for the maximum strain that can be applied to the square inch of sectional area of iron. The general tension will of course be less than half that quantity. There are 780 factory maunds of iron in the bridge, which cost in its finished rate about 19½ Ca. Sa. Rs. per maund.

2.—*Mr. Previté's mode of preserving bread for Ships, &c.*

We said nothing of Mr. Previté's prepared milk, because we did not think that its quality was very agreeable to the palate, in fact we doubt whether it be possible to evaporate milk to dryness without changing its properties; but of Mr. Previté's bread we can speak in the highest strain of encomium, from having made a breakfast off his regenerated rusk of November last, in preference to other fresh loaves and rolls on the table! The mode of preservation adopted is simply to drive off all the inherent moisture from the bread by a moderate heat, and hermetically seal it in tin boxes until required. It is then exposed to steam, to supply the natural moisture, and rebaked lightly and rapidly on the surface.

Without detracting in any way from the merit of Mr. PREVITÉ'S invention, we may mention, on the authority of Lieut. BRADDOCK, that the same principle has been long practised at Madras. In the parching land-winds in the interior, when bread becomes perfectly dry and hard during a march, the native cooks sprinkle it with water, and place it between two hot earthen pans over a fire; the steam penetrates, and softens the whole mass; the heat is then raised, sufficiently to rebake the surface. We do not know if the same simple plan prevails in Hindustan, but the hint is well worth the consideration of travellers in our hot winds by land or river.

3.—*Illustration of Herodotus' account of the mode of obtaining gold dust in the deserts of Kobi.*

In HEELEN'S Asiatic nations, vol. 1, we find the following remarks on this subject, commencing with an extract from Herodotus:

"There are other Indians living near the city Caspatyras and the country of Pactyca, (the city and territory of Cabul,) situated to the North of the rest of the Indian nations, resembling the Bactrians, their neighbours, in their manner of life. These are the most warlike of all the Indians, and the people who go to procure the gold. For in the neighbourhood of this nation is a sandy desert, in which are ants, less in size than dogs but larger than foxes, specimens of which are to be seen at the residence of the king of Persia, having been brought from that country. These creatures make themselves habitations under ground, throwing up the sand like the ants in Greece, which they nearly resemble in appearance. The sand, however, consists of gold-dust. To procure this the Indians make incursions into the desert, taking with them three camels, a male one on each

and a female in the centre, on which the rider sits, taking care to choose one which has recently foaled. When in this manner they come to the place where the ants are, the Indians fill their sacks with the sand, and ride back as fast as they can, the ants pursuing them, as the Persians say, by the scent; the female camel, eager to rejoin her young one, surpassing the others in speed and perseverance. It is thus, according to the Persians, that the Indians obtain the greater part of their gold; at the same time that the metal is also found, though in less quantities, in mines."

Herodotus has so accurately marked the situation of these auriferous deserts that it is impossible to be mistaken. The nation in whose neighbourhood they are situated "live near to Bactria and Pactyca, to the north of the other Indians," and consequently among the mountains of Little Thibet, or Little Bucharja; and the desert in their vicinity can be no other than that of Cobi, which is bounded by the mountains of the above countries.

There is no doubt that the account of the historian is applicable to this region. We have already remarked that the lofty chain of mountains which limit the desert, is rich in veins of gold; and not only the rivers which flow from it westward, through great Bucharja, but the desert-streams which run to the east and lose themselves in the sand, or in inland seas, all carry down a quantity of gold-sand. Besides, who knows not that the adjacent country of Thibet abounds in gold? Nor can we be surprised if, at the present day, the rivers in question should be less abundant than formerly in that metal, as must always be the case when it is not obtained by the process of mining, but washed down by a stream. As late, however, as the last century, gold-sand was imported from this country by the caravans travelling to Siberia; and under Peter the Great this gave occasion to abortive attempts to discover those supposed *El Dorados*, which were not without some beneficial results for the science of geography, though utterly unprofitable for the purposes of finance.

That these were not ants, but a larger species of animal, having a skin, is apparent not only from the account of Herodotus, but from that of Megasthenes in Arrian, (*India*, OP. p. 179,) who saw their skins, which he describes as being larger than those of foxes. The count Von Veltheim in his *Sammlung einiger Aufsätze*, vol. II, p. 268, etc., has started the ingenious idea that the skins of the foxes, (*Canis Corsak*, Linn.) found in great abundance in this country, were employed in the washing of gold, and which, as they burrow in the earth, may have given rise to the fable. Bold as this conjecture may appear, it deserves to be remarked, as it is in perfect agreement with what we know of the natural history of the country. The actual observation of fresh travellers can alone afford us a complete solution."

This idea of the skins of animals being used in the washing of the gold sand elucidates well the marvellous tale of the Grecian author. It is a common practice in Savoy to this day. Perhaps however the simple account published in the first volume of the present journal, page 16, of the mode employed by the Burmese in collecting the gold dust of the *Kyenduen* river by fixing the horns of a peculiar species of wild cow in the small streams coming from the hills, to entangle the gold dust in the velvet or hairy coat with which the young horns are enveloped, may throw some fresh light on the subject. The horns (Mr. Lane was informed, although himself rather incredulous) are sold with the gold dust and sand adhering to them for 12 or 13 *taels* a piece. Now may it not be very probable that in the gold streams to the north of Himalaya, whole fleeces of some small animal were employed for the same purpose, and were occasionally sold entire?

Meteorological Register, kept at the Assay Office, Calcutta, for the Month of April, 1834.

Days of the Month.	Barometer reduced to 32° Fahr.			Thermometer in the Air.			Depression of Mens. bulb Thermometer.			Hair Hygro-meter.		Rain. Inches.	Wind.		Weathers.		
	At 4 A.M.	At 8 A.M.	At 10 P.M.	At 5 A.M.	At 10 A.M.	At 4 P.M.	Max. by Reg. Ther.	At 4 P.M.	At 10 P.M.	At 10 A.M.	At 4 P.M.		Morning.	Noon.	Morning.	Noon.	Evening.
1	29.85	29.88	29.93	77.0	83.4	85.0	86.8	83.6	77.1	13.3	5.4	90	77	99	79	79	clear.
2	29.86	29.89	29.94	77.1	83.5	85.1	86.9	83.7	8.1	10.5	13.4	84	84	84	84	84	cloudy.
3	29.87	29.90	29.95	77.2	83.6	85.2	87.0	83.8	4.3	9.8	14.3	85	85	85	85	85	misty.
4	29.88	29.91	29.96	77.3	83.7	85.3	87.1	83.9	4.0	9.1	15.3	86	86	86	86	86	do
5	29.89	29.92	29.97	77.4	83.8	85.4	87.2	84.0	3.7	8.4	16.3	87	87	87	87	87	clear.
6	29.90	29.93	29.98	77.5	83.9	85.5	87.3	84.1	3.4	7.7	17.3	88	88	88	88	88	do
7	29.91	29.94	29.99	77.6	84.0	85.6	87.4	84.2	3.1	7.0	18.3	89	89	89	89	89	do
8	29.92	29.95	30.00	77.7	84.1	85.7	87.5	84.3	2.8	6.3	19.3	90	90	90	90	90	do
9	29.93	29.96	30.01	77.8	84.2	85.8	87.6	84.4	2.5	5.6	20.3	91	91	91	91	91	do
10	29.94	29.97	30.02	77.9	84.3	85.9	87.7	84.5	2.2	4.9	21.3	92	92	92	92	92	do
11	29.95	29.98	30.03	78.0	84.4	86.0	87.8	84.6	1.9	4.2	22.3	93	93	93	93	93	do
12	29.96	29.99	30.04	78.1	84.5	86.1	87.9	84.7	1.6	3.5	23.3	94	94	94	94	94	do
13	29.97	30.00	30.05	78.2	84.6	86.2	88.0	84.8	1.3	2.8	24.3	95	95	95	95	95	do
14	29.98	30.01	30.06	78.3	84.7	86.3	88.1	84.9	1.0	2.1	25.3	96	96	96	96	96	do
15	29.99	30.02	30.07	78.4	84.8	86.4	88.2	85.0	0.7	1.4	26.3	97	97	97	97	97	do
16	29.99	30.02	30.07	78.5	84.9	86.5	88.3	85.1	0.4	0.7	27.3	98	98	98	98	98	do
17	29.99	30.02	30.07	78.6	85.0	86.6	88.4	85.2	0.1	0.0	28.3	99	99	99	99	99	do
18	29.99	30.02	30.07	78.7	85.1	86.7	88.5	85.3	0.0	0.0	29.3	100	100	100	100	100	do
19	29.99	30.02	30.07	78.8	85.2	86.8	88.6	85.4	0.0	0.0	30.3	101	101	101	101	101	do
20	29.99	30.02	30.07	78.9	85.3	86.9	88.7	85.5	0.0	0.0	31.3	102	102	102	102	102	do
21	29.99	30.02	30.07	79.0	85.4	87.0	88.8	85.6	0.0	0.0	32.3	103	103	103	103	103	do
22	29.99	30.02	30.07	79.1	85.5	87.1	88.9	85.7	0.0	0.0	33.3	104	104	104	104	104	do
23	29.99	30.02	30.07	79.2	85.6	87.2	89.0	85.8	0.0	0.0	34.3	105	105	105	105	105	do
24	29.99	30.02	30.07	79.3	85.7	87.3	89.1	85.9	0.0	0.0	35.3	106	106	106	106	106	do
25	29.99	30.02	30.07	79.4	85.8	87.4	89.2	86.0	0.0	0.0	36.3	107	107	107	107	107	do
26	29.99	30.02	30.07	79.5	85.9	87.5	89.3	86.1	0.0	0.0	37.3	108	108	108	108	108	do
27	29.99	30.02	30.07	79.6	86.0	87.6	89.4	86.2	0.0	0.0	38.3	109	109	109	109	109	do
28	29.99	30.02	30.07	79.7	86.1	87.7	89.5	86.3	0.0	0.0	39.3	110	110	110	110	110	do
29	29.99	30.02	30.07	79.8	86.2	87.8	89.6	86.4	0.0	0.0	40.3	111	111	111	111	111	do
30	29.99	30.02	30.07	79.9	86.3	87.9	89.7	86.5	0.0	0.0	41.3	112	112	112	112	112	do
31	29.99	30.02	30.07	80.0	86.4	88.0	89.8	86.6	0.0	0.0	42.3	113	113	113	113	113	do
Mean, 26, 756	29.981	30.011	30.061	77.9	85.5	86.6	88.5	85.2	3.4	8.9	13.9	98.4	98.4	98.4	98.4	98.4	98.4

The instruments for 10 A. M. and 4 P. M. are suspended in the free air of the Laboratory, those for 5 A. M. and 10 P. M. in the south veranda of the Assay Office near the entrance. The register thermometer for extremes is also in the same veranda. A slight shock of an earthquake was felt in Calcutta and its neighbourhood on the 23rd inst. on the morning of the 31st ult.

drill sky - 4 squalls.

south.

77.6 2.30

4.9 98.4

13.9

8.9

80.2

85.2

94.6

93.2

80.2

80.2

80.2

80.2









# JOURNAL

OF

## THE ASIATIC SOCIETY.

No. 29.—May, 1834.

I.—*Translation of an Inscription in the Pali and Burma Languages on a stone slab from Ramávati, (Ramree Island,) in Arracan, presented to the Asiatic Society by H. Walter, Esq. C. S. as explained by Ratna Paula.*

The first line contains the name of the temple, the erection of which is commemorated, in the Burma character. (See Plate XV.)

KALIANÍ SINDOGI (the prosperous temple).

[Then follows in the Pali character and dialect of the Sanscrit the following aslōka.]

*Invocation to Buddha.*

Paramánanta-gyanassa varachákinda rájino,—gunáchintéya punnassa chirang dibbatú sásanam.

To the divine authority of infinite wisdom, of supreme majesty, and incomprehensible virtue, be glory for evermore.

[This is followed by an interpretation in Burmese, also written in the Pali character : after which come some more aslōkas, and a prose account of the purport of the record, which is then detailed at length in the common Burma language, forming the main portion of the inscription.]

Bikhú sanghéna ajjena séta náginda náména—rattha rájinda rajéna migasra punnamáyam,

Chhidra-champa-ráma-nétan sampaté jina chakkéta—Théra vassa padipéka pitakékovida théra

VIMALA'VANSÁ DEHAJA maharája gúru pámakhá Mahinda Pamukhaviya sállekhá vuttino pancha,

Patitthá pésum sásanam,—tisuna nésang ágantva imá símácha Kalianí samatá tehi théréhi chétiya pabaté tammé, tésu tésucha gámésu tathá kothápi símayú vansánu rakhaka tesáng.

Bhavo kula, putáto pathatá anusásani—samudda téla télangvá santá rakhaná sásanam.

Samá devácha rájano dibantu dhamma vādina, chandevá punna másiyam péhi-antu ásanyáka.

In concert with his assembly of priests the illustrious king of kings, Raja SETA NAGINDA\*, in the full moon of the month *Mrigashirā* (Feb.) in the year 2329† of the sacred or Jina era, having nominated the venerable priest, learned in the three volumes, VIMALA VANSA DHARJA, of illustrious family, chief Guru, and saint, after the manner of the holy Mahinda‡, and five eminent divines, established the Buddha religion throughout the country: three of these having come, founded the *kaliani* temple: as many villages as there were, so many *chaityas* did these guardians of mankind erect on the joyful hills.

May the dignified of men, stand fast in the holy precepts, unruffled like an ocean of oil, and with saints, rajas, and good *devas*, spreading illumination as the full moon, in multitudes attain freedom §.

*Burmese text.*

Four months after attainment of final emancipation by BUDDH, and after the dispersion and extermination of those who conformed not to the dictates of his shastras were complete, 500 *Arahanta*|| entered into a general conference on the remarkable sayings, maxims, and doings of BUDDH. From this time to the third general conference DASAKA SONAKA SIGGAVA, MOGGALIPUTTATISSATHER, and their successors, preserved the shastras in purity. In the third general conference, and in the 218th year of the annihilation of BUDDHA, when his doctrines and dogmas were established and become the rule and standard amongst his votaries, a certain minister, MOGGALIPUTTATISSATHER by name, in union with the votaries, companions, and guardians of the Arahant, employed appropriate instruments to circulate Buddhism amongst mankind. It was on this occasion first established in Ceylon, where it has been ever since maintained and preserved by MAHINDA SONATHER, ARITHA, TISSAATTA KALASUMANA, DIGHASUMANA, and by their respective successors to this day. In the country of *Suvarnabhūmi* (in Burmah called *Sathum*) it was first introduced in the 236th year of BUDDH annihilation by SONATHER and UTTARATHER, and has been preserved with purity

\* Lord of the white elephant, a translation of the Burmese Rájá's name *Simpyá myaskhén menturágl*. (See the same name correctly written in page 212).—Ed.

† In Páli, as in Sanscrit, the date is expressed in words: *chhidra*, *champa*, *rāma*, and *netra*, (*hole*, *a flower* of two kinds, *Ram*, and *eye*,) signifying respectively 9, 2, 3, and 2: (see page 3 of the present volume,) and forming invertedly the year 2329 of the Gautama era, which corresponds with A. D. 1785-6.—Ed.

‡ A Buddha saint, son of DHARMA ASOKA.

§ The Páli text was made out with the help of Hindu pandits; it may not be quite correctly rendered, though most of the words are readily convertible into Sanscrit.—Ed.

|| By Arhant is meant those who have achieved an entire conquest over their evil passions, without a possibility of these passions ever obtaining the predominance.

ever since by his successors. In the 1600th year, when the *Arahanta* became paramount in the country of *Pukkam*, and in the kingdom of *Arimaddana*, the sovereign thereof, ANOBATHACHO, in the greatness of his regard and esteem for the shastra, invited the learned from the country of *Sathum*, and planted it in his own dominions, which was done through the instrumentality of SONATHERA and UTTARATHER, and their disciples and survivors. Those who planted the shastras in *Pukkam* in union with the transcendently wise, as also with UTTARAJIVATHER (the guide of the king of *Pukam* country), the disciple of ARYAVANSAMATHER, who was the disciple of MAHÁKÁLATHER (of *Dassita*), in the year 1714, with the view of performing the púja of BUDDH, UTHARAJIVAMATHER and the rest went to and united with the followers and successors of MAHINDATHER and other great personages in Ceylon, and there engaged in religious exercises, and held discussions on the shastras; he felt great pleasure in finding the shastras pure and unalloyed, went to the temple in a body with them, and engaged in holy exercises. His disciple CHHAPADASÁMANE was on this occasion ordained a minister, and accordingly began to study the shastras with intensity in Ceylon, and in due course was promoted in ministerial rank, and installed one of the paramount ministers. In the year 1724, and in the reign of NARAPATICHESU, he uniting with SIVALITHERA of *Temulitte* village, TAMALINDATHER of *Kamboja*, ANANDATHER of *Kingchipura*, RAHULATHER of *Ceylon*, all unusually versant in the shastras, which they had wholly committed to memory, they came to *Pukam* country, where since the introduction of the shastras, as above stated, to the year 2314, the shastras were maintained and preserved by MAHINDATHER, SONATHER, and UTTARATHER, and their survivors and successors. After the death of his spiritual guide, VICHITTA LANKARA SAMME began to study the volumes called *Nayattika*, *Gandhara*, and *Abhidhamapitakat* (metaphysics) under the guidance of DHAMMAVILAMAHARAJAGURU. It happened that in the Burmese year 1132, and in the reign of CHHANGPRURHANG, he entered a society called *Suddarma*, and standing before the highest minister, addressed him thus: "I am your follower, and in order to have myself confirmed in the career in which I have started, I would choose you as my chief spiritual guide," and turning himself to MAHA SRISADDHAPPAVARACHEHARATO and BUDDHARAKKHITA MAHASAMICHARATO (who was the superior minister of the temple of the *Pukam* country), he besought them to become his secondary guides.

It happened in the 100th year, that in the country of *Vesali*, the ministers who had come there from *Vajji*, made ten several additions to the shastras, and which were in full prevalence, thus endangering the orthodoxy of the shastras.

In the reign of MAHAMANYGOLARHVE BHUNGÁTHOP KRIDAYAKA MANGTARA, in the year 2323, certain unholy priests violated the laws of the holy BUDDH by inventing in the Pali language ten heterodox doctrines of their own, and substituting them in the stead of the dictates of BUDDH. It was amongst other things directed, that a piece of yellow cloth of four cubits long and one span in breadth, tied around the breast, should form the only raiment of priests—a doctrine to which they gave all the force of their own example. These inconsistencies made the monarch anxious to exhibit and elucidate to all his subjects, both foreigners and aborigines, the laity and the priesthood, the true shastras with commentaries: he therefore convened a general meeting, where those versed in shastrical lore, by long discussion and close scrutiny, came to the conclusion that the use of the yellow cloth in the manner stated was a violation of the shastras, and that priests should roll part of their cloth, and pass it under their arms; when it was also enjoined that the uninitiated priests should study *Sekhiyavatha*, (a volume which regulates dress and ceremonies,) and correct by its dictates their system of mendicancy, habiliments, and general demeanour. Many holy volumes, teeming with sapient comments, were brought to demonstrate the inconsistency of the practices prevalent, which could not be gainsaid or counteracted by the advocates of the new system, who formed a class living by themselves in the village of *Dum*.

Another general conference was held, in which presided MAHAYASA. There was a class of priests called *Chhabbaggi*, who used to practise ten several kinds of inconsistencies, when in the year 2326, it was determined and ascertained that the practice was founded on tradition, and not in the shastras. CHHANGPRU MRAHSAKHANG MANG TARAH KRI, the king of *Amarapura*, to whom were subject several tributary rajahs, being displeased at the perversion, he by the power he was invested with by the institutions of Heaven, as well as by those of the laws of his own kingdom, suppressed unholiness, and amongst the rest destroyed the evil practices alluded to, and what was impure he filtered into refinement, so that the conduct and holy exercises of the priests were brought to concord and harmony, and those who followed wrong dogmas, or their own whims, were brought within the pale of orthodoxy.

In fine like SRIDHAMMASOKA, king of the world, he directed the circulation and establishment of the shastras in all accessible countries. Having heard that the shastras were made light of in a country called *Mahavisa*, he took possession of it, and brought and charmed away thence the statue of MAHAMUNI, and deposited it in a temple decorated with gems.

In Brother CHANGPRURHANG's reign, VICHITTA LANKARA being ex-

traordinarily versed in shastrical learning, the sovereign invested him with the joint office of *Vimala vansa-dhaja-maharaja guru*, and the presidency of the five several religious denominations; and they are as follow: *Punyavanasaparama maharaja Gurucharato*, *Munindasridhaja maharaja Gurucharato*, *Chandamedhabhidhara maharaja Gurucharato*, *Paramasri-dhaja maharaja Gurucharato*.

After a consultation between the king and the priests of the country, it was determinèd upon, that some should be employed in extending and circulating the shastras beyond the limits to which they were confined. To this end those who had the shastras by heart started in the year Sakkaraj 1148 (A. D. 1786), with a view to plant and introduce it in *Rammavati*, in the island of *Yanbya Kvyan*, accompanied by a numerous retinue and attendants to answer every purpose. But before the conveyers of the holy word arrived at the destined place, they were escorted with honor thither by (the governor) *NARASAMANKVYO*, the general *CHICKAYRAY KHONGSIHA KVYO CHVA*, &c. *CHIKSIHANAKHANGNAT MHANG TAKNGORALHAKYOTAN*, and the chief secretary *CHARE KRIVERASUNGORASU MIUNG*, and other chiefs of the country, who introduced the body composing the mission into the country. So great was the effect produced by their arrival, that from the 5th day of *Tabadou*, (February,) to the end of the month, the very flower of the country were ordained priests of different degrees in the great temple called *Mahavihara*.

In the full-moon of *Tabongla*, (March,) a temple called *Kalyani simtokri*, was duly consecrated; in short, the various parts and villages of the island abounded with temples and pagodas, which were on this occasion built and consecrated. They also fixed the holy shastras in *Dváravati* and *Meghávati\**, and brought into operation the holy institutions, so that the very government and all its members, with the subjects of the island, heard with attention the three several classes of holy science, read, expounded, and proclaimed, in which they were eventually established. Thus holiness was attained, ministers of different ranks and degrees commenced the study of the shastras, so that the very island shone with yellow robes, characteristic of the prayers of holiness. During this state of things, it was earnestly prayed by all the zealous, that the unholy should separate and divide themselves from the righteous within 5000 years, and that the excellent of the land with their votaries may shine and prosper, in order that they may at last obtain that most transcendent of all bliss, *Nirbhan*, (final emancipation.)

\* *Sandoway* and *Cheduba*, according to Mr. WALTER'S free translation of the same inscription, which has reached us too late to be otherwise available than for general comparison with *Ratna Paula's* version.—ED.

II.—*Translation of an Inscription in the Pāli character and Burmese Language, on a stone at Buddh Gya, in Behar. Plate XVI.*

When the Burmese ambassador MENGY MAHA CHESU and his suite were on their way to the Upper Provinces, to visit the Governor General; they took the opportunity of paying their devotions at the celebrated Buddhist temple near Gya. There, as usual making notes of every occurrence, they took copies of an ancient inscription in the Pāli character, discovered by them, in a half-buried situation near the *Maha Bodhi gāch* or sacred pipal tree, on the terrace of the temple. A copy of their manuscript having come into RATNA PAULA'S hands, he has obliged me by lithographing the text, as a sequel to the more lengthy inscription from Ramree in the present number.

It will be remarked that there is a near coincidence in the names of the kings of Ava, alluded to in the two inscriptions; although an interval of more than 500 years separates the two in date: this can only be cleared up by a better knowledge of the history of the country, than we now possess. In the Burmese chronological table, published in Crawford's Embassy, SATO-MANG-BYA (probably the same as *Sado-meng*) only founded Angwa or Ava in the Sakkaraj year 726. In 667-8, TACHI-SHANG-SI-HA-SU reigned in *Panya*: his grand-son founded and reigned in *Chit-gaing*.

At page 111, Lieut. BURT refers to an unintelligible inscription at Gya, mentioned by Mr. HARRINGTON; but that contained only one line, and was in a different locality. The present inscription seems therefore to have escaped attention up to the present moment: it is now recorded as furnishing an authentic note of the construction of the *Buddha Gya* monument in the year 1305 A. D.; for it may be presumed that the previous Chaityas and Buddhist structures had been long before levelled with the ground, and the inscription states, that previous missions to reconstruct the edifice had been unsuccessful. As proving that this spot is held in peculiar veneration by the Burmese, it may be remembered that in 1823, a deputation of Buddha priests was sent from Amarapura, by the Burman emperor, to perform the obsequies of his predecessor, recently deceased, at the shrine of Buddha Gya.

*Translation.*

"This is one of the 84,000 shrines erected by SRI DHARM ASOKA, ruler of the world (*Jambodwip*), at the end of the 218th year of Buddha annihilation, (B. C. 326,) upon the holy spot in which BHAGAVAN (Buddha) tasted milk and honey (*madhupayasa*;) In lapse of time, having fallen into disrepair, it was rebuilt by a priest named NAIK-MAHANTA. Again, being ruined, it was restored by Raja SADO-MANG. After a long interval it was once more demolished, when Raja SEMPYU-

SAKHEN-TARA-MENGI appointed his *gúru* SRI-DHAMMA RAJA-GUNA to superintend the building. He proceeded to the spot with his disciple, SRI KÁSYAPA, but they were unable to complete it, although aided in every way by the Raja. Afterwards VARADASI-NAIK-THERA petitioned the Raja to undertake it, to which he readily assented, commissioning prince PYUTASING to the work, who again deputed the younger PYUSA-KHENG, and his minister RATHA, to cross over and repair the sacred building. It was thus constructed a fourth time, and finished on Friday the 10th day of *Pyadola*, in the Sakkaraj year 667 (A. D. 1305). On Sunday the 8th of *Tachhaon-mungla*, 668 (A. D. 1306), it was consecrated with splendid ceremonies and offerings of food, perfumes, banners, and lamps, and *púja* of the famous ornamented tree called *calpa-vriksha*: and the poor (two?) were treated with charity, as the Raja's own children? Thus was completed this meritorious act, which will produce eternal reward and virtuous fruits. May the founders endure in fame, enjoy the tranquillity of *Nirbhan*, and become *Arahanta* on the advent of ARYA MAITRI (the future Buddha)."

III.—*Classification of the Néwárs, or Aborigines of Népal Proper, preceded by the most authoritative Legend relative to the Origin and Early History of the Race.*

The *Swoyambhú Púrána* relates in substance as follows: That formerly the valley of Népal was of circular form, and full of very deep water, and that the mountains confining it were clothed with the densest forests, giving shelter to numberless birds and beasts. Countless water-fowl rejoiced in the waters. The name of the lake was *Nága Vása*; it was beautiful as the Lake of Indra; south of the *Hemáchal*, the residence of *KARKÓTAKA*, prince of the *Nágas*; seven *cos* long, and as many broad. In the lake were many sorts of water-plants; but not the lotos. After a time, *VIPASYI BUDDHA* arrived, with very many disciples and *Bhikshús*, from *Vindúmati Nagar*, in *Madhya Désa*, at the Lake of *Nága Vása*, in the course of his customary religious peregrinations. *VIPASYI*, having thrice circumambulated the lake, seated himself in the N. W. (*Váyúkona*) side of it, and, having repeated several mantras over the root of a lotos, he threw it into the water, exclaiming, "What time this root shall produce a flower, then, from out of the flower, *Swoyambhu*, the Lord of *Aknishtha Bhavana*, shall be revealed in the form of flame; and then shall the lake become a cultivated and populous country." Having repeated these words, *VIPASYI* departed. Long after the date of this prophecy, it was fulfilled according to the letter.

After *VIPASYI BUDDHA*, came *SIKHI BUDDHA* to *Nága Vása* with a great company of respectful followers, composed of *rajas* and persons of the four

castes (chatúr varana). SIKHI, so soon as he beheld JYOTI-RUP-SWOYAMBHU, offered to him many laudatory forms of prayer : then rising, he thrice walked round Nága Vása, and, having done so, thus addressed his disciples : " This place shall hereafter, by the blessing of SWOYAMBHU, become a delightful abode to those who shall resort to it from all quarters to dwell in it, and a sweet place of sojourn for the pilgrim and passenger : my apotheosis is now near at hand, do you all take your leave of me and depart to your own country." So saying SIKHI threw himself into the waters of Nága Vása, grasping in his hands the stalk of the lotos, and his soul was absorbed into the essence of SWOYAMBHU. Many of his disciples, following their master, threw themselves in the lake, and were absorbed into SWOYAMBHU, (i. e. the self-existent ;) the rest returned home. VISWABHU was the third Buddha who visited Nága Vása. VISWABHU was born in Anúpama-puri-nagar, of Madhya désa, (in the Trita yuga ;) his life was devoted to benefitting his fellow-creatures. His visit to Népal was long after that of SIKHI, and, like SIKHI, he brought with him a great many disciples and Bhikshas, Rajas and cultivators, natives of his own land. Having repeated the praises of SWOYAMBHU-JYOTI-RUPA he observed. " In this lake Prajnásurúpa-Guhyéswari will be produced. A Bodhisatwa will, in time, make her manifest out of the waters : and this place, through the blessing of SWOYAMBHU, will become replete with villages, towns, and tirthas, and inhabitants of various and diverse tribes." Having thus prophesied he thrice circumambulated the lake and returned to his native country. The Bodhisatwa above alluded to is MANJU SRI, whose native place is very far off, towards the north, and is called Pancha Sirsha Parvata, [which is situated in Maha China Dés\*.] One day in the Trita yuga, and immediately after the coming of VISWABHU Buddha to Nága Vása, MANJU SRI, meditating upon what was passing in the world, discovered by means of his divine science that SWOYAMBHU-JYOTI-RUPA, that is, the self-existent, in the form of flame, was revealed out of a lotos in the Lake of Nága Vása. Again, he reflected within himself : " Let me behold that sacred spot, and my name will long be celebrated in the world ; and on the instant, collecting together his disciples, comprising a multitude of the peasantry of the land, and a Raja named DHARMAKAR, he assumed the form of VISWAKARMA, and with his two Dévis (wives,) and the persons above-mentioned, set out upon the long journey from Sirsha Parvata to Nága Vása. There having arrived, and having made púja to the self-existent, he began to circumambulate the lake, beseeching all the while the aid of SWOYAMBHU in prayer. In the second circuit, when he had reached the central barrier mountain on the south, he

\* The bracketed portions are from the commentators.

became satisfied that that was the best place whereat to draw off the waters of the lake. Immediately he struck the mountain with his scimitar, when the sundered rock gave passage to the waters, and the bottom of the lake became dry. He then descended from the mountain, and began to walk about the valley in all directions. As he approached Guhyéswari\*, he beheld the water bubbling up violently from the spot, and betook himself with pious zeal to the task of stopping it. No sooner had he commenced than the ebullition of the water became less violent, when, leaving bare only the flower of the lotos, the root of which was the abode of Guhyéswari, he erected a protecting structure of stone and brick over the recumbent stalk, and called the structure, which rose into a considerable elevation as it neared the flower of the lotos, *Satya Giri*. This work completed, MANJU SRI began to look about him in search of a fit place of residence, and at length constructed for that purpose a small hill, to which he gave the name of MANJU SRI Parbata, (the western half of the little hill of Sambhú Nath,) and called the desiccated valley, *Népalá*—*Né* signifying the sender (to paradise), who is SWOYAMBHU; and *pála*, cherished, implying that the protecting genius of the valley was SWOYAMBHU or ADHI BUDDHA. Thus the valley got the name of Népalá: and, since very many persons had come from Mount Sirsha [or China] with MANJU SRI, for the residence of DHARMAKAR Raja and his suite, MANJU constructed a large place of abode, half way between Mount Swoyambhu and Guhyéswari, and named it after himself, *Manja Pattana*, and established therein DHARMAKAR [of Maha China], as Raja, subjecting the whole of the inferior sort of people who came from Sirsha Parbata to DHARMAKAR'S rule, and providing abodes for them in the city of Manja Pattana.

Thus was Népal peopled: the first inhabitants of which came all from Mount Sirsha [which is in Maha China], and thus the valley got the name of Népalá, and its inhabitants that of Népalí, [whose primitive language was Chinese.] [This language in course of time came to be much altered by the immigration of people from Madhya désa, and by the necessary progress of corruption and change in a new country,

\* The site of the temple is near the centre of the valley, on the skirts of the lovely grove of Pasupati; and above 2½ or 3 miles east from mount Sambhu. The fable says, that the root of the lotos of Guhyéswari was at the former place, and the flower at the latter; the recumbent stalk being extended throughout the interval between them. SWOYAMBHU or ADHI BUDDHA is supposed to reside in the flower, in the form of flame; PRAJANA PARAMITA of GUHYESWARI, in or at the root, in the form of water.

till a new language arose in Népal by the natural course of things. The primitive inhabitants of Népal were all of one caste, or had no caste. But their descendants, in the course of time, became divided into many castes, according to the trades and professions which they followed; and of these, such as abandoned the world and shaved their heads, became Bhikshu, Sramana, Chailuka, and Arhana, and took up their abode in forests or in monasteries. The latter four orders are all ascetical; and in strictness absolutely excluded from all worldly commerce. But should any of them, still retaining the custom of tonsure, become worldly men, such are called Srávaka, &c. to a great extent of diverse\*names]. MANJU SRI, having by such deeds as these acquired the highest celebrity in Népal, ostensibly, and for the instruction of the people, relinquished his mortal form, and became *nirván*; but, in truth, departed for Mount Sirsha with his two Dévis, and in due course arrived at Pancha Sirsha Parvata. Some time after the disappearance of MANJU SRI [in the Trita yúg] KARKUTSANDBUDDHA came to Népal, with some Bhikshukas, DHARMAPALA Raja, and a multitude of the common people, from Kshémávati nagar, of Madhya désa. The beauty of the country delighted him, and he remarked that in such a land the cultivator must be sure to reap as he sowed. He paid his devotions to SWOYAMBHU, and then launched out in praise of the merits of MANJU SRI the Nipálese patriarch. Afterwards, he performed púja to Guhyésvari, and then ascended Sankhocha mountain (Siva Púra): the prospect of the valley from that mount filled him with fresh delight, and he again celebrated the excellence of the country. GUNADHVAJA, a Brahman, and ABHAYANDADA, a Kshetriya, and others of the four castes (chatúr varana), respectful followers of KURKUT SAND, here solicited at his hands the favour of being made Bhikshukas, in order that they might remain in this happy land, and by the worship of SWOYAMBHU attain to high merit and honour. KURKUT cheerfully complied, and agreed to make a great many of the company Bhikshukas; and since the mountain top afforded no water for that ceremony, he by his divine power caused a spring to issue from the rock, and with its waters gave to his followers the requisite Abhishéka or baptism. He called the river that originated with this spring Vángmati; and then related to his followers both the past and future history of the valley watered by the Vángmati. Then, having left behind him at Népal, Raja DHARMAPÁL and some Bhikshus and common folks, who had come with him, and desired to stay, KURKUT SAND departed with the rest of them to his native city of Kshémávati. These companions of KURKUT SAND, or KRAKUCCHAND, were the first natives of the plains of India (Madhya-désa) who remained in Népal. Many of them, addicting themselves to the

business of the world, became householders and the founders of several towns and villages in Népal; whilst others, who adopted the ascetical profession, dwelt in the forests and Vihárs. When these Madhyadésiyas had become numerous in Népal, they and their descendants were confounded with the former or northern colonists under the common appellation of Népáli and Névári; being only separated and contradistinguished by the several trades and professions which they hereditarily practised. Thus, in the early ages, Népal had four classes of secular people, as Brahman, Kshatriya, Vaisya, and Sudra, and four ascetical classes, namely, Bhikshu, Sramana, Chailaka, and Arhanta, dwelling in forests and monasteries; and all were *Buddh-márgi*.

*Account of Dharmákar Raja and Dharmapál Raja.*

DHARMAKAR, the before noted Chinese prince of Népal, being disgusted with the world, abandoned his sovereign power, and placed *Dharmapál*, the Raja of Gour-dés, already mentioned, upon his throne. *Dharmapál* governed his subjects with perfect justice and clemency, and made puja at the Chaitya erected by DHARMAKAR, and regarded with equal favour his subjects that came from Mount Sirsha [or Maha China], and those who emigrated from Madhya-dés.

*Account of Prachanda Deva.*—PRACHANDA DEVA, a Raja of Gour-dés, (which is adjacent to Madhya-dés,) and of the Kshetriya tribe, was the wise man of his age and country. At length, being inspired with the ambition of becoming *nirvan*, he abandoned his princely sway; and taking with him a few sages, he began to wander over various countries, visiting all the shrines and pilgrimages, and in the course of his peregrinations arrived at Népal. He was delighted with the beauty of the country, and having visited every *tirtha*, and *pith*, and *devata*, and having made puja to the *Tri Ratna*, or triad, he went to the temple of SWOYAMBHU, and there performed his devotions. He then ascended MANJU SRI Parvat, and offered his prayers to MANJU SRI, and finished by becoming a disciple of GUNAKAR BHIKSU, a follower of MANJU SRI. One day PRACHANDA DEVA so delighted GUNAKAR with the display of his excellent qualities, that GUNAKAR made him a Bhikshuka, and the said Raja PRACHANDA after becoming a Bhikshu obtained the titular appellation of SANTA SRI. A great many Brahmans and others who accompanied PRACHANDA to Népal received the tonsure, and became Bhikshus at the same time with PRACHANDA, and took up their abode in the monasteries of Népal. Some others of those that came with PRACHANDA to Népal, preferring the pursuits of the world, continued to exercise them in Né-

‡ From *Vach*, speech.

pál, where they also remained and became Buddhists. A third portion of PRACHANDA'S companions returned to Gour-dés. After a time, SANTA SRI represented to his GÚRÚ GU'NAKAR his desire to protect the sacred flame of SWOYAMBHU with a covering structure. GU'NAKAR was charmed with the proposition and proposer, and having purified him with 13 sprinklings of sacred water (*trayodas abhiséka*), gave him the title of Dikshita Santikar Vajra Acharya. [From these transactions is dated the arrival of the people of Gour-dés at Népál, and their becoming Buddhists.]

*Account of Kanaka Muni.*—Once on a time, from Súbhávati-nagar of Madhya-dés, KANAKA MUNI BUDDHA, with many disciples, some illustrious persons, and a countless multitude of common people, arrived at Népál, in the course of his religious peregrinations, and spent some months in the worship of SWOYAMBHU, and the Tri Ratna, and then departed with most of his attendants. A few remained at Népál, became Buddh-márgi and worshippers of SWOYAMBHU; [and these too, like all the preceding, soon lost their name and character as Madhya-désiyas, and were blended with the Népáli or Névári race.]

*Account of Káshyapa Buddha.*—Once on a time, in Mrigadába-vana, near Benares, KÁSHYAPA BUDDHA was born. He visited Népál in pilgrimage, and made his devotions to Sambhu-nath. [Most of the people who came with him staid in Népál, and soon became confounded with the aborigines.]

*Account of Sákya Sinha Buddha.*—Some time after KÁSHYAPA'S visit, in the beginning of Kali yuga,] on the shores of Ganga Ságara, in the sthan of KAPILA MUNI, and city of Kapila-vasta, and reign of SADHÓDANA Raja, of the Sákya vansa, was born (as the son of that Raja) SARVARTHA SIDDHA, who afterwards became a Buddha with the name of SÁKYA SINHA. SÁKYA, with 1350 Bhikshukas, and the Raja of Benares, several counsellors of state, and a crowd of peasantry of that kingdom, set out on the pilgrimage to Népál. Having paid his devotions to the self-existent, in the form of flame, he went to the Chaitya on Púchhagra Hill, and repeated to his disciples the past history of Népál, as well as its whole future history, with many praises of MANJU SRI BODHI SATWA: he then observed, "In all the world are 24 *Piths*, and of all these that of Népál is the best." Having so said, he departed. His companions, who were of the Chatur varana, or four castes, [Brahman, Kshetriya, Vaisya, and Súdra,] and belonged to the four orders, [Bhikshu, and Sramana, and Chailaka, and Arhanta,] being much pleased with Népál dés, continued to dwell in it; [and in course of time were blended with the aboriginal Népális, and became divided into several castes, according to the avocations which they hereditarily pursued.]

Some time after the date of the above transaction, Raja GUNAKAMA DEVA, prince of Cathmandú, a principal city of Népal, became the disciple of the above-mentioned Sántikar Vajra Achárya. GU'N KÁM DEVA, with the aid derived from the divine merits of Sántikar, brought the Nág Raja KARKU'TAKA out of the lake or tank of Adhár, and conveyed him to Sántipúr with much ceremony and many religious rites. The *cause* of this act was that for many previous years there had been a deficiency of rain, whereby the people had been grievously distressed with famine; and its *consequence* was, an ample supply of rain, and the return of the usual fertility of the earth and plenty of food.

Subsequently, SRI NARENDRA DEVA became Raja of Bhagat-pattan; (or Bhatgaon); he was the disciple of BANDUDATTA ACHÁRYA, and brought ARYAVALOKITESWARA (Padma Páni) from Pátalakáparvat (in Assam) to the city of Lalita pattan in Népal. The reason of inviting this divinity to Népal was a drought of 12 years' duration, and of the greatest severity. The measure was attended with like happy results, as in the case of conveying the NAG Raja with so much honour to Sántipúr.

[The classification will be given in an ensuing number.]

IV.—*Further Account of the Remains of an ancient Town, discovered at Behat, near Seháránpur. By P. T. Cautley, Art. Supt. Doab Canal.*

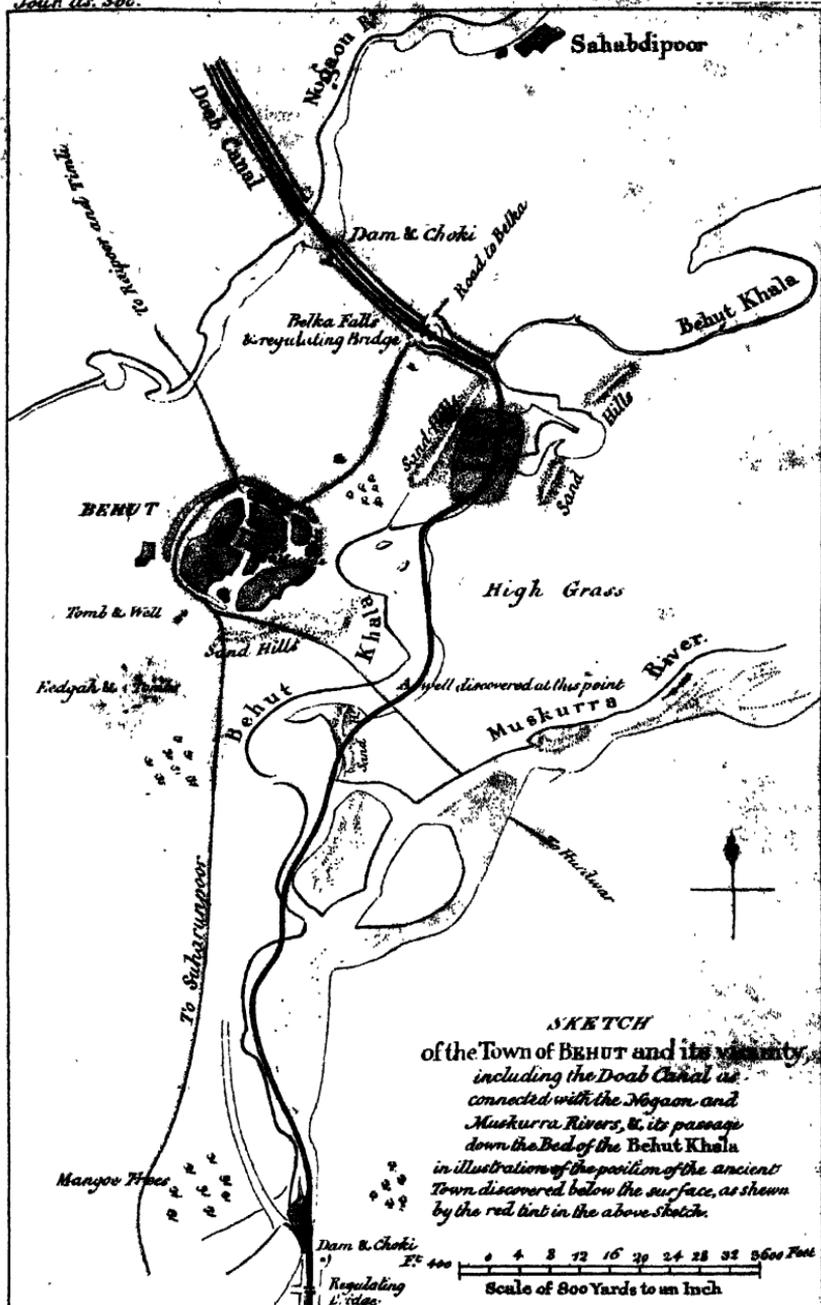
[In a letter to the Secretary, read at the Meeting of the 30th April.]

With more coins and other articles that have been found in our Herculaneum, I have now the pleasure of sending a sketch of the country in the neighbourhood of Behat, which will be more descriptive of the ancient town, with the size and extent of the mountain torrents in its vicinity, than any explanation that I could give in writing: the total absence moreover of any tradition of its having existed, and the little information to be gained from natives on subjects of this nature, unless coming under their immediate observation, places me in dependence solely on the few notes that I have by me, which I fear are hardly worthy of the notice of the Society.

Tradition, but even that of the vaguest description, carries us back to the reign of SHAH JEHAN, as well as to that of MUHAMMED SHAH and his successors at the dissolution of the empire. SHAH JEHAN built a palace or hunting seat at the foot of the lower range of hills on a branch of the Jumna river, about 14 miles north of Behat: this place which consists of a main quadrangle of 800 feet square, with numerous buildings and minor courts attached, is now in perfect ruin, the superstructure only remaining in a few places, and that entangled and held together by arms and roots of the Bur

(*Ficus Indica*) and other jungle trees; at Raipūr, Nyashahr, Fyzabad, and other places between Behat and this palace are remains of the same period in mosques, tombs, &c. and the forests in the neighbourhood contain marks of a more extended cultivation, and of a country more thickly inhabited than it is at present; it may be fairly presumed that all the Musulman buildings now in existence here are dependent on a period posterior to the middle of the 17th century. Behat itself contains a mosque and tomb near it, with only one brick house or enclosure, but a number of pukka wells, and is said to have been a large town at the period alluded to; but the ruins and tombs pointed out as the remains of this era are south of the present town, and in quite a different direction to the antiquities that have been now discovered.

To a person at all acquainted with the strange revolutions that take place on the surface, in the proximity of these mountain torrents provincially termed *rows*, the mere change of the river's course, or an extensive deposit of sand on a wide surface, thereby laying waste large tracts of cultivable soil, would not be at all surprising: such changes are in constant progress, and things of annual occurrence! The course of the Nogaon row, as shewn in the map, has been so altered within the last half century, agreeably to the information of a respectable zemindar, or landholder who resides at Behat, that the features of the country are perfectly changed since his childhood: he mentions (a circumstance borne out by my excavations) that in his recollection, "all the country between the two rivers through which the present canal runs, and on which the Belka falls are now constructed, was a low clay soil (*dhaka*), with rice cultivation; that this tract now is raised five hat'hs by a deposit of sand, caused by one very severe rainy season, in which the present town of Behat was in jeopardy;" this exactly corresponds with the canal excavations, the superficial 5 to 7 feet of which was sand, reposing on a reddish sandy clay, the section at the point where the ancient town is buried shews the same deposit of  $4\frac{1}{2}$  feet with the same sub-stratum of clay! The Behat khala or ravine opening out into the Muskura river is said to have been much enlarged by the ancient canal, when great mischief was done to the neighbourhood; referring to the last attempt at making use of this line as a canal by the Rohilla ЗАВИТНА KHAN, who has the credit of having carried water to the town of Jelalabad and his fortified camp Gousgurh. I take the liberty of referring you to the strange tortuous outline of this ravine, of which the map gives a faithful representation, (Pl. xvii.) as near this ravine lies the old Town at a depth of 17 feet from the surface, with a super deposit of  $12\frac{1}{2}$  feet of a reddish sandy clay.





The fall or difference in level between the bed of the Nogaon and that of the Muskura river, at the point where the khala joins it, was previous to the present canal works being constructed about 21 feet, on a line with all its tortuosities not exceeding threemiles! Now it would be supposed that had the canal formerly passed over this line, without masonry or other works to protect it from erosion, the wear and tear of such a rapid would in a very short space of time have connected the Nogaon with the Muskura, and thrown all the waters of the former down the latter's channel. It is perfectly evident, that this did not take place, for such an event must, when once established, have remained; a point which almost ensures one of two surmises;—either that the ancient canal never was opened, or kept open for any length of time; or that works were constructed in this neighbourhood. These works might have been at the spot where these antiquities have been found: such was my idea on the discoveries being laid open, and such was the impression under which I visited the spot after it had been pointed out to me, and I must confess that the reasons were so strong in favor of this being the mere ruin of old canal works, that I was considerably biased in favor of the supposition, that at this spot had been the descent or fall by which the difference of level had been accomplished. On examination however, this idea was completely annulled, for the distinct stratum of black soil, filled with bits of pot and bone so exactly corresponding with the sites of ancient villages now existing on the surface, and this stratum extending for a continuance, placed the matter in a far different light, completely laying aside the possibility of this either having been the remains of a canal work, or with reference to the coins, &c. the probability of its being a mere deposit caused by transportation. There is not a doubt on my mind of this being a town submerged, the reasons and causes of which may be ascribed not only to the proximity of rows, but to the effects of winds; in short the filling in of a hollow. But when this happened, or what were the features of the country's surface at the period previous to this taking place, may well remain an enigma; for looking around us at the present day, we find the position of towns and villages invariably fixed either on the highest spots or on the slopes of valleys! Now, was this town at the period of its existence high or even partially so, with reference to the surrounding country, to what date can we possibly look to its existence? And how picture to ourselves the face of the neighbouring country? There is no doubt however that this town is of great antiquity, and to those conversant in these matters, and I cannot refer myself to one more so than yourself, a

door may be opened, from the great number of coins that have been found, to fix the probable date, when this town was inhabited.

The level of the country does not exhibit any distinct basin or hollow; but, taking a line from the Nogaon river at the dam over the site to the Muskura, one continuous slope will be found, with indentations at each of the rivers; the proximity of the lines of sandhills and their directions might lead to speculations; but these are just as well avoided; for if, as we must allow, (from finding shingle and old beds of rivers many feet below the present surface,) the present surface has been considerably raised, we have with the agency of these mountain streams, and the soil acted on by winds, data sufficient to shew that the inhumation of a city, or whatever was at the spot in question, was nothing at all extraordinary.

It may be interesting, with reference to the constant change of surface in this region, to mention, that when engaged in constructing a bridge at the village of Gandewar, about two miles higher up the canal than the Nogaon row, the difficulty of obtaining water for the works was such, that I was induced to sink a shaft in the canal bed. The well was sunk 30 feet to water, the upper 20 feet was through the reddish sandy clay above-mentioned, below which was shingle or boulders exactly resembling those found now in the beds of all these rivers: through 10 feet of this shingle water was found. This nearly corresponds with the bed of shingle now laid bare south of the Belka Falls, and amongst which the coin, &c. have been found, and I have no doubt that it is all part of an extensive line formerly the bed of the escapes from the lower mountains. If this is true, it goes far to prove a circumstance that I before mentioned in a communication to the Society, that the enormous discharge of matter from the debouchements of these lower hills is, in the reduction of themselves, gradually giving a rise to the whole country skirting their bases! I may also mention, that near a village named Jytpúr, three miles south of the Kalowala Pass, (at which pass water is within 10 inches of the surface,) I sunk a well for the reasons aforesaid 60 feet deep through a succession of beds of shingle, and left off, finding no water! At a place six miles south of this again, water is within eight feet of the the surface. This phenomenon extends apparently on the whole line between the Jumna and Ganges, that is to say, water is near the surface at the foot of the hills, and shews itself again near the surface about 10 miles south, being in the intermediate distance at a great depth. In building the masonry dam on the Nogaon river, water was found at a depth of 29 feet from the bed of the row; the excavation through beds of sand and clay, but no shingle. The only mark of building which has

been as yet found on this site is the remains of a foundation, the greater parts of which had been cleared out and broken by the canal: the bricks were soft and friable. This foundation was sunk about four feet in the black soil, terminating on its surface; the great quantity of bricks however scattered in the canal bed proves distinctly that many more foundations had been cleared out, and it is possible that when I have time to sink wells in neighbouring points, so as to detect the boundaries of these ruins, I may bring to light matters of greater interest than those even now before us. The bricks discovered are of a large size, and generally speaking, badly burned, (similar to some that were found on a former occasion at Manukmow, near Sehāranpūr, where a quantity of old foundations were discovered, consisting entirely of the same sized bricks :) a number of them wedge-shaped  $\approx$   $\frac{9 \text{ inches}}{6 \text{ inches}}$  as if intended for well building, and better burned than the square ones. Amongst the fragments of pots, were some which the natives recognised as resembling those now used in making indigo, long elliptical vessels! the fragments of pots, bones, teeth, and articles of this description are in abundance. In sinking three wells on the west of the canal near the spot; the same section of soil appeared, and the same articles were discovered on reaching the black stratum. I look forward with great interest to the time when I can have leisure to make further excavations in the neighbourhood, enabling me to form an idea of the extent of the discovery.

At a spot considerably south (marked A in the map) a large pukka well was also exposed in the canal channel. I had this cleared out and partly removed, supposing that there was a probability of making further discoveries. I send to the Society an article (either lead or pewter)\* which was the only thing of metal found: a great quantity of *gharas* or water pots were taken out whole, as if they had fallen into the well and sunk; the bones also of two deer (barasinghas), the horns broken in pieces, but the jaw bones and other parts tolerably perfect: from the circumstance of finding so many *gharras* the natives seem to conclude that this was a town or village well, and not that in use for irrigation. If the ancient town extended to this point, it would be extensive indeed, but of this there does not appear to be any probability.

The presence of the deer's bones is easily accounted for, as a number of these, as well as other wild animals, are constantly lost in galloping over the jungles, and falling into deserted wells. The well in question was doubtless one of this description, for a long time after either the town or cultivation for which it was intended was deserted, and remained long open amongst the high grass and jungle which so rapidly obtain in this part of the country when the hand of man is absent: all

\* This small disc or wheel does not bear any marks of antiquity. — Ed.

marks of this well were so completely obliterated, that the present canal was excavated over it without its being discovered. The bricks used appear to have been of the same description as the square ones above described.

Amongst the metal articles found in the site of the old town, are a great number of *selals* or instruments in use in a Hindustani lady's toilet for applying surma to the eyes, made of *copper* apparently. To this circumstance my attention was drawn by a native sonar, who observed that *now* articles of this description were never made of that metal; the great quantity of rolls of metal and wire found would lead a person to suppose that the main exhumation at present consisted of a smith's shop! There are some other things, one bearing in some respects a resemblance to a small cannon (17), another to a button hook, &c. &c. The quantity of slag of iron smelting furnaces is a singular circumstance, for although iron ore is found in the mountains at no great distance, it is not the practice now to import it in that state into the plains.

The number of coins found, and in my possession, is 170, amongst which are two intruders that would, if they belonged to this town, very considerably reduce the antiquity of it; but from the circumstance of there only being two, and from their appearance (having no mark of that antiquity so eminently conspicuous in all the other coins found), I am much inclined to suspect that some of my myrmidons have been false, or that there are stray coins\*; both of them are sent with this letter. My method of collection was by giving new coin for old, that is to say, new pice for all the old ones, and new rupees for all the old rupees discovered, and remuneration according to the value of other articles: this may have raised the cupidity of some speculator to introduce these two Musulman coins into my cabinet. All those upon which any mark is apparent, and all other articles worthy of transmission, will be sent to the Society's museum.

I will conclude with a remark, that the accompanying map will give a good idea of the Doab Canal works in the neighbourhood of Behat, shewing its connection with two of its greatest impediments, namely, the Nogaon and Muskura rivers, and the descent between the two at the Belka Falls. During the rains and floods, the regulating bridges being closed with gates, and the dams thrown open, no water whatever passes down the canal, and each river or torrent has its own flood kept to itself; the size of these rivers, and the quantity of water that they carry, is in high floods very great; at other seasons they are quite dry, and consist

\* Our author need be under no alarm whatever from the presence of these two coins, which must have been purely accidental, and in no way connected with the antiquities of Behat; for on examination, one turns out to be a pice of Indore, the other of Lakhnao, both known by their respective symbols, and quite modern.—Ed.

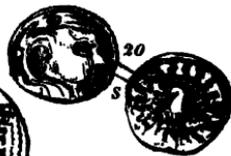
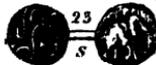


# HINDU COINS.

from the ancient ruins of Behat, near Scharanpur.



from the ruins of Kanouj



सिद्धिर्ह्यस्य

of extensive beds of sand with scarcely any vegetation. The falls at Balka consists of two chambers thirty-five feet in total breadth, passing in two descents of brick masonry, a fall of 15 feet, a power for machinery that would in any country but this be duly appreciated, and have long ago led to the establishment of a town or city in its neighbourhood, which would have thrown into the shade the submerged city. These falls are worthy of the attention of speculators under the new charter, a point which although not directly coming under the views of the Society, may be well referred to, as bringing to notice the dormant claims that the Doab Canal has on those possessed of capital, combined with mechanical skill and energy.

V.—*Note on the Coins, found by Captain Cauley, at Behat.* By James Prinsep, Sec., &c.

The accompanying plate (xvii.) exhibits faithful representations of some of the coins presented by Captain CAULEY to the Society. Those numbered 1 to 6 are all of the same character, and, as far as I am acquainted, entirely new to Hindú numismatology, although connected by a peculiar symbol with the fifth series of Col. TOD's plate\* (fig. 19 of the present plate); also with the copper coins 68, 69, of Mr. WILSON's third plate† (fig. 22 of the present plate); and with fig. 19 of Mr. MASSON's collection, in plate 9 of the last number of the Journal; all three series in other respects differing materially from one another.

*Fig. 1.* May be looked upon as the type of this new series. It is a silver coin of the size depicted in the engraving, and weighs 20 grains. The silver has been so acted upon by long continued burial, that on arrival in Calcutta, wafered on to the folds of a letter for security, the removal of the wafer stripped off a thin film of silver from its surface. The impression however is still perfect and in deep relief.

*Obverse.* On one side we perceive a female figure clothed, holding in her right hand a stalk, bearing on its summit a large open flower:—(this emblem will be seen below to be common to another class of Indian coins;) on her right stands an animal, of the precise character of which it is difficult to make any positive assertion:—it has a stout straight trunk, which might pass for that of a deer, or of a horse, but the head more resembles that of a bird, and it is surmounted with a radiated crest, which at first sight wears the appearance of horns. On the left of this nondescript animal is a symbol or monogram much resembling character 5 of the Allahabad inscription, No. 1, but square, instead of round, in the body. There are other characters round the margin but partially visible.

\* Trans. Roy. As. Soc. vol. i.

† As. Res. vol. xvii.

**Reverse.** The opposite side of this curious coin presents an assemblage of symbols, the purport of which it is difficult to divine. The principal figure in the centre seems to represent a temple, a pyramidal building, with three tiers of rounded *súras*, spires or domes, surmounted by a *kulsa* or pinnacle in the form of the letter T: the contour of this device resembles also the Hindú drawings of rocks and mountains, and it may be intended to portray some holy hill, connected with the mythology or with the locality of its place of coinage: beneath the pyramid is a waved line, which may also possibly depict the sea, and point to some fabulous mountain in the ocean, as *Lanka* or *Meru*. To the right is another curious emblem, which for want of more correct information, we may call a *tree of triple branch*, standing in a frame or on a kind of *chabútra*. To the left is the *swastika* emblem  $\text{卐}$ , of four legs conjoined: and below it a figure very similar in form to  $\text{⌘}$  or  $\text{⌚}$  or some other compounded Greek characters on the Bactrian coins. There is a legend around the margin consisting of the letters hitherto called *Pehlevi*, but which I think we shall soon find reason to denominate otherwise.

**Fig. 2.** A copper coin similar in every respect to fig. 1, but of inferior execution; in this the circles of the *chaitya* or temple are made square, and resemble common masonry.

**Figs. 3, 4, 5;** are smaller copper (or rather white bronze) coins, stamped only on one side, except No. 5, which has a faint impress of a *tirsul* on the reverse. The form of the tree is altered, and the frame below has, in some specimens, four compartments instead of two: the *swastika* is also exchanged for four circular rings.

**Fig. 6.** A copper coin weighing  $163\frac{1}{2}$  grains, in imperfect preservation. The only variation in this coin from the type-coin fig. 1, is that the pyramid contains two tiers instead of three. This circumstance, however, constitutes the link of connection with the other series of coins to which I have alluded.

All of them having the symbol  $\text{⌘}$  in common.

**Fig. 7.** Is a small square copper piece, with an elephant on one side, the other effaced.

**Fig. 8.** Is a small copper coin procured by Lieut. A. CONOLLY, at Kenouj, upon which this mark  $\text{⌘}$  forms the distinguishing emblem. A similar coin is in Major STACY'S possession, obtained in Central India. I shall have to recur to the subject in describing figs. 19 and 22.

**Figs. 9 and 10.** I have introduced these two coins to shew, that what has been called the Indo-Scythic series occurs plentifully among the exhumated relics of Behat.

The first of these, the raja and bull coin, must henceforward be

entitled the *Kadphisee* series, in compliance with the successful researches of Mr. MASSON published in our last number; the *Kaseries* series, also occurs as commonly among the coins transmitted by Capt. CAUTLEY, and as we know that these two coins bear Greek inscriptions, and that their epoch cannot consequently be much posterior to the Bactrian dynasties, we may presume that all the descriptions of coins having the *chaitya* or  $\text{☪}$  symbol, being proved to be contemporaneous with these, must belong to the first centuries of the Christian era, and consequently the destruction of the ancient city may be ascribed with tolerable certainty to the same early period. The circumstance of so much money being discovered in one place would seem to denote that the catastrophe which destroyed the place was sudden, but the destruction is as likely to have been effected by the ravages of war, as by any convulsion of nature; and, when once depopulated, the place might easily have been buried under the gradual deposit of silt washed down by the hill streams, as described by Capt. CAUTLEY.

*Figs. 11 and 12.* These coins are connected with the above by the tree symbol, by their being stamped only on one side, and by their being of white bronze; but in them the animal is decidedly the brahmany bull, and the inscription is in a different character.

*Figs. 13, 14, 15, 16, 17, and 18,* are introduced to give an idea of the other curiosities from Behat.

The first is a black and white enameled bead; 14, an ornament of the headdress of some image; 15, a ring probably worn while performing certain religious ceremonies; 16, appears to be a weight moulded in the shape of a frog, as is the custom in Ava, and in many parts of India: it weighs 360 grains, (precisely two tolas,) or six Grecian *drachme*, and is not corroded. Fig. 17 is the metal handle of some vessel: it is broken in half. Fig. 18, are the *selais* for applying *surma* to the eyes, spoken of by Capt. CAUTLEY, as so numerous: in the present day they are generally made of zinc. Besides these articles, our flourishing little museum contains plain rings, arrow-heads, hooks, and rolls of lead, converted into semi-crystalline hydrated oxide by exposure to the moisture under ground\*. Most of the copper coins likewise are in a very imperfect state, the pure metal not resisting corrosion nearly so well as bronze.

#### *Hindû Coins from the ruins of Kanouj.*

To confirm the assertion made above of the connection of several other series with the *Behat* coinage, I have introduced at the foot of the

\* See note on a similar change produced in zinc plates, vol. ii, p. 437. The lead is partially converted into minium and partly into protozide. In some rolls the interior is still metallic.

present plate, drawings of some most interesting coins, procured by Lieut. A. CONOLLY, of the 6th Light Cavalry, at Kanouj, and this moment received from that officer at Cawnpore.

*Figs. 19 and 21.* Silver coins, weighing 28 grains each ( $\frac{1}{2}$  drachm), corresponding in every respect with Col. Tod's fifth series, in the head, on the obverse, and in the circular inscription on the reverse: in 19, also, we find the central symbol  $\text{卐}$  with five dots on the side, as in his coin.

Col. Tod's observations on these rare coins are as follows:

"The fifth series is entirely novel and unexplored. All I can say of them is that they belong to a dynasty which ruled from *Avanti* or *Ujjayan* to the Indus, for in that whole tract I have found them. The first I obtained was from the ruins of ancient *Ujjayan*, twelve years ago, presented to me by Mr. WILLIAMS, resident at the Gykwar court, who first awakened my attention to their importance. He found them in Cutch, and in his company, I discovered others among the ruins in the Gulph. The character of the epigraphic I have met with on rocks in *Saurashtra*, in the haunts of the Suroi, the bounds of the conquests of MENANDER and APOLLODOTUS. I have little hesitation in assigning them to the *Balhara* sovereigns of RENANDOT'S Arabian travellers, the Bhalla Raes of *Anhulwára Patan*, who were supreme in those countries: "This Balhara is the most illustrious prince of the Indies, and all the other kings acknowledge his pre-eminence. He has, of these, pieces of silver called Tartarian drams. They are coined with the die of the prince, and have the year of his reign."—RENANDOT, page 15. "The Balhara dynasty had a distinct era, 375 years posterior to VICRAMADITYA."

The character of the circular legend in all these coins strongly resembles Sanscrit:—if the place of their discovery be a test of the extent of empire in which they circulated, they will belong to a powerful monarch indeed, for Mr. MASSON has found twenty at Begham, (of the same symbol at least,) while they extend to Kanouj, Behat, and Benares on the east. *Fig. 20.* A silver coin, weighing 34 grains; is evidently of the same series; but here the distinctive symbol is lost, and is replaced by a peacock with expanded tail: the letters are not decypherable.

*Fig. 22.* A square copper coin, also from Kanouj, is already known as No. 68 of WILSON'S plate, (see *As Res.* vol. xvii.) which was dug up by Capt. VERTCH on the Allahabad road. It bears on the *obverse* an elephant and some other animal prostrate; on the *reverse*, the  $\text{卐}$  symbol, the tree, and a cross, all of which prove its close alliance with the Behat coins. More of the general history of the whole series may yet be developed by future discovery.

*Fig. 23.* A silver coin, weighing 7.7 grains, resembles a fanam of South India, but its type shews that it may be a genuine connection of the coins it accompanies.

*Fig. 24.* A gold medal weighing 123 grains. *Obverse*,—a figure clothed in the Hindú dhoti, with armlets, holding a bow, as having just discharged an arrow through the head of a lion, or other monster, on the right; in his left he holds another arrow prepared; his right foot

rests on the tail of the lion. Inscription in ancient Nagari **महाराजधिराज श्री** *Maharajadhiraja Sri*. Reverse—either the same person or a female figure clad in similar costume, seated upon the vanquished lion, holding a large flower in the manner of a cornucopia in the left hand, (see also figs. 1, 4,) and in the right, a kind of noose; above which the lozenge symbol with four prongs (16 of plate xiv. vol. ii.) On the right in ancient Nagari, the words **श्रीमद्व कचो** *Sri madghavakacho*. It will be at once seen that this beautiful medal has no connection with the subjects of the foregoing remarks. I have given it a place that it might be as early as possible brought to the knowledge of numismatologists, for it appears likely to prove the very key to our knowledge of the valuable series of Kanouj coins, forming the fourth of Col. **TON**; and the second Plate of **WILSON**.

The former author says of these coins :

“They are Hindu, of a very remote period, and have the same character which I have found wherever the *Pandu* authority existed, in the caves, and on the rocks of *Janagurr Girna*, on the pillar of victory in *Meywar*, and on the columns of *Indraprestha* (Delhi) and *Prayag* (Allahabad). Some of them are not unlike ancient *Pehlevi*. These coins are of gold, and in fine preservation. Like all my medals, they are either from *Agra*, *Mathura*, *Ujayan*, or *Ajmere*. **DR. WILKINS** possesses some found even in *Bengal*: he thinks he can make out the word *Chandra* upon them.”

It is well known, as **Lieut. CONOLLY** remarks, “that our love for the antique has induced certain cunning men of this famed city to set up a mint for the fabrication of moneys of the olden time,” and many that are brought thence bear all the marks of having been cast in the mould of some original, of which they bear so imperfect an impression that it has been hitherto impossible to assign the true nature of their inscriptions: **Col. Ton**, it is evident, supposed them to be in the *Delhi* character No. 1;—one was read as in the *Mahabalipur* alphabet (see vol. ii. page 412, 649): and only now do we perceive for certain that the character is precisely that of No. 2, of the *Allahabad* column: of which the reader may convince himself by comparing the legend on the obverse with the titles of *Chandragupta* in *Plate VI.* of the present volume. Applying the same alphabet to the reverse, we find the name *Sri mad-ghava kavo* or *kacho* which the **Rev. Dr. MILL** remarks, by a slight alteration will become **GHATAT-KACHO**, the very name read by himself as the father of **CHANDRAGUPTA** in the *Allahabad* inscription\*. I must here leave this important discovery to the elucidation of our learned **Vice-President**, having performed my own more humble duty of making known by the pencil the prize which has rewarded my friend **Lieut. CONOLLY**'s researches.

\* In a paper read before the Asiatic Society on the 28th instant.

**VI.—A Brief Sketch of the Present State of Georgia, now a Russian Province.** By Captain Robert Mignan, Bombay European Regiment, Fellow of the Linnean Society, and Member of the Royal Asiatic Society of Great Britain and Ireland.

The name of Georgia, which is applied by modern geographers to the country south of Mount Caucasus, lying between the Euxine and Caspian Seas, comprehends, according to the native historians, *Kartveli*, *Imeritia*, *Mingrelia*, and *Guria*, under the general name of Iberia. It is now exclusively applied to the four provinces, Kartalinia, Kakhetia, Kisik, and Georgian Armenia. According to several writers, the appellation *Georgian* is transmitted to us from the river Koor, Kooros, or Cyrus; and they add, that the inhabitants ought to be named *Koorjians*. By the Turks and Persians they have always been denominated "Goorjees," and their territory "Goorjistan."

This country must be considered as one of the most interesting on the face of the globe. It is at this moment a small canton of Russia, included within the limits of that huge empire, but happily, as yet, not governed in so despotic a manner. In the map, it is situated in the centre of the isthmus; though I shall describe it as comprising the territory between the great Caucasian ridge, and the river Arras, (the ancient Araxes) on the Caspian side; and the redoubt of St. Nicholas below the mouth on the Phasis on the side of the Euxine.

All was a blank, until the Russian CATHERINE, of notorious memory, sent GULDENSTAEDT to traverse these delightful regions, trace the rivers to their sources, make astronomical observations, examine the natural history of the country, and collect vocabularies of all the dialects he might meet with. He enumerates seven distinct nations, divided into numerous tribes, each speaking its own dialect. The Caucasian isthmus contains innumerable small nations. They are composed of indigenous and primitive tribes, although some are doubtless the remains of Asiatic hordes. Their physiognomy combines the characteristic features of the principal races of Europe, and of Western Asia. The writings of Moses, the allegory of Prometheus, the famous expedition of the Argonauts, and several traditions of the Scandinavians, all combine to satisfy us that this kingdom was one of the most ancient of the globe. We know for certain, however, that Georgia was conquered by the illustrious NOURCHIRVAN, the contemporary and rival of JUSTINIAN; became a portion of the empire of the celebrated SULTAN MAHMOUD of Ghisnee; was invaded by ALP ARSELAN (the conquering lion); overtaken by TIMOUR; ravaged by ISMAIL; conquered by TAMASP, in the reign of our ELIZABETH; reconquered from the Turks by SHAH ABBAS: that,

although thus by turns overrun and pillaged by Turks, Tartars, and Persians, it never wholly lost its independence, but preserved itself as a kingdom nearly two thousand years; and what is still more to its honor, it preserved its ancient faith in Christianity for fourteen hundred years, in the very midst of countries enthusiastically devoted to the Mahomedan religion. The ruins of walls and fortresses, commanding its passes, and perched on the summits of its mountain ridges; the remains of bridges in its streams; the ruins of palaces, churches, and baths, in the midst of which are frequently discovered coins and medals of Media, Parthia, Persia, Greece, and Rome, attest the various nations that have been in possession of Georgia in ancient times.

Towards the close of the last century, the aged Prince HERACLUS, who had proclaimed himself King of Georgia, took advantage of the anarchy and confusion which existed in Persia, after the death of KURBEM KHAN, and by formal act renounced his dependence upon Persia, after having struggled against the depredations of its inhabitants during his whole reign, and placed himself under the protection of the Russian empress. Subsequently, however, he was obliged to abrogate his alliance with Russia, and to acknowledge himself tributary to Turkey.

At the peace in 1791, Georgia was declared independent, and in 1795, AGA MAHOMMED KHAN, the late king of Persia, advanced to its capital: His first act was an order for the slaughter of every human being in this large and flourishing town—his next was, to set fire to it; and it was totally burnt down. Every brutal excess of cruelty that national hatred, inflamed by bigotry and infernal policy, could dictate, was committed. Pillage, murder, and conflagration met the eye on every side. While some were occupied in plundering the villas of rich merchants, and others in setting fire to the hamlets, the air was rent with the mingled groans of men, women, and children, who were falling under the daggers of the Moslems. The only exception made during the massacre was of the young women and boys, who were preserved only to be sold as slaves. Many of the women, whose husbands had been butchered, were running to and fro frantic, with torn garments and dishevelled hair, pressing their infants to their breasts, and seeking death as a relief from still greater calamities that awaited them! The number of those slain or dragged into slavery on those dreadful days was not less than twenty thousand.

In the following year, this brutal eunuch determined again to visit Georgia, but he had only reached the town of Sheesha, in the fertile district of Karabagh, when his career was arrested by the hand of violence. Two servants, whom he had sentenced to death for a very trivial offence, entered his tent at night, and with their daggers put an end to one of the

most cruel tyrants that ever ruled in Persia. It is beyond the limits of this paper to particularize his cruelties. In the first year of his government, he deprived seventy thousand people of their eyes, and massacred at least a hundred thousand. In Persia (as we all know), they think no more of plucking out an eye, than we do of extracting a tooth.

On the death of HERACLIUS, in 1798, his eldest son, GEORGE HERACLIUS, unable to withstand the attacks and intrigues of foreign and domestic enemies, ceded his states (under a stipulation of being handsomely provided for) to the Emperor PAUL, who, deeming it safer to remove the queen and her children to Moscow, commanded that her supposed lover should make the proposal. Fixing her eyes steadily upon him, she said, "Forget not that thou art my subject—repeat not so hateful a proposal, or I shall know how to punish your audacity." Her lover persisted in his entreaties, and in an instant she drew her dagger, and laid him dead at her feet. She was, however, forcibly conveyed along with her two daughters and two sons to St. Petersburg, where they had precedence next to the imperial family, and though deprived of liberty, were liberally treated. Her youngest son, ALEXANDER, possessing an independent spirit, together with an ardent love of country, preferred liberty, although accompanied by every privation; and vowing eternal enmity to Russia, he became a wanderer in the adjacent mountains. His hatred has increased by time, although any thing like resistance to the colossal power of Russia must be perfectly hopeless, even if supported by Persia, with the ruler of which kingdom he is still in constant communication, and watching a favorable opportunity of making the endeavour to recover his lost territory.

The late Emperor ALEXANDER found it expedient to grant to the Khans, or Princes of Daghestan and Shirwan (the ancient Albania), the enjoyment of their former privileges, and indeed, to change little of their ancient customs—except that they were prohibited from selling their children to the Turks and Persians, and of executing summary vengeance on their subjects by mutilation or death. Several examples of severity did not prevent vast emigrations into Georgia. In the year 1820, alone, not less than ten thousand Persian families crossed the boundary, to whom it was intended to assign lands; and both Turks and Armenians are continually placing themselves under the Russian government. The Circassians, however, on the northern frontiers of the Caucasus, still bring up their children for the market of Constantinople. This is done by stealth, for the Russians use every means in their power to prevent the inhabitants quitting the country. In the year 1828, when I crossed the Araxes, the influx had been so great that I met thousands of both sexes, and all ages, returning again to

Persia, and execrating the name of PASKEWITCH, then Governor General of Georgia, to whom they attributed all their misfortunes, and from whom they had received the most flattering but fallacious promises.

The whole of Georgia is beautifully diversified with mountain scenery, gradually spreading out into hill and dale. The climate is delightful, and the country well watered. It is remarkable that in Persia most of the inhabited places are situated in plains and valleys : in Georgia, on the contrary, the towns and villages are almost uniformly built upon the sloping sides of hills or heights, after the manner of the hamlets of Koordistan. The scarcity of rain in Persia, and the abundance of water in Georgia, has been assigned as the reason for this difference. The melting of the snows on Mount Caucasus causes floods to pour down from the hills with such violence as to sweep every thing before them. To give an idea of the enormous masses of snow which are constantly thawing during the summer season, I will mention, that in my journey across Caucasus, in August, 1828, a piece of frozen snow had detached itself from a neighbouring peak, and shelved down across the road, covering it to an extent of *at least three quarters of a mile*, and rendering the passage nearly impracticable. The Koor, however, does not rise above its banks. Generally speaking, the climate is mild and salubrious. From April to November, the sky is for the most part cloudless ; but during the night, the dews are frequently very heavy. As in Persia, the sultry days are not unfrequently succeeded by intensely cold nights. During the other parts of the year, there is no deficiency of rain ; and to this circumstance the fertility of Georgia is chiefly attributable. The winters are generally very penetrating ; every possible degree of temperature may be had on the sloping spurs of Caucasus.

Among various indigenous productions may be enumerated the cedar, and other varieties of the pine ; the oak, the beech, the elm, the ash, the chesnut, the walnut, the apple, the pear, the citron, the peach, the plum, the apricot, the pomegranate, the raspberry, the quince, and many flowering shrubs, among which the vine entwines itself in wild luxuriance, loaded with the finest grapes. The most numerous, however, and that in which the riches of the country chiefly consist, are mulberry trees, on which they feed an infinite number of silk-worms. Georgia was famed for its silk long before this article found its way into Italy, in the reign of JUSTINIAN. GULDENSTAEDT describes Georgia as most fertile and fruitful. An Asiatic's ideas of fertility differ sufficiently from ours, to explain in part this assertion : for to him plantations of olives, almonds, and figs, with which the country is covered, suggests the same associations of plenty that are called up in our minds by rich tracts of corn land.

The same traveller characterises the country as flowing with milk and honey, and it still answers to this description; for it contains the richest pasture lands, and the rocky portions are covered with aromatic plants, yielding to the wild bees who hive in the crevices of hollow trees, such an abundance of honey as to supply the poorer classes with an article of food, and with wax to be exchanged for cloths and stuffs. Honey from the rocks is repeatedly referred to in the Holy Scriptures, as a delicious food, and an emblem of plenty. (1 Sam. xvi. 25 : Psalm lxxxi. 16.) GOLDBENSTADT instances the growth of the date tree as a proof of the mildness of the temperature, and when to these we add the oil extracted from the almond (the *amygdalus Persica*) and olive, we shall be at no loss to account for the ancient fertility of the most barren districts of Georgia, or for the adequacy of the soil to the support of so numerous a population, notwithstanding the comparatively small proportion of arable land. Delicious wine is produced in the districts, and the valleys bear plentiful crops of rice, wheat, millet, and barley; while cotton, flax, and hemp grow spontaneously on the plains bordering the Caspian.

The streams are full of fish, but with the exception of the river Koor, are all brooks or torrents, and therefore unfit for internal navigation. In short, nature has rendered it one of the most beautiful and highly favored countries in the world. Wild animals are not numerous; for every man being armed, they have ever met with constant enemies. On the plains however, there are deer and antelopes; and the pygarg (*cervus pygargus*), or dishon of the Scriptures, called in Persia *aha*, bears, wolves, wild boars, and the rock goat (*capra Cascasia*) delight in the rugged summits of the schistose mountains. The chamois, on the contrary, prefers the lower calcareous hills; as also do the hare, fox, and jackal. In ornithology I can enumerate from my own personal observation the eagle, the falcon (*falco tinnunculus*), the pheasant, the jack-daw, in the oak-woods, the bee-catcher (*merops apiaster*), the field lark, the red partridge (*perdix rufus*), the quail (*tetrao coturnix*), and the ring-dove. Game is abundant, partridges in particular being found in large coveys, so fat and heavy, that they may easily be knocked down with a stick. The male species is a most beautiful bird. The females are not so prettily marked. Wild-geese, ducks, snipe, and water-fowl of every description abound in some situations. I have seen several large snakes, but the only one much dreaded is a small slender species, spotted black and white, the bite of which is said to be instantly fatal. Flies of every species are annoying in the hot-weather, and a species of ant (*formica ruginosa*), is very numerous.

Georgia was formerly celebrated for its mineral treasures, but its mines have been neglected, and now produce but little. Gold, silver, and iron

are found in the mountain range of Caucasus. Coal is also said to be found in different parts of the country. STRABO goes so far as to assert that the numerous small rivers carry down gold dust in vast quantities, which being stopped by sheep skins, placed on purpose, furnishes an explanation of the fable of the golden fleece, (*Strabo, xi. passim.*)

I was assured that the total population of Georgia is four hundred thousand, of whom ninety thousand are Armenians, following chiefly the rites of the Greek Church, and partly their own. There are at least seventy thousand Russian and Georgian troops stationed throughout the districts. The number of the inhabitants is doubtless increasing, as previous to its connexion with Russia, the people were sadly reduced by the constant dissensions of the chiefs, who, possessed of unlimited power over their vassals, chose to be eternally at war with each other, chiefly, if not entirely, with a view of making prisoners of both sexes, for the harems of the Turks and Persians. The incursions of these latter, moreover, utterly desolated from time to time the provinces on the frontier. In 1603, when that accomplished despot SHAH ABBAS marched into Georgia, he carried off no less than ten thousand families; but as a striking proof of his beneficent despotism, instead of making them slaves, and compelling them to change their religion, as his predecessors had done in similar cases, he settled them in different parts of his kingdom, and afforded them every encouragement. The Armenian colony formed by him at Ispahan remains an honorable monument of his wise and liberal policy. These drawbacks, however, on population have of late years ceased, and it is said, that the measures now adopted for the encouragement of agriculture and commerce have already produced the best effects. The capital is rising from a dismal-looking town into a cheerful bustling city, and its population, which, in the year 1826, was only 26,000, has risen in four years to 33,000. It would be superfluous to allude to the beauty of the women of Georgia, which has become so proverbial. Their symmetrical form and regular features might serve as the model for the finest statues. "It is in Georgia," says the elegant GIBSON, "that nature has placed, at least to our eyes the model of beauty, in the shape of the limbs, the colour of the skin, the symmetry of the features, and the expression of the countenance. The men," he adds, "are formed for action, and the women for love." Yet, HERODOTUS says, that the natives, in his time, were dark complexioned (*μελανχροες*) and had crisp, curling hair (*κυλωνειρες*); such is the change produced by the mixture of nations, and the slow but powerful influence of climate. The women, however, not satisfied with the prodigality of nature, have recourse to the odious use of paint; and although this is considered indicative of want of chastity, it does not prevent the beauties of Georgia using

their detestable and deleterious cosmetics. Their chief delight is in bathing and shampooing, which at Tiflis may be enjoyed to perfection. The baths, situated in deep caverns, are impregnated with sulphuretted hydrogen, and their temperature I found at 112° Fahrenheit.

Georgian girls are not unfrequently married by the wishes of their parents at the early age of twelve; for, although they are not as formerly, so easily smuggled out of the country for sale; yet, the Russians are constantly seizing them to gratify their own gross and vicious inclinations. In every other respect, a spirit of forbearance is manifested towards those who have sought protection under the imperial crown:—whether it be to those hordes of barbarians which have intruded themselves into parts of the Russian territory already occupied by Russian subjects, or to those restless and infatuated beings whom disordered imaginations concerning points of religion would not permit to remain quiet in more civilized countries.

VII.—*Explanation of the Sketch giving a geological Section of the Strata from Nimach to Mértá, published in the Asiatic Researches, vol. xviii. p. 92. By JAMES HARDIE, Esq. Beng. Med. Service.*

[In the second part of the eighteenth volume of the Asiatic Researches, an article is published by Doctor HARDIE, on the geology of Central India, exclusive of Malwa, to which a geological section is appended of the “*strata between Nimach and the British Residency at Mértá.*” Owing to the transfer of the editorship from the then Vice-President Mr. J. CALDER to ourselves when the volume was half through the press (the plates being at the same time in the publishers’ hands), it was not perceived that the text did not contain any specific account of this particular plate, and it was only on lately recurring to the records of the Physical Class that a separate and detailed explanation by the author was found, which it has been thought advisable to make public at once through the pages of the Journal, as some apology to Dr. HARDIE, for the imperfect justice done to his geological researches. Many of our readers will be able to refer to the volume of Transactions for the plate in question, and to others the nature of the country will be sufficiently intelligible from the explanation itself, with the aid of a map, the examination being of course confined to the surface and proceeding westward from Nimach.—Ed.]

This section is not offered as being perfectly correct, but it will serve to give a general idea of the rocks which occur on the route from Nimach to Mértá. The exact limits of the different formations are not laid down with precision, the surface is in so many situations covered with soil that I found it impossible to do this. I believe, however, that the whole will be found to approximate pretty nearly to the truth. I need scarcely add, that the exact position and breadth of the different alternating beds are not intended to be represented. This could not

have been done unless the section had been constructed on a much larger scale. With the scale to which I have limited myself, a bed of several yards in breadth would have been out of proportion large had it been represented by a single colored streak. I have at the same time endeavoured to preserve, as far as my observations would permit me, the general proportions which the one rock bears to the other on the grand scale in such alternations. The line of section runs in the first instance over a waved country, and afterwards over one which is nearly level. None of the hill ranges are traversed by this section.

*A*, the overlying trap formation of Malwa, at Nimach. *B. B. B.*, the sandstone slates, &c. described in page 39, of the paper in the Researches. These are continued as far as *Benauti*—surface generally covered with soil from which the strata here and there protrude: country waved and strata become more inclined as we proceed; west-dip SE. or E. On descending from the trap, the descent being gentle, the sandstones are immediately perceived, and, as we proceed west they pass into sandstone slate and lastly into the shale, &c. Numerous low detached ranges observed running on a northerly and southerly direction; none of these traverse the line of section, and only in one instance have we occasion to pass over a gentle rising ground connecting two low table crowned ranges. *C. C.*, the hills of this sandstone formation, which are generally of the table shape represented, though sometimes they are conical. The *Jésalmtr* stone abounds with fossil shells, scarcely a slab being free from them; they are not of the least detriment to the stone, so far as it regards its aptitude for lithographic purposes; the substance of the shell appearing to have become homogeneous with that of the stone in which they are imbedded.

Resting on the sandstones and forming the tabular summits of the hills occur, *D. D.*, the quartzose breccia, described page 49. To the west of the *Bári* hills occurs *E*, a yellow-coloured argillaceous limestone, of a compact texture, consisting of about 75 per cent. of earthy carbonates. It contains a small proportion of magnesia, and is coloured by iron, which last exists in pretty considerable proportion. The relative position of this limestone to the sandstones could not be correctly ascertained. A little to the north of *Benauti* occur the limestones described in page 43. These occupy gentle rising grounds.—I could not discover any organic remains in the yellow limestone, but I have not examined it minutely enough to speak with decision on this point.

The other limestones are purer and less ferruginous. They contain from 84 to 88 per cent. of earthy carbonates, but both the above varieties have a small proportion of carbonate of magnesia associated with the lime. A thick bed of *kankar* and soil covers the junction of the

yellow limestone and the sandstones; this bed is of considerable breadth; both however dip to the east at a considerable angle; and as the limestone occurs to the west of the sandstones, the former may possibly dip under the latter, and the series of formations of the narrow bed described in my published paper, may be thus completed.

*F.* a hill composed of the out-croppings of the quartz formation which shews itself further west. *Benauti* is situated at the base of this hill.

*G. G. G.* Quartz rock as described page 31. It alternates with *H. H.* *H.* &c. which is the rock described as an imperfect variety of granite rock. It has a porphyritic structure, and might almost be classed with the porphyries. It is however indistinctly stratified. In travelling from *Benauti* to *Nakum*, as far as the yellow limestones occurs, the surface is generally covered with soil from which the limestone occasionally protrudes; but on passing the limits of this vast formation, a very narrow bed of a slaty argillaceous rock presents itself, and this is immediately succeeded by the quartz, which rises occasionally into craggy and rugged hills, and the outcroppings of the highly inclined, and in many situations almost vertical, strata of which are constantly observed. The line of section traverses a hill: also composed of quartz. *I.* The separate section, *K.* is an imperfect representation of a hill composed of quartz which occurs to the east of *Nakrum*. The slope in the direction in which the strata dip is abrupt and destitute of soil. In the opposite direction, it presents a bluff rugged face and which rises abruptly from the slope; *M. M.*, the slope in this direction being more gradual. The hills at *Nakrum*, which are also of quartz, exhibit something of a similar appearance: these rise about 300 feet above the level of the plain. The bluff crag *L* occupies the highest position of the ridges, and the hills slope on either side their summits, presenting bare perpendicular cliffs, rising abruptly to the east and west from the slopes, which last are covered with stunted trees. From *Nakrum* to *Mangarwár* the surface, for the first half of the distance, is usually covered with soil, from which occasionally protrude the quartz and the granitic rocks; *H. H.* &c. As we proceed west the quartz becomes purer and more transparent. It frequently assumes a nearly slaty structure, in consequence of minute plates of mica being parallel to the stratiform structure. Thus far the surface is nearly level. It afterwards becomes very gently undulating, and the out-croppings of the quartz strata are occasionally seen occupying the gentle swells. This quartz now appears to alternate with or rather there occur inclosed in its narrow beds of argillaceous schist, the quartz being the preponderating rock till within about three miles of *Mangarwár*, when the argillaceous schists become more plentiful. At and near *Mangarwár* the argillaceous schists pass into and alternate with greenstone schist

and a hornblende rock of a large grain. The last is composed of longish portions of hornblende of a shining aspect, which constantly intersect each other, and with this is associated a grey crumbly felspar. To this quartz is frequently added, in which case it forms a variety of sienitic granite. The greenstone schists are of a dark green color and of an uniform texture, they are apparently composed of similar ingredients to the last, but in a more minute state of aggregation. The argillaceous schists are of a greenish grey color; they are rather soft, and some of them seem to approach to chlorite schist; scales of mica sometimes occur disseminated through these. The alternating quartz beds frequently assume a greenish tint. This is particularly observed where they occur in contact with the greenstone.—*N. N. N.* &c. represent the above series of argillaceous schists, greenstone schists, &c. The country, after leaving *Nakrúm*, is characterised by its level and unbroken aspect; the gently undulating appearance alluded to, being scarcely observed on the large scale, and the hills in the neighbourhood of *Mangarwár* more deserve the name of low rounded swells. On leaving *Mangarwár* the route lies, for the first five miles, over an uncultivated level plain, covered with soil, and, in one or two instances, outgoings of strata of pure white quartz are observed. From this it is probable that the alternations observed, to the east of *Mangarwár*, are continued thus far. About a mile from *Híta* we observe a very fine-grained granitic rock, composed of a pale reddish felspar, semitransparent quartz, and mica; the last in very small proportion, and in some situations, entirely wanting. This rock frequently assumes something of the structure of gneiss.—At *Híta* we also find this granite, and, associated with it, another variety of a larger grain, composed of white quartz, greyish white felspar, of a soft and friable nature, and a very dark colored mica, the last in great abundance. Shortly after leaving *Híta*, beds of greenstone schist, *N. N.* approaching to argillaceous schist, alternate with the close-grained granites for a short distance, and afterwards granitic rocks inclosing beds of quartz are alone observed. A similar granite to the large grained variety of *Híta*, also, occasionally presents itself, but the mica is in much smaller proportion. As we proceed west the felspar acquires a redder tint, and the large-grained granites here and there are seen: the fine-grained varieties preponderate. The mica in the fine-grained granites is frequently of a greenish color, it also occurs nearly black. Hornblende too, occasionally occurs: and this, as we proceed west, appears to be replaced in many instances by actynolite, which is found as a constituent of these granites. *O. O. O.* the granitic rocks just described, are generally speaking stratified, and many of them have a structure approaching to that of gneiss. This is even observed in several of the

varieties composed entirely of quartz and felspar; these two ingredients, being arranged in nearly parallel grains of a prismatic form, the felspar frequently entirely surrounding the longish grains of quartz, and giving rise to a porphyritic structure. The felspar is the principal ingredient in these granitic rocks or perhaps granitic gneisses.

Q. The *waved sienitic gneiss*, similar to that described in a former paper, as occurring at *Karúbar*. The country where this occurs is generally covered with soil, but in one or two instances it presents itself at the surface. S. *Primitive dolomite*; it occurs regularly stratified, the surface where exposed, having acquired a dark earthy aspect. The fresh fracture is coarse-grained and crystalline: some of the crystals being of rather a darker color than others, and the whole being of a smoky grey. It is almost entirely dissolved in nitric acid, and is composed of carbonate of lime, with which a considerable proportion of carbonate of magnesia is associated. This is succeeded by alternations of granitic rocks, *W. W. W.*, and hornblende rocks, *X. X. X.* The granitic rocks of this series are very various, some are large-grained, and are composed principally of flesh-red felspar and white quartz; some are fine-grained; many of them almost compact, composed of similar ingredients but are of a lighter colour. In both mica occasionally occurs, but in very small quantity. It is sometimes dark-green and at others greenish yellow; the quantity of mica varies much in different beds, and is very frequently entirely wanting. Sometimes too a granite rock occurs, principally composed of whitish or pale red granular felspar, to which quartz, mica or chlorite are occasionally added in small proportion. In many of the fine-grained granitic rocks, &c. minute yellowish green specks of *epidote* are observed. Some additional remarks on the above rocks will be found in my memoir. The *hornblende rocks X. X. X.* exist in the form of a nearly pure hornblende rock, and to this last felspar of a grey color is occasionally added. When quartz exists in any quantity in these, they pass into sienitic granite. Hornblende schist is also common, and with this a small proportion of felspar is occasionally associated, making it sometimes appear to pass into sienitic gneiss.

An idea of the form of the hills near the line of section may be gathered from the slight uncoloured sketch placed over the different formations. The line of section however does not traverse any of these. The general dip of the strata is to the N. E. and after leaving *Nakrúm* their position is nearly vertical.

N. B. *Mértá* is distant 12 miles from *Oudáipur*. It lies to the east, and a little to the north of the latter city.

VIII.—*Latitude of the Church Bungalow at Nasirábád, by altitudes (170) of Polaris out of the Meridian, observed with a Troughton's 18-inch Altitude and Azimuth circle, by Col. Thos. Oliver.*

[We use the privilege allowed as by the author to omit the details of observations, and confine our publication to the following abstract carefully calculated by the author himself from them. We trust that the Church Bungalow will soon become a more permanent structure ; it is a constant complaint of astronomers in this country that points of reference are not to be had.—ED.]

Date.	Horizontal point.	Mean of 5 observations on each face.	Mean in each position of Microscopes.	
	o	a ' "	o ' "	
December 25th, 1831.	0	26. 18. 03.0	}	
28th,	0	01.7		
January 2nd, 1832.	0	03.8	} 26°. 18' 03".2	
3rd,	0	03.2		
4th,	0	04.5	}	
5th,	20	08.4		
6th,	20	07.5		
24th,	20	09.9		0.90
25th,	20	17.2	}	
26th,	340	03.0		
29th,	340	17. 58.8		
31st,	340	18. 01.4		01.3
February 1st,	340	02.1	}	
21st,	330	17. 59.9		
26th,	330	18. 01.7		
27th,	330	01.6		01.5
28th,	330	02.6		

Mean of the whole,

26. 18. 03.8

The observations were conducted thus : five sights were taken with the face of the circle east or west as it happened, the level (both ends) being read off and noted after each sight. The instrument was then turned round 180° in azimuth, and five more sights taken as before. The correction for level (that is, the mean of the ten readings) has been applied to the numbers in the column headed " Microscopes." I have used Dr. YOUNG's refractions, and the position of the star, as given in the Greenwich Ephemeris.

The Microscopes of the Altitude circle having a motion of about 60° concentric with the circle, I occasionally availed myself of this contrivance in order to get readings on different parts of the circle, and to get rid of errors of division ; but I regret that I did not make more use of this expedient, since so wide a result appears when the Microscopes were placed at 20° from what the other positions give. The instrument is now at the Lucknow Observatory, where I did hope that, in the hands of my lamented friend HERBERT, it would have had fair play ; but he, poor fellow, died very soon after he received it.

## IX.—Population of the City and District of Allahabad, in 1831-32.

To the Editor of the Journal of the Asiatic Society.

SIR,

The inclosed census of the town of Allahabad may be considered more accurate than that published in a former number of the Asiatic Society's Journal. Kyd-gunj adjoins the town, and should be considered a portion of it. Dara-gunj, situated on the banks of the Ganges, may be held as a suburb. The census of the whole district or zillah of Allahabad, is a mere approximation to the truth; it has not in consequence been deemed necessary to detail the population of each pergunnah. Some of the returns, from which the total was obtained, were drawn out several years ago by the police officers, other were drawn up by revenue officers. The revenue (land, abkaree, and stamps) drawn from the district amounts to about 20,90,000 Rs. whence the payments of each person will be nearly 2.68 rupees yearly.

Your's obediently,  
D. S.

1831 and 32.	Houses.	Musulmans.					Hindus.					Grand Total.
		Men.	Wo-men.	Children.		Total.	Men.	Wo-man.	Children.		Total.	
				Males.	Females.				Boys.	Girls.		
Kotwalee chouk,	1742	900.	889	323	364	2466	1746	1498	726	723	4083	7149
Badshah Munder,	3987	2397	2679	1039	1116	7223	4391	4503	1291	2366	13011	20264
Dureabad, . . . . .	926	722	826	311	404	2263	1111	1299	520	714	3614	5877
Kholdabad, . . . . .	1486	1295	1471	474	500	3740	1174	1206	543	549	3472	7312
Ahmuty-gunj, . . . . .	1178	347	293	122	134	800	1436	1155	491	591	3623	4519
Total, . . . . .	9219	5661	6158	2251	2518	16593	9850	9621	4061	4903	28433	45021
Dara-gunj, . . . . .	2084	578	602	270	258	1703	2551	2547	1029	1218	7335	8103
Kyd-gunj, . . . . .	2063	769	844	380	379	2373	2904	2841	1158	1485	6388	10661
Grand Total, . . . . .	13866	6999	7604	2911	3156	20669	15203	15009	6298	7606	44116	64785

District of Allahabad, exclusive of the town approximation,	Houses.	Hindus.		Total.	Musulmans.		Total.	Total.
		Males.	Females.		Males.	Females.		
	1,43,737	2,51,789	3,02,417	5,54,206	90,531	70,678	1,61,209	7,15,415
Grand Total,								7,80,199

*Allahabad, May, 1834.*

D. S.

## X.—Proceedings of the Asiatic Society.

Wednesday Evening, the 28th May, 1834.

The Rev. W. H. MILL, D. D. Vice-President, in the chair.

The Proceedings of the last Meeting were read.

Messrs. W. M. MARTIN, ROBERT SPIERS, and Capt. WILLIAM FOLEY, proposed at the last Meeting, were elected members of the Society.

Read a letter from W. E. FRERE, Esq., Secretary to the Bombay Branch of the Royal Asiatic Society, conveying its thanks for the XV. and XVI.

volumes of the Asiatic Researches, and announcing that Mr. WALTER ELLIOT, of the Madras Civil Service, had placed in his hands, for presentation to the Society, 20 copies of the ancient Canarese Alphabet, lithographed in Bombay through the liberality of the Right Honorable the EARL OF CLARE.

*Library.*

Read a letter from J. VAUGHAN, Esq., Librarian of the American Philosophical Society, forwarding on behalf of ISAAC HAYS, Esq. M. D. descriptions of the fossil Mastodons in the Philadelphian Museum.

The following books were presented :

Malatimdhavæ, Fabulæ Bhavabbutis, actus primus, ex Recensione Christiani Lasseni, Prof. BONN.—*By the author.*

Gymnosophista, sive Indicæ Philosophiæ Documenta : 1 fasciculus, by Professor LASSEN.—*Ditto.*

Journal Asiatique, No. 70.—*By the As. Soc. of Paris.*

Meteorological Register, for April, 1834.—*By the Surveyor General.*

The following books received from the book-sellers :

Lardner's Cab. Cyclopaedia, Middle Ages, 2nd vol.

—————, British Admirals, 2nd vol.

Library of Useful Knowledge, Lives of Eminent Persons.

*Museum.*

A large Asamese ornamented chhatta was presented by Dr. Burlini.

A stuffed Saw-fish, eight feet in length—*purchased.*

Two boxes of geological specimens, collected in the course of a survey of the river Satlej, from Ludiana to its confluence with the Indus—*presented by Captain C. M. Wade.*

*Antiquities.*

Read a letter from H. WALTERS, Esq. forwarding fac similes of the inscription on the Ramree stone, and a rough translation in Persian and English, made by himself, with the aid procurable in Arracan.

The stone was found in Ramree. It had been brought from a temple somewhere in the island to Kyúk Phyú, whence it was shipped off, both to serve as a specimen of the sandstone of Arracan and as a curious monument : there were several similar in different parts of the province.

Mr. WALTERS also forwarded specimens of shells encrusted with stalactite from the Musmye Cavern, Silhet; this cave is remarkable for the sparkling purity of its calcareous encrustations, which give it a singularly clean and imposing appearance.

The Secretary submitted the fac simile of an inscription in the Burma language, and Páli character, found at Gya, and copied by the pandit in attendance on the Burmese ambassador, with a translation of the same, as explained by RATNA PAULA.

[Printed in the present number.]

Read extracts of letters from B. H. HODGSON, Esq. resident at Népal, on the subject of inscriptions in the character No. 1, of the Allahabad column, and forwarding a native drawing of the *Matthia Lal'h*, situated in a wilderness, between *Bettiah* and the *Gandak* river, in the *Sáran* district, with an accurate transcript of its inscription. Also an accurate fac simile

of an inscription from the Ságar territory, which proves to be in old Sanscrit character, (No. 2.)

These inscriptions, Mr. HODGSON says, were communicated to the Asiatic Society, eight or ten years ago, but no trace of them could be found among its records: fortunately he has preserved the originals, from which we shall take an early opportunity to make engravings for publication, together with the author's remarks upon this and three other *Lal'hs* in North Bchar of a similar nature.

The Vice-President exhibited a fac simile of an ancient inscription in the same character, No. 2, from the iron pillar at Delhi, carefully taken off at his particular request by the late Lieut. WM. ELLIOTT, of the 27th N. I. in the year 1831.

Read extracts from Dr. J. G. GERARD's letters to the Secretary, communicating further information of Mr. MASSON's proceedings in the examination of the Afghan topes.

Mr. MASSON's letter contained copies of an inscription found on a box extracted from a tope at Jelalabad, by himself, in the same character, as that on the cylinder from Manikyála, and bearing strong resemblance to Sanskrit.

Dr. GERARD gives the following account of the disasters which befel Mr. MARTINE HONIGBERGER, on his route homeward: he had fortunately left the chief part of his collection of relics with General VENTURA.

"I beg to notice here the misfortunes which have attended Mr. HONIGBERGER's journey from Kabúl across the Hindú Kúsh mountains, in progress to Balkh and Bokhara, in the hopes that they will become known through this medium to his friends and countrymen in Europe. Mr. H. reached Bamíán in safety, and left it, to all appearances, without apprehension, but was almost immediately beset by a party of horsemen, who began a promiscuous plunder of his property, first binding the traveller hand and foot, and then threatening him with instant death, which seems to have been most fortuitously averted; the gang declaring at the same time that they had the authority of the governor, at the instance of DOST MAHOMED KHAN, for the act; but this I can scarcely credit, at least am very unwilling to trace it to such a source, though suspicion is implicated in the mystery at present. After the timely intercession of one of the party, Mr. MARTINE was untied, but he lost his arms, which were valuable, and all the cash he had on his person. In the struggle, the KAFILA BASHI', the same man who conducted Mr. BURNES and myself safely to Balkh, received several slight wounds in attempting to defend his charge. The party then resumed their journey, having been ordered direct to Khúndúz by the chief MÍR MORAD BEG, which my informant considered by no means inauspicious, since Mr. HONIGBERGER's treatment at Bamíán was likely to plead favourably with the Usbck tyrant. Nothing further was heard of him till a few days ago, while I remained at Lahore, Mons. ALLARD received a letter from himself, dated *Káulm*, stating that he was on route to Balkh, and an open road before him. A large town in the northern base of Hindú Kúsh, in the vicinity of the Oxus, where Mr. BURNES and myself supposed we were prisoners."

The Secretary submitted to the inspection of the Meeting several ancient coins, procured at Kanouj, by Lieut. A. CONOLLY, amongst which was one gold coin of Hindu fabrication, peculiarly interesting from the legibility of its inscription and superior excellence of its workmanship.

[A drawing and notice of this coin is given in the present number.]

The Secretary also laid on the table an extensive collection of ancient coins, received through Capt. WADE and Lieut. CONOLLY from Mulvi SHEKH KERAMAT ALI, now residing at Kábúl, on the part of the British Government.

SHEKH KERAMAT ALI is well known as the companion of Lieut. A. CONOLLY in his journey from Persia to India, of which an account was printed in the GLEANINGS, vol. iii. page 346. On quitting Calcutta, in 1832, to join his new appointment, he carried with him copies of all the plates of ancient coins up to that time printed, and others were afterwards forwarded to him, to assist him in the search he zealously undertook to make for Bactrian and Hindu coins, then only sparingly known to us. Later in the field, and bringing none of the knowledge of the subject possessed by his European competitors, his comparatively undirected efforts have been wonderfully successful: the collection now transmitted comprises numerous coins of APOLLODOTUS, MENANDER, HERMÆUS, EUCRATIDES, KANERKOS, KADPHISES, and indeed almost all of those enumerated by Mr. MASSON'S Memoir, besides some very curious Parthian and many gold and silver Hindu coins.

In all, the packet contains gold coins, .....	8
Silver ditto, .....	128
Copper ditto, .....	247

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[An account of such coins as are new, will be published hereafter.]

*Papers read.*

Dr. GERARD'S Memoir on the Topes of Afghanistan.

[This paper will be noticed in a subsequent number.]

Observations on the Allahabad Inscription, No. 2. with a translation. By the Rev. W. H. MILL, D. D. Vice-Pres. &c.

Dr. MILL has succeeded in restoring completely the main portion of the inscription; of which he presented a transcript in Modern Devanagari, on a large scale, interlined with a verbal translation in Latin. The Vice-President read his version of the same in English, which we shall have the pleasure of presenting to our readers in the next number of the Journal.

XI.—*Scientific Intelligence.*

*Willard's Treatise on the Music of Hindustan.*

With the exception of Sir WILLIAM JONES' valuable and learned essay in the third volume of the Asiatic Researches, we have had little information on the music of the Hindus, beyond a notice of the adaptation of the rags to the different seasons and hours in GILCHRIST'S Hindustáni Grammar, and occasional cursory (generally disparaging) mention of the existing practice of the art at nâches, in noisy processions, or on the ghats, by travellers ill capable of appreciating the peculiarities of the science of sweet sounds among the nations of the East. The instruments themselves are pretty well known; SOLWYN'S magnificent work contains accurate drawings of most of them, which have been copied into other more popular works.

The present volume therefore, a child of long promise, and consequently of high expectation, was received with avidity, as the author was known to be a skilful

performer himself on several instruments, and to have enjoyed local advantages of observation from his appointment at the native court of the Nawab of Banda : neither has his little volume disappointed us, being a familiar and pleasing account of his subject, intended for the general reader, and rendered more inviting by frequent allusion to the music of the west both ancient and modern. An author in the present day labours under evident disadvantages, in attempting to describe what the music of the Hindus was in the flourishing period of their literature and religion, when poets and priests were also musicians, modulating and singing their own compositions. To have pursued the subject as an antiquary, would have required extensive knowledge of Sanscrit, and sufficient familiarity with the varied metre of its heroic, and erotic poetry, to do without aid from native professors ; for the present cultivators of the science are for the chief part of the most ignorant and abandoned classes ; so that the very art is held to be disreputable among the more respectable ranks, just as among us the noble drama is forsworn by many, from the abuses which have crept into our theatres. Still in these degenerate days there are exceptions, and the sacred *Vin* may occasionally be heard pouring forth a strain of rhapsody that carries the imagination back to the fabulous age of *Rishés* and *Gandharbas*.

Our author treats successively of the gamut, of time, of oriental melody, rags, and raginees, (giving a long catalogue of compound rags,) instruments, vocal compositions, and of the peculiarities of manners and customs exemplified in the songs of Hindustan. Then follows a brief account of the most celebrated musicians, a copious glossary of musical terms, and copperplate tables of the varieties of time or metre with their native characters and values.

"The musicians of Hindustan never appear to have had any determined pitch by which their instruments were regulated, each person tuning his own to a certain height, adapted by guess, to the power of the instrument and quality of the strings, the capacity of the voice intended to be accompanied, and other adventitious circumstances. From this it may be observed that it is immaterial which note is designated by which letter." Sir WILLIAM JONES makes the *Kharaj*, or key-note, on the *Vin*, to correspond with A, but the author thinks it would be more systematic to tune it to *ut* or C, the key-note of the natural scale of Europe. This depends upon whether it was the intention to speak of the diatonic intervals, or of the absolute pitch of the instrument. "The notes of an octave are divided into 22 minor subdivisions instead of twelve semitones, as is done with us : these are called *srúti*, and each of them has a distinct name assigned as follow :

*Soor. Abbreviated for sofang. Srutis comprised.*

C.	<i>Kharaj</i> , . . . .	<i>Sa</i> . . . . .	Butra, Cumodutee, Mundrica, Chhundavutee.
D.	<i>Rikhab</i> , . . . .	<i>Ri</i> . . . . .	Duyavatee, Ructica, Runjuneo.
E.	<i>Gandhár</i> , . .	<i>Ga</i> . . . .	Sivee, Crodhee.
F.	<i>Maddham</i> , . .	<i>Ma</i> . . . .	Bujra, Prusaruneo, Preetee, Marjuneo.
G.	<i>Pancham</i> , . .	<i>Pa</i> . . . . .	Kshutee, Ricta, Sidpuneo, Ulapuneo.
A.	<i>Dhyat</i> , . . . .	<i>Dha</i> . . . .	Mundutee, Rohinee, Rummya.
B.	<i>Nikhád</i> , . . . .	<i>Ni</i> . . . .	Oogra, Joobhanka.

The intervals between the first and second, fourth and fifth, and fifth and sixth notes are divided into four parts ; those between the second and third, and sixth and seventh, each into three parts ; and those between the third and fourth, and seventh and eighth, which with us are reckoned semitones, each into two parts."

Captain WILLARD asserts under the division 'time,' notwithstanding the authority of TARTINI and Dr. BURNBY, that no musician can execute measures of five notes in a bar,—“There is beautiful melody in Hindustan comprising seven and other unequal number of notes in a measure, and that they have musicians in abundance that are able to execute it.” We should much doubt this fact.

Indian Harmony is mostly confined to a monotonous repetition of the keynote during the flights of their vocal or instrumental melody; for it is melody which has ever constituted the soul of the national music in India as among the Greeks and Egyptians. Our author has the following general observations on this subject.

1. Hindoostanee melodies are short, lengthened by repetition and variations.
2. They all partake of the nature of what is denominated by us Rondo, the piece being invariably concluded with the first strain, and sometimes with the first bar, or at least with the first note of that bar.
3. A bar, or measure, or a certain number of measures, is frequently repeated with slight variation, almost *ad lib.*
4. There is as much liberty allowed with respect to pauses, which may be lengthened at pleasure, provided the time be not disturbed.

The author corrects Sir WM. JONES' rendering of *râg* by the expression 'mode, or key, for which the Hindûs have the distinct word *t'hat*:—*râg* signifies rather 'tune' or 'air.'

The personification of *râgs* and *raginees*, and the series of pictures called *ragmalas*, are too well known to require any remarks; it would have increased the interest of the work to European readers had the descriptions of these been accompanied by engravings of a selected series of drawings, but we are aware that this could not have been easily done in India. The sixteen melodies set to music (always excepting the impossible 7-quaver airs) form however, an interesting part of the author's labour; the effect of metre is strikingly marked in some of these airs.

We cannot resist pointing out the close resemblance of the 9th (a Persian ghazal) to the hexameter verse; by transposing the first and second section in each line and adding one long foot the metre becomes perfect:

Ashvagari dil burda za man (*tâ*) jalva numâi,  
Kajkulahi zarrin kamari (*ham*) tanga qubâi,  
Man bavasâlash ky rasam in (*ast*) bas ki barâhash,  
Khâka shavam rôzi (*tâ*) bôsam (*man*) kañ pâi.

which may be anglicized in the metre of the original;—

(Dil burda za man—ashvagari—jalva numâi, &c.)

Oh thief of my heart, eye me not so—shining so brightly  
With head dress awry—girdle of gold—boddice bound tightly—  
When, when shall we meet! Ah not in life—not till my ashes  
Lie strew'd in thy path—kissing thy feet—treading so lightly.

## 2.—Representation in Roman Characters of the principal Asiatic Alphabets.

Mr. TRÉVELYAN has done an eminent service to literature, and to the Asiatic Society in particular, by standing forth as the advocate of Sir WILLIAM JONES' mode of expressing native characters in the Roman Alphabet. The cause had nearly become desperate, both from the influence and popularity of the Gilchristian system\*, and from the adoption of a modification of the latter by the Gov.

\* These are the only two radically opposed systems, taking the characters of the vowels as the most obvious test: the numerous modifications of the consonants are of minor importance.

erament in its surveys and records ;—when, we may say, the scale has been turned by one whose official situation, and whose zeal in the cause, promise all the success that human efforts can command. The scheme has been printed and circulated extensively ;—it has been adopted in the Persian office :—and in school-books now printing by the promulgator : while on the other hand all the learned oriental societies and their members have ever pursued it, and will rejoice in lending it their renewed support. The distinctions and marks introduced to discriminate the different classes of letters (guttural, nasal, &c.) are judicious, and can hardly be esteemed a departure from Sir WILLIAM'S scheme, while their occasional omission will be no stumbling block to the scholar, whose memory will recur to the original orthography of the word in the oriental character. We wish that all contributions to the Journal could be made to conform to the system ; but with Europeans this necessarily presupposes an acquaintance with the native characters, otherwise the fallacious ear must ever continue to guide the traveller's pen as he puts down names and places in his note-book. The promulgation of our author's scheme will however now serve the double purpose of teaching the European alphabet to the natives, while it makes theirs known to us in return. That it will have the further effect of displacing the Nagari and Persian alphabets as expected by the originator, is a point of which the discussion may be safely postponed for a few hundred years ! It is not contended that existing knowledge can or ought to be suppressed ;—that during the *transition* period, books are not to be furnished in every type for which there is a demand ;—but it is assumed that the superiority of the *reformed* system will be gradually perceived, and that “ the native alphabets, retiring before the Roman, and being naturally displaced by its incumbent and increasing weight, will eventually without violence or alarm, disappear from off the land.”

We feel no disposition to contend against the speculative *possibility* : the question requires too many concurrent data, to be made the subject of rational argument :—and as to the abstract advantages of an universal alphabet, they will be as readily granted by all men as those of an universal language.—All we would maintain is, that efforts should not be relaxed in spreading the blessing of education through the medium of the native languages and the native alphabets, in anticipation of the sudden and miraculous substitution of a type utterly foreign to the vast majority of the population.

## XII.—European Science.

*Remarks on the Report of the First and Second Meetings (1831 and 1832) of the British Association for the Advancement of Science. By D. Butler, M. D., Surgeon, Bengal Establishment.*

Four years ago, BABBAGE and BREWSTER sounded the alarm of “British science in danger” and well have the philosophers of England responded to the summons. The recent publication of this admirable report will constitute an important era in our history ; it is indeed impossible to calculate the full results of this organization of the scientific strength of the country. The plan adopted, of publishing an account, by the most competent associate, of the recent history and actual state of each department of science, is a signal boon conferred upon its admirers in all parts of the world, more especially upon residents in the more distant parts of the empire, where the original sources of such information are inaccessible. The peculiar excellence of these treatises consists in their shewing, upon good authority, and up to a recent date, the exact points where knowledge terminates and

ignorance begins; thereby indicating the most promising lines of investigation for future explorers, and obviating all the useless and ungrateful labour of its discovery.

Perhaps the most finished of these essays is Mr. AIRY'S astronomy. He notes, as characteristic of its progress in England, during the present century, an exclusive attention to the perfection of instruments, and a zeal for accumulating observations, which remain useless until they are reduced and applied by the expert and ingenious analysts of the continent. But how many thousands of these must be lost in their original form, for ever unknown to the skillful metallurgists, who could extract the valuable metal from this heap of ore! The public gratitude will not be withheld from those who thus sacrifice fortune, time, and health, to the comparatively humble toil of observation, and it will be long before the Baconian mode of seeking for truth can be undervalued; but surely there is a savour of ultraism in this blind devotion to the occupation of storing up barren facts, to the total neglect of moderate generalization. It should not be forgotten that, in nearly all the physical sciences, several of the most brilliant discoveries have been the result of happy guesses, which gave a new and infinitely more productive direction to the views of investigators. Astronomy, in short, is in want of what LYELL has so ably done for geology. Conclusions, bearing to each other the most striking relations of analogy, are allowed to stand as ultimate and isolated facts; while by connecting them, not only would their own authenticity be more firmly established, but they would directly lead to others which might without this aid be unattainable.

Thus the recent annals of astronomy are full of scattered evidences of a constant process of *uncompensated attraction*, whereby nebulae are converted into stars, and separate stars converted probably into binary or multiple systems. Instead of regarding the proper motion of the stars as merely the result of the universal law by which they all tend to approach one another in times inversely proportional to their respective masses, and to the squares of their respective distances, even the enlarged mind of Sir JOHN HERSCHEL has been employed in a fruitless attempt to shew that the only real change of this kind now in progress is the mutual approach of our sun and Hercules, and that the proper motions of other stars are merely a perspective appearance occasioned by their being situated at very different distances from our system. There can be no doubt that many of them depend upon this cause; but this attempted restriction of a universal law to a single case is a retrograde step in generalization, and an admitted failure. It seems, on the contrary, highly probable that *all* the stars of the greater magnitudes are approaching our sun in nearly right lines, and are destined, millions of ages hence, to form multiple systems with our sun, and some of the stars in the constellation of Hercules; whence would arise the necessity of a new creation of organized beings, fitted to exist in the temperatures which would be produced by this new order of things. The complication of attractions to which each star is exposed during this accelerated approach must render the case of actual collision between any pair of them a very uncommon occurrence; instead of impinging upon, they will pass each other, and will thenceforth revolve in ellipses having their common centre of gravity in one focus. That such a process of condensation is going on, we have not only the evidence of the otherwise inexplicable apparent separation of the stars of Hercules;—the rest of our nebula is undergoing the same change, the milky way visibly "breaking up," as Sir W. HERSCHEL expressed it, in many places into similar

detached groups. This is the unavoidable result of the subjection of a fluid mass of moveable bodies to the law of gravitation, uncompensated by any projectile force acting tangentially to the radius of the system.

The precipitation of *meteoric stones* upon the earth is, in all probability, another consequence of inadequately restrained gravitation. The cloudy form in which they first appear in the heavens, the light and detonation which precede their fall, and the ignited and occasionally semi-fluid state which they immediately afterwards present, all go to prove that, until their immersion in the earth's atmosphere, and their subjection to its pressure, these bodies existed in a gaseous form, and were cometary satellites of the earth, invisible when at a great distance, by reason of the smallness of their size. It seems therefore reasonable to conclude, that in the event of any portion of a great comet being drawn within the sphere of the earth's attractions, the result would be a precipitation of meteoric dust, and stones of various magnitudes, from the smallest aerolite up to the largest meteoric blocks, such as have been found in Greenland and on the plains of Russia and America.

A cause, which will accelerate the fall of these bodies, especially of those which confine their gyrations to one sun or planet as a focus, is the long doubted, much ridiculed, but now universally acknowledged *ETHER* of Sir ISAAC NEWTON, whose bold and fortunate conjectures regarding the existence of this medium, and the combustibility of the diamond, will ever be remembered, among the proudest triumphs of the human intellect. By opposing to the projectile force of these vapoury masses a continual resistance, greater\* perhaps the nearer to the sun and planets, their centrifugal force will at last be so far weakened that collision with a sun or planet must ensue. As meteoric dust and stones have in all ages fallen upon the earth, so will the comets of ENCKE and BIELA, now entangled within our sun's exclusive† attraction, be finally thrown upon that luminary: the chances of their striking a planet or even approaching so near to one as to suffer a deflection of course, which would again throw them out of the solar system, are too minute for calculation. That the dense planets themselves and their satellites similarly suffer a constant retardation, constantly approach their foci, and would in time come in contact with them, cannot be doubted without calling in question the universality and equality of the law of gravitation; but their comparatively great inertia makes the change so slow as to escape observation, and the major axis of each planet's orbit is practically considered as of invariable length‡.

\* ENCKE's comet has been observed to contract its diameter as it approaches the sun, whence it may be inferred that the ethereal medium has there a greater density, occasioned by its gravitation to the sun, and consequently a greater pressure upon the gaseous mass of the comet, and a more powerful resistance to its motion.

† It may be conjectured that many of the comets of immense period never have their perihelion twice round the same sun, but travel in a zigzag course over the whole extent of our nebula in the milky way; their projectile force being always sufficiently great to carry them within the attraction of stars different from those where they had their last perihelia.

‡ The resistance of the ether must give an eccentric form to the earth's atmosphere, and increase the pressure upon that side of the earth which is most forward in its orbit. The same resistance must tend to retard the earth's revolution round its axis, but a counter-balancing agent is here at work—the shrinking of the earth by cooling, which would have an opposite effect.

It appears extremely probable that those meteors which are observed to move horizontally over extensive portions of the earth's surface would, if watched to the end of their course, be found to terminate this by an explosion and fall of aerolites. It is also probable that the only remaining phenomenon of analogous character, that of *falling stars*, which may be constantly seen to occur in the field of a large telescope, is a case of precisely the same kind—minute cometary clouds, condensed and burnt into dust by the pressure and oxygen of the atmosphere, with the extinction of light which would follow such condensation and combustion\*.

An apparent exception to the general process of attraction presents itself in the case of a few fixed stars, which are supposed to have been changed into nebulæ. It is more probable that no such change has occurred, and that the mistake has happened through the insufficient power of the telescopes of early observers.

Mr. AIRY'S paper gives no elucidation of that strange phenomenon, so brilliant in this climate, the zodiacal light, which by its form and position would appear to be a solar atmosphere; while we know for certain that, if all its parts have the same angular velocity of rotation as the body of the sun, no such atmosphere can extend to such a distance from the sun without being entirely carried away by its centrifugal force.

Another subject which more comprehensive views could not fail to elucidate is the TEMPERATURE of the solar system and of the medium which surrounds it.

FOURIER concludes that the temperature of the whole of the planetary space, or rather of the ether which fills it, is about 58° Fal.. But if this ether obey the universal laws of gravitation, as it is reasonable to infer from general principles must be the case, and as the contracted bulk of ENCKE'S comet, near its perihelion, may be said to prove; moreover, if, as is probable, this ether be highly mobile and obedient to the laws of latent heat, its density must be greater in the vicinity of the sun and planets, and each atom of ether in approaching the sun or planets must have its temperature raised by the partial loss of its capacity for heat, and will again lose this heat in moving away from the sun or planets: whence it will follow that the ethereal temperature must be higher in the neighbourhood of the larger of these bodies, and that FOURIER'S deduction concerns only that portion of the ether which immediately surrounds the earth's atmosphere.

If we suppose the whole solar system to have been at its creation endued with the same temperature, and if we consider its members as so many liquid spheroids, subjected to the usual laws of cooling, the largest and rarest masses, and those protected by the largest atmosphere envelopes, retaining their heat the longest; to have an explanation of the present high temperature of the sun, which with only  $\frac{1}{3}$  of the earth's density has 300,000 times more weight, of the moderated temperature of the earth's surface, of the ice-bound condition of the surface of the moon, which with a greater density than the earth has, only  $\frac{1}{10}$  of its weight, and hardly any appreciable atmosphere, and of the apparently fluid condition of the

\* It is a popular belief in some parts of Great Britain that falling stars have been found in a gelatinous form upon the earth's surface; and from professor SILLIMAN'S Journal, it would appear that the same notion is current in America; the "sparkling jelly," there described, would form a curious subject for chemical examination! From the composition of aerolites it would seem that the elementary components of the universe are the same every where, but this singular substance would appear to have no representative in our globe.

surface of Jupiter\*, which with a density, and therefore a heat-conducting power, even less than those of the sun, has 300 times the earth's weight.

Popular belief, both in ancient and in modern times, has attributed a frigorific power to the rays of the moon. Modern philosophers, on the contrary, have all expected a calorific effect from the concentration of her beams; and an American journalist has recently published the alleged result of an experiment, in which an evident rising of the thermometer was occasioned by a powerful arrangement of this kind. Dr. LARDNER, in his monogram on heat, published in 1833, calculates on the supposition that the respective heating powers of the sun and moon's rays are in the ratio of their brightness; that in the experiment of DR LA HIRE, who condensed the lunar rays 300 times by a 3-foot burning glass, the heating effect could not have been so much as  $\frac{1}{5}$  of a degree. Sir JOHN HERSCHEL, in his work (which I have not seen) on ASTRONOMY, also published last year, gives the following imaginary description of the lunar climate:

"The moon has no clouds, nor any other indications of an atmosphere; hence its climate must be very extraordinary: the alternation being that of unmitigated and burning sunshine, fiercer than an equatorial noon, continued for a whole fortnight, and the keenest severity of frost, far exceeding that of our polar winters, for an equal time. Such a disposition of things must produce a constant transfer of whatever moisture may exist on its surface, from the point beneath the sun to that opposite, by distillation *in vacuo*, after the manner of the little instrument called a cryophorus. The consequence must be absolute aridity below the vertical sun, constant acretion of hoar frost in the opposite region, and, perhaps, a narrow zone of running water at the borders of the enlightened hemisphere. It is possible then, that evaporation on the one hand, and condensation on the other, may to a certain extent preserve an equilibrium of temperature, and mitigate the extreme severity of both climates."

In this instance, popular prejudice, though also overshooting the mark, has probably erred less than philosophical hypothesis. There is no sufficient reason for believing that the moon's temperature ever was higher than that of the earth at the same time; and on the supposition that at some very distant period they were equal, it must follow from the greater comparatively surface of the moon, from her greater density and heat-conducting probable power, and still more, from her almost total want of an atmosphere, that her temperature on the surface is very greatly inferior to that of any portion of the earth; whence, under any circumstances, the earth must constantly give out heat to the moon, which will, therefore, with effect, appreciable or not, according to the power and sensibility of the instruments employed, act upon the thermometer like the mass of ice used by the Florentine Academicians, which gave rise to so many speculations upon the possibility of a radiation of cold. It is probable that the temperature of the moon's surface does not exceed that of the ethereal space which immediately surrounds it; and, from the considerations above detailed, especially the moon's smaller mass, that this falls short of the temperature determined by FOURIER as belonging to the ethereal space immediately beyond the earth's atmosphere.

\* The physical condition of Jupiter's surface, his ever-varying belts, all disposed in parallelism with his equator, and the occasional more permanent spots like the summits of icebergs floating in a liquid medium, would perhaps be best explained by the hypothesis of this planet still being in a state of partial fusion. His moons may be at a lower temperature, and now inhabited.

The telescopic appearance of the moon, the snowy covering of her mountains, continents, and the silent ruggedness of her frozen seas, might suffice to disprove the existence of a temperature upon her surface equal or similar to that of the earth. In what respect, it may be asked, differs the aspect of the bright portion of the moon's disc from that which would be assumed by a portion of the Himalaya mountains viewed at the distance of the moon, when winter has clothed both eminence and valley in a uniform robe of snow, and bound in icy chains every stream and expanse of water? In that elevated region of the earth there is a partial, in the moon there is nearly a total, want of that atmospheric envelope, which, like a garment, enables those bodies which receive it to retain the solar warmth. The moon's rays will no more heat a warmer thermometer than will the concentrated light given out by a snowy range of terrestrial mountains. This refrigeration appears to have extended through a great thickness of the moon's external crust, for her volcanoes are nearly extinct: the flames which they give out were barely visible even through Sir W. HERSCHEL'S powerful telescopes.

Still less compatible with their snowy whiteness, and with the bold precipices and overhanging character of the lunar Alps, is Sir JOHN HERSCHEL'S idea of a monthly revolution of the climate on the moon's surface. Not only would the *limen terminator* or boundary of light and darkness be followed during the moon's increase by a bright line of melting snow, while the enlightened face generally would present a scene of overwhelming deluges, breaking down the edges of its numerous elevated cavities, and reducing the moon's surface to a near resemblance to that of the earth; but the irresistible expansive force of the ice, monthly freezing in the fissures and cavities of its mountains, would in the course of a few years reduce these to a much smaller altitude than those which are now left upon the earth.

It is probable indeed, that the causes of the striking differences between the lunar and terrestrial surfaces may be referred solely to the smaller bulk and rarer atmosphere of the moon. An attentive examination of the most ancient craters of volcanoes now active, such as Vesuvius, will shew, that the first stage of a violent eruption must have been the blowing into the air an inverted conical mass of the mountain, two, three, or four miles in diameter, leaving a crater of similar dimensions, such as may yet be traced of Vesuvius, where Monte Somma forms the eastern edge of the ancient crater, upwards of four miles distant from the western; with the modern cone and crater rising between them, like the central elevations, which are to be seen in the circular hollows of the moon. From the smaller force of gravity at the moon's surface, the masses displaced by those explosions have greatly exceeded the size of any craters that can now be traced upon the earth, many of the lunar cavities being from twenty to fifty miles in diameter and a mile or two in depth. A rapid refrigeration appears to have followed the active era of the lunar volcanoes, so that the whole of them remain visible and unaltered by falls of rain or by alternate frosts and thaws, (while the operation of these causes upon the earth's surface has left barely traceable vestiges of whole volcanic regions;) and, during the short period of her being a habitable world, her atmosphere must have consisted chiefly of watery vapour.

If would appear, from the known laws of the communication of heat by radiation, that the created universe is constantly suffering a loss of that principle, which can be supplied only by successive exertions of the creating power. Hence the decay and loss of old stars, and the appearance of new ones recorded in the annals of astronomy.

Meteorological Register, kept at the Assay Office, Calcutta, for the Month of May, 1854.

Days of the Month.	Barometer reduced to 32° Fahr.			Thermometer in the Air.			Depressed Maximum Thermometer.			Bar Hygrometer.			Rain. Inches.	Wind.		Weather.		
	At 4 A.M.	At 10 A.M.	At 4 P.M.	At 4 P.M.	Max. Therm.	At 10 P.M.	At 10 A.M.	At 4 P.M.	At 10 P.M.	At 10 A.M.	At 4 P.M.	At 10 P.M.		Morning.	Noon.	Morning.	Noon.	Evening.
1	777	784	790	80.6	111.0	91.0	83.0	2.0	6.0	9.3	9.3	94.0	91	S	E	clear.	clear.	clear.
2	770	779	785	80.0	107.2	92.1	84.0	3.8	6.3	9.4	7.0	92.0	90	S	N.W.	do	cloudy.	do
3	780	787	793	80.7	108.0	92.7	85.3	3.0	5.8	9.3	6.1	94.0	96	S	E	do	clear.	do
4	780	786	792	80.2	108.1	92.6	85.3	3.0	5.8	9.4	5.0	92.0	96	S	S	do	do	do
5	780	786	792	80.2	108.1	92.6	85.3	2.7	7.3	11.3	6.2	92.0	96	S	S	do	do	do
6	780	786	792	80.2	108.1	92.6	85.3	1.9	7.4	10.7	4.1	91.0	93	S	S	do	do	do
7	785	792	798	80.7	108.5	93.1	86.4	3.1	7.2	11.5	4.1	91.0	93	S	S	do	do	do
8	787	794	800	81.0	107.8	92.7	86.4	3.7	9.2	12.7	4.3	88.0	91	S	S	do	do	do
9	789	796	802	81.3	107.2	92.6	81.0	2.6	8.0	11.7	8.3	88.0	83	S	S	do	do	do
10	785	792	798	80.7	108.0	92.1	81.0	6.9	9.9	12.6	4.0	86.0	81	S	E	do	do	do
11	788	795	801	81.0	108.3	92.5	81.0	3.7	6.3	11.0	9.2	87.0	83	S	E	do	do	do
12	785	792	798	80.7	108.0	92.1	81.0	5.4	10.8	14.3	6.7	83.0	76	S	N	do	do	do
13	785	792	798	80.7	108.0	92.1	81.0	2.8	11.2	15.2	12.0	84.0	74	S	var.	do	do	do
14	785	792	798	80.7	108.0	92.1	81.0	4.0	10.7	14.8	4.9	86.0	88	S	var.	do	do	do
15	785	792	798	80.7	108.0	92.1	81.0	4.0	10.7	14.8	4.9	86.0	88	S	var.	do	do	do
16	785	792	798	80.7	108.0	92.1	81.0	7.5	7.9	10.9	4.7	91.0	83	S	S	do	do	do
17	785	792	798	80.7	108.0	92.1	81.0	2.8	7.7	11.9	7.5	91.0	83	S	S	do	do	do
18	785	792	798	80.7	108.0	92.1	81.0	3.5	8.6	11.7	7.5	91.0	83	S	S	do	do	do
19	785	792	798	80.7	108.0	92.1	81.0	3.3	10.7	12.1	13.7	83.0	82	S	S	do	do	do
20	785	792	798	80.7	108.0	92.1	81.0	3.3	10.7	12.1	13.7	83.0	82	S	S	do	do	do
21	785	792	798	80.7	108.0	92.1	81.0	4.6	8.1	10.4	4.7	91.0	87	S	S	do	do	do
22	785	792	798	80.7	108.0	92.1	81.0	7.2	9.9	13.0	2.2	88.0	87	S	S	do	do	do
23	785	792	798	80.7	108.0	92.1	81.0	2.0	6.8	9.0	5.0	92.0	94	S	S	do	do	do
24	785	792	798	80.7	108.0	92.1	81.0	3.0	6.1	9.7	3.1	92.0	97	S	S	do	do	do
25	785	792	798	80.7	108.0	92.1	81.0	4.5	5.9	4.8	3.1	80.0	91	S	var.	do	do	do
26	785	792	798	80.7	108.0	92.1	81.0	4.2	8.4	9.4	3.7	86.0	91	S	var.	do	do	do
27	785	792	798	80.7	108.0	92.1	81.0	2.4	6.8	9.4	3.4	83.0	89	S	S	do	do	do
28	785	792	798	80.7	108.0	92.1	81.0	2.8	6.8	9.4	5.3	91.0	79	S	S	do	do	do
29	785	792	798	80.7	108.0	92.1	81.0	3.3	7.5	10.0	7.5	89.0	76	S	S	do	do	do
30	785	792	798	80.7	108.0	92.1	81.0	6.0	7.1	10.1	4.3	89.0	84	S	S	do	do	do
Mean.	785	792	798	80.7	108.0	92.1	81.0	3.7	7.9	10.9	6.1	90.0	84	monsoon.				

The thermometers for 10 A. M. and 4 P. M. are suspended in the free air of the Laboratory, those for 5 A. M. and 10 P. M. in the south window of a tiled store near the cathedral. The register thermometer for extremes is also in the same window.

# JOURNAL

OF

## THE ASIATIC SOCIETY.

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No. 30.—June, 1834.

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I.—*Restoration of the Inscription, No. 2, on the Allahabad Column.* By the Rev. W. H. MILL, D. D. Principal of Bishop's College, Vice-President of the Asiatic Society, &c.

[Read at the Meeting of the 28<sup>th</sup> ultimo.]

THE March number of the Journal of the Asiatic Society contained the result of the Pandit MADHU RAO's collation of the Allahabad Inscription, No. 2, with others in a similar character—together with Captain TROXER's English version and valuable remarks. The learned Pandit's transcript exhibits such letters only of the pillar in Devanagari as were capable of tolerably certain identification with those found on monuments already deciphered, leaving frequent and often considerable intervals for the remaining letters: and the version, as was indeed unavoidable from such a text, presented still wider intervals. The translation of many of the clauses thus insulated was necessarily of a conjectural kind: and except in the valuable discovery of lines 25 and 26, where the Prince's genealogy occurred, contained nothing like a connected sentence.

A cursory inspection of the transcript and the version convinced me that, where so much was done, more might be certainly attained. To those acquainted with the art of deciphering unknown arbitrary characters in any *known* language, it is needless to remark that the clear possession of a key to two or three common letters, necessarily draws after it the discovery of all the rest: and that where the further progress of discovery is really barred, it is an infallible proof of some error in the previous assumption. No such error was suspected here, (except in some comparatively inconsiderable instances, which may be seen by any one that will take the trouble of comparing the two transcripts together.)

and therefore nothing could impede the progress to deciphering the inscription as far as it remained—provided only the language in which it was written were sufficiently known to us.

Now that this language was the well-known classical Sanscrit—the language of MĒNU'S Institutes, the Purānas, the Kāvya, &c. admits of no reasonable doubt. The supposition of its being any older Sanscrit, resembling that of the Vedas, to the understanding of which a *bhāṣya* or gloss is all but indispensable, is rendered extremely improbable by the apparent date of the monuments on which inscriptions of the same character appear. The style of the Gya Inscription, so satisfactorily deciphered by Sir CHARLES WILKINS in the 1st volume of the Asiatic Researches; and the metre in which it is composed, the *Sardūla-vikrīḍita*, (which, like all other lyrical measures of that kind occurring in the Hindu drama and elsewhere, belongs to a period in the history of the language long posterior to that of the great sacred epics, the Rāmāyana and Mahābhārata, by which the present classical Sanscrit was fixed,) would alone be sufficient to remove such a supposition.

With this conviction, I determined to subject the Allahabad Inscription to a close critical examination; discarding in the first instance all reference to other interpretations of the inscription itself, and proceeding only upon the indubitably deciphered letters of the above mentioned Gya Inscription, or rather of that portion of it, of which Lieutenant BURR has now given us a far better fac simile than what is contained in the Society's first volume. Applying this to his excellent copy of the Allahabad Pillar, though at first the limits of discovery appeared no wider, and indeed much narrower, than in what has already been presented to the Society, yet by carrying on the results of what was thus ascertained, wherever any glimpses of decided meaning appeared, to the investigation of characters before unknown, and testing the conjectures thus made by other places—the usual result of such inquiries displayed itself. What was at first mere assumption turned to probability, and then to certainty: and such places as the juxta-position of the names of known countries in line 19, but above all, the short clause in line 27 on which the rest of the inscription hangs—(*ravi-bhuvó bāhur ayam uçchritas stambhas*, "of this Sun-born king THIS LOFTY PILLAR is the arm")—occurring as they did to me not as the basis of conjecture, but as the unexpected results of inferences from other probable assumptions,—removed all possibility of doubt. And notwithstanding the turgid character of the composition, and the enormous length of the epithets affixed to this "child of the Sun," consisting often of more than 25 words, and filling the whole line—the meaning is sufficiently connected and definite in this, which is the greatest part of the inscription, to remove all doubt

of the accuracy with which Devanagari letters are assigned to the several characters\*. In one only of the regal proper names, that of the king's grandfather **GHATÓTKACHA**, does my reading differ from Captain **TROYES**'s: and it is observable that this is also the name of a son of the Pándava hero **BHÍMA SENA**, brother of **YUDHISTHIRA** and **ARJUNA** in the Mahabhárata, and might perhaps have given rise to the popular appellation of this pillar in Hindustan, "the Staff of **BHÍMA SEN**."

The test arising from *definite and continuous meaning* applies of course only to those parts where the inscription is itself complete, and clear of all considerable interruption, viz. all from the 14th to the 29th lines inclusive, (for the 30th is separate from the rest, and appears broken off like the earlier lines,) perhaps also the 2nd and 3rd, which, though short, seem to me to be very nearly complete. But even in the other lines, the *words* and the *compounds* are intelligible: and if we except the 1st, and the end of the 6th, lines (the first containing but nine insulated letters, and the last breaking off in the midst of a compound, leaving the preceding words *in that compound* uncertain as to their bearing)—the separate clauses may be pretty well traced, though their import in the sentence is lost. In all these, lacunæ of various lengths occur in the pillar, which I have scrupulously filled up with precisely the same number of letters as are designated by Lieutenant **BURT** for the several intervals. It is not by any means intended to ascribe to these added† letters of my own, (except when the interval is very small, as in line 24,) the same degree of accuracy which I should be disposed to claim for all, with one or two exceptions only, of the *transcribed* letters: for the most part they merely indicate the probable (and in some cases of very marked meaning, as in line 28, the certain) *equivalents* of the letters that formerly occupied the same spaces. Where lacunæ occur at the end of a line, I had no such consideration to guide me: here, as in lines 18 and 26, it was merely my object to close the imperfect compound by as few letters as would serve the purpose of expressing the evident meaning. In the earlier lines, the idea of completing the *sentence* by such means was out of the question.

\* In one instance I was assisted to the meaning of an ill-defined letter resembling a **q** in the accurate fac-simile,—by the partial specimen of the inscriptions on the pillar given in the 7th Volume of the *As. Res.* (Plate xiv.)—which though very inferior in accuracy to Lieutenant **BURT**'s, yet having been taken at a time when the pillar had not been so much defaced as at present, may be conceived to convey some characters more perfectly. The character was there **q** distinctly, and as this happily made sense of what was before unintelligible, its accuracy could not be questioned.

† These letters are distinguished in the transcript by a much smaller character.

In these conjectural supplements, as well as for ascertaining the true transcript of letters in doubtful cases, the discovery of a lyric measure like that of the Gya Inscription, in which the succession of long and short syllables is determined by invariable rule, would have been a most valuable assistance. But not merely is such measure as this undiscovers in the greater part of the inscription—but every rhythm whatever (including the freer measures of the *Arya* genus, or the loose *Anustup* of VALMIKI) is equally absent from it—as an examination of all the complete lines from the 14th downward will evidently show\*. Some of the incomplete lines have indeed a deceitful resemblance to metre—the 4th line to the *Sárdula-vikrídita*, (the measure of the Gya Inscription,) and the 12th to a yet longer lyric measure of twenty-one syllables, called *Srag-dhará* : but in each of these cases the perfect application of the prosodiocal rule is forbidden† by some one or more syllables in the line, whose reading cannot be mistaken. The only genuine appearance of metre that the closest examination could detect is in the 8th and 9th lines, which are proved by the undeviating regularity of all the syllables, as far as they can be traced on the pillar, to form together a stanza of the measure called *Mandákrántá*, (the same in which CALIDASA's beautiful poem, the Cloud Messenger, is composed,) one of very frequent occurrence in the lyric poetry of the Hindus. In this measure, each of the four *pádas* or verses which compose the stanza consists of two Spondees, a Proceleusmatic, and three Bacchii, having the *cæsura* after the tenth syllable; thus :

— — — — — 0 0 0 0 — — — — —

Accordingly, in the additions necessary for these two lines, I have taken care not only to preserve the measure, but to expand them so as to complete the hemistich in each case. But this slight and solitary advance beyond the usual necessary addition of letters is made more to indicate the prosody of the preceding syllables, and to mark precisely the certain length of the line in these places, than with any pretence of supplying the very words that are effaced. The real termination of these lines, as of the fourth and others, if found, would clear up the obscurity that now necessarily attaches to all the early part of the inscription, and on which it would be now vain to offer any conjecture.

\* The apparent rhyme observed by Lieut. BURT, is merely the genitive termination *aya* at the end of each huge compound epithet, agreeing with "the Sun-born King" above-mentioned.

† The name *kávyam* applied by the author himself in line 28 to his inscription, will apply to unmetrical poetry, as well as to that which has the advantage of prosody.

To the Devanagari transcript is annexed a close interlineary version, in the only language (one excepted) whose freedom of collocation and general analogy to Sanscrit made it available for this purpose—distinguishing always by brackets the version of the intercalated or added syllables, the necessity of which will thus be often apparent to the Western reader. I have now to subjoin a somewhat looser version in English—to which I would prefix merely the following brief analysis of the inscription.

LINE. 1. Unintelligible, and most probably unconnected with what follows.

2, 3. Invocation in behalf of the sculptor and blackener of the letters of the inscription.

4—12. Various descriptions, at first dependent on the relatives *yas*, *yasya* (who and whose), but afterwards governed by the antecedent personal pronoun *sa*, (he,) all of which evidently relate to the same person, and that the king—but which, from the incompleteness of the lines, and the absence of verbs governing the principal substantives, cannot be traced in their conjunct meaning as one sentence, which it is evident they must have composed.

13—27. Panegyric descriptions of the same king in the genitive case, (connected at first with the nominatives of line 13, but afterwards evidently with the Pillar-Arm at the conclusion,) viz. SAMUDRA-GUPTA, SON OF CHANDRA-GUPTA, of the Solar race, all sufficiently perfect and intelligible.

28. Comparison of the king's glory to the sacred water of the northernmost Ganges in the Mahabharata.

28, 29. Name and description of the self-satisfied author of this panegyric, (whose intellect, as he tells us himself, was utterly subverted by his intimacy with the great king, when he ventured on this composition,) concluding with a salutation to the Deity.

Then, after a very wide space, comes

30. A compliment, somewhat obscure and imperfect, to the author's immediate superior and patron.

#### TRANSLATION.

1. *The jackal [left the b]ear in the forest. (♀)*
2. This goodly s[ign] of one endued by nature with a mind of fire having been, for the conveyance of his commands, covered over with ink; may the ma[ker also] fixed [as the letters themselves by the durability and immortality of the monument he has raised, viz.]
3. The [king's] dependant VITKA, having formed these [letters] for the love of the multiplied virtues of the son of the bow-armed GIVA [viz. GANESA patron of letters] enjoy in heaven, even in the city of VINDHAR [BRAHMA] himself, the royal glory of eminent poetical dignity!

4. He who while worthy of eulogy, yet by means of informers, whose character is much to be concealed, men whose hair is diminished by being often pulled, was entangled and impeded by the pride of men of obscure family, a hoary-headed counsellor being - - - - -
5. He who was distinguished in letters, even by the able ontologist CHAKAN, called familiarly the talking Guru, with the honourable appellation of one in whom all [admirable qualities] are united. - - - - -
6. By this [excellent Guru] resembling those [true sages] who are utterly alien from all delight in selfish worldly occupations, - - - - -
7. He, having been inflamed with warlike prowess, before whom prostration being made even by the enemies' forces, the conjoined battle strife of armies disappeared, - - - - -
8. Whose mothers-in-law\*, formerly proud and addicted to high minded oppressions perpetually, having been by his own arm subdued with the sword of battle, [viz. SANHA'RICA' and the rest, - - (line 18.)] - -
9. By their passions, at first fiercely erect and tall as the stalks of green barley, at length bursting forth and ripening into affection through the abundant juices within, thus became penitent [in heart permanently from that time ; and]
10. When, sprung from the bank of the [sacred ?] river, the strength of the arm of RA'XASA and the rest, directing his arms, had even removed mountains, by the death of the formidable [rapid victor] XANAJIT,—then he also
11. With assiduous offerings to the planetary deities—did in his own pleasure gardens, from which are gathered noble garlands of flowers woven as it were from the Sesbana grandiflora—[seek to propitiate the immortals].
12. But though the glories of greatness, of clemency, and of warlike prowess were in him blended into one, as [the several colours] in the pure white rays of the moon ; yet was there at this time no [remission of his past grievous offence.
13. Still not his was the path of those devoted to the present life, nor any dereliction of the wisdom and power which belongs to contemplative sages ; nor was there any poetical censurer of him, whose gifts were without end.

\* \* The great Rajas of India have frequently been polygamists—and in these cases, the father and mother of each wife, as well as those of the sole rightful queen, bear the honourable names of *svasura* and *svasú* (*socer* and *socrus*), i. e. father and mother-in-law. The mothers-in-law here appear to have been independent princesses, whose daughters were thus won in battle by SAMUDRA GUPTA, and seem to me undoubtedly those, whose homage to the conqueror is described as increased by their alliance and hope of royal offspring, in lines 18, 19. With respect to the grievous sin for which his repentance is recorded in line 12, the incompleteness of the line precludes all but the merest conjecture.—On the 6th and 7th lines it may be remarked that the heroic ages of India afford examples of Brahmanical *military* tutors to young Rájas,—who like DRONA are said to have united great skill in war to eminent contemplative devotion.

14. Of him therefore, skilled in the due performance of the hundred libations of consecrated *ghœe* to BRAHMA, who by the strength and power of his arm reduces his foes to bondage, and brandishes for the destruction of their hosts barbed darts and swords and lances\* ;—
15. Of him whose salvation is in the guardian of waters [VARUNA] the terrible SIVA and VISHNU, surpassing the graces of the most adorned recited speech by the rising splendours of a name illustrious for the hundred wounds inflicted on the [rival] tribe by strokes of the flesh-devouring arrows of iron, as well as of weapons grasped by the hand and others ;—
16. Of him, who after the royal insignia had been destroyed by the hand of the [hostile] monarch, as it were the tiger of the forest, the great lord of wild buffaloes,—yet having from the resources of his excellent guardian GIRI-KAHLA'RAKA the gift of infantry and other soldiers—became by the mixture of this benevolent aid with the royal majesty that sprung from it, no longer unfortunate ;—
17. Of him whose mind was next intent upon the capture of all the kings of the South and of the East, as well as of DHANANJAYA, protector of the North country, springing from the race of the divine UGRASENA, splendid as the sun, and patron of HASTIVAKMAN—a bard equal to the blue sovereign [SIVA ?] himself ;—who therefore is justly worshipped by his ministering lieges, as sole king of all the gods ;—
18. Of him whose state might be propounded as an object of imitation, in respect of troops, chariots, and other [war-like apparatus] even to the divine RUDRA, the wise NAGADATTA, to CHANDRA [god of the moon] to VAHNI [or AGNI, lord of fire], to GANESA, to NRIGA, [brother of IXVACU, of the solar race], to NAGASENA, and to the unmoveable forces of the NANDIS [SIVA's attendant gods]—and who moreover by SANHA'RICA' and all the rest [of the vanquished mothers-in-law] who have the accumulative incentive of the wish and prayer for a royal offspring, is approached with all just payment of tribute, with propitiatory gifts, and with reverent prostration ;—
19. Of him who when his fame penetrated to the friendly province of Pines—to *Camarûpa* [the present kingdom of Assam]—and to *Nepal*, did for the sake of procuring a shower of darts to pierce the princes even of the extreme west and other quarters, dispose his soldiers in ambush behind the stations of the cowherds of *Madra*—and is therefore celebrated by the poet whom this battle raised up [to commend the stratagem], as equal in the rapid destruction of his foes to the Lord SIVA, or to CAMA OF ARUNI, [the gods of love and fire—thus celebrated] also by SANHA'RICA' and all the rest [of the allied princesses] ;—
20. Of him whose government is invariably strict—who moreover has the glory, & glory pervading the highest heaven, of largesses to destitute persons, invited by him in pursuance of the restitution of a royal race sprung from a kingdom which the [enemies] soldiers had subverted—

\* Or "iron clubs." For the Sanscrit *तौलक* bears both meanings.

- who moreover imposed on the rank foliage of forests, on the lakes, and on the land, the chains [of clear roads and of bridges respectively]—who on the earth has no equal as a car-borne warrior ;—
21. Of him who bears a gentle and kind disposition, to be hailed by the inhabitants of all the islands of the ocean with pure constant worship of oblation and sacrifice—the materials of which spring from the rich revenues obtained by his wise assessment from the produce of cultivators firmly and devotedly subjected to him as was the bird GARUDA to VISHNU, [a devotion testified] by the harmonious confluence of their loyal words and songs addressed to himself—who also without being addicted to works [alone, but spiritual science also, yet] bestows hundreds and thousands upon the affairs of heaven and of earth ;—
22. Of him whose glory in war obliterates that of all other kings beside himself, by reason of the multitude of virtues, diverse in kind, embellished in hundreds of poems—from fear of whose [vigorous rule] dissensions never arise—who is alike pure from the stains of grief and of foolish laughter—who is in devotion unrivalled—and who having by his own arm subdued so many kings, has succeeded further in taming the so great fury and wrath [that such reverse naturally produces] by the continual intercourse and profit of the western commerce begun with the riches derived from that conquest ;—
23. Of him who is pleased with long poems of victory closely following the battle-array formed by the king himself, whose disposition is that of the [Supreme Lord, the] Lord of the Poor ; who is at the same time the slayer of elephants that smite in war—and is consecrated as the most excellent of learned kings by [CUVERA] giver of wealth, by VARUNA, by INDRA, and him who dwells in the mansions of death [YAMA] ; who is renowned for noble exploits to be heard to distant times, and sounded even to heaven ;—
24. Of him by whom are well understood, the GANDHARVAS or celestial songsters, learned and of excellent wisdom ; also the regent of the planet Mars ; also [BALARA'MA\*] foe of the earth ; also the preceptor of INDRA himself, the lord of the thrice-blessed immortals [viz. VRIHASPATI, regent of Jupiter] ; also TUMBARU [the wise GANDHARVA], and NA'RAIDA, and all the rest [of the ultra-deified sages]—who moreover is consecrated as the most excellent of kings by acts worthy of the poems of the great Rishi VYANNACA [or the foodless†], who is renowned for noble exploits to be heard to distant times, and sounded even to heaven ;—

\* So I conjecture from the legend found in the Sri Bhágavat and elsewhere concerning BALARA'MA, the 8th incarnation of VISHNU, having depressed all the eastern part of the earth. But perhaps the epithet may refer to the deities of the destroying elements Water or Fire.

† Perhaps a title of the great VALMIKI, author of the Ramayana, who is said to have fasted ten thousand years ! unless the terms of the inscription should be thought to require the name of some poet who has sung the exploits of SAMUDRA-GUPTA himself.

25. Of him whose mind is in time of affliction and distress, ever singly intent on the disposition and arrangement of charitable works; who is a god in the mansion of the world; the great grandson of the great king GUPTA, grandson of the great king GHATOTKACHA, son of the great king, the supreme monarch CHANDRA GUPTA;—
26. Of him who is also maternal grandson of LICHEAVI, conceived in the great goddess-like CUMA'RA-DEVI, the great king, the supreme monarch SAMUDRA GUPTA, illustrious for having filled the whole earth with the revenues arising from his universal conquest, [equal] to INDRA chief of the gods;—
27. Of this child of the Sun, though clothed in hairy flesh, this lofty pillar is the arm, sustaining all his friends with powerful assistance both at home and in foreign travel; of him, [I say,] whose fame raised by gradual accumulation of materials to the most exalted eminence in the strength of the arm of his liberality, and the abundance of his sentences respecting the law of tranquil meditation, is extended in various directions.
28. And that [fame] purifies the three worlds; even as the [sacred stream given by ARJUNA the hero] of the house of PANDU, [purified the dying] BHISHMA, thus encircled within the noble bandage of the clotted hair of SIVA [whence Ganges first sprung]. Such is the unequalled eulogy, the composition of him who serves the countenance of the great monarch, who by reason of the favour of continually going about in his presence is even infatuated in mind,—
29. The mature\* dwarf—son of the great superintendant of penal justice SHAYA-BHU'TI, who is both in peace and war, the counsellor of the young king, the great superintendant [of penal justice] HARI NANA. Salutation to [God], the kind friend of all creatures.
30. But with whom, however devoted to the study of the Rig Veda, the best gift of the Supreme Sovereign, [can we compare] TILASHATTA, the great superintendant of penal justice, surrounded by his army [of inferior ministers of the law]?

*Remarks on the above Inscription.*

The style of laboured ornament affected in the public inscriptions of India is strongly contrasted with the severe simplicity of the same kind of composition in the monuments of other ancient nations: and the deciphering of the Allahabad pillar does not appear destined to remove in any degree this reproach from the national taste. With this criticism, however, of this inscription, as a literary work, we are little

\* I am by no means satisfied with this rendering of *वृद्धरूपिक* but I can find no better. The translation "culinary dwarf" had occurred to me: thus associating to the character of *dwarf* (in Sanscrit *वृद्धरूप*) that attachment to good cheer, which is a standing characteristic of the half buffoon, half counsellor, called *Vidushans* in the Indian drama, and considered as a Brahmanical appendage to royalty. But the words scarcely bear out either interpretation:—nor is this association of the characters of *dwarf* and of *royal attendant* confirmed by any Indian example that I am aware of, however common in the fairy tales of Persia and the West.

concerned : but only with the light that it may help to throw on the history of the people for whom it was written.

Were there any regular chronological history of this part of Northern India, we could hardly fail in the circumstances of this inscription, even if it were without names, to determine the person and the age to which it belongs. We have here a prince who restores the fallen fortunes of a royal race that had been dispossessed and degraded by the kings of a hostile family—who removes this misfortune from himself and his kindred by means of an able guardian or minister, who contrives to raise armies in his cause; succeeding at last in spite of vigorous warlike opposition, including that of some haughty independent princesses, whose daughters, when vanquished, become the wives of the conqueror—who pushes his conquests on the east to Assam, as well as to Nepal and the more western countries—and performs many other magnificent and liberal exploits, constructing roads and bridges, encouraging commerce, &c. &c.—in all which, allowing fully for oriental flattery and extravagance, we could scarcely expect to find more than one sovereign, to whom the whole would apply. But the inscription gives us the *names* also of the prince and his immediate progenitors: and in accordance with the above-mentioned account, while we find his dethroned ancestors, his grandfather and great-grandfather, designated only by the honorific epithet *Mahá-rája*, which would characterize their royal descent and rights—the king himself (SAMUDRAGUPTA) and his father are distinguished by the title of *Máha-rája Adhirája*, which indicates actual sovereignty. And the last-mentioned circumstance might lead some to conjecture, that the restoration of royalty in the house began with the father, named CHANDRAGUPTA, whose exploits might be supposed to be related in the first part of the inscription to add lustre to those of the son.

Undoubtedly we should be strongly inclined, if it were possible, to identify the king thus named—(though the name is far from being an uncommon one) with a celebrated prince so called, the only one in whom the Puranic and the Greek\* histories meet, the CHANDRAGUPTA or SANDRACOPTUS, to whom SELEUCUS Nicator sent the able ambassador, from whom STRABO, ARRIAN and others derived the principal part of their information respecting India. This would fix the inscription to an age which its character (disused as it has been in India for much more than a

\* This identity, which after the researches of SCHLEGEL (*Indische Bibliothek*), and WILSON (preface to the *Mudra Ravasa* in the 3rd volume of the *Hindu Theatre*), may be considered as established, has been questioned on very insufficient grounds by Professor HEEREN in the last volume of his admirable *Researches into the Politics, Intercourse, and Trade of the Principal Nations of Antiquity*. The Indian accounts vary as much from each other concerning CHANDRAGUPTA as they do from the classical accounts of SANDRACOPTUS.

thousand years), might seem to make sufficiently probable,—viz. the third century before the Christian era. And a critic, who chose to maintain this identity, might find abundance of plausible arguments in the inscription: he might imagine he read there the restoration of the asserted genuine line of NANDA in the person of CHANDRAGUPTA, and the destruction of the nine usurpers of his throne: and in what the inscription, line 16, tells of the guardian GIRI-KAHLÁRAKA-SVÁMÍ, he might trace the exploits of CHANDRAGUPTA'S wily Brahman counsellor CRÁNAKYA, so graphically described in the historical play called the *Mudra-Ráxasa*, in levying troops for his master, and counterplotting all the schemes of his adversaries' able minister RÁXASA, until he recovered the throne: nay the assistance of that RÁXASA himself, who from an enemy was turned to a faithful friend, might be supposed to be given *with his name* in line 10 of the inscription. And the discrepancy of all the other names beside these two, viz. of CHANDRAGUPTA'S son, father, grandfather, and guardian minister, to none of whom do the known Puranic histories of that prince assign the several names of the inscription—might be overcome by the expedient usual among historical and chronological theorists in similar cases,—of supposing several different names of the same persons.

But there is a more serious objection to this hypothesis than any arising from the discrepancy of even so many names—and one which I cannot but think fatal to it. In the two great divisions of the Xattriya Rajas of India, the CHANDRAGUPTA of the inscription is distinctly assigned to the Solar race—his son being styled child of the Sun. On the other hand, the celebrated founder of the Maurya dynasty, if reckoned at all among Xattriyas, (being, like the family of the NANDAS, of the inferior caste of Sudras, as the Greek accounts unite with the Puránas in representing him,) would rather find his place among the high-born princes of Magadha whose throne he occupied, who were children of the Moon: and so he is in fact enumerated, together with all the rest who reigned at Pátaliputra or Palibothra, in the royal genealogies of the Hindus. It is not therefore among the descendants or successors of CURU, whether reigning (like those Magadha princes) at Patna, or at Dehli, that we must look for the subject of the Allahabad inscription; but if I mistake not, in a much nearer kingdom, that of Canyácubja or Canouje. This is well known to have been the seat of an extensive empire on the Ganges, founded by a branch of the Solar family, after the decline of Ayodhya or Oude, the ancient capital of RÁMA and his ancestors. And this opinion is confirmed by the coins lately discovered at Canouje, in which we find characters exactly corresponding to those of our inscription—and the same prefix to the king's name on the reverse of the coin, viz. *Mahá-rája Adhirája Sri*. One of these, a gold coin, communicated to me by Mr. J. PRINSEP, and exhi-

bited in the last number Pl. IX. fig. 24, had struck me, before I saw the engraving, as seeming to bear on the obverse the name of *CHANDRACHA*, (not, however the father of *CHANDRAGUPTA* so named on the pillar from whom the title of *Adhirāja* is withholden, as I before remarked—but a *reigning* prince of the same name and family.) But another gold coin of the same class, in Plate I. fig. 19 of the XVIIth. volume of the *As. Res.* seems to me an undoubted coin of *our* *CHANDRAGUPTA*\*.

Unfortunately, the catalogues of the children of the Sun, in the *Hari-Vansa*, the *Bhāgavat*, and the *Vansa-lata*, as published by Dr. *HAMILTON*, are far from being so full and ample as those of the *Lunā* race, (to which the heroes both of the *Mahābhārata* and the *Sri Bhāgavat* belong :) and neither these, nor I believe the *Vishnu* and *Kurma Purānas*, extend their lists to the princes of this particular dynasty. From the first formation of this solar royalty at *Canouje* to its extinction in the person of *JAYA CHANDEA*, A. D. 1193, I know no authenticated name but that of *YASOVARMAN*, said in the *Rajja Taranginī* to have been the patron of the dramatist *BHAVABHUTI*, and to have been expelled from his kingdom by the *Cashmirian* conqueror *LILITA'DITYA*, about A. D. 720:—till we come to the last five, viz. the *Rahtore* princes, whose names from *CHANDRADE'VA* to *JAYACHANDRA*, are known from inscriptions and coins, all in *modern* *Devanagari*, and posterior by several centuries to our inscription. (*A. R.* vols. 9,15,17). Until further lists be obtained, therefore, the apparent absence† of all date on this part of the column, must preclude any thing like exact determination of the time that elapsed between its hero *SAMUDRAGUPTA* and *YASOVARMAN*.

As far as it is possible to form a judgment on internal evidence concerning the age of so short a composition as this, from the enumeration of deities, or the traces of manners that may be discoverable in it, I should be inclined to think that it was written after the hero-worship, which the sacred epics first introduced, had begun decidedly to take place of the simple elementary adoration visible in the ancient hymns of the *Vēdas*—yet before it had altogether its present shape, and apparently before the worship of the *linga*, and that of the *saectis*, the most impure parts of an impure system, had begun to attain the footing which they

\* No. 13 bears the cognate name of *SANIGUPTA*, and Nos. 5, 7, 12, 17, &c. contain names, more or less distinct, of others of the same dynasty.—Mr. *PRINSEP*, whose attention I called to those coins, thinks also that No. 12, which is in his possession, bears the name of *our* *SAMUDRAGUPTA*: and indeed the resemblance is sufficiently striking to authorize the belief.

† Unless indeed the mysterious isolated words at the end, *वत्सवत्* "on the *Arav*'s bank or shore," should be thought to inclose a date. According to some numeral rules used amongst *Hindu* mathematicians, these words might denote 22; and this applied to the era of *Vikrama'DITYA*, the usual era in those parts, would bring us to A. D. 34. But I need not observe how slippery such a conclusion must be.

had in India at the period of the first Mahometan invasions. While the distinction of works and of spiritual science, as taught in the Upanishads, and pervading all the literature of the Hindus, is alluded to more than once in the inscription;—the Brahmans have that honor as spiritual superiors which we find assigned to them in the Rāmāyana and Mahābhārata—not that excessive superiority and extravagant homage which in subsequent ages they claimed from princes: the Brahma here contributes to the honour of the king, not, as in some later inscriptions, the king to the honour of the Brahmans. But I cannot forbear from quoting at length the passage of the Muhābhārata to which allusion is made in line 28—proving, that at the date of this inscription, the sacred epic of VYA'SA was regarded and quoted in nearly the same manner as in later ages. The passage is from the 118th canto of the *BHISHMA-parva*, describing that hero's death, surrounded by the chiefs of both the rival branches of the house of CURU: and is as follows:

भीमसु वेद्मं चर्यान्विष्टञ्च भरतर्षभ ।  
 अभितप्तः शरीरेव निवसन्नुरजो यथा ॥ १० ॥  
 शराभिनप्रकाशोऽपि शक्यमंपानमूर्च्छितः ।  
 पानीचमिति संप्रेक्ष्य राज्ञस्त्रान् प्रत्यभाषत ॥ ११ ॥  
 ततस्तो चमिथा राजन् समाजङ्गः समन्ततः ।  
 भक्ष्यानुचावचाम् राजन् वारिकुर्वांस्य शीतयान् ॥ १२ ॥  
 उपानीतं तु पानीयं दृष्ट्वा शान्तमवोऽब्रवीत् ।  
 नाद्य भोक्तुं मया शक्या भोगाः केचन मानुषाः ॥ १३ ॥  
 अपक्रान्तो मनुष्येभ्यः शरशय्यागतो ह्यहं ।  
 प्रतीक्ष्यमाकशिञ्जामि निहांसं शशिसूर्ययोः ॥ १४ ॥  
 एवमुक्त्वा शान्तवरो निन्दन् वाक्येन पार्थिवान् ।  
 चर्जुमं द्रुमुनिष्ठाणि इत्वभाषत भारत ॥ १५ ॥  
 अथापेत्य महाबाहोरभिवार्य पितानहं ।  
 अतिदत्त् प्राञ्जलिः प्रकः किं करोमीति चात्रवीत् ॥ १६ ॥  
 तं दृष्ट्वा पाण्डवं राज्ञश्चमिथावचतः स्थितं ।  
 अभ्यभाषत चर्षात्मा भीमः प्रीतो धनद्वयं ॥ १७ ॥  
 दृष्ट्वातीव शरीरं मे संहतस्य तवेवुमिः ।  
 मर्षोऽपि परिक्रम्यन्ते मुञ्चं च परितृष्यति ॥ १८ ॥  
 वेद्मनात्तं शरीरस्य प्रवक्ष्यामो समाजुंन ।  
 तं हि शत्रो महेश्वाय दातुममो यथापिभि ॥ १९ ॥  
 चर्जुमसु तयेत्युक्तो एवमावच्य नीर्येनाम् ।  
 अथिचं यत्कवतकुला माफीर्न वाचिषद्भुः ॥ २० ॥  
 मया व्यामस्यनिषाचं निष्कृजितनिवाह्येभ्यः ।  
 यिषद्भुः चर्जुमूतानि सर्वे मुला च पांथिषाः ॥ २१ ॥  
 मतः प्रदक्षिचं कृत्वा एवेव एधिवां वरः ।  
 अथाहं भरतवेदं चर्जुमूतानां वरं ॥ २२ ॥

सन्नाद्य च शूद्रं दीप्तमभिमन्त्र्य च पाशवः ।  
 पार्जन्याजेभ्य संशोभ्य सर्वभूतोकस्य पशवतः ॥ २३ ॥  
 अविध्यत् इचिवीं पार्थः पाश्व भीष्मस्य इक्षिले ।  
 उत्थयत् ततो चारा वारिकी विमला गुभा ॥ २४ ॥  
 शीतस्त्राण्डनकल्पस्य दिव्यमन्वरसस्य च ।  
 क्षमयैवन्नतः पार्थः शीतया जनधारया ॥ २५ ॥  
 भीष्मं कुक्कुणाच्छपभं दिव्यकर्णोपराक्रमं ।  
 कर्णैका तेन पार्थस्य शक्तस्यैव विकुर्वन्तः ॥ २६ ॥  
 विस्तर्य परमं जयमुत्तमो वसुधाधिपाः ।  
 सत्कर्णं प्रेक्ष्य बीमस्यनतिमानुषविक्रमं ॥ २७ ॥

But BHISHMA, O chief of the Bhāratas, with firmness suppressing the sense of pain, while burning with the arrows that pierced him, and breathing hardly like a serpent—nor only with body inflamed, but with mind also maddened with the wounds of those sharp weapons, exclaimed only “Water!” when he saw the princes approaching. Then, O king, did those Katriyas collect immediately from every quarter food of various kinds, and goblets of cold water upon seeing which the son of SANTANU sadly exclaimed, “Not now can such ordinary human pleasures be tasted by me: for now cut off from mankind, I am stretched upon my arrowy\* bed, and lie expecting the hour when the sun and moon shall be closed to me.” But having spoken thus, O BHARATA! chiding by his words the assembled chiefs, the son of SANTANU added, “I would see ARJUNA.” Upon which, he of the mighty arm approaching with salutation his grand-uncle, and standing with hands joined and body bent forward, said, “What shall I do?” And the pious BHISHMA, with pleasure beholding the great Pāndava chief standing before him, answered, “My body burns, covered as I am with thy arrows, my vitals are racked, my mouth is dry: bring some water, ARJUNA, to my tortured frame, for thou of the great bow art able to give me such streams as I require.” The brave ARJUNA thus addressed, having mounted his car, and fitted his bow-string, beat his strong bow called Gandiva, for the intended shot: and on hearing the twang of that bow-string, a sound as if bursting from the thunder-bolt of INDRA—all creatures trembled, even all those chiefs themselves. Then he, the best of charioteers, having wheeled his car in a reverential circle round BHISHMA on his right, the prostrate son of BHARATA, best of all hurlers of weapons—and having taken a flaming arrow, and breathed a magical sentence (*mantra*) over it, and fitted it to his bow—the whole world looking on—did with that dart of thunder pierce the whole earth close on the right side of BHISHMA—and thence sprung up a pure beauteous stream of cold water, like the nectar of the immortals, of divine scent and flavour: and with this cold stream did he powerfully refresh BHISHMA, prince of the CURUS, of god-like works and prowess. With this work of the prince ARJUNA, as of a mighty transforming magician, the lords of the earth were seized with extreme astonishment, beholding it as a deed equally compassionate and transcending all human power.

\* The *arrow-bed*, or arrow bed, was assumed as a voluntary penance in imitation of BHISHMA by a singular devotee, who was living at Benares in the year 1792, a curious account of whose travels and adventures, together with a portrait of him stretched on his pointed bed, was given by Mr. JONATHAN DUNCAN in the 5th volume of the Society's Transactions. [In that account, p. 5, *Bhikma Pishama*, is nearly the Hindu mode (बुध for वु) of writing “BHISHMA the grand sire,” or rather grand-uncle of the contending chiefs of the houses of DRUPIDASHASTRA and PANDU.





[I.—*Journal of a Tour through Georgia, Persia, and Mesopotamia, by Capt. Mignan, Bombay European Regiment, Fellow of the Linnean Society of London, and M. R. A. S.*

At the commencement of the year 1830, after travelling over a large portion of the Russian dominions, I reached the capital of Georgia with an intention of prosecuting my journey through those provinces of Persia, which have not been visited by Europeans for many years. With this view I took advantage of the departure of the Persian Prince KHOSROU MIRZA, with whom I had been for some time associated, and who was now with a numerous suite on his return to his native country, from the court of St. Petersburg, where he had been deputed by his own Government, to explain the causes which led to the massacre of M. GERSBOROFF, the Russian ambassador, and his whole retinue. This melancholy occurrence took place at Tehran, the capital of the Persian kingdom, in February, 1829.

KHOSROU MIRZA is the fifth son of His Royal Highness ABBAS MIRZA, the heir-apparent to the Persian throne, by a Khoi woman of inferior rank and family. He is about three and twenty years of age, of middle stature, and like the majority of Persians, possesses great *politesse*, and much *naivete* in conversation.

On the 31st of January, we left the sublime chain of "Frosty Caucasus" in the rear, covered with perpetual snows, and following the course of the river Koor (the Cyrus of the ancients), in a south-easterly direction, entered at once upon the plains of the ancient Iberia, which lays stretching before us, till lost in the blue haze of distance, and presenting to the eye a most uninteresting and even depressing effect. At this season it was peculiarly so, every passing cloud sprinkled flakes of snow on our track, and threatened a heavy fall. Our road passed through a succession of low hills of a gravelly soil, lightly mixed with earth, though sufficiently fertile when water for the purposes of irrigation can be procured. On the bank of the river, at a short distance from the village of Saganlook, our proposed quarters, we observed some time-worn memorials of the extinct dynasty of the last Georgian kings. Of these, the remains of an old fortress, on the nearest heights, and near it two ancient towers, with the remains of a bridge, were not the least conspicuous objects. This village, which is about ten miles from Tiflis, was the place marked out for the termination of our first day's march, and the houses were so small and wretched, as to be scarcely discernible from the inequalities of the ground. Their description corresponds precisely with those mentioned by XENOPHON in the Anabasis, or expedition of Cyrus into Persia. In book IV. chap. v. he says

"Their dwellings were under ground, the mouth resembling that of a well, but spacious below; there was an entrance dug for the cattle, and the inhabitants descended by ladders. In these houses were goats, sheep, cows, and fowls, with ~~the~~ <sup>the</sup> young." Throughout Georgia the inhabitants make an excavation in the ground, and then build up the sides with large stones. Upon this they lay rafters, and cover the whole with earth, so that in walking through a village, it is very difficult to tell whether you are upon a house-top or on the bare ground. An aperture is left at the top to light the room inhabited by the family, who are only divided from the cattle by a thin planked partition.

To the traveller indeed, nothing very enlivening presents itself; the roofless remains of hamlets that have been destroyed by the tyranny of rulers frequently occur, and old burying places which mark the spots where man *once* has been. Every thing, in short, indicates that the Government is a bitter enemy to the prosperity of the people.

At Saganlook, the range of mountains made an acute angle, direct south; and thence continued stretching along the acclivities which formed an alpine wall to our road. On quitting the village we bade adieu to the often travelled Erivan road, and some crumbling towers; and descended a narrow ravine into a valley bounded by an inconsiderable but romantically situated lake. The hills on our right presented the habitations of the peasantry; who appeared poor and wretched. On leaving the valley, an abrupt ascent brought us to an open tract of country. The plain to the southward of our route was bounded by a flat horizon, from which every successive mountain rose, as we advanced, like objects when first seen at sea; while to the eastward of our direction, the turbid river Cyrus playfully meandered through a fine though uncultivated soil, until it was lost in the capricious stratification of the inhospitable looking mountains.

This part of Georgia is now called Kartalinia, and was the ancient Iberia. *PTOLEMY* describes it as bordered on the north by the Sarmatian mountains; to the south by a part of Armenia; to the east by Albania, and to the west by Colchis. Many of its towns and villages are mentioned by him, and also by *STRABO*, who travelled through this country, and who speaks of its being a luxurious and flourishing state. A distressing contrast it now presents! An independent kingdom, reduced to the abject situation of a province; and not immediately to the sovereign power itself, which might dispense consequence with near union; but through the double vassalage of a medium, being an appendage to another subject province—that of Georgia. Invasions from rival neighbours swept off the brave population of this little kingdom; and the final blow was struck by those who possessed ambition, without the manliness to maintain it themselves. Like other powers who have

committed national suicide, they taught the Les-guys the passes of their country. The Iberian chiefs, in times of civil discords, subsidized these warlike barbarians to fight their battles, who in their turn trampled on these lords, and soon reduced a people who had such inefficient leaders. Hence, the country sank under oppression, and the peasantry gave themselves up to despair, from which its present possessors are neither calculated, nor willing to rouse them.

Towards dusk, we reached a post called Dimoorchikal, where we took an escort of Cossacks, having to go some distance to attain our proposed sojourn for the night. We had not advanced more than a mile or two, ere it became quite dark; yet, I could distinguish that the deepening gloom was occasioned by the closing in of a valley, the hills of which drew so close to each other, as to exclude all trace of the road; and we had nothing to guide us from stepping into the Koor, that was lashing the rocks at our side, but the waraing noise of its course, and now and then a glimmering of light from the moon through some friendly chasm in the rocky canopy above us.

At ten o'clock we arrived at Beerchaly, a wretched village, situated on the banks of the river Gram, which flows from the Koor, thus forming two sides of a triangle. The former is an insignificant stream, but the latter requires a particular notice in this place. This noble river (the Cyrus of the classic ages) has its source in the mountains which form the western boundary of the province of Akiska near Kars, and which are a ramification of Mount Caucasus. From the recesses of this branch issue several small rivulets, which uniting a little to the eastward of Akhalzikh, flows through a part of the Turkish territories, and gradually augments its stream by the reception of several minor rivers in its course. Although its windings are very capricious, its general direction is to the eastward, rolling onward through fertile and extensive plains in its course to the capital of Georgia. From this point it takes a south-easterly direction, and is considerably augmented by the Alazan from the north-east, and the Araxes from the south, when it becomes navigable for large boats. On nearing the Caspian, it divides itself into two branches, and flowing onward through the province of Mogaum, unites its waters with the sea.

From the accounts of ancient authors, it would appear that the Cyrus was formerly navigable to a much higher point than it is at present. PLINY, in particular, describes the route by which goods were conveyed from India to the Euxine. "Having arrived at Bactria," he observes, "the merchandise then descends the Icarus, as far as the Oxus; and is thence carried down to the Caspian. They then cross that sea to the mouth of the Cyrus, where they ascend that river, and, on going

on shore, are transported by land for five days, to the banks of the Phasis, where they once more embark, and are conveyed down to the Euxine." The Koor must have sunk wonderfully in its bed, since a traffic could be carried upon its stream to such a height, as to make the land carriage across to the river Phasis or River, only a journey of five days. GIBSON says, that the Koor is navigable as far up as Sarapona, a distance of a hundred miles from the sea, forty only of which would admit large vessels. From the information I have been able to collect upon the spot, I should say that this river will admit vessels drawing about five feet water as far up as its junction with the Alazan, but not until its being augmented by the Araxes, would vessels of considerable burden find a sufficiency of water. At present the Phasis is not navigable beyond Kotais, the capital of Immeretia. Hence from the present shallowness of these two rivers, instead of goods being landed at a point on the Koor, whence they might arrive, after a journey of only five days, at a corresponding point on the Phasis, they would be obliged to unship them so low down the river as to require at least sixteen days' land transportation over a mountainous country, ere they could be re-embarked upon the Phasis. We know also, that SELEUCUS Nicator projected a connection between the Euxine and Caspian seas by means of a canal, which being only to be effected by the union of the two rivers in question, it is obvious that the idea could not have been conceived at all, unless the Koor and Phasis then possessed a more extensive navigation than they do at present.

On quitting Beerchaly, the valley opens with a considerable expanse, for several miles, crossing a rich soil, watered by branches of the Koor, whence we obtained snipes, ducks, and bitterns, in great plenty. Large flocks of pigeons flew continually over our heads, winging their way to some forlorn remains of forts upon the neighbouring heights, which are no longer worthy of being noted in the topography of Georgia. After three hours' march we came upon the banks of the Koor, along which we pursued our way for the rest of the day's journey. A gorge in the mountains on the opposite shore was pointed out to me as a noted avenue whence the Leaguys issue to ravage the country. A Cossack guard is stationed there, and is said to be sufficient for the defence of the pass, as the old invaders do not at present hazard descents of any power. They are not often seen but in marauding parties, small enough to escape pursuit, as easily as they elude vigilance in making these excursions. It is only in war-time, when the Russian soldiers are drawn to more distant service, that they descend in numbers, and spread rapine and misery in every direction.

We reached Tusantoo just as night drew around us. On our right lay a range of mountains running south-east, amongst whose defiles we

were to pursue our journey on the morrow. On a height near a defile, an old stone fortress, black with time, and the shadows of the night, stood in mournful solitude; a well chosen position to have commanded the pass in earlier ages. At its base is a small Cossack station, and a detachment of infantry. Several massive fragments of fallen masonry added to the dark solemnity of the scene.

At nine next morning, we ascended the mountains, which were sufficiently rugged, though not of the most formidable altitude. The road to the top was scarcely wide enough to admit a calèche to pass, and very rough all the way. We then descended the opposite side, by a track of much the same difficulty; but it gradually opened to our view a valley, which lay at the foot of some rich-looking hills, traversed by a stream winding its fertilizing way to the north-east. In the middle of this valley some striking remains of a strong fortress still exist. After crossing the dry bed of a river, we reached Tayaz, where we found warm and ample quarters. A supper consisting of eggs, milk, butter, and honey, was set before us. This latter luxury I might have anticipated from the propitious aspect of the country for maintaining colonies of bees; and I understood it to be an article of great profit to the inhabitants. Indeed, every thing spoke the fertility of the soil, and the hospitality of the people. They possess numerous herds of cattle, with plenty of wheat, barley, and millet.

At seven o'clock in the morning, we again sat forward on our journey, and halted at Zegaum, about three leagues distant. The road was unusually stony; and the river Algat was seen at a short distance. We often met caravans of mules laden with merchandize. The bales were placed in a right line, and the mules, when unladen, were left to themselves, and straying in every direction in quest of pasture. The merchandize was heaped up in small tents, guarded by one or two men. The right in the soil begins now to be marked out in a particular manner. Vast extents of land, enclosed with artificial fences, in which herds of oxen and cows fed, sufficiently indicate a right of property. The country, nevertheless, is for the most part uncultivated, and few traces of agriculture appear. We passed some Georgians nearly naked, and loaded like beasts of burden. Such labourers are very rare, because the Georgians are in general lazy. A traveller, while passing through these solitudes, and beholding the state of abandonment in which the virgin and fertile soil is left, cannot but feel indignation against its governors. The tracts where the silver mines were formerly worked lay due west from hence, the rocks which form them are of a yellowish hue. Indeed, the whole of this part of Georgia is rich in ores of different kinds, and particularly in copper. Leaving

these vestiges of exhausted wealth on our right; we crossed the Algat through a deep and rapid ford. On gaining the shore we rode on for Borsoom, distant about four leagues. The road we traversed was horribly bad, and we often sank deep into the mud. On passing the verge of a precipice, it was necessary to shut our eyes that we might not be terrified by beholding danger in its most frightful aspect. Here we were forced to trust entirely to the experience of our mules, which are wonderfully sagacious in selecting paths; but notwithstanding their sagacity, they sometimes sank to the belly in holes of mud.

Our road continued south-east over trackless snows, through narrow glens, and occasionally over low hills, without a tree or shrub. At about a league distance from Ganja that town is discovered; which, with its numerous and extensive gardens, presents a most agreeable coup d'œil. It is situated in a wide-spreading plain, wherein many villages are scattered. Agriculture has not made great progress here, and this plain, which in Europe would present a luxuriant cultivation, exhibits but few traces of culture; but the natural fertility of the soil gives rise to an abundant vegetation, consisting of useless plants.

Ganja, or Elizabeth Pol, as it is called by the Russians, is the first place of any note on approaching Persia from the north-west: it is built upon a broad mountain torrent, (over which is a ruinous brick bridge of six arches,) beneath the Aligex mountains, which divide the beautiful province of Karabagh\* from that of Irivan. I have observed that the approach to the town wears an imposing appearance, surrounded with inclosures, and resembling an oasis in the desert. As we entered, however, this delusive aspect vanished, and we found ourselves passing through a large maze of utter ruins, abandoned suburbs, and crumbling walls—these conceal the houses from the eye of a traveller, until he passes through a paltry bazar that extends for some hundred yards, partially occupied by shops of the most needful trades, and very scantily supplied. Every thing breathes of poverty and oppression: in fact, with the exception of the house of the Russian commandant, the habitations are deplorable in the extreme, and all is totally at variance with English habits, customs, and comforts. A habitation was assigned us by the Russian General, who was acting as Mehmandar to the Persian Prince, and the best mat was spread on the floor, in the midst of which a fire burnt bright and cheerfully, while its Mussulman inmates prepared a good supper of fowls and eggs, followed by coffee, and the chibouque. We found the luxuries of Tifis had not at all impaired our relish of this simple and friendly reception. Our servant, who

\* The appellation Karabagh signifies in the Turkish language "the black garden;" implying the richness and fertility of the whole district.

was a Yorkshireman, though not a little of a rogue, was a great *gourmand*. His constant prayer was to get plenty to eat and drink, and be sent safe home to his wife. "Well THOMAS, where have you been to-day?" said I, as he entered the apartment. "Only to the bazar, Sir, to get something to eat."—"And what did you procure there?" "A kabobed goose, half of which I ate, and the rest I have put into my pocket for to-morrow's march."

Ganja contains five thousand inhabitants, who are all Mahomedans of the Shiah sect. The language is a dialect of the Turkish, but the people read and write the Persian. The manufacture of silk is carried on to a great extent. This is for exportation, and a supply is regularly sent to the Russian market, though as yet little encouragement is held out. A small quantity found its way to Bombay, where it has been justly appreciated. The people of Ganja are very hostile to the Russians from a religious feeling, but the peasantry are favourably disposed, as they evade various taxes which were exacted by their Mahomedan rulers.

Before proceeding further with a description of this interesting country, it may not be improper to bring into view some observations (derived from unquestionable authority) with regard to that period when the Russian and Persian armies were opposed to each other, since this very plain is celebrated for the last decisive victory gained by the former troops over the latter during the campaign of 1826.

In 1795, AGA MAHOMMED KHAN, uncle to the present Shah, assembled a powerful army at Teheran, and moving rapidly into Georgia, defeated HERACLUS near Tiflis, and entered that city before General GOODWICH, who commanded the Russian troops in the Caucasus, could arrive to oppose him. Determined to intimidate the Georgians by making an example of their capital, he abandoned it to the rapine of his soldiers; while the religious enthusiasm he excited in his army, and the natural ferocity of his troops, prepared them to take every advantage of the licence he had given.

The Empress CATHERINE II., irritated by the vengeance which had fallen on Georgia, in consequence of its having transferred its allegiance to Russia, immediately declared war against Persia; and in the following year, Count ZUBOFF, at the head of a powerful force, marched upon Durbund, and took that fortress by assault. He subsequently captured Ganja, Lankeran, and the island of Saree on the Caspian Sea. At this period, PAUL ascended the throne of Russia, and recalled his army.

AGA MAHOMMED KHAN was at this time in Khorasan, and on hearing of the Count's successes, hastily returned to oppose him; but

ere he could reach the scene of action, ZUBOFF had already abandoned his conquests.

IBRAHIM KHULEEL KHAN, the chief of Karabagh, had hitherto succeeded in holding the fort of Shesha against AGA MAHOMMED KHAN; but its inhabitants, wearied by the yearly plunder of their country, rose against their chief, compelled him to retire to Daghestan, and surrendered Shesha into the hands of the Shah, who was advancing with a sweeping army to invade Georgia. On his arrival at Shesha, he was murdered by one of his servants, whom he had threatened to put to death; and his successor, the present Shah, was too much occupied in establishing his authority to pursue the bold policy of his predecessor.

In 1798, HERACLIUS died, and left his crown to his son, whose short reign was disturbed by a rebellious brother, who, backed by the Leaguers, endeavoured to seize the kingdom. He was however completely defeated, and escaped into Persia. In 1800, the Emperor PAUL, incorporated Georgia with the Russian empire, and in 1801, the son of HERACLIUS was no more, and PAUL assassinated. On the accession of ALEXANDER, this act was confirmed, and shortly after, General SEESEANOFF was appointed Governor General and Commander-in-chief of Georgia. He captured Ganja, and advancing to Irivan, encountered the Persian forces: an action ensued, in which the Persians were entirely routed. SEESEANOFF then invested Irivan, which the governor refused to surrender; but the Russians were in want of supplies, and consequently made a hasty retreat when the enemy hovered over their flanks, and committed great havoc by their nocturnal attacks. This was the first time in which these armies had met in a general action. It may be said to have commenced the war for the possession of Georgia. About a year after this, Karabagh submitted to Russia, and in 1806, SEESEANOFF was assassinated at Bakou.

The war continued till 1814, when by the mediation of Sir GORE OUSELEY, the ambassador extraordinary from the king of Great Britain, a treaty of peace was concluded. Persia ceded to Russia all her acquisitions south of Mount Caucasus, and agreed to entertain no navy on the Caspian; while Russia engaged to aid the heir to the Persian throne against all competitors. Upon CONSTANTINE's abdication in favor of NICHOLAS, it was whispered at the Court of Teheran that violent disturbances had arisen at St. Petersburg; that in fact a civil war had broken out, and that the mountaineers of Caucasus had risen to assert their independence. It was known also that the interference of the Russians with the religious prejudices of the Mahommedan subjects had produced feelings of the most serious discontent. Proposals had been

made to the Governor of Azerbaijan by chiefs of districts to co-operate with him in a war against Russia. Letters were written to these leaders, by the head of their religion, who came from Meshed Hussein, and urged the king to arm against the insulters of his religion. The Moolahs flocked around their leader, the inhabitants of the capital listened to their inflammatory orations. The Shah was called upon to declare war, the troops were enthusiastic in the cause, and the contest commenced. The following account of the reception given to the chief priest of the holy shrine of Meshed Hussein, being from an eye-witness, may not prove devoid of interest. "When AGA SYYUD MAHOMMED arrived, a vast number of people, and most of the infantry, without regimentals or arms, went out to meet him. The Shah sent his own litter for the Syyud: and some princes, and many of the chief people of the court did honour to his entry. Much enthusiasm was manifested by the populace. To the Syyud's person they could not get access, but they kissed the litter, kissed the ladder by which he ascended to it, and collected the dust which had the impressions of the mule's feet that bore him. The people beat their breasts, and the litter was brought close to the Shah's door, that the Syyud might alight without being overwhelmed by the populace. Six or seven of the chief priests entered the court with him, and one of them insisted on going in on his mule. An officer of my acquaintance who happened to be there on the spot prevented him. He said that the ordinary attendants on His Majesty seemed quite to have lost sight of their duty to the sovereign, and were occupied in paying their devotions to the Syyud. The Shah came to the door of the court to receive him, and the enthusiasm of the populace seemed to be communicated to the royal hearts, as the Shah and the prince royal wept bitterly in speaking of the misfortunes of the Faithful under the Russian Government. AGA SYYUD MAHOMMED, with a suite of one thousand Moollahs, had a separate encampment. Two princes had by order of the king pitched near him, professedly to prevent the intrusion of the populace, but secretly to hinder too general a manifestation of public esteem and consideration. Another detachment of holy men have just reached this, covered with winding sheets, and we hear that the heads of the religion of most of the principal cities are flocking to this point. The Shah has twice visited the Syyud, and on one occasion, His Majesty said, "I am anxious to shed the spoonful of blood that remains in my weak body in this holy cause, and it is my wish to have in my winding sheet a written evidence from you, that the inquiring angels may at once recognise my zeal, forgive my sins, and admit without delay my entrance into heaven." This description is not very dissimilar to the language and conduct of European monarchs

during the age of the Crusades ; and it is not surprising that the graver considerations of policy should have been neglected under the excitement of religious enthusiasm. The Syyud, I have little doubt, found reasons for combining motives of probable worldly advantage with the promise of heavenly favour.

The result of the campaign is already known to every one. Persia lost more of her territories, and was obliged to make peace on any terms ; while Russia interferes with Persian affairs *ad libitum*—and England, who might have prevented the aggressive and unjust scheme of the autocrat, looks placidly on the scene, and is satisfied with her own innocence and fidelity ! A few more years, and she will bitterly reproach her blind and irreparable policy. Having considered it expedient to bring these interesting circumstances into view, I shall now resume my narrative. Before however proceeding to this, I may be permitted to advert for a moment to the “ arrow that flieth by day ;” namely, the *plague*, which always creates so much alarm to the traveller.

It would appear that this disease is *endemic* to the Russians, for it is a singular fact, that previous to their occupation of Georgia, the whole country was exempted from this pestilence. It made its appearance at Ganja in 1805 ; at Tiflis in 1806, and at Erivan, in 1825, and from that time down to the period I was in Georgia, the country had (with the exception of the mountainous districts, which are rarely visited with it) been regularly afflicted. This scourge is generally checked by the summer heats and winter frosts. But I may further observe, that among the anomalies of this extraordinary disease, there is one fact, viz. that it raged unchecked in the severe winter of 1829, throughout the Caucasian villages. Its consequences were of course fatal in a country where no medical practitioners, and consequently no means to lessen the mortality of the disorder, are to be found. When I was last at Annanour, in the recesses of Mount Caucasus, a peasant came to the commandant, and said, “ My father, mother, wife, and sister, are lying dead in the next village ; I am afraid to bury them.” The Russian instantly despatched a party of soldiers to set fire to all the hamlets they could meet with, and turning to me, said—“ ‘Tis my vocation !” To administer relief, as far as human means could accomplish, to the suffering villager, would with us have been the primary feeling : but this barbarian could only ridicule the concern I expressed for this unfortunate creature. I afterwards mentioned this to Count PABKEWITCH at Tiflis, who laughed heartily, and exclaimed, “ You English are always inclined to regard with seriousness the *veriest trifles*.”

[To be continued.]

### III.—On the Adaptation of the Roman Alphabet to the Orthography of Oriental Languages.

All who have devoted themselves to the acquirement of any of the languages of India must have experienced in the irreconcilable difference of the alphabets of the East and West a stumbling block in the porch of their studies, and a source of constant doubt and difficulty, whenever the occasion has arisen for expressing in the letters of their mother tongue sounds and vocables belonging to any of those languages. It is the scholar's object to write the words so that they shall be read with a correct pronunciation by the uninitiated, and at the same time show the true spelling of the original. He seeks therefore the letters of known pronunciation that come nearest, not only to the sounds he desires to represent, but likewise to the letters used in the language from which the word is taken. Unfortunately it is not always easy to find letters that will answer this double purpose, and the difficulty is much increased by the circumstance, that all the vowels and several of the consonants in use have more than one sound in the same language of Europe, and some of them half a dozen sounds at least, if the varieties of all the countries which use the Roman alphabet are taken into account. What then was to be done when India fell into European hands, and the necessity arose for continually writing Indian words in books and public correspondence? Every one at first of course had to decide for himself, and unfortunately they who commenced the work of writing Asiatic names in the alphabets of Europe were not scholars. At present we shall confine ourselves to the proceedings of our own countrymen in this respect, putting out of view all reference to the modes of writing adopted in France and Germany, and elsewhere, and those in particular which have been adopted recently, in consequence of the efforts making by the literati of Europe, to bring into vogue the Sanscrit language and its literature, at the very time that the half informed of our countrymen are seeking to discredit both here.

It would appear that they who first had occasion to write in English the names or words of the East, bethought themselves of the sounds in that language which came nearest to those they desired to represent, and spelled the words accordingly: thus *sipahee* was very generally spelt *seapoy*, doubtless from the similarity of its sound to the well known word *teapoy*, and in the jargon of the day, *Surajood-doula* was corrupted into *Sir Roger Dowler*, and *Allahabad* became known as the *Isle of Bats*. Many absurdities of this description might be pointed out were it our object to seek them: even Governor HOLWELL, though himself a Bengalee scholar, has in his printed tracts, *Morattors—Shaw*

*Zadda—Gemana—Pateha—Shaw Allum—Phirmaund—Metre (for Mitr)* &c. &c. He has also *Sou Raja Dowla* which is nearly as ridiculous as the English knighthood of that Nuwab.

This method of writing from the ear did very well so long as it was the half-informed addressing the absolutely ignorant. The transmutations were precisely of the same description as those of which we find examples, not only in the Greek and Roman methods of writing Teutonic and Asiatic names, but in the Leghorn and Calés of the old English writers of the past century, the Naples and Venice of the present day, and the Ecosse and Galles and Espagne, into which the less pronounceable native names of those countries have been softened in France.

But as the knowledge of the languages of the East extended, and they who had to write became themselves well acquainted with the true pronunciation and orthography of the words and names they were using, and felt likewise that they were addressing others as well informed upon the subject as themselves, they began to seek the means of spelling true—that is, of using in English corresponding letters for those used in the language from which the word or name might be taken. The Persian and Arabic are languages that have long been known in Europe, and the force and power of each of the letters of those alphabets have accordingly been attempted to be expressed in various ways, according to the native country of the interpreter; but the first we believe who accurately gave to the public the Nagree, Devanagree, and Bengalee alphabets was Mr. HALHED in the Preface to his version of the Code of Hindoo Law, compiled under the orders of WARREN HASTINGS in 1775. His consonants correspond very nearly with those of Sir WILLIAM JONES's alphabet, except that he makes no distinction between the hard and soft *d*, *t*, *dh*, and *th*. The short vowel  $\text{ॠ}$  he writes with a short *e*, the letter  $\text{ॡ}$  with a double *ê*, bearing similarly the short mark:  $\text{ॢ}$  is expressed by *ûê*;  $\text{ॣ}$  he writes *r* and  $\text{।}$ , *ou*. Every vowel according to this system had its long or short mark above it, which was very inconvenient either for printing or writing.

When the Asiatic Society was established, Sir WILLIAM JONES saw the necessity of introducing a consistent mode of writing all Indian words. Not satisfied with this system of Mr. HALHED, he devised the alphabet that bears his name, and is still used by that learned body in its proceedings; but neither the influence nor the reputation of this great linguist was sufficient to procure for his alphabet the general adoption so desirable, and indeed so essential, to the purposes he had in view. It continued as a sort of Devanagree for the learned *par excellence*; a style of writing to be revered and respected, but not

initiated. In spite of every endeavour to recommend the Society's alphabet for universal use, the business of the country continued to be conducted either in the jargon spelling first adopted from similarity of sound, or with the *ad libitum* improvements of those, who, knowing the correct spelling of the original, adopted the letters they thought best calculated to express the true sound of the words properly pronounced. It is now near fifty years since the attempt was first made to introduce this obvious benefit of a consistent and correct alphabet, and yet Sir WILLIAM JONES's mode of writing has gained no ground in India, whatever may have been its fate elsewhere. What can have been the reason for this? Does not the fact itself afford irrefragable evidence that there must be some inherent defect in the system that induced its rejection, and led to others being preferred. There it was, recommended by the Asiatic Society, composed of the principal civil servants, and of all in the military, clerical, and medical professions, who were entitled by knowledge of the subject, or by situation, to take the lead in such a matter. There was this Society, periodically putting forth its volumes, and all its principal members publishing their works according to the orthography of the illustrious founder; yet no one out of the pale, and not all of those within it, could be brought to spell names, in their correspondence, as the Society spelt them. For fifty years this tree of Sir WILLIAM JONES's planting has been stationary or has grown like the aloe repulsive and disagreeable, living still, but putting forth no branches and yielding no fruit. Who after this can say that there must not be something in this system repugnant to the ideas and preconceived notions of those whose language is English? The powers and pronunciations given to the different letters are manifestly not such as have been recognized and adopted as just and appropriate by those who read and write that language. Another system has gained ground in its stead, and to its prejudice, and this in spite of the great names of JONES and COLEBROOKE and WILSON, whose adherence to the antiquated style has prevented its sinking into absolute disuse and oblivion. Let us inquire then what is this other system, and what the claims it possesses to the preference of the unlearned.

Towards the close of Lord CORNWALLIS's government, Dr. JOHN BORTHWICK GILCHRIST produced his Dictionary and Grammar of the Hindoostanee language, and as matter of necessity, prefaced both by explaining the force of all the letters in use in that language, and the corresponding vowels and consonants of the Roman alphabet, by which he proposed to express them. The difference between his system and that of Sir WILLIAM JONES lies entirely in the vowels: the short unexpress-

ed letter  $\alpha$  which Mr. HALHED wrote  $\epsilon$  was written  $\alpha$  by Sir WILLIAM JONES and  $\mu$  by Dr. GILCHRIST; the  $\epsilon\epsilon$  and  $\epsilon\epsilon$  of HALHED,  $i, i$  of Sir W. JONES, were rendered  $i$  and  $ee$  by GILCHRIST; the  $\delta\delta$ ,  $\omega\omega$ , of HALHED,  $u, u$  of JONES, were expressed by  $oo$ ; and the  $\bar{i}$ ,  $ai$ , of the two former systems by  $y$ , corrected but not improved to  $ue$ ; and lastly, the  $o\bar{w}$  of HALHED and  $au$  of JONES by  $ou$  corrected to  $uo$ .

The more taking and popular part of this system lies evidently in the use of the short  $u$  instead of  $a$ , for the silent unexpressed inherent letter of the languages of India: people could not be brought to write *bat* for the sound of *but*, *tab* for *tub*, and *patee* for *putee*. Having the choice therefore, they discarded the letter which never in any of the words of any of the languages within their knowledge had the sound it was proposed to give to it. The adoption of  $oo$ , instead of Sir W. JONES'  $\alpha$ , followed as a necessary consequence of the appropriation of  $\alpha$  to the short sound; and  $au$  for the sound of  $ow$  in how was so unnatural, that it was gladly discarded for  $ou$ .

It does not appear that the Government took any part, until very recently, in promoting the use of one or other of these systems: they had each therefore a fair field and no favor for thirty years at least. During the whole of that period the knowledge of the languages was extending, and the old jargon was disappearing from all the public departments, finding only a sanctuary and stronghold that bade defiance to all reform within the precincts of the supreme Court. The issue was in a decided leaning from the first to the system of GILCHRIST. This has now been that of all official correspondence for fifteen or twenty years at least, whereas it will not be found that the orthography of Sir WILLIAM JONES has taken root in any single department, pertinaciously as certain learned individuals of high authority have adhered to it.

In 1822, the design was conceived of forming an accurate record in the English language and character of all the land tenures of the country. It was felt to be necessary to determine upon some alphabet or system, for the conversion of names correctly, prior to the formation of these registers, and then first did the Government officers indicate any system under authority for preference. The merits of each method were fully weighed and considered, prior to the determination, and the scheme of GILCHRIST was adopted, simplified by the rejection of some of his quaint methods of expressing the nicer distinctions of sound. This alphabet was circulated, and great progress was made all over the country in producing registers, in which the names of persons, and places, and properties were so written that no one could hereafter find difficulty in writing them back, into any given character, upon bare inspection.

Contemporaneously with this measure, and as part of the same scheme, revenue surveys were put in hand, and maps on a large scale were constructed, in which the names of every place or object were accurately entered according to the same system. Up to this time, no attempt had ever been made to make this grand improvement in the geography of India. The maps of Bengal were copied to the letter from the surveys of RENNELL made in the era of jargon, and though better spelt than most of the documents of that period, yet still partaking largely of the miscellaneous mode of writing, so liable to mislead. All the surveyors subsequently employed had been left to pick up the names of places by the ear, and it had never been made an instruction to them to ascertain how they were written in any dialect or language of India, and to transfer them according to system into their maps. The surveyors too unfortunately were very seldom scholars. In order to show the consequences of this neglect, and to expose at once the absurdity of trusting to the ear in a matter of this kind, an extract is annexed\* from a map of the Dooab, compiled not ten years ago, and now in our possession: it bears the official signature of the surveyor-general of the day, and professes to be from the best materials then in the archives of that department. In this extract it will be seen that the well known road from Cawnpoor (Kanhpoor) to Utkurpooris laid down double, being taken apparently from two routes made with compasses, or the odolites, varying in a small degree, so as to give a different direction, and the copyists of the surveyor general's department have not discovered that the routes are the same, *because all the names are spelled differently*. There are regularly

Kuttra,  
Chicheeree,  
Bhysour,  
Fattipr.  
Reneea,  
Oomrun,

Gitters,  
Chichindy.  
Bhysawn, Bheisawn, (Bhenour ?)  
Futtehpr.  
Runneah,  
Oomeron.

With sundry other names, till one road comes to Akberpoor and the other to Akbarpoor, the relative distances of all these places being the same. Like absurdities might be shown in many maps similarly constructed from materials, in which the names have been set down by the ear without the observance of any system of spelling. It is no fault of the map compiler if he has not recognized Chicheeree to be the same place as Chichindy, and Kuttra as Gitters, when they stand in two maps in positions not exactly corresponding. The fault was in the employment of an officer to survey, without instructing him specifically how he was to write the names of his map. The revenue surveys, so far as they went,

\* See Plate xix. fig. 1a.

effectually corrected this error; and what is more, the maps, constructed by the officers employed in this department, are capable of being converted with confidence into any character, without each name being as at present, an object of separate inquiry and research, whenever it is desired to publish a map in the Persian, the Hindee, or in any other character of the country.

But to return to our subject: the Record Committees, wheresoever they were established, succeeded entirely in reforming the orthography of names in the zila dufturs. That they did not do more, but after involving considerable expence, failed to provide the desired land registers, was owing to many causes, which need not be discussed here. The effect of these institutions in confirming the use of the Gilchristian system is all we have now to do with: that effect will we presume not be denied. The leaning had been to this system for thirty years before, but at last the act of Government, and the specific exertions of all public officers throughout the country, continued for nearly eight years consecutively while the Committees lasted, fixed and established this system of Gilchrist, as the orthography of office and of business. Even though there were not in it any innate inherent superiority or grounds for preference, even were it the inferior system of the two, still this fact ought, one would think, to secure it from any hasty attempt at change. Except there be some obvious apparent defects pointed out, the undoubted ascertainment of which has been the result of actual experience, would it not be madness to think of discarding what had been so established? What then is to be thought of this new attempt of Mr. TREVELYAN, to set up again the rejected alphabet of Sir WILLIAM JONES, and by the gratuitous circulation of thousands of copies to diffuse and disseminate, as if from authority, a system fully and formally tried and found wanting?

The Journal of the Asiatic Society, being a work of science, conducted under the special countenance and support of that Society, will always be respected for the matter it contains; and it signifies little in what garb it may choose to present its Asiatic names. Allowance will be made for the consistency of the Society's adherence to the system of its venerable founder, and all that read its proceedings know well what they have to expect, and are prepared to encounter familiar letters applied to strange uses after the manner practised by this Society for half a century. But now that the Gilchristian method of writing has been so long established for record, for surveys, and for making familiar to the uninitiated public, the sounds and names of Hindoostan, every official man and every man of sense must protest against the present attempt to introduce once more the discarded system, one

too that from its use of the *s* for the short *u* would change the spelling of every word and name from one end of India to the other.

Let the Sir WILLIAM JONES' system, his *a* and his *i*, *ɛ*, and his long and short *ɛ* be reserved, like the Devanagree, for recondite science: there his alphabet has its footing, and no one desires to eject it from its stronghold: but for business let us have our current Nagree, the short *u* and the *ee*, and the *oo*, which have grown into use from their ready adaptation to the ear; and from the preference secured for them by all the associations of sound to letters, which we have been accustomed to from our infancy.

In the pages of the Journal there has appeared a notice laudatory of Mr. TRUVELYAN'S attempt to effect by a *coup de main* a change in all the established methods of writing mofussil names. As this Journal has won for itself so wide a circulation in the interior, it is necessary that its pages should not be made to serve the party views of the advocates of any one exclusive system, but that the merits of each in its particular line should be fairly stated. The Sanscrit scholar will perhaps find his advantage in following the alphabet of Sir WILLIAM JONES, which is that of the grammars and dictionaries, and of most of the translations from that language; but he that is content with the Persic, Oordoo, or the familiar literature of Hindoostan, the man of business and of the world, will find all the books, the dictionaries, and grammars, and vocabularies, to which he is in the habit of referring, and all the records and public documents that fall under his observation, written uniformly in the character of GILCHRIST. There is little fear that even the weight of the Journal's recommendation will be successful in superseding what is so established. If the world were not wide enough to hold both systems—if the order had gone forth from CÆSAR, that one only should stand, and the issue were, a *bellum ad interneconem* between the two—then might the Journal fitly advocate the cause of its scientific mode of writing to save it from destruction and the sponge: but so long as there is no attempt to encroach on the ground it occupies, or to interfere with its peculiar province in literature; while it is suffered to luxuriate in the paradise of Sanscrit, without any attempt to foist in its rival, even as an humble companion of its pleasures in that Eden of joy; why should the votaries of this learned system strive to gain for it an universal dominion, for which it has been found unfitted, and assume the offensive against the system in use for business? Let each retain its own, and both abide together in peace and good will and harmony, holding forth in the facilities they jointly offer an invitation to all people to adopt either one or the other, accordingly as they find either most convenient for their purpose, and under the assurance that the

subject, which is to obtain such a method of writing as shall afford a ready means of transferring the word back into its native character, will equally be accomplished, whichever may be the character adopted. Both systems represent perfectly to the scholar the letters used in the original languages, but it is contended that the GILCHRIST alphabet, as now generally introduced and used in the public offices of this presidency, conveys to the uninitiated a more correct and true notion of the proper pronunciation, than the antiquated and rejected system of Sir WILLIAM JONES, and therefore is the best adapted to business. Through the pages of the Journal let the European public of India be undeceived on this point. The attempt to dislodge the system of GILCHRIST is entirely a matter of individual speculation, and is certainly not the result of any inconvenience felt, or dissatisfaction expressed with it, by the Government, or by any class of public officers or persons whatsoever.

H. T. P.

[We had no intention of conveying an impression, in our brief notice of the Alphabetical Scheme to which the above alludes, that it was circulated by authority, nor, though we hailed with pleasure the promise of increased uniformity in the spelling of Oriental words, did we express any very sanguine hopes of success;—for our own opinion on the subject, and the rules which we shall continue to follow in the pages of this work, we beg leave to refer to the Preface of the second volume of the Journal.—Ed.]

#### IV.—On Catadioptric Microscopes. By J. W. Laidly, Esq.

The construction of reflecting microscopes having of recent years greatly occupied the attention of philosophers and artists, and arrived at a high degree of perfection in their hands; one can scarcely, without incurring the censure of presumption, advance any suggestion for its further improvement. Even in the detail of mere mechanical arrangement, ingenuity appears exhausted in contrivances to gratify the taste or anticipate the wents of the most fastidious observer; while the optical principle has been so matured, as to lead competent judges to declare, that the instrument in its present state would pass down unchanged to posterity. Narrowed however, as the field undoubtedly is, there appears still some room for the exertions of subsequent inventors, and I incline to think that the modification about to be described will be found for many purposes to improve, as it most certainly simplifies, the construction of these beautiful and delicate instruments.

To enable the general reader the more easily to comprehend the alteration I propose, it is requisite in the first instance to place before him the principle of former constructions, which it is the object of my

present attempt to supersede. For this purpose, I select the microscope invented by Professor AMICI of Modena, as justly deemed the most refined and perfect now in use. The optical principle of this instrument is represented in fig. 2, Pl. XIX, and is thus described in Dr. BRADLEY's elegant treatise upon optics: "He (professor AMICI) made use of a concave ellipsoidal reflector, whose focal distance was  $2\frac{1}{8}$  inches. The image is formed in the other focus of the ellipse, and this image is magnified by a single or double eye-piece, eight inches from the reflector. As it is impracticable to illuminate the object, *m n*, when situate as in the figure, professor AMICI placed it without the tube or below the line RN, and introduced it into the speculum A B by reflection from a small plane speculum placed between *m n* and A B, and having its diameter about half that of A B." I have marked the requisite position of the object *m n* to facilitate the reader's conception.

The reader will note that there are two reflections in the objective part of this instrument; one of which is useful only as introducing the rays proceeding from the object, and contributes in no respect to the magnifying virtue of the microscope. He cannot fail to observe also, that the great size of the plane forms a very serious impediment to the rays of light proceeding from the concave metal to the eye-glass. By an improvement of Dr. GORING's, the size of the plane has indeed been reduced to  $\frac{1}{3}$ rd the diameter of the great mirror. But even in this improved state it continues so material an obstacle, besides having other and greater disadvantages to be touched upon in the sequel, that one cannot avoid wishing it removed if possible, by introducing and illuminating the object itself in the axis of the tube at the focus of the concave speculum. This improvement I have endeavoured to effect by a very simple optical contrivance, which will be easily understood by reference to figure 3, representing the form of the instrument adapted for diaphanous objects. A B is the concave ellipsoid or mirror, and C is a transparent object situated directly in its focus: D and E are the illuminating apparatus, D being a bull's-eye lens, and E a very small plane diagonal mirror, so situated as to reflect parallel with the axis of the tube rays of light coming from the lens. By this arrangement, an image of the luminous aperture F, is formed in the focus of the lens and just behind the transparent body C. It is now apparent that but one reflection is sufficient to form an image of a microscopic body in the conjugate focus of the speculum; and that the diagonal plane being of almost evanescent dimensions, presents no obstacle worth mentioning to the rays in their passage to the eye-glass.

The mere loss of light however, attendant upon the Amician construction, is a disadvantage of very secondary importance; for it is obvious

that almost any amount of loss may be compensated by an artificial condensation of light upon the object under examination. But the disadvantages of a double reflection are of a higher and more important order. It is one of the most inflexible laws of practical optics, that all superfluous refractions or reflections are to be avoided, and for this simple reason, that to form a perfect surface, either plane or spherical, or of any other figure, is beyond the power of human art, however exquisite, and hence the greater the number of reflections or refractions, the more darkened and muddy will the vision become. When we consider therefore, how extremely minute are many objects of microscopic investigation (such for instance as the marks, probably not the 10,000th of an inch in diameter, upon the dust of lepidopterous insects), we may conceive how much vision may be impaired by a very slight error in the figure of the plane, augmented in the long passage of the rays from the mirror to the eye-lens. It is well known that Newton's objections to the Cassigramian and Gregorian telescopes arose from considerations of this kind. "The errors (says he) of the said convex will be much augmented by the too great distance through which the rays reflected from it must pass before their arrival at the eye-glass. For which reason I find it convenient to make the tube no wider than is necessary, that the eye-glass be placed as near to the oval planes as possible, &c." If we conceive his own form of the instrument subjected to reversed vision, it will bear no remote resemblance to the Amician microscope; and tried in this way, I am pretty confident we should find a material difference in the performance of the most exquisite reflector. I took a one-foot Newtonian, having a very indifferent plane, but which showed objects in the day time sufficiently well; and making the rays from the object enter by the small metal, I looked with a lens directly in front, throwing the image a little out of the axis so as to escape the plane. Allowing for the necessary deficiency of light, the image was so confused and distorted, that it was almost impossible to distinguish any object whatever.

As there is some analogy between the telescopic "front view" of HERSCHEL, (*magnis componere parva!*) and the microscope I propose, it may not be amiss to remind the reader of the advantage that great optician found in laying aside the oval plane. Besides the "capital advantage of nearly double the light of former constructions," the defining power seems also to be increased. "The 20ft. reflector having been changed from the Newtonian form to my present one, I had a very striking instance of the great advantage of the increased penetrating power in the discovery of the Georgian satellites. The improvement, by laying aside the small mirror, was as 61 to 75, and whereas

the former was not sufficient to reach these faint objects, the latter showed them perfectly well."

But to return to our humble sphere; the advantages of the new construction may be very briefly summed up. First, increased brilliancy and penetrating power, arising from the removal of the plane. Secondly, the probability of obtaining finer instruments; for the artist having the difficulties of but a single reflecting surface to contend with, manifestly enjoys at least a double chance of producing a perfect work.

Of the method of observing with this instrument, I think it hardly necessary to speak. The object must be inserted into the tube, affixed either upon a very small plate of talc, or upon the point of a fine needle; and adjusted to the focus with a delicate screw. This is a very simple affair in the hands of a skilful mechanic. For observing large objects with low powers, a speculum of long focus, say  $1\frac{1}{2}$  or 2 inches, is obviously the best; but for more minute investigations a deeper one is desirable. With the requisite arrangements, such an instrument would, I conceive, be hardly if at all more difficult to use than a refractor.

I have wrought several metals upon this plan, and though I enjoy no opportunity of having them fitted up otherwise than in the rudest and most imperfect manner, I find their performance upon some minute and rather difficult objects very satisfactory. With a metal of about six inches focus and three aperture, without any attempt at adjustment, or any convenience for arranging the focus, several test objects have been easily developed, such as the asperities on the surface of the human hair, the striæ upon the dust of lepidopterous tribes, &c. Fig. 5. represents the hair of the mouse, like a piece of well twisted whipcord, with longitudinal marks between the spirals, considered by microscopists as a good test. (Dr. GORING in the Quart. Journal, June 1827.) A represents the hair near the root, B near the extremity.

When I first applied myself to these constructions, I was apprehensive that the introduction of light would produce a glare in the tube detrimental to vision. But I find this not at all the case. The main tube however, should be made considerably larger than the diameter of the mirror, and a well blackened diaphragm may be placed on each side the illuminating apparatus to quench any straggling light that may intrude. The size of the diagonal plane in the above instrument is about .05, its shorter diameter, and as I find a great deal too large. One of only .025 would be sufficient, I think. I had almost omitted to mention, that as many objects require a somewhat oblique radiance to be even seen, this may be obtained by giving the diagonal a slight revolution on its shorter axis; or perhaps as simply by closing up one half of the ball's eye lens.

Having now so fully described the microscope for viewing transparent objects, I shall very briefly notice that intended for opaque ones. It is represented in fig. 4, where A B is the great mirror, perforated in the centre for the purpose of admitting a cone of light proceeding from the lens D, and forming an image of a luminous aperture (not represented in the figure for want of space) just in front of the microscopic object C, situated in the focus of the metal. The attempt to construct this instrument was at first attended with a great deal of trouble, my original intention being to introduce a parallel beam of light, condensed by a combination of lenses, through a *very small* hole pierced in the centre of the metal. But for want of proper mechanical assistance the attempt proved abortive. I accordingly altered the plan, and enlarged the aperture to about 0.2, as in the figure, and admitted light through a bull's-eye. E, is a stop, to arrest the rays that would otherwise pass out to the eye-glass. It may be coloured according to the ground that is best adapted for displaying the object under observation.

After enlarging so fully upon the former instrument, it is not necessary to enter into much detail regarding the present one. All the observations upon the optical principle of the one apply with equal force to that of the other. I regret, however, that I had not an opportunity of ascertaining as satisfactorily by experiment the performance of this instrument, the perforated metal having been accidentally shattered to fragments by a fall. Some trials however, upon ordinary objects in its incomplete state, convinced me that this construction would perform well. It exhibited the brilliant scales of a curculio in a very pleasing manner. If upon the back of the stop E, a small silver cup be fixed so as to be turned round occasionally, it will enable us to vary the light by which objects are viewed; and to examine them at once by radiated and transmitted rays.

Nothing I conceive can be more simple than the optical principle of these instruments; a single reflection, and a single refraction. And what on the other hand can be more complex than achromatic refractors with their triple, quadruple, quintuple, sextuple, and even triple-triple object glasses? As any ordinary reflector may be very simply converted into one upon the new construction for diaphanous objects, by merely substituting a small diagonal metal for the Amician plane, I am not without hopes that some naturalist in possession of a standard instrument will do me the honour of giving the new principle a fair trial. The result with an object metal wrought by a good artist will be decisive.

I have already extended this notice too far to enable me by this opportunity to communicate some speculations I intended upon several

new and curious achromatic combinations I have tried. I shall possibly do myself the honour of submitting them upon a future occasion; meanwhile, nothing I trust has escaped me in the foregoing observations that can be construed into a disrespectful mention of the Amician reflection. Far from me be the impertinence of disparaging an instrument which the highest optical authorities have concurred to applaud. I have merely ventured to inquire whether that instrument, superior as it is, has yet attained the maximum of excellence.

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V.—*Notes relative to the collection of some Geological Specimens in the Kásia Hills between Assam and Nunklow. By W. Cracroft, Esq. C. S.*

On my journey from Chira Poonjee to Assam, I endeavoured to recognize the ascents and descents, and the geological features of the country, as laid down in Captain FISHER'S Sketch, but I found this impracticable, excepting at those mountains of which he observed the altitudes. I was therefore led to imagine that the intervals between the points given in his sketch had been filled in at random, and that the general geological characters of only the observed points were noted.

On my return, I endeavoured to obtain a nearer approximation to the real outline of the road, and the positions of the various rocks, and I accordingly made the following notes of the time occupied in travelling, both in ascending and descending, the different hills, sketching their profile at the same time on the opposite page of my memorandum book, and noting the times and places at which the geological specimens already forwarded to you were collected. The heights of Jyrong and other points I have taken from Captain FISHER, whose barometrical observations have been found to correspond very closely with others since made. Allowance has been made in the outline for the difference of time in ascending and descending. (See Pl. XX.)

*First day, from 8h. 48m. ; commencement of ascent to Jyrong.*

I began to ascend at viii. 48, through a narrow defile; the rock is apparently a fine grained granite, containing beds of A 2 (a conglomerate of iron clay): at viii. 50, reached the bottom of the first descent, (which was a granite similar to No. 1, but rather whiter and less decomposed): by xi. 7, I reached the next summit, the ascent yielding the granites, A. 4, 5, 6, and 7, and decomposing felspar: the road was then comparatively level till viii. 37, when the ascent became steeper and the rock all along was A. 8, (granite); but at 37 minutes containing large scales of mica (A. 9.)

The descent, after ix. 40, was at first very steep, with precipices at the road side: afterwards less steep; A. 10 and 11 mica and gaeiss being in

situ with red clay: the stream, passed at x. 57, runs over gneiss rock: at xi. 50, began to descend, and after passing a small stream, running over rock A 12, arrived at Jyrong at 12 o'clock; the rock at Jyrong is A 13. The whole of this day's march was through a well wooded country. The gibbon or long-armed ape inhabits the forest near Jyrong, and its hootings echo through the forest; wild elephants are occasionally seen and leopards.

*Second day, from Jyrong to Ongswee and Mopea.*

The road continues through the forest, principally along the course of mountain torrents till vii. 33. where there is a level, capable of cultivation, and formerly was a stockade; it is however a swampy place, and certainly not a good situation for a stage-house. If a stockade were erected at the top of the hill, which we reached at viii. 56., it would divide the journey from Mopea to Ranegang very equally, and much better than either Jyrong or Ongswee, the latter of which is situated in a hollow surrounded by a swamp. The decomposing felspar found at I. 25., and other places seems likely to afford porcelain. A small chestnut not much larger than a fine marrow-fat pea grows here; also a few beech trees,

*Third day, from Mopea to Nunklow.*

The view from Mopea is I think more beautiful than any on the road between Assam and that place.

Between Mopea and the Burpanee there is no jungle, the neighbouring hills have many fir trees. The water-fall at the Burpanee surpasses in beauty any I have seen; it has not indeed the advantage of falling from a great height, but the body of water is very large: I descended with some difficulty to the rocks at the bottom of the fall, which seems not to be more than 80 or 90 feet, and is broken in several places; the black rocks, through which it has cut its passage, rise considerably higher than the stream, and overhang the basin at the bottom of the fall: they are well covered with wood. The basin extends to a great distance, beyond which a turn of the river seems to inclose it, and gives it the appearance of a spacious lake. It is altogether truly sublime and beautiful. Between this river and the small stream at the bottom of the great ascent, the road winds through a forest of enormous fir trees; the mountain seems perfectly to overhang the road wherever you get a glimpse of it through the trees, and almost discourages the traveller from attempting the ascent, which occupies more than two hours.

An accident which befell me at Nunklow prevented the continuance of these remarks, but I collected a few specimens mentioned in the list, and made the following observations in the neighbourhood of the Bogapanee and Kalapanee rivers.

At Moufong the rock is white flinty slate, the joints or strata being nearly in the direction of the meridian and inclined to the horizon at an angle of about  $60^\circ$ ; this rock continues all the way down to the bed of Bogapanee river, which is covered with rolled masses of granite, gneiss, porphyry, and sandstone: wherever the rock bassets, it is red slate (E 2,) at the same angle and in the same direction as the white at Moufong; immediately upon this lies a stratum of the conglomerate (E 3), containing pebbles of quartz and jasper with a talcose cement, of which large masses have fallen into the bed of the stream; it may be traced to the bed of the next nullah, where it also appears in sight; the stratum above this is a dark sandstone, E 4, upon which is a stratum of basalt, or porphyry, F 5, the outside of which becomes red by decomposition. Above this are new sandstones of various hardness and colours (mostly white), alternating with conglomerate (E 6), which continue as far as the valley of the Kalapanee, in descending into which the same strata are visible in the perpendicular face of the rock, and in the large masses which have fallen over; E 7 (conglomerate) is picked out of a stream: about 80 feet above the stream, the same porphyry or greenstone basalt again appears, E 8, with veins of fine quartz E. 9. This rock forms the bed of the river, and continues till we begin to ascend on the opposite side of the valley (I saw one mass evidently columnar, the faces with angles of  $120^\circ$ ). In the ascent we return to the sandstone, and conglomerate, in which I found a bed of lithomarge, E 10, and a bed of quartz conglomerate, containing crystals of amythystine quartz.

After reaching the summit on the road to the left leading to Moleem (at about 100 yards distance) is a bed of bituminous slate, E 12; from hence to Chira we meet only varieties of sandstone, with beds of stalactitic iron ore, (No. 13), and of coal adjoining pipe-clay E 14, 15, which are found about a mile and a half south of Sura-reem.

*Catalogue of Specimens, deposited in the As. Soc. Museum.*

*Ascent to Jyrong. Specimens marked A.*

1. Fine grained granite, glassy and angular.
2. Conglomerate of iron ore with pebbles in beds in the above.
3. Granite resembling 1.
4. Do. apparently quartz in fine grains stratified with decomposing felspar, being No. 1, in a state of decomposition; but the rock No. 1, is regularly crystalline, its angles and joints perfectly defined.
- 5, 6. Fine grained red granite. (with minute crystals of hornblende?)
7. Decomposing felspar with quartz in irregular fragments.
8. Fine grained red granite.
9. Gneiss (granite stratified with plates of mica).
- 9½. Conglomerate; iron ore and pebble found in a watercourse.
10. Decomposed gneiss,—purple.
11. Decomposing felspar with quartz in very small particles.

- 11½ Quartz passing into gneiss; apparently a vein in the gneiss.
12. Fine grained granite, the mica in larger masses than the felspar and quartz.
13. Fine grained white granite (containing hornblende).

*Between Jyrong and Mopea, (marked B.)*

1. Black gneiss containing much hornblende.
- 2, 3. Granite, fine grained, with much black mica.
4. Quartz and mica (not in situ) white in great quantity, with red clay.
5. Quartz, in situ, white.
6. Decomposing felspar containing small crystals of quartz.
7. Fine grained granite, white, containing minute crystals (of hornblende)?
- 8, 9. Do. do. red.
10. Mica stratified with decomposing felspar, (query gneiss?)
11. Gneiss with much mica.
12. Do. less mica, much felspar, decomposing.
13. Granite with much mica.
- 13½. Almost all mica (gneiss?)
14. Gneiss with much mica.
15. Granite with black mica.
- 16, 17. Gneiss. 18. Granite, grey.
19. Decomposing felspar with quartz, fit for porcelain.

*Between Mopea and Nunklow, (marked C.)*

- 1, 2, 3, 4, 5, 6. Granite, reddish and grey varieties—approaching sandstone.
7. A micaceous schist with red felspar.
9. Crystals of felspar decomposed, but retaining their form.
10. Mica stratified with decomposed felspar.
11. Mica in hexagonal plates.
12. Quartz tinged with mica.
13. Micaceous, with crystals radiating from a point (approaching actinolite?)
14. Red quartz (approaching hornstone) with mica.
15. Granite (the felspar decomposed).
- 16, 17. Quartz with mica in veins.

*Specimens, none of them in situ, found on the ascent immediately below Nunklow.*

*C-a.* White and black zeolitic porphyry?

*C b, c, and d.* Micaceous schist.

*C e.* Decomposed ditto, ferruginous.

*C f.* Ditto white, in laminae.

*C g.* Quartz with black mica. and fine specimens of green actinolite.

*Collected between Myrong and Moufiong, marked D.*

1. Near Ly, yung, clay slate.
2. Lithomarge.
3. Slate, a small hill between the valley of Kiug-lung-tung and Moufiong.

*Between Moufiong and Surareem, marked E.*

- |                                    |                                      |
|------------------------------------|--------------------------------------|
| 1. White sandstone.                | 8. Greenstone.                       |
| 2. Red ditto ditto.                | 9, and 8. Fat quartz veins in No. 8. |
| 3. Brescia.                        | 10. Lithomarge.                      |
| 4. Dark red sandstone (query old)? | 11. Coarse quartz sandstone.         |
| 5. Basalt, conchoidal lumps.       | 12. Bituminous shale.                |
| 6. Sand stone, new.                | 13. Stalactitic iron ore.            |
| 7. Clay slate.                     | 14, 15. Coal.                        |











The following is a List of the Occultations of Stars by the Moon, observed by Mr. BOULDERSON, at Seháránpúr, latitude  $29^{\circ} 57' 79''$  N, longitude 5 h. 10. m. 54.1 E. with the longitudes as deduced by him.

		AR of Star.		Dec. of Star.		Mean time of Phenomenon.		Resulting Longitude.	
		h. m. s.	' "	' "	' "	h. m. s.	' "	h. m. s.	' "
1833.									
Feb....	27 * Tauri,.....	4 38	55,268	+	18 25 26,60	Im.11	40 0	5 10	31,6
1834.									
Jan. ...	20 * Tauri,.....	3 51	7,95	+	16 49 18,7	Im. 9	8 45,0		56,5
Feb....	18 o Tauri,.....	5 17	40,165	+	21 47 16,4	Im. 9	7 7,3		45,1
	19 (796) Geminorum,	6 15	27,371	+	23 24 39,84	Im. 8	49 28,1		74,6
	20 (908) " " " "	7 13	28,88	+	23 15 26,12	Im. 6	38 30,0		62,2
Mar....	18 H " " "	5 54	1,808	+	23 15 53,4	Im. 9	12 44,8		49,9
	H " " "					Em. 9	46 43,3		62,9
	10 S " " "	5 59	38,38	+	23 7 58,4	Im 11	52 7,7		53,5

Mean, 5 10 54,1

*Noté.*—The AR of these stars have been deduced from the Madras catalogue (by Mr. TAYLOR we suppose): and, with the exception of the emersion of H. G. minorum which may be in excess about 3'', the mean times of the other phenomena are estimated to be correct within one second.

Of the other stars whose occultations have been observed there is but one (63 Ceti) that can be traced in Piazzi's catalogue.

Jan. 1st, 1800 63 Ceti (78) AR= $32^{\circ} 44' 30''$ 0, Annual motion  $+ 47' ,34$   
Dec.  $+ 6^{\circ} 49' 6'' ,8$  ,, 16,88

The observations made by Mr. BOULDERSON and by Col. T. OLIVER would have been published in a former No. of this Journal, but that we were in expectation of obtaining other corresponding observations from some of our scientific correspondents to incorporate with them: the longitudes of the places where these observations were made have been deduced for them, for each day, with reference to Greenwich, on the supposition that the apparent AR of the stars, and of the moon, as given in the Nautical Almanac, would accord with observations made on these objects at Greenwich.

A correspondent has brought to our notice that there is, generally, about 0,5s. of difference between the apparent AR as given in former numbers of this Journal and in the Nautical Almanac for 1834. This we much regret; and the more so, as it is out of our power, at present, to apply a remedy.

In a catalogue of 720 stars, recently published by the Astronomer Royal, and from which, doubtless, the places of those in the Almanac have been taken, there are but seven which accord in AR with the catalogue of the Astronomical Society, (Mem. As. Soc. iv. 258,) while there are,

	s.	s.
94 stars whose AE differs between	0,3	and 0,4
78 .....	0,4	and 0,5
51 .....	0,5	and 0,6
37 .....	0,6	and 0,7
27 .....	0,7	and 0,8 &c.

from which it will be seen that, without that catalogue, which unfortunately we do not possess, we cannot apply a remedy to this evil.

VII.—*Proceedings of the Asiatic Society.**Wednesday Evening, the 2nd July, 1834.*

The Right Rev. the Lord Bishop of Calcutta, Vice-President, in the chair.  
Read the Proceedings of the last Meeting.

Read letter from Dr. A. HAMILTON, and Capt. WILLIAM FOLEY, acknowledging their election as members of the Society.

Read a letter from M. A. LANGLOIS, Professor of the University of France, acknowledging his election as an honorary Member of the Society.

Read extract of a letter from T. CLEMISHAW, Esq. stating that he regrets being obliged to withdraw from the Society from motives of economy.

Read a letter from H. T. PRINSEP, Esq. Secretary to Government in the General Department, forwarding copy of a letter from Monsieur CORDIER, administrator of the French Possessions in Bengal, soliciting on behalf of a learned Society at Paris, a complete set of Meteorological Tables for this country, from January, 1823, to June, 1834.

Resolved, that such records as exist for the period in question shall be placed at the disposal of the French Society.

*Library.*

Read a letter from EDWARD T. BENNETT, Esq. Secretary of the Zoological Society of London, forwarding the Journal of their proceedings, January to October, 1833, together with the first part of 1st volume of their Transactions, for presentation to the Society.

The following books were also presented :

Memoirs of the Astronomical Society of London, 6th vol.—*by the Society.*

DE LA BECHE'S Geological Manual, 3rd edition—*by the Author.*

Chrestomathie Chinoise, comprising six Chinese works, (including the *Santsuk-ing*, or Vocabulary, in three characters,) lithographed at Paris under the charge of Monsr. KLAPROTH, at the expence of the French Asiatic Society—*by the Society.*

Observation on Cholera Asphyxia, by J. HUTCHINSON, Esq.—*by the Author.*

Transactions of the Medical and Physical Society, vol. vii. Pt. 1—*by the Society.*

The Indian Journal of Medical Science, Nos. 5, 6, and 7—*by Messrs. J. GRANT and J. T. PEARSON, Editors.*

The *Bytul Pachisee*, and the second edition of the "*Vidovin Moda Tarangines*," translated into English, by RAJA KALIKISHEN—*presented by the Author.*

Meteorological Register for May, 1834—*by the Surveyor General.*

Ditto, kept at Cawnpore, for October, November, and December, 1832, and March, April, and May, 1833—*by Lieut. Col. POLLOCK, C. B.*

Read extracts from a letter addressed to the Secretary by Professor H. H. WILSON, announcing the receipt of the MOORCROFT Manuscripts sent home under charge of Lieut. BURNES, and stating that an arrangement was under negotiation to print them free of expence to the Society.

"Part of the journals, digested and corrected as I propose, have been already placed in the publisher's (MURRAY'S) hands. I sought for TREBECK'S map, at the India House for some time in vain, but at last found it had been incorporated with other cis-Himalayan maps, by Mr. WALKER in his atlas. He is willing to prepare it in as much detail as TREBECK'S field books will allow." (We have reason to know that the matter incorporated in WALKER'S atlas was taken from a

copy traced on this paper from the original map in this country by a gentleman who visited England on furlough, in 1824, and we are not sure that copies were ever sent home officially to Loudonhall street, but rather suppose they may be still found in the archives of the Political Secretary's Office.)

Mr. WILSON alludes also to the Indo-Scythic coin brought to light by Lieut. BURNES, and attributed to Kanishka. The Greek scholars of Oxford all read the inscription KANHPKOT. No doubt the discoveries since made in Bactrian numismatics will excite great interest among the antiquarians of the University.

#### *Antiquities.*

Read a letter from W. STURMER, Esq. forwarding twelve pieces of metal supposed to be ancient coins, which were dug up on clearing an estate in the Sunderbuns (lot, xlii. of Capt. T. PRINSEY's Sunderbun map.)

These coins are of silver and copper, square or circular, without any proper die impression, but bearing merely small *chakras* or shraf marks of various kinds. The silver pieces have an average weight of 52 grains, and have been adjusted by cutting off the corners.

Read a letter from Major L. R. STACY, bringing to the notice of the Society two coins of his cabinet, having the symbol observed in the Behat coins of Capt. CAUTLEY, united to a Greek inscription. Connected with this subject, the Secretary also exhibited to the meeting, and read a note on, a silver coin of the same type just received from Lieut. A. CONOLLY, bearing a most clear and unequivocal inscription in the illegible character, No. 1. of the Allahabad column.

(We shall hasten to lay drawings of these two curious coins before our readers.)

A second letter from Major STACY drew the Society's attention to a small copper coin found in Malwa, having the image of a sphinx on the obverse.

Read a letter from Captain GEO. BURNESY on the subject of the Pall inscription at Geya.

The impressions of the inscriptions were it seems taken off by Captain BURNESY himself in Feb. 1833, with very great trouble; and there was no Pandit in the survey's suite; one copy was given to the Governor General, with a translation, and the other to the Burmese Ambassador. The remaining copy with the translator's observations was intended for the Asiatic Society. We regret that our ignorance of these circumstances should have caused a premature publication of the inscription, but Capt. B.'s observations will still be of equal value.

Copies of an inscription in Nagri, Marhatta, and Tamul characters, from a stone dug up in building a new ghat at Benares, were communicated, as in a Persian letter from Múnshi Pal Singh, at Benares.

The stone was 29 feet long and 9 feet in girth, it seems to have belonged to a temple of no great antiquity. The inscriptions are too imperfect to be deciphered, but the example of making such discoveries known is deserving of every encouragement. They bear the date *Samsat* 1655.

#### *Physical.*

Specimens of the fossil shells found in the lime quarries on the banks of the Derwent river, 12 or 13 miles from Hobart Town, in Van Diemen's Land, were presented by H. T. PRINSEY, Esq.

They are identical in appearance with some of Dr. GUZANO's shells from Spain (*Spirifer striatus* of SEWENAY, a shell of the mountain limestone group.)

A fine specimen of the Kyuk-Phyoo lignite half-silicified and other minerals were presented in the name of Lieut. W. FOLEY.

A flying fish preserved in spirits, presented by J. A. WILKINS, Esq.

The saw of a saw-fish, 5 feet long, presented by Capt. R. LLOYD, Mar. Surv.

Read a letter from Serjeant EDMUND DEAN, of the Sappers and Miners, forwarding some selected specimens of the fossil bones discovered and collected by himself in blasting the rocks of the Jumna river, for inspection and examination.

Among the present specimens are some not found in the collections received from Captain SMITH and Lieut. BURT, from the same localities; of these the most interesting are, two teeth of the fossil hippopotamus, and a bone resembling the cervical vertebra of a camelopardalis, as compared with one in possession of Dr. J. T. PEARSON.

[This paper shall appear as soon as possible.]

Read extracts of a letter from Dr. MALCOLMSON, Secretary Medical Board, Madras, forwarding some botanical specimens collected by him at Malacca, and a report upon them, by Dr. N. WALLICH, Superintendent Botanical Garden.

Having seen the interest excited by Lieut. NEWBOLD's fern from Mount Ophir, Dr. M. obligingly sent his collection in hopes that some prize might reward the labour of their examination. Dr. WALLICH, however, finds nothing in the list which is not already well known. No. 9, only, a *Bossia*, is probably new and an interesting plant.

Dr. MALCOLMSON's letter contains the following account of fossil shells discovered in the Hyderabad country.

#### *Fossil Shells in Hyderabad.*

"In the *Neermai* hills lying north of the *Godavari* river on the road from Hyderabad to *Nagpur*, many very perfect fossil shells, mostly bivalves, and evidently marine, have been found imbedded in a volcanic rock; also the head and vertebra of a fish. The formations rest almost every where on granite, and have the usual characters of this class of hills. The most interesting facts however, are the raising of some portions of the blue limestone, passing into clay-slate, by the basalt, and in one place the bursting through of the latter with very remarkable distinctness through the limestone, which is singularly altered, its silicious constituents being converted into glass-slag, and a cinder-like rock. There is a series of hot springs holding lime in solution, which is deposited in rocks on the passing off of the carbonic acid which gives the river a sour taste. The contrast between the ancient and recent fossils is very striking. The hills I find belong to the *Sehas* range, extending S. E. to N. W. several hundred miles. In the same occurs the *Lamar* lake, (40 miles from *Jainah*.) which I examined some years ago. It is a vast crater nearly 500 feet deep, and four or five miles round on the upper margin. Its waters are green and bitter, supersaturated with alkaline carbonate, and containing *siles* in solution as well as some iron. The mud is black and abounds with sulphuretted hydrogen, but the water is pure and without smell. The rocks are volcanic, and springs of pure water rise out of the salt mud of

down the sides of the patch bowl, thus strangely sunk in a nearly level country, there being but a gentle rise to the edge. The crystals of salt found at the bottom by the divers who remove it for purposes of commerce are tubular. Between this and the hot springs of *Kes* others are found, and the direction of the range corresponds with the dykes described by VOYSEY in the Hyderabad country."

A note from Capt. F. JENKINS to the Secretary intimated the discovery of limestone in Assam.

"I find the shell lime of Sylhet extends across to Assam in the direction of *Dharnipur*; it having been discovered on the right bank of the *Kopili*—a discovery of no small importance to us: no lime before having been known to exist in Assam nearer than the *Brahmakund*."

A Persian letter from SHEKH KERAMAT ALI at Cabul, accompanied a package of the fruit and flower seeds of that country, and some specimens of lead and antimony ores.

The seeds were unfortunately nearly spoiled on their way down by the rain. They were made over to Dr. WALLICH'S care.

Extracts from the letter before alluded to of Prof. WILSON, were read.

Professor BUCKLAND had been much gratified with the duplicates of Dr. J. G. GERARD'S fossil shells selected and transmitted for his examination. He found them to corroborate in every respect a view of the distribution of the *ammonites*, on the subject of which he had recently been delivering a lecture to the Ashmolean Society at Oxford: he had no doubt, although doubts had been very justly entertained before, that the formation to which these shells belonged in India was allied to the Lias of Europe. We shall look with eagerness for the report of this high authority, which promises to confirm the opinion of our associate the Rev. E. EVEREST on the subject. A most valuable article on the species and distribution of *ammonites*, by DE BUCH, appears in the *Annales des Sciences Naturelles* of May, 1833, which we regret our inability to transfer to the *Journal*: it contains plates of all the varieties of this fossil hitherto discovered in the Himalaya range.

The business of the evening being concluded, The Right Rev. the Vice-President rose and addressed the meeting:—

It had been suggested to him that the death of the Rev. Dr. CAREY, one of the oldest and warmest supporters of the Asiatic Society, was an occasion which called for some testimonial of the sense entertained by all its members of the value of his services to the literature and science of India, and of their sincere respect for his memory.

He had himself enjoyed but two short interviews with that eminent and good man, but a note from Dr. WALLICH, who was prevented himself from attending to propose the resolution, supplied his own want of information. Dr. CAREY had been 28 years a member of the Society: and (with exception of the last year or two of his life, when protracted illness forced him to relinquish his *Calcutta duties*), a regular attendant at its meetings, and an indefatigable and zealous member of the Committee of Papers since the year 1807.

He had enriched the Society's publications with several contributions:—an interesting report on the agriculture of *Dinajpur*, appeared in the tenth volume of the *Researches*. An account of the funeral ceremonies of a Burman priest in the twelfth:—The catalogue of Indian medicinal plants and drugs in the 11th vol. bearing Dr. FLEMING'S name, was also known to have been principally derived

from his information and research. As an ardent Botanist, indeed, he had done much for the science in India, and one of the last works upon which he had been engaged, was the publication, as Editor, of his deceased friend Dr. Roxburgh's *Flora Indica*.

His Bengalee, Marhatta, Telinga, and Punjâbi dictionaries and grammars, his translation of a portion of the Ramâyana, and other works, were on our shelves, to testify the extent of his learning as an oriental scholar. It was well known that he had prepared some time ago an elaborate dictionary of the Sanscrit language, the manuscripts of which, and a considerable portion of the work already printed off, the result of many years' intense labour and study, had been destroyed by the fire which burnt down the Serampore premises. He had also been of great assistance, as the author testified, in the editing of Baboo RAM COMUL SEN'S Anglo-Bengalee Dictionary.

The memory of those members, who had been longer associated with him than himself, would easily fill up this very imperfect estimate of his various services.

During 40 years of a laborious and useful life in India, dedicated to the highest objects which can engage the mind—indefatigable in his sacred vocation, active in benevolence, yet finding time to master the languages and the learning of the East, and to be the founder, as it were, of printing in these languages, he contributed by his researches, and his publications, to exalt and promote the objects, for which the Asiatic Society was instituted. The close of his venerable career should not therefore pass without a suitable record of the worth and esteem in which his memory was held; and His Lordship begged to move that the following minute be entered on the Journals of the Society:—it was seconded by Colonel Sir JER. BRYANT, and carried unanimously:

“The Asiatic Society cannot note upon their proceedings the death of the Rev. WM. CAREY, D. D., so long an active member and an ornament of this Institution, distinguished alike for his high attainments in the oriental languages, for his eminent services in opening the store of Indian literature to the knowledge of Europe, and for his extensive acquaintance with the sciences, the natural history and botany of this country, and his useful contributions in every branch towards the promotion of the objects of the Society, without placing on record this expression of their high sense of his value and merits as a scholar and a man of science; their esteem for the sterling and surpassing religious and moral excellencies of his character; and their sincere grief for his irreparable loss.”

### VIII.—Indian Zoology.

*Notices extracted from the proceedings of the Zoological Society of London, January 22, 1833.*

Mr. BENNETT called the attention of the Society to a stuffed specimen of an *Antelope*, from the southern part of the peninsula of India, which had been presented to the Society several months since by CHARLES TELFAIR, Esq., Corr. Mem. Z. S. He remarked, that notwithstanding some discrepancies between the specimen exhibited and the description published by PALLAS, he was disposed to regard

it as the young of the *Indian Antelope*, *Antelope Cervicapra*, FALL. Its general colour is pale fawn, and it has a paler streak on each side, passing from the shoulders to the haunches; characters by which, as well as by the form of its horns, the pale circle surrounding the eyes, and the white patch under the tail, it agrees with the young of the *Indian Antelope*: but it differs by the fawn colour extending down the sides to the under parts of the body, which are merely of a lighter shade than the upper, and are not pure white; and by the length of the ears, which does not exceed 4 inches, while in no specimen of the *Indian Antelope* possessed by the Society, is the length of these organs less than 5 inches. The latter circumstance is so remarkable, as to suggest the necessity of further inquiries into the history of the race from which this individual was derived. Its age may be conjectured from the size of its horns, which have made two nearly complete turns, and are surrounded by eighteen rings.

Specimens were exhibited of the adult male of the *lined Pheasant*, *Phasianus lineatus*, LATH., and of two immature birds of the same species: for the whole of these the Society is indebted to GEORGE SWINTON, Esq., Corr. Mem. Z. S. The immature birds died on their passage to this country; the adult skin was obtained from the Tennasserim coast.

At the request of the Chairman, Mr. GOULD made some observations on these specimens. The adult bird differs in some particulars from the description published by Dr. LATHAM. "Its total length is 2 feet 8 inches; the length of the wings, from the shoulder to the end of the longest feather, 9 inches; of the beak, from the gape to the tip, 1½ inch; of the *tarsus*, 3½ inches; and of the tail, 1 foot 2 inches.

"The beak is strong, and considerably arched; the naked space round the eye bright red, and covered with numerous *papillæ*; the head crested with long glossy blue-black feathers; the back of the neck, and whole of the upper surface, delicate grey, very numerously barred with fine zigzag lines of black; which are broader on the quill feathers; the throat, breast, and belly, black; the sides of the breast and flanks having white lanceolate feathers with black edges; the tail, of eighteen feathers, very much graduated, and arched, as in the *Silver Pheasant*, *Phasianus Nycthemerus*, LINN., the outer edge of the two centre feathers, and the tips of the two next, being white; the remainder are alternately marked with irregular lines of black and white, the black predominating; and the legs strong, of a reddish flesh colour, furnished with conical sharp spurs.

"The two immature birds are alike in colouring, and appear to be male and female. They differ very materially from the adult, and very much resemble the female or the young male of the *Silver Pheasant*. They are about 18 inches in length; wing, 8½ inches; *tarsus*, 2½; beak, 1½; tail, 10. The head is crested with feathers nearly 2 inches long, of a reddish brown, obscurely marked with minute zigzag lines of black; the naked skin round the eye is not so much developed as in the adult male; the neck, throat, breast, and under parts are brown, each feather having a lancet-shaped mark of white; the whole of the back and shoulders brown, minutely sprinkled with a darker colour; the quill-feathers brown, having the outer edges barred with yellowish white; the secondaries brown, with oblique, irregular, and narrow lines of a lighter colour; the tail irregularly barred, and dotted with rich brown and yellowish white; the legs and feet reddish brown."

February 12, 1833.

A note from Col. HALLAM was read, accompanying drawings of the *Mango-fish*, *Polynemus paradiseus*, LINN.; and of two individuals of a race of *pigs* with only

two legs, the hinder extremities being entirely wanting. The latter, Col. HALLAM states, were observed "as a town on the coast in the Tanjore country, in the year 1795: they were from a father and mother of a similar make, and the pigs bred from them were the same."

June 11, 1833.

Specimens were exhibited of various *Mammalia*, *Birds*, and *Reptiles*, from the continent of India, which had been recently presented to the Society by THOMAS HEATH, Esq. Mr. BENNETT observed on the several objects, pointing out especially the more interesting among them. They included an individual apparently referrible to the *Semnopithecus cucullatus*, Isid. Geoff. St.-Hil., although darker in all its markings than is indicated in the description given by the original observer of the species. They also included a species of *Felis*, of a size intermediate between the larger and the smaller animals of that genus, and having in its grey colour and longitudinal striping a general external resemblance to some of the *Viverræ*. This Mr. BENNETT regarded as new to science, and proposed to designate it

*FELIS VIVERRINUS*. *Fel. fulvo-cinereus, subtilis albescens; capite, nuchâ, dorso, genis, guldque nigro vittatis; lateribus, ventre, pedibusque nigro maculatis.*

Long. corporis cum capite, 33 unc.; caudæ mutilæ, 7; auriculae, 1½.

The prevailing colour of the upper surface is a rather deep yellowish grey, the separate hairs being dusky at the base, yellowish in the middle, and having short black tips. The black lines and spots are formed of hairs destitute of yellow, and having the black tips of much greater length. A longitudinal black band passes on each side from the inner *canthus* of the eye above the ear nearly to the shoulder; a second, more internally, passes to the same distance backwards, and is somewhat interrupted anteriorly; and between this and its fellow on the *vertex* is the vestige of a median line, which on the forehead is broken up into a double row of spots; these and the two adjoining lines subdivide in front into numerous very small spots between the eyes. Two black lines pass downwards obliquely on either side from below the eye, over the angle of the jaw; and from their terminations on each side there passes a transverse band across the throat: the space between these lines is nearly white, as is also a stripe over each eye, and the whole of the under jaw and chin. There is a large black spot surrounding the base of the ear posteriorly, and the ear is also tipped with black. The long, linear, markings of the back are disposed in about five interrupted, longitudinal bands, and some of the spots on the sides assume a linear form. Of these the most remarkable are, one on each side of the neck, and an oblique wavy band on the shoulder. The spots on the sides generally approach a rounded shape, and form, posteriorly, four or five interrupted longitudinal rows. Those of the under surface are larger, and are arranged without order. On the fore limbs the spots are small externally, and internally there are on each two large transverse black patches. On the hinder limbs the spots are arranged so as to form interrupted transverse bands on both surfaces. The hairs of the soles of the feet are dusky brown. The tail is spotted above in the same manner as the sides; its colour beneath is uniform. The spots are throughout numerous. The whiskers are white, and take their origin from three black lines on either side.

The species is nearly allied to *Felis Serval*, SCHREB., but will readily be distinguished by the characters above given, by the comparative shortness and strength of its limbs, and by the locality whence it was obtained.

Col. SYKES reminded the Society that, in submitting his catalogue of the *Mammalia* observed in Dukhun, East Indies, he took occasion to comment on the

popular error respecting the ferocious and untameable disposition of the common *Hyæna*, *Hyæna vulgaris*, Cuv.\* His opinions were founded partly on observation of a cub which he had domesticated, and partly on facts communicated by his friends. He went on to state as follows :

“ Two years have elapsed since I placed in the Gardens of the Society the above-mentioned cub (a female), which has now attained its full growth, and I am happy to be enabled to confirm the opinions I formerly advanced. In India it was allowed to run about my house, and on board ship it was released from its cage two or three times a day, to play with the sailors and gambol with the dogs. It early recognised my person and voice, and would obey when called; and in general was as playful and good-humoured as a puppy. My visits to it in the Gardens have been rare, and at long intervals, nor have I ever carried it food; I anticipated, therefore, that it would outgrow its early associations, and that I should be to it as any other stranger; but it has always greeted me not only as an acquaintance, but as an old friend; and if I am to judge from its agitation and peculiar cries, the animal's recognition is that of affection.

“ On Sunday last it was asleep in its cage when I approached. On calling to it by its name it looked up, distinguished me in the crowd, started on its legs, and on my applying my hand to its mouth to smell to, it threw itself down against the bars, rubbed its head, neck, and back against my hand, and then started on its legs and bounded about its cage, uttering short cries. On ceasing to speak to it, and moving away, it stopped, and looked wistfully after me, nor resumed its motions until I addressed it again. Its manifestations of joy were so unequivocal, as to excite the surprise of a great number of bystanders. As these pleasing traits in the disposition of a calumniated animal appeared so new to those who surrounded me on that occasion, they may possibly be deemed of sufficient interest to be worthy of extended promulgation by record in our Proceedings.

“ I take occasion to repeat my conviction, that association with man, constant kindness, and abundance of food, will suffice not only to modify, and indeed eradicate, the worst traits in the disposition of any animal of the higher classes, but give birth to others of which their natures were not deemed susceptible.”

September 10, 1833.

A letter was read, addressed to Mr. VIGORS by B. H. HODGSON, Esq., Corr. Memb. Z. S., and dated Nepál Residency, February 23, 1833. It referred to the zoological specimens which the writer had forwarded to Calcutta, to be thence transmitted to England, some account of which, as contained in a letter from Mr. PAINSE, was read at the last Meeting.

[The account given of the Mammalia of Nepal in this day's proceedings has already appeared in the Journal for 1832. A letter from Mr. BENNETT, Sec. Zool. Soc. gives a sad account of the result of Mr. HODGSON's consignment of animals: of the few which remained alive to be shipped by the Susan, in April, 1833, none reached England! One of the deer leaped overboard, the other knocked itself to death against the bars of its cage. The pheasants and pigeons lived until the vessel got into the colder latitudes, when they died one after the other! a most unfortunate termination of an attempt from which much had been hoped, and on which no trouble or expense had been spared by our zealous naturalist.]

A “ Description of *Perdix Lerwa*,” by B. H. HODGSON, Esq., Corr. Memb. Z. S., was read. It was accompanied by a coloured drawing of the bird, which inhabits the northern region of Nepál, and forms, by its half-plumed *tersi*, a sort of link between the *Partridges* and the *Grouse*. Its habits assimilate with these

of the latter genus. It is found close to the permanent snows, among rocks and low brushwood, and sustains itself upon aromatic buds, leaves, and small insects. It is characterized as follows:

**PERDIX LERWA.** *Perd. nigra, albo castaneoque transversim lineata; pectore brunneo; tarsi ultra calcar plumosis, remige 2da longiore.*

The great comparative expanse of the wing; the diminution of its rounded form by the second quill feather being the longest; the increased length and strength of the tail; and the extent of the feathering of the *tarsi*, are very remarkable characters, which give to this species a peculiar interest. Its dimensions, as compared with several allied birds, are given by Mr. HODGSON in the following table:

	<i>Perd. Lerwa.</i>	<i>Perd. Chukar.</i>	<i>Perd. Gularis.</i>	<i>Perd. Francolinus.</i>
Length, from the tip of the bill to that of the tail . . . . .	1·2½	1·1½	1·2½	1·2
Length of the bill . . . . .	1	1½	1	1, ⅓
Basal height of ditto . . . . .	¾	⅓	⅓	¾
Basal breadth of ditto . . . . .	¾	⅓	⅓	¾
Length of the tail . . . . .	4½	3½	4½	3½
Expanse of the wings . . . . .	1·11½	1·8	1·9½	1·8
Length of the <i>tarsi</i> . . . . .	1½	2, ⅓	2½	2, ⅓
Length of the central toe and nail . . . . .	1½	2, ⅓	2½	1½
Weight . . . . .	1 lb. 2 oz.	1 lb. 2 oz.	1 lb. 2 oz.	1 lb.

September 24, 1833.

A collection of skins of *Birds*, sixty-four in number, formed in the Himalayan Mountains, and presented to the Society by Lady WILLIAM BENTINCK, was exhibited. It included several species apparently new to science, and was particularly rich in the interesting *Pheasants* of the Himalaya. The collection was remarkable on account of the fine condition of the specimens, which generally surpassed in beauty those previously contained in the Society's Museum.

A series of eighty skins of *Birds*, selected from a collection formed in India by H. B. HILLIER, Esq., and presented by that gentleman to the Society, was exhibited. It comprised specimens of many species in fine or interesting plumage.

[This day's proceedings also contains a note of Mr. HODGSON's papers on the Chira antelope and the wild dog of Nepál, published in the Gleanings and Asiatic Researches.]

October 8, 1833.

A letter was read, addressed to the Secretary by W. A. WOOLER, Esq., and giving an account of a *wild Dog* from the Mahabaléshwar Hills, now known as Malcolm's Pate, in the Presidency of Bombay: its local name is *Dhale*. The habits of this *Dog*, in a state of nature, are described by Mr. WOOLER: they accord with those of the *Búdnú* of Nepál, as detailed by Mr. HODGSON in a paper read at the previous Meeting of the Society.

### Miscellaneous.

#### 1.—On Spherical Mirrors.

It would appear from the undermentioned paragraphs, which have been extracted from HUTTON's *Mathematical Recreations*, vol. ii. p. 201, that opticians have not yet determined the reason why objects on being reflected from convex and concave mirrors appear of less magnitude in the former, and of greater in the latter; than they really are. Now, nothing appears to me to be more easy of demonstration, for let us suppose a cylinder having its outer surface so polished as to reflect distinctly

all objects surrounding it. In the next place, let us imagine another cylinder, a hollow one, to be placed concentric with the former, but at such a distance on the outside of it, that any object situated on the inner surface of the outer cylinder, may be distinctly reflected upon the outer surface of the inner one.

Now as every particle in the outer cylinder is reflected from that part of the inner one which is situated immediately and perpendicularly opposite to it, it is evident that the whole of the outer cylinder is represented on the polished surface of the inner one, but the latter being on account of its interior situation the smaller of the two, it follows that every object that is situated on the inner surface of the outer or larger cylinder, must be represented on a smaller scale (as far as its lateral measurement is concerned) upon the polished surface of the inner and smaller one, than it really is in the other, which contains the real size or dimensions of the object.

It may be easily seen then, that if a polished globe or a polished segment of a circle similar to a convex mirror be substituted for the inner cylinder, the same reasoning must hold good, for each dimension of the image, in which case the reflected objects must become diminished both in height and diagonal measurement, as well as breadth, merely because the surface upon which they are represented is less than that of the objects themselves.

So much for the reduction of the spectrum or image of objects in convex mirrors, and as to the increase of it in concave ones, the reasoning must be exactly the same, as for the above, excepting that the object must then be considered as situated on the outer surface of the inner cylinder, which should be unpolished, and be reflected from the inner polished surface of the outer one, in a magnitude of course greater than the object itself, in proportion to the increased radius of the outer mirror.

I cannot but express a difference with the common opinion, that the place of the spectrum in the convex mirrors is at *H.*, see the accompanying figure numbered in HUTTON, fig. 30, plate 9; it may surely with fairness be considered to be at *M.*, that is exactly at the same distance within the mirror measured on the prolongation of the line of reflection, as the object is distant from the point of incidence, in the same manner as in a plane mirror; for although the object or rather its image arrive at the eye in a reduced size when reflected from the convex mirror, yet by the above reasoning, with the two cylinders, it is easily explained, for the image of the object, having fallen from without upon the convex surface of the mirror which is situated within and which in this case corresponds as it were with the inner cylinder above noticed, has become itself reduced in size, and being so reflected, proceeds towards the point of sight in that diminished state, and therefore it necessarily appears to the eye when reflected from the convex mirror less in size than it really is, and by a parity of reasoning, greater in size when reflected from a concave one.

In my opinion, the image (with the exception above noted of its being reduced in size, by its actual contact with the speculum without the eye having any thing to do with that reduction) is not only situated at the same distance above described within the mirror, as the object is distant from the point of incidence, but it becomes reflected from a convex mirror in exactly the same manner that it would be from the polished surface of a plain one, such as *F. G.* where the angles *B. E. F. A. E. G.* formed by the lines of incidence and reflection, *B. E. E. A.*, with the speculum are always equal to one another.

*Extracts for Hutton's Mathematical Recreations, vol. ii. p. 201.*

"A more philosophical principle advanced by Dr. BARROW is, that the eye perceives the image of the object in that point where the rays forming the small divergent bundle, which enters the pupil of the eye, meet together. It is indeed natural to think that the divergency as it is greater when the object is near, and less when it is distant, ought to enable the eye to judge of the distance."

"By this principle, also, we are enabled to assign a pretty plausible reason for the diminution of objects in convex, and their enlargement in concave mirrors; for the convexity of the former renders the rays which compose each bundle that enters the eye more divergent than if they fell on a plane mirror, consequently the point where they meet in the central ray produced is much nearer. It may even be demonstrated that in convex mirrors it is much nearer, and in concave, much farther, distant than the point H., considered by the ancients, and the greater part of the moderns, as the place of the image. In short, it is concluded that in convex mirrors, this image will be still more contracted, and in concave ones, more extended than the ancients supposed; which will account for the apparent enlargement of objects in the latter, and their diminution in the former."

"We must allow that even this principle is attended with difficulties, which Dr. BARROW, the author of it, does not conceal, and to which he confesses he never saw a satisfactory answer."

2.—*Replies to Lieut. Burt's Questions, by Lieut. W. S. Jacob, Engineers.*

SIR,

Having just seen in your No. for December last, several questions proposed by Lieut. BURT, Eng. I take the liberty of sending you the following answers to them, for insertion in your Journal, should none more satisfactory have been received in the mean time.

Reply to Q. 1st. The longest known period of any comet that has appeared twice is about 575 years, but it was calculated that of 1811 would return in not less than 3000 years; then by KEPLER'S rule, the major axis of its orbit =  $2d \times (3000)^{\frac{2}{3}} = 2d \times 208$  nearly, ( $d$  being the mean distance of  $\ominus$  and  $\odot$ ): now it is very certain, that no star has an annual parallax of  $2''$  (nor probably  $1''$ ), consequently the nearest star will be distant more than  $2d \times 100,000$ , or nearly 500 times as far as the furthest known comet. There may, however, be others more distant, which have never appeared to us; but as the period of one, which should extend from our system to another star, would be at least 11,000,000 years, it is not easy to see, what connection this could form between the two systems.

Q. 2nd. Supposing the moon to have an atmosphere like our own, this would be insufficient to render visible the whole of her dark disc, for we find that, on the earth, the sun's light is extended by refraction to barely  $18^\circ$  beyond the limit of direct vision, instead of  $90^\circ$ , as it appears to be in the moon. The phenomenon alluded to is much more simply accounted for by the light reflected from the earth, which will be nearly 14 times greater than what we receive from the moon. The limit of light and darkness on the moon's disc is more clearly defined than it could be, if she were surrounded by an atmosphere like ours.

With regard to the law of attraction of fluids, I conclude it to be the same with that of all other bodies, viz. that they are attracted in proportion to their mass, or in equal bulks, directly as their specific gravities; as far as I know there is neither fact nor analogy to support the idea that the attraction is either directly or inversely as the cube root of the specific gravity.

With regard to the tides, Lieut. BURR appears to have rather overestimated them, for the height of the mean lunar tide wave is about five feet, and of the solar, two feet, so that the total spring-tide, unaffected by local causes, will be seven feet, instead of 12 $\frac{1}{2}$ . Also the mean depth of the sea is usually estimated at much more than  $\frac{1}{2}$  or even than 1 mile, but it is difficult to perceive any connection between this depth and the height of the tide; for were the whole earth a globe of water, it would, I conclude, assume the same figure, when acted on by the same forces, as in its present state; supposing, of course, gravitation to remain unaltered. But if the height of the tide be  $\frac{1}{18}$   $\times$  the depth of the fluid, it is evident that Lieut. BURR has made an error in his calculation; for in that case, the mercury in the barometer will be raised to  $\frac{1}{18}$   $\times$  its own height, or 30 inches; now  $\frac{1}{18} = \frac{1}{3}$ , or more than  $\frac{1}{3}$ , instead of  $\frac{1}{3}$  inch. This mistake has arisen apparently from the indirect mode of calculation which he has used, thus unnecessarily increasing the number of figures, and of course the liability to error; in the quotient of  $5\frac{1}{2} \div 138$ , the decimal point is wrongly placed.

It is certain, however, that the tide does not raise the mercury 0.2 inch, but if the barometer be carefully observed at the times of high and low water, it is possible that a very small difference may be perceived; which, however, will be accounted for by the fact that at these times the height of the observer above the sea is actually changed, or in other words, the atmosphere is raised and lowered by the tide of water, so that strata of different densities are brought in contact with the mercury.

I cannot conceive how the moon's attraction, by opposing gravitation, could increase the weight of the air or any other body; it would produce a contrary effect, and cause the mercury to fall, were it not that its weight also is diminished in the same proportion with that of the air, so that the one will continue to counterpoise the other, as if acted on by gravity alone. It is evident, then, that the barometer is utterly incapable of indicating either the amount or existence of a tide in the atmosphere.

As Lieut. BURR does not know the temperature of red-hot iron, it may be well to bear in mind that the zero of Wedgewood's pyrometer is fixed at the lowest red heat visible in day-light. [This instrument has been proved greatly incorrect.]

*Soolkee, Feb. 10th, 1834.*

I remain, &c.

The Burmese philosopher prince seems to have excited the talent of many champions of science. A writer in the Madras Literary Gazette has taken up a new ground in his reply, and insists that a comet is as cool and habitable when shining on the solar disc as when wandering in its aphelion darkness. We shall venture no remark ourselves, as we think the prince has now had enough of a discussion which any of our standard elementary works would fully explain to him.—Ed.

*Asiatic Society of Paris, 2nd Sept. 1833.*

A letter was read from Mr. LEWIS D'ACOSTA, presenting a prospectus and specimens of a work on Universal History, translated by him into Persian. The author at the same time presents a copy of NABES' Elements of Natural History, ancient and modern, translated into Hindustani, by Mr. D'ACOSTA. Both works were referred to the *Journal Committee*.

Mr. MOHL, in the name of the Committee, appointed last Meeting, proposed to admit as Honorary Members of the Society, Messrs. PARNSZ and HARKNESS, Secretaries, one of the Asiatic Society of Calcutta, the other of the Asiatic Society of Bengal—(read London; a curious mistake to occur in an Oriental Journal). This proposition was carried.

Meteorological Register, kept at the Assay Office, Calcutta, for the Month of June, 1834.

Days of the Month.	Barometer reduced to 32° Fahr.				Thermometer in the Air.				Depression of Moist-bull's Thermometer.				Hair Hydro-meter.		Rain.	Wind.			Weather.		
	At 4 A. M.	At 10 P. M.	At 4 P. M.	At 10 P. M.	Minimum At 4 A. M.	At 10 A. M.	Max. by Reg. Ther.		At 4 P. M.	At 10 P. M.	At 4 A. M.	At 10 A. M.	At 4 P. M.	At 10 P. M.	Inches.	Morning.	Noon.	Evening.	Morning.	Noon.	Evening.
							At 4 P. M.	At 10 P. M.													
1	.462	.502	.422	.570	87.1	82.4	100.0	85.8	83.0	3.1	5.4	10.0	5.0	91	.86	.40	s. e.	s.	hazy sky.	clear.	storm.
2	.480	.504	.374	.651	84.0	91.3	101.0	97.8	83.1	3.0	7.3	10.5	5.3	91	.85	.75	o.	s.	cloudy.	overcast.	viol. storm.
3	.493	.561	.472	.673	82.0	90.4	97.8	93.3	83.8	3.3	7.4	10.1	6.9	90	.86		o.	s.	do threatening.	cloudy.	cloudy.
4	.591	.668	.606	.682	82.2	90.0	92.2	86.8	84.0	2.5	8.3	7.6	4.0	93	94		o.	n. w.	do	cumuli.	clear.
5	.684	.742	.612	.695	82.4	89.6	94.6	95.1	85.2	1.4	6.9	14.2	3.8	91	80		e.	s.	clear.	clear.	do
6	.618	.640	.490	.701	85.2	90.4	94.2	84.9	78.1	4.3	6.0	9.2	2.0	92	81		s. e.	s.	cloudy.	do	rain.
7	.547	.600	.474	.601	82.3	90.4	96.2	91.6	76.2	2.3	6.1	7.0	1.6	94	93	.10	s.	s. w.	stratus.	cloudy.	storm.
8	.632	.600	.520	.645	79.0	89.4	90.8	89.0	83.2	1.9	5.9	7.0	3.4	93	93	3.65	o.	s.	do	do	clear.
9	.627	.637	.574	.637	82.0	86.4	91.2	87.3	79.4	2.3	5.8	5.3	2.7	93	94	.05	s.	e.	clear.	do	cloudy.
10	.640	.630	.548	.621	79.2	87.0	92.0	85.2	81.0	0.9	6.0	6.0	1.6	95			o.	s. w.	haze.	do	clear.
11	.568	.581	.516	.572	79.2	82.9	85.4	83.4	80.0	0.9	4.3	6.3	2.2	96	93	.40	n. e.	e.	hard rain.	rain.	do
12	.536	.470	.406	.528	79.0	85.0	91.4	84.2	81.0	2.0	4.3	4.2	1.6	96	97	.25	o.	n. e.	stratus.	overcast.	cid. r.
13	.518	.541	.479	.573	81.0	85.9	90.0	86.2	83.0	2.2	4.6	5.4	3.0	97	97	.43	n.	e.	cloudy.	cloudy.	cumuli.
14	.607	.565	.510	.600	82.0	82.9	86.7	86.4	91.4	1.9	3.6	4.7	2.1	97	96	.45	e.	s. e.	cumuli.	do	cum. cir.
15	.680	.529	.420	.472	80.2	83.8	88.0	87.2	83.4	2.2	3.4	5.4	3.0	98	96	.60	o.	s. e.	clear.	do	cum. do
16	.609	.435	.322	.444	82.1	85.8	90.0	87.6	85.2	0.7	4.6	6.1	2.3	97	96		o.	s. w.	clear.	do	cum. do
17	.397	.430	.430	.404	82.0	87.0	88.0	84.7	81.7	2.8	3.9	3.4	1.3	96	98		s.	s. w.	cloudy.	hazy.	threatening
18	.424	.410	.331	.406	82.8	86.2	87.8	86.0	84.9	1.6	3.8	5.0	1.7	98	97	.15	e.	e.	stratus.	stratus.	cir. cum.
19	.355	.371	.287	.341	80.1	86.3	87.6	87.0	84.3	1.7	2.9	6.2	4.6	96	97	2.45	s.	s.	hard r.	cumuli.	cum. strat.
20	.322	.345	.300	.340	80.3	84.4	90.0	84.4	81.9	3.2	3.9	3.2	1.9	97	98		s.	s.	haze.	rain.	do
21	.340	.406	.342	.439	82.0	87.4	94.0	91.4	85.4	1.0	5.4	6.8	1.6	96	95		s.	s.	bank S.	fine.	acid.
22	.419	.469	.418	.527	84.6	88.1	95.8	89.6	85.0	1.8	2.9	6.6	2.3	97	95		s.	s.	cir. cum.	fine.	clear.
23	.509	.565	.472	.519	83.5	88.5	91.6	90.7	83.2	0.8	6.5	7.5	2.0	94	92		o.	o.	haze.	do	umuli.
24	.415	.561	.472	.518	83.0	86.6	90.2	89.5	85.2	1.0	4.9	5.9	3.1	96	95	.03	o.	s. e.	clear.	cumuli.	clear.
25	.416	.540	.440	.550	84.3	87.0	91.4	87.3	86.0	3.0	5.2	4.9	4.2	95	97	.15	s.	s.	cum. strat.	rain.	strong wd.
26	.446	.515	.410	.513	84.8	87.3	92.9	92.2	82.5	2.8	4.1	5.8	2.7	97	96		s.	s.	cum. cir.	fine.	heavy rain.
27	.491	.534	.550	.527	84.2	87.4	89.8	87.3	78.2	2.0	3.6	5.5	2.1	96	95	2.35	s.	n. w.	gale.	hard rain.	do
28	.491	.510	.452	.518	77.5	81.1	84.1	84.4	80.4	1.0	3.1	3.2	0.9	99	98	4.	o.	s. e.	haze.	overcast.	nimbi.
29	.460	.476	.420	.493	80.4	83.3	85.7	83.2	79.0	1.3	2.5	3.2	1.4	98	99	1.45	s.	e.	do	clear.	rain.
30	.463	.484	.404	.534	78.4	83.6	86.7	84.9	80.6	0.6	3.0	3.9	1.1	98	98		o.	e.	clear.	cloudy.	cumuli.
Mean	59.500	.530	.450	.542	81.8	87.0	91.3	87.8	82.3	2.0	4.8	6.1	2.7	95	94	18.53			calms and south.		rain early and heavy.

The instruments for 10 A. M. and 4 P. M. are suspended in the free air of the Laboratory, those for 5 A. M. and 10 P. M. in the south veranda of a third story near the cathedral. The register thermometer for extremes is also in the same veranda. The expected standard Barometer is just arrived in the Neptune.

# JOURNAL

OF

## THE ASIATIC SOCIETY.

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*No. 31.—July, 1834.*

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I.—*On the Coins and Relics discovered by M. le Chevalier VENTURA, General in the Service of Mahá Rájá RUNJRET SINGH, in the Tope of Manikyála. By James Prinsep, F. R. S. Sec. As. Soc. &c.*

[Read at the meeting of the As. Soc. 20th March, 1834.]

General VENTURA's well imagined and successfully executed operations for the examination of the Tope of *Manikyála*, near *Kabul*, in the year 1830, are familiar to all who are interested in antiquarian research. His own account of the excavations was published in the *Calcutta* newspapers of the day, and was afterwards inserted, with remarks, in Professor WILSON's essay on ancient Indian Coins, in the seventeenth volume of the *Researches*. Some of the coins have been the subject of discussion and investigation at Paris; and the subsequent collections of Lieut. BURNES, Doctor MARTIN HONIGBERGER, and especially, Mr. MASON, who have all followed in the track pointed out by the success of General VENTURA, have materially contributed to demonstrate the value of his original enterprize, and to make us wish for a fuller account of its highly curious results. Lieut. BURNES favored the Society with his own impressions of the importance and magnitude of the Chevalier's labours from an ocular inspection of the Tope itself, and of the collection of relics which were shewn to him at *Lahore*. This is printed in the second volume of the *Journal*, p. 308; and an expression, which I ventured to use, in a note subjoined on that occasion, "trusting that the Chevalier would no longer deem us unworthy of being made the medium of their introduction to the world," was, in fact, a hesitating allusion to the good fortune which a letter from Captain WADE had that moment announced; but which I could hardly bring myself to believe. A more

than ordinary degree of magnanimity was necessary to induce the author of such discoveries to forego the natural desire of monopolizing a prize won by his personal achievement and labour, and at considerable cost to himself; but in the present instance it required further the self-denial and disinterestedness of a friend to whom the possession of these valuable relics was generously proffered, to enable them to reach a third party who had no such claims of friendship; and nothing to offer in recompence, but the public notice, which his position enabled him to promise, in the pages of the Journal. I should not do justice to General VENTURA, nor to Captain WADE, did I not make known circumstances so highly to their credit, and I trust therefore that I shall be pardoned by the latter gentleman for publishing the following extract from his private letter to my address, in corroboration of the above facts, from which the world will be enabled to appreciate both the extent of his forbearance, and of the sacrifice made by General VENTURA himself.

*Extract of a Letter from Captain C. M. Wade, Political Agent at Lúdi-ana, dated 3rd June, 1833.*

“ While at *Derá Ghází Khan* in March last, the guest of M. VENTURA, the Journal for January reached me, containing a notice of the coins found by the Chevalier at *Manikyála*. I showed the passage to him, and he expressed himself flattered by the allusion which you made to his labors in exposing the numismatic treasures buried under that mysterious temple. We had a long and interesting conversation on the subject, the result of which was an offer to me on his part of the whole of the *Manikyála* coins, together with the cylinder in which some of the most valuable were found. I told the Chevalier I could never think of accepting such a gift for myself, but that I should be proud of the honor of sending them in his name to you, who would be able justly to appreciate their value, and to do him the credit to which he was entitled as the author of the discovery. He assented to my proposition, and promised to dispatch these precious articles to me on his arrival at Lahore, for which place he was then about to set out.”

In acknowledging this unexpected and most disinterested offer, I could not but disclaim all permanent interest in the relics, and request M. VENTURA, through Captain WADE, to consider them still at his disposal, although I should be proud, while they were deposited under my care, to do my utmost in making them more fully known to the world.

On the 16th August, the precious packet came into Captain WADE'S possession, and although he was unable to find a secure opportunity of conveyance for them to Calcutta, until the beginning of the following year, still through fear of injury or displacement of the various objects, especially the liquid contained in the cylinders, he would not open the

package even to gratify the curiosity of many who wished to feast their eyes on its contents.

General VENTURA's simple request is characteristic: "Je m'empresse de vous expedier mon fameux Manekiala, que vous desirez pour envoyer à M. PRINSEP: veuillez je vous prie, mon bon ami, vous servir de cette occasion pour faire agréer mes sentimens d'estime à M. PRINSEP, et de le prier en même tems de m'envoyer une description écrite en Français de ce qu'il pourra dechiffrer des inscriptions, et empreintes de ma trouvaille."

The package has just now reached Calcutta under charge of our associate Sir JEREMIAH BRYANT.

I hasten to make known its curious contents to the Society, confining myself on the present occasion to a description of the several articles in the order of their discovery, of which we have a full account in the "Etat des travaux," published by Mr. WILSON, as already noticed, in the *As. Res.* vol. xvii., page 601:—The articles, being separately and carefully packed, left no difficulty in recognizing them from the circumstances there indicated.

#### *Description of General Ventura's operations.*

The excavation was commenced on the 27th April, 1830, at the very bottom of the cupola on the south side, where having met with nothing but loose materials, the work was of necessity discontinued.

On the 28th April, the cap of the cupola was laid open, and there at the depth of three feet, six medals (or coins) were discovered.

On the 1st May, at the depth of twelve feet, a square mass of masonry was found, exactly in the centre of the mound, and regularly built of quarried stones, in very good preservation. On piercing ten feet into this, a medal was found in the middle of a clod of earth.

On the 6th, a silver coin and six copper coins were met with at the depth of twenty feet.

I am not able to recognize the coins discovered up to this period, and I conclude they have been mixed with the general heap of scattered coins, all being of the same nature.

On the 8th May, the workmen came upon a box of iron (probably copper) which was broken by a stroke of the pick-axe. There was in this box a second smaller box of pure gold, (*fig. 1, Plate XXI.*) with an ornamental top, in the centre of which is inserted a stone resembling the opal but friable and adhesive to the tongue like *tábasheer*; it is reserved for future examination: this box contained the following articles: *Fig. 2.* One medal of gold, weighing 122 grs., or two drachmæ (the same as was depicted from a sealing-wax impression, in the *As. Res.* vol. xvii. as No. 1. of Mr. WILSON's plate.)

*Obverse.* There is also a description of this coin in the Journal, ii. 38, but both that and the drawing (Pl. ii. Fig. 18) are imperfect, when compared with the real coin, of which I have now endeavoured to give an exact etching. The sceptre held by the king on the obverse has a knob like an ear of wheat. The projection behind the cap is a double fillet or ribband, and not hair: the side-flap on the contrary has more the appearance of hair, and the mustaches are well defined: the left hand holds a hook or key, or it may be a small sickle, with which the ear of corn has been cut? the legend, if Greek, is considerably corrupted (see vol. ii. p. 38), but the central part .. ANOPA.. may be traced on many of the copper coins.

*Reverse.* The seated figure on this side appears at first sight to have four arms: but on closer inspection, what was taken for one right arm may be a sword belt, and the up-lifted left arm may represent the curved part of a bow; the resemblance to wrist bangles and hands however is strong. The half moon behind the shoulders seems to prove the figure to be a sacred or symbolical personage, although the chair is a Grecian fauteuil, and the head-dress resembles a close helmet. The epigraphe on this side can hardly be other than MANAOBA... PO: the first may be connected with the name of the sacred personage, or the locality; the last two letters may be the date, 73, of some unknown era.

*Fig. 3.* A gold ring, set with a pale sapphire stone, having characters engraven upon it, apparently Pehlevi, (*fig. 3, a.*)

*Fig. 4.* A small bit of pale ruby, (Balas or Balakshani ruby, see vol. i. 358.)

*Figs. 5, 6, 7.* Three very small silver coins.

*Fig. 8.* A thin silver Sassanian coin, similar to those so frequently met with in Persia; weight 60 grs. or 1 drachma.

*Obverse.* The king's head, bearded, and having flowing curled hair: the cap peculiar for its central ornament of feathers, which somewhat resembles the Egyptian symbol of two wings supporting (in this case) a half moon, and star. The characters are Pehlevi and illegible.

*Reverse.* A rudely executed fire altar and two priests or supporters.

*Figs. 9 and 10.* Two silver coins, resembling the Sassanian piece in thinness and general character, but destitute of the fire altar; weight about 50 grains each.

*Obverse.* A beardless head, with well marked Indian features: the head-dress has a kind of tiara in the centre, and two flowing ribbands. A name very faintly written on the field in an unknown character. The whole is encircled with an inscription at once recognized to be in Sanscrit characters; these have been also engraved under the coins, to shew the coincidence of the two inscriptions, one of which will materially assist the decyphering of the other\*.

*Reverse.* Head of a female, front face, with very singular headdress: necklace and rows of pearls on the bodice: legend in the ancient Persian character not easily legible. It is copied in 10, a.

*Fig. 11.* The last coin of this series is a silver coin, already depicted as 43 of Mr. WILSON'S plates, very rude in execution, but of strong relief.

The fabrication of this is decidedly Hindu, and the inscription on the

\* A few more of these curious coins have been received in KERA'MAT ALI'S collection, but I do not introduce them here, being desirous of exhibiting the Manik-yala treasures unmixed. One bears the name of KRISHNA as *Sri Vasu Deva*.

reverse resembles the *Lantsu*, or pointed variety of the Nagari Alphabet, of which we have specimens from *Nipal* and *Tibet*. The words visible are *Srí yag* . . . .

*Obverse.* A rájá, coated, his disproportionate left hand seems to hold the hook before remarked; the hair is disposed in curls; on the right is a symbol resembling a tree, but it may probably be the sleeve of the right arm.

*Reverse.* I have little doubt that this rude figure represents a female standing, with flowing drapery; the head and face are out of the die, but the breast and waist on comparison with other coins of the same type (for they are plentiful), fully bear out this conclusion.

The contents of this first box are peculiarly valuable, not only from the variety of coins here discovered to be contemporaneous, but from the presence of the Sassanian coin, which brings the epoch of the structure within cognate limits, unless indeed a dynasty of fire-worshippers reigned in these parts previous to the formation of the last Persian monarchy by ARTAXERXES in A. D. 223: but we must postpone all speculations, and proceed with our description of the works.

The above box and its contents were found in their natural position, as deposited at the base of the square stone block of masonry which terminated there: (I am uncertain however whether the French text will bear the interpretation I have given, or whether the *square* is not a hollow square or chamber "on a trouvé un carré parfait a douze pieds, très bien établi au centre, bâti régulièrement en pierres de taille et très bien conservé:—après avoir creusé dix pieds, &c." and afterwards "le tout au bas du carré dont la batisse régulière s'est terminée là.")

On the 12th May, the perforation had reached thirty-six feet, when another copper coin presented itself.

On the 22nd May, as it was imagined that nothing more would be found in the centre of the cupola, on account of the termination of the square building, an opening was made on the northern side, of the height of six feet, and twelve broad: the excavations were pushed forward at both points.

On the 25th May, a depth of 45 feet had been attained, when on lifting up a large quarried stone, another similarly squared stone was found underneath, having in its centre a round hole; in the middle of this hole there lay deposited a copper box, somewhat similar in form to the gold one just described: it was perforated on opposite sides, (*Fig. 12*.) where apparently handles had been soldered on. The lid was decayed. Inside this box were found, *Fig. 13*, a little piece of cloth, *Fig. 14*. A circular crystal drop, and *Fig. 15*. A small cylinder of pure gold. (Whatever relic may have been in the gold cylinder has been lost.)

27th May. On this day, at the depth of 54 feet, another copper coin was turned up.

On the 29th, at the depth of 64 feet, an irregular hole appeared of six lines broad, in which were discovered

*Fig. 16.* A copper ring, and

*Fig. 17.* A couree (cypræa moneta).

At ten lines lower down were also found an iron ring and three more Sassanian coins, in a very decayed state, *Fig. 19.*

On the last day of the same month the principal discovery rewarded the Chevalier's labours.

An immense stone slab seemed here to cover the whole surface: it was removed with great labour and difficulty, and underneath was perceived with joy a small chamber or basin cut into the solid stone, a foot in breadth and depth, the interior of it built up with stone and lime; in the midst of this, on its careful removal, were found, thus hermetically sealed, the second series of relics now to be described (*Plate xxii.*)

*Fig. 19.* A box of copper (supposed to be iron by M. VENTURA) filled with a brown compound liquid.

*Fig. 20.* Within this box and liquid, a brass cylindrical box, cast and turned on the lathe:—the surface of the metal was in such excellent preservation as still to retain the fresh marks of the tool, but the pinnacle on the top of the lid was broken off by corrosion, or in consequence of a flaw at the neck.

The lid having been made on the lathe also fitted perfectly tight, and must have kept in, without loss by evaporation, another portion of the thick brown liquid with which it was found to be filled.

On cleaning the upper surface of the lid, it was discovered that an inscription had been there *punched* circularly round it. The letters are formed by dots, but they are perfectly well preserved, and are of the first importance in making out the nature of the deposit. *Fig. 20, b* represents a facsimile of this inscription, which is again written below to facilitate its lecture. The character so strongly resembles an ancient form of *Nagari*, such as might be used in writing, without the head-lines of book-letter, that sanguine hopes may be entertained of its yielding to the already successful efforts of our Vice-President and Captain TROYER. The same writing has been found by Dr. MARTIN and Mr. MASSON in other topes. The latter has favored me (through Dr. GERARD) with a transcript of two in which he finds the same words repeated. I have placed these on the same plate for convenience of examination.

In this brass box, 20, were five copper medals, *Figs. 28, 29, 30, 31, 32*, all differing in device, but of that kind already known to us from a multitude of specimens found in Afghanistan and Upper India, by the arbitrary name of "Indo-Scythic coins," and now ascribed by Mr. MASSON with certainty to KANERKA, KADPHISES, &c.

They are all wonderfully well preserved, and seem to have been selected to shew us the prototype of the very five species of coins to which the key monogram is peculiar.

Leaving these coins, as already familiar to us, although by no means exhausted in interest:—within this brass cylinder and buried in the brown liquid appeared a gold cylindrical box, *Fig. 21*, four inches long, by  $1\frac{1}{2}$  inch in diameter; the lid fitting closely on the interior of the cylinder, which it entered to the depth of  $1\frac{1}{2}$  inches.

This box was also filled with thick brown liquid mixed up with a multitude of fragments of what M. VENTURA supposed to be broken amber (*ambre brisé*). *Fig. 22, a, b, c, d, e*, will give some idea of their appearance when washed. They were of a light yellow or topaz colour, which was driven off by a red heat, leaving them colourless. The first conjecture supposed them to be fragments of a glass vessel, which burst into pieces from the expansion or fermentation of its contents; and that the small bit of string, *Fig. 23*, might have been used to bind the cover?

Within the box was discovered also, *Fig. 24*, a small gold coin weighing precisely 30 grains ( $\frac{1}{2}$  drachma). The device resembles in some respects the larger gold coin in the first gold box.

*Obverse.* The king holding the spica and hook, (quere, sickle;) dress as before described, and characters on the margin decypherable; as, ONIKIKOPANO—the rest illegible.

*Reverse.* A sacred personage standing with his hand out-stretched in an impressive attitude; his head surrounded with a halo or rather sun, as distinguished from the moon on the other coin. The four-pronged symbol occupies a place to the right, and on the left are some indistinct letters, KNIIPO. The head of the figure is rather out of proportion, but the execution is otherwise very good.

There is also another minute coin of gold, *fig. 25*.

But the article of chief value in this cylinder is decidedly

*Fig. 26*. A plain disc of silver, upon which have been engraved certain letters, evidently calculated and intended to explain the purport of the whole mystery. The characters are precisely those of the lid of outer brass cylinder: but their combination is different. There can be little doubt of their affinity to the Sanscrit, but the difficulty of decyphering them is enhanced by the substitution of the written hand, for the perfect Nāgarī, which it is clearly proved, from the coins discovered in the first box, to have been well known at the same period. The difference is such as is remarked between the *mahājantī*, and the printed Nāgarī of the present day.

I am unprepared to speak of the nature of the brown liquid, which must therefore furnish matter for a separate notice.

In the same receptacle of stone and lime were deposited outside the copper box a collection of forty-four copper coins: all matching with

one or other of the five types so carefully preserved within the brown liquid.

On the 2nd of June, one more copper coin was extracted, and on the 3rd of the same month, six more of a similar nature.

On the 8th June, the opening perforated from above met that from the side, and reached the earth beneath the foundations. The excavations were however pursued to a depth of twenty feet below the level of the structure without making any further discovery, until the setting in of the rains finally obliged the Chevalier to discontinue his operations.

I had delayed the publication of the above narrative in hopes of obtaining a section of the building, and a ground plan of the spot, which Captain MAISON had obligingly written for at my request; but the lamented illness of General VENTURA and his visit to Loodiana for medical advice have precluded the possibility of its arriving within a reasonable time; it may however still reach us ere I resume the subject, which I must now drop, to admit of the insertion of Captain GERARD's and Mr. MASSON's further details on this interesting field of discovery. I have before alluded to Dr. MARGIN's prosecution of excavations at Jhalabad: the extent and success of these, from Dr. GERARD's account, is much greater than might have been expected. While he was pursuing his search in this direction, Mr. Masson was equally active in the plains of Beghram; where his good fortune in the discovery of coins and his talent in decyphering, arranging, and describing them, and eliciting useful results, have been made conspicuous by the valuable memoir read on the 30th April, to the Society. A subsequent note from him to Dr. GERARD, (from which extracts will be given presently,) puts us in possession of the progress of his operations on the Topes up to the end of March last. Dr. GERARD himself also remained at Kabul at the same time, zealously pursuing the same inquiries.

Thus we shall bring together in one view the history of the opening of the Punjab mounds up to the present time, when we may suppose them to be nearly exhausted of their treasures; but we must remember that, however successful subsequent researches may have proved,—to the Chevalier VENTURA must be awarded the palm of originality in these discoveries: while he alone perhaps could have commanded sufficient influence, from his position in a dominant court, to overcome all the scruples and difficulties which the first enterprise of the kind naturally presented. When once it was found that treasures lay hidden under the topes, a stimulus was furnished for the prosecution and continuation of similar researches, and I fear it must be added, for the demolition of these mysterious monuments of past ages.





II.—*Memoir on the Topes and Antiquities of Afghanistan.* By J. G. Gerard, Esq. Surgeon, Beng. Est., addressed to the President of the Asiatic Society, from Jelalábad, 4th Dec. 1833.

[Read at the Meetings of the 30th April and 20th May.]

The topes or edifices of which *Manikyála* is already familiar to us by the enterprising researches of General VENTURA, had appealed to our curiosity in the journey to *Turkistán*, but three only were visited en passant; viz. *Manikyála* itself, one at *Usmán Kháitr* in the basin of the *Indus*, and another at *Pésháwer*. On my return to *Kábul*, in November last, ample gratification awaited me, through the zealous exertions of Messrs. MARTIN HONIGBERGER and MASSON, whom I met in that city.

The interest excited by the labours of these travellers (as might be supposed) was not limited to the mere inspection of their collections, which were displayed to me with an open candour that leaves me their debtor. I followed up the inquiry to which they had unfolded to me the clue; and though unproductive of similar results to those which have crowned their exertions, I am enabled to speak to some points from actual experience, and hope to have it in my power to add more hereafter.

The monuments now about to be considered, which were first introduced to our notice by Mr. ELPHINSTONE, are calculated to rouse the attention of the antiquarian and the philosopher, when he surveys the relics they disclose in connexion with dynasties, of which all our knowledge is scarcely more than the faintest lineaments, and of the events to which they yielded and ceased to exist, history gives us little or no account. To have a prospect of filling up a blank in chronological annals of itself sufficiently interesting, but it is doubly so when these may serve to illustrate the career of one whose exploits are a theme of so much fame, and whose foot-steps have employed so many pens to trace even consistently.

These ancient edifices may perhaps present to us the sepulchral remains of the Bactrian kings, and others who succeeded to their sway; but whether we view them as cotemporary with the Grecian dynasty of *Balkh* in *Turkistán*, or of those subsequent satrapies which emanated from the remains of that kingdom, the same thoughts recur, the same suggestions rise, Who were those kings? and what was the extent of their individual sway in these and other regions? for there is no doubt that the whole of the *Panjáb*, and even a great part of the Gangetic territory and *Sind*, were the seat of their dominion, whether this was Indo-Scythic or Indo-Grecian;—by what revolutions their reign termi-

nated, and they themselves became extinct? and who were their successors till the period when the frenzy of Muhammedan religion overturned the whole institutions of the country? These questions, which involve many others, may yet be answered by these memorials.

Ancient history is sufficiently intelligible, and conducts us to the path, and even the allocation of Macedonian conquest in *Afghanistan*; and if identity in the appellations of places is still perplexing, and even apparently inaccessible, it must be assigned rather to a deficiency in ourselves, than to a result produced by any interchange of language that may have occurred during the lapse of ages; for instance, if a person, familiar with Sanscrit, were to visit these regions, there is no doubt that things would speak to us, instead of awaiting to be interrogated.

We are indebted to Col. WILFORD for a knowledge of the fact, that the names of all the places in ALEXANDER'S route from *Bamián* to *Multán*, are pure Sanscrit.

The Persian will also assist us in the inquiry. I need scarcely mention the single word *Panjáb* (i. e. *panj-áb*), five waters; or *Hydaspes* (*Jhilam*), the initial syllable of which answers to the Greek term for water, and the last to the Persian word "*asp*," a horse; and it is notorious, that the *Doáb* (two waters, or rather the land between them), of the *Jhilam*, is famed for a breed of fine horses called *dhan\**, and also of fine women. It is related to us, that so many honors were reported to be paid to beauty in the country of the Cathæi under King *SORHITES*, that even dogs and horses were selected for their quality; and farther, that notwithstanding their barbarism, this nation was first in wisdom, being ruled by salutary customs, one of which was, that children born with disproportions in any part of their body were to be killed; nuptials being only influenced by beauty of exterior in children: a commentary upon this will readily occur in the practice of the present day, and the usages which prevail in the territory watered by the *Hydaspes*. In *Turkistán*, the field for etymological affinities is equally prolific: the river *Jaxartes*, we are told, is read in the Mongol *Iriartis*; but the *Túrks* also call it *Secandria* or ALEXANDER'S river. The river *Sogd* retains its name, as we find from *ISSIT GÖLAN'S Journal*. The *Sogdrians* are therefore readily recognised as the people inhabiting the course of that valley. The *Getæ* must be identified with the *Jogatai*, who inhabit *Zataria*; beyond the limit of *Yarkand* and *Kushgar*, and of which stock the present king of *Delhi* and his relative, the sovereign of *China*, are descendants. *Balkh*, I think, Colonel *WILFORD* designates in the Sanscrit *Bahalac*; also *Bu-*

\* *Mahá Rájá RUNJEE SINGH* gets his best steeds from that district.

side, in *Vimiyán*. *Baktra*, of which *Balkh* was the capital, is the native cognomen which the Greeks modified into the more liquid sound Bactria or Bactriana. *Bakhtar*\* is applied to *Kábul* to this day, and occurs in the histories of those countries; but if this proves any thing, it is that the Greeks retained the appellation, and did not bestow it. *Pesháwer* is known as a district of *Baigram*, which was a province of *Bakhtar*; in short, a philologist coming into those regions would find synonymes at every step, and could not fail to elucidate etymologies, which we at present receive as vitiated beyond the limits of analysis, and inaccessible by synchronotic induction. In this view, the *Afghán* or *Pashtú* language may furnish us with many idioms, and especially the local dialects of districts which have resisted Muhammedan conquest, and are comparatively in a state of primitive simplicity. The vernacular dialects of the *Tájiks* (simply crowned heads or descended of kings,) the aborigines of the country, may be expected to elucidate something; for it is there we can hope to find traces of far antiquity; and if sepulchres alone are the result, they may at least enable us to connect local affinities, and fix the situs of some monarchs whom we already know to have been extant, but of whose reigns and institutions no vestiges have hitherto been discovered; and though the inference is, that they perished by the sword of the Khalifs, which swept away almost every written memorial of a prior epoch, it would be an extreme conclusion that some annals of the dynasties which followed the Grecian empire, if not those of the original settlers in *Balkh*, may not exist. The period of 1200 or 1500 years is far from incompatible with the expectation of finding inscribed legends either in stone or metal. Coins, the representatives of nations, are already in our possession, and obnoxious as they are to Islamism, as the types of idolatry, they have survived both the ravage of time, and the intolerance of history, and still mock the prejudices of religious zeal; we may therefore expect to find remains that will afford local illustrations the more interesting to anticipate from the very obscurity of the subject, the total absence of research at any former period, and the barrenness of history and tradition concerning such events.

The topes or tombs which appear in the environs of *Kábul* are planted along the skirt of the mountain ridges, which support that elevated plain, and this peculiarity is common to almost all of them: the adjacent level has obviously been the basin of a lake or sheet of standing water, till drained away by the course of rivers, and it still continues more or less a quaggy marsh. The first settlers seem to have

\* I don't know if it occurs in *BARRÉ'S* Memoirs, but I think it does in the *Timúr Nama*.

chosen the rising ground at the roots of the hills for their locations, the ancient city of *Kābul* (still visible in the remains of mounds or heaps) also occupying that basal line.

The position of the monuments, if not influenced by natural causes, or selected from motives of religious veneration, is rather fanciful; those which I have seen being either situate close under the cliff of the mountains, or secluded within recesses, wherever a running stream had its course; and it would appear that a rill of water nourishing a few trees or patches of cultivation and verdure was a conjunctive feature of every spot. The most usual site of those structures is an isolated rising ground, washed by a perennial current. Trophies of such magnitude, serving merely as receptacles for the dead, and often devoid of any traces either of them or of the living, sequestered and almost shut out from sight, will not be sufficiently intelligible to our ideas, except by comparing them with edifices in other regions of the world, the object of which is known:—if they had been smaller they must have fallen to ruin in a few centuries. The masses of *Manikyāla* in the *Khyber Pass* and at *Peshāwer* almost forbid the idea of identifying them as tombs, except some more decided proofs are forthcoming than have yet appeared, though we are not without analogies in the size of some of the Muhammedan cemeteries, not to speak of the pyramids of Egypt themselves, while the absence of any inscriptions to denote another purpose, leaves us in the former belief.

Of the sepulchres excavated by M. MARTIN HONIGBERGER, amounting to more than thirty, the greater part have their sites at *Jelālabād* and the adjacent territories, and it is this spot particularly that commands our notice, since it may be assumed to have formed the seat of one of the Bactrian sovereignties, as *Balkh* did another; the more readily as it would seem to answer in its locale and conformation to the spot which ALEXANDER consecrated with Bacchanalian revels; and it is certainly from physical position fully eligible for the capital of a kingdom, uniting, as if by a band, the temperature and even some of the productions of an intertropical climate, with zones chilled by perpetual frost, having a considerable expanse of level, and a soil irrigated by perennial streams. Here we behold the tombs of a long race of kings (as I suppose them to be) which have survived in obscurity the lapse of many centuries: a large proportion of them, indeed the majority, have crumbled into mere tumuli; but, except those opened by Mr. HONIGBERGER they appear to have been hitherto untouched by the hand of man.

Muhammedan bigotry, which swept away all the traces of written knowledge within its reach, and defaced the memorials of whole nations,

has spared these cemeteries : yet this does not surprise us when the *Bait* of *Bamian*, such gigantic types of idolatry, remain trophies of contemporary or even prior ages. These wonderful images are mentioned in the Koran, and if we admit the authority of the *Mahábhárat*, and the still more fabulous history of the *Páandu* dynasty, their antiquity will approach to a period co-existent with the fall of the *Greecian* kingdom, which is perhaps somewhat repugnant to conjectural analysis ; yet we must either assign that date, or an epoch antecedent to *ALEXANDER'S* conquest, for the construction of those wonderful idols.

But, to return to *Jelálábád*. The topes are here very thickly planted on both banks of the river, which washes the northern limit of the valley ; the declivity of the soil being from the snowy ridge of *Sufféd koh*, has thrown the stream quite to their base ; and here the tombs appear, black with age, extending from *Bálá Bágh* to the conflux of the *Kábul* river at *Droná*, about 10 miles downward and four from *Jelálábád*. As we passed along, several were noticed, which did not appear to be delapsé ; but they had no doubt been excavated at their base, since it is in this immediate vicinity that recent discoveries have been chiefly directed.—In the plain were seen the ruins of others which had subsided into mere heaps like cairns : these were standing in the midst of green fields, but this is rare ; and upon a shelf of conglomerate rock, and diluvial accretions continuous from the roots of *Sufféd koh*, and here forming the cultivable limit of the valley on the south, extends a long line of tumuli or ruined sepulchres, insulated upon natural eminences ; though often upon raised platforms, a dozen of these may be recognised, not as mere visible heaps, but mounds of great size, and which until very recently had been undisturbed by man\*. Several having been opened by Mr. *MARTIN HONIGBERGER* with sufficient recompense. Their position is strange enough, upon a bare rugged surface of attrited stones, furrowed by the interfections of water-courses, the cliff of which formed of agglutinated pebbles, or pudding stone, is hollowed into recesses which were represented to me as the caves of the *Káfirs*, or “unbelievers :” they are still inhabited by the pastoral tribes, who migrate with their flocks, according to the seasons of the year, and take up their winter quarters in these *Troglodite* abodes. The site of the topes commands the whole landscape, which is limited to a narrow slip of luxuriant cultivation, sloping to the cavity of the valley ; the interval southward, of ten or twelve miles, being a high plain of gravel, pebbles, and rolled stones, all sterile and arid to the foot of *Sufféd koh*, where again villages and

\* There is one immense edifice, but now crumbled into a mere heap, near *Jelálábád*, which serves the *Nawab* as a prospect point : he often repairs to it and seats himself upon its summit for hours to enjoy the fresh atmosphere.

horticultural productions abound, ramifying within the flexures of the mountains, or rising upon the acclivities, till checked by the rigor of climate. It must have been in this neighborhood that ALBANDER revelled in imitation of Bacchus, and there is actually a spot upon the flanks of the snowy ridge that would seem to correspond with the locale of that event, the summer residence of the Nuwab of *Jelalábád*, which is described as affording the most delicious transition from the heat of the valley, embowered in the most redundant ever-green verdure. This portion of territory acknowledging but a capricious allegiance to the Nuwab, and a less certain attachment to his authority, is seldom frequented and little known; and though it is affirmed that there are no monuments beyond the line above alluded to, I cannot doubt that research would be repaid, and that along the skirts of a magnificent range, crowned with eternal snow, tombs will be discovered: the situation almost warrants the belief, if that has been selected from a regular to natural concomitants, and in *Kábul* the choice has evidently been influenced by such circumstances, for we cannot otherwise account for a position that connects its objects with the surrounding gloom. There, in one of the recesses or glens deeply locked within the mountains, stands a Grecian pillar called *Surkh Minár*, from its red colour. The site is isolated upon a natural eminence, showing a steep acclivity, lofty and almost mural cliffs rear on all sides. Another Grecian monument or minar, appears perched upon the crest of the ridge, at a great elevation; neither of these bear inscriptions nor any kind of device, but I am informed there is no doubt about their origin.

The decay and most commonly total wreck of all the edifices planted upon the southern margin of the dell at *Jelalábád* is easily explained in the nature of the materials that have composed them, which are pebbles of vast size, or blocks of stone, attrited by water to smoothness, conjoined by a cement of mud. They have consequently been easily delapsd, and have crumbled away into mere heaps, like gigantic mole-hills. Where these have been excavated at their base, a small hollow square or cavity is disclosed, formed of hewn stones\*, wherein was deposited whatever remains were designed. These topes differ very materially from that of *Manikyála*, and *Usmán Khatir*, where the square is continued from the top in the form of a shaft. In none of those which I have seen, or which have been opened by Mr. HONIGBERGER, does this conformation occur, and we may at once note it as a distinguishing feature in these fabrics, which has no doubt a local import. There are indeed few exactly similar; for they vary in size, in external decorations, or in their structure; though the contour has

\* Then the *carré* of Gen. VENTURA, about which a doubt was expressed in the foregoing paper, was a hollow, and not a solid, square.—ED.

a generic type, as we should expect, if the mausolea represented the offspring of a single and original dynasty; however much its character might be altered by the interchange of successive generations, deriving new ties of consanguinity, in the same manner as ALEXANDER did, intermarrying with the conquered, which he considered a link of union in a government, that was to become dependent upon its natural resources, though perhaps the only apology that he could offer for the sudden transport of love which wedded him to ROXANA.

The contents of the thirty or more topes excavated by Mr. HONIGBERGER are of the highest interest. Many of them were indeed unproductive of any insignia by which we can identify their original design, or connect them with their founders: a circumstance the less remarkable, when we consider the surreptitious interests of the workmen often employed remote from any control, but even where control embraced the entire operations the labour often ended in inanity. Many of the sepulchres (perhaps most of them) are comparatively small\*; from 30 to 45 or 50 feet high, with a circumference of 80 to 110 feet; and not one of them presented the structure of *Manikyāla*, or a hollow shaft penetrating from the top, filled up however with the materials of the building, and discovering deposits of coins at various intervals, which continued beyond the limit of the shaft or 25 feet, to the base where the excavated stone reservoir was found, that proved so fruitful of reliquæ. Nothing answering to the above has accrued to Mr. HONIGBERGER, if we except a single gold coin, I believe of SOTER MEGASTHENES, which was found in one tope lodged within a silver cup, but a similar cup yet unopened, would seem to argue the prototype of that acquired by General VENTURA. The exterior is a hard metal, containing a fluid which is perhaps inclosed within a golden casket like that of *Manikyāla*; on perceiving which Mr. HONIGBERGER with provisional care cemented the whole together, till he should lay it before his countrymen at Vienna. With the above solitary exception, I do not think any coins were elicited from the tombs, nor any other device indicative of the object of their erection, though it would be an extreme supposition to entertain, that such fabrics should be raised as mementos to posterity without a single trait

\* In the gorge of the *Khyber* Pass which penetrates the country from *Peshāwer*, stands a most magnificent edifice, equal to or exceeding that of *Manikyāla*, and if I am not mistaken, there are others. Mr. HONIGBERGER sent a servant to explore the antiquities of this district, habited as a faqir or mendicant, his best or only passport among people who live by pillage. He tempted the *Khyberis* to dig by the prospect of treasure, but they would do nothing without pay, and the object was thus (fortunately) abandoned.

† *Soter-megas*, see Mr. MASSON'S *Memoir*, page 168.—Ed.

to connect them with the individuals whose existence they commemorate\*. The relics which have accrued to Mr. HONIGBERGER are however extremely curious, consisting of very minute bones, or their dust, pearls, pieces of amber and rubies, and different kinds of sedimentary remains, the nature of which can only become known by chemical analysis. These were found reposing within excavated (turned) cylinders, of a soft striated stone, quite similar to that of which the shot and shells of H. R. H. ABBAS MIRZA at Meshed are made. These cups, both in their size and form, correspond to a model which is frequent enough in India: they have a lid surmounted by a small knob. A roll of paper, apparently the back of the *Bújpatra*, containing written characters, occurred in one instance; this precious fragment may unfold some satisfactory evidence of the origin and design of the edifice which enclosed it. Small burnt clay lamps, and occasionally square or oblong clay receptacles, filled with osseous remains, gems, and thread, are among the collection. If my memory does not deceive me, I think I remarked small golden images of birds, while I am certain that many things escaped my observation, and also that I retain but a very imperfect idea of any individual relic, notwithstanding the candor and liberality with which they were displayed to my view. I felt backward to gratify a curiosity that had little to recommend it, and the brief and defective notice I have now taken of Mr. HONIGBERGER'S discoveries, while it can only convey but a faint trace of the facts which remain for original analysis, I venture to believe will receive from that gentleman the only construction that its motives can be supposed to meditate in making it. One object may indeed be gained, since Mr. HONIGBERGER has already embarked upon a long and perilous journey viâ *Bakhtar* to his native land†, after having given charge of all his valuable acquisitions to Chev. ALLARD, whose prospects of returning to Europe seemed to offer a favorable passport for their transmission to Germany, but which I have since learnt is likely to be protracted indefinitely. Under such a view, the foregoing remarks, if deemed worthy of being read before the Asiatic Society, may become known in Europe through the medium of a journal which has already in these obscure regions (as will soon be shewn) stimulated the development of antiquarian research, and in this immediate instance is calculated to communicate and preserve the merit of labors, which natural and adventitious causes might otherwise tend to consign to oblivion.

\* There are inscriptions on the brass cylinders deposited in the topes; see the foregoing paper.—ED.

† See note of this traveller's adventure at *Bawian*, p. 246. It is fortunate that he had left his coins and relics behind.—ED.

Mr. HONIGSWANER would only have promoted his own views, had he made the Journal of the Asiatic Society a channel of publicity to his discoveries, since it is fully probable that subsequent laborers in the same field will weaken the interest of his researches, before that gentleman can reach his own country (which must be considered a problem), or the fruits of his exertions shall have quitted British India. These are destined to enrich the Cabinet of Vienna, and we may imagine the precious banquet they will afford to such eminent literary patrons as KLAPROTH and VON HAMMER.

[We thank Dr. GERARD most cordially for his zeal on behalf of the Journal, but it would indeed be presumption in us to imagine the German Doctor's coins could be better disposed of here than in the hands of the eminent men he names. We appeal to M. SCHLEGEL'S note on Bactrian coins too often to allow of our undervaluing such high authority. We have been obliged for want of space to curtail the foregoing memoir, and to omit for the present Dr. G.'s remarks on the climate and country of *Kábul* and *Jelálabád*. We have said nothing on his hypothesis that these mounds are the sepulchres of kings; a theory also adopted by Mr. MASSON, but contradicted by most other authorities, who look upon them as Buddhist structures. This supposition is confirmed by the existence of similar mounds in Nipal and elsewhere, and by the very nature of the relics discovered in them.—ED.]

III.—*Extracts from Mr. Masson's Letter to Dr. J. G. Gerard, on the Excavation of Topes, dated Tattung, 22nd March, 1834.*

The fourth tope I opened had in its centre a small chamber, with nothing therein but a little loose dust. I excavated to the very soil beneath the foundation, but nothing farther was discovered: eighteen days' labor were expended here. In the central chamber was a small cobweb with its tenant, a spider, apparently in good health and spirits. The tope was 144 feet in circumference, and how the insect got there, and contrived to live, is somewhat astonishing; if he introduced himself at the period of the erection of the tope, he must have been above 1600 years old. I know not whether naturalists will concede to his species such extraordinary longevity. The results of three other topes will be known within the three next days. Of one of them a *nishán* or token of there being something has been brought to light. Although by the experience of the fourth tope, I find that some of these structures do not contain relics, by which they may be identified, as coins, writings on leaves, &c. yet from the experience of all hitherto opened, I am confirmed in the opinion, that no one is without a sign or token of some kind, if it be only a small recess or chamber in the centre. Ultimately, a line of distinction may be formed between the topes of

sovereign princes, members of their family who did not rule, and of saints, at least it so strikes me on a primâ facie consideration of these monuments; but there is one misfortune, that the contents of none can be judged by the mere appearance. To ascertain them it is necessary to excavate; and tokens the most useful to antiquarian or historical research are often extracted from such whose appearance is least inviting, and vice versâ. The topes, which are well preserved, and whose outlines are clear, are also excavated at less expence, than the dilapidated ones whose outlines are faint or totally defaced. With the first the sanctum sanctorum is reached without chance of error: with the last, the direction of the excavation depends more on chance, and there is the additional trouble of penetrating through the mass of fallen materials around. The famous *Nandâra* tope, 164 feet in circumference, was opened in eight days; a much inferior one on the level plain, from which I now expect something, and which has a circumference only of 108 feet, has now employed the same number of men twelve days.

My search for coins at this place has been very unsuccessful; I look forward however to a glorious stock from *Kâbul* this year, and only hope that my competitors may not raise the market too high for me. I have an idea, if funds permit, to send one of my men to *Balkh* for a couple of months, for the purchase of antiques: this will moreover depend on my verifying what I have heard from two or three sources, viz. that old coins are readily procurable at that place and neighbourhood. Now that Bactrian coins excite so much attention, you may, if you please, let Mr. PRINSEP know that three years since Major TAYLOR at Bagdad had some sixteen or seventeen Bactrian silver tetradrachms, and that two gold Bactrians were procured at *Tabriz*, both or one of them by Dr. CORMICK. That gentleman's coin was stolen from him. Major TAYLOR intended his coins, with a vast number of others, for Sir JOHN MALCOLM.

I have heard nothing farther concerning MARTIN. I learn that he did not forward to Captain WADE the account of his operations on the topes of *Jelâlabâd* and *Kâbul*, which he had prepared for that purpose in Persian. When I wrote the notice on the *Beghram* coins, I supposed that he had sent it, as he even read it to me, and made the remark that Captain WADE might publish it if he pleased. I observed that Captain WADE was not likely to do so unless authorized by him: he therefore by a letter authorized Captain WADE to make it public. Neither one or the other was probably sent, and this I merely note in case I may have alluded to this account in the memoir, which I presumed would have been published by the Indian press. The account was simply one of the operations and discoveries, without any hint or opinion as to what age, &c. they had reference.

I have some idea of publishing a detached small volume in India, (that is Calcutta,) "An Account of the Topes of *Afghanistan*," with sketches of the whole. I apprehend that India is too limited a field to expect any extensive sale for any literary work whatever, nor do I know how the publication of works is managed in Calcutta, neither whether engravers would be found to execute the plates. Of these there would be some thirty or forty, or perhaps more. Neither am I satisfied that any one would undertake the expence of publication, nor am I sure that a publication by subscription would be sufficiently encouraged. I have set in order a general and individual account of these tope, explaining their site and identification as far as the relics extracted from them testify, with my conjectures respecting all and each of them: these conjectures involve some points of history and geography not to be avoided. I have also taken sketches of all of them, at a certain measured distance, and used a camera lucida, that their comparative dimensions in the sketches might be exactly preserved\*.

I have not heard whether M. MARTIN, on being despoiled, lost his gold medal of KADPHISES: as he justly prized it he always retained it about his person, and it was the only one of his coins, excepting perhaps the silver ones of MENANDER and EUTHYDEMUS, of each of which he had one, that he did not forward by your medium to M. ALLARD. If he lost it, it is fortunate that I preserved the sketch of it. (See Pl. xiii.)

I hear nothing conclusive here of your researches at the Peshawar tope. OSMAN notes in his letter to me that the statues are very wonderful and beautiful. I trust you will have found a prize there; they are certainly a very singular discovery, and may occasion a good deal of speculation as to the nature of the monument; it will be highly interesting if their *caste* be recognizable.

I inclose a copy of the inscriptions around the *koti* or box extracted from a tope here, as noted in my last. This if you think fit may be forwarded to Mr. PRINSEP for notice in the Journal†, and he may invite those who are competent to decypher it. There must surely be individuals at Calcutta, certainly at Bombay among the Parsees, who

\* We should be most happy to second Mr. MASSON'S project, did we think that he could be rewarded by any sale or subscription in Calcutta. It would certainly be preferable to publish in Europe, with all the advantages of good engravers, a large reading public, and the various facilities which publishers there enjoy of interchange and communication with others of the profession at home and abroad. There is besides a heavy duty on importing into England works printed in this part of her dominions! The camera lucida sketches will be most valuable.—ED.

† See plate xxii. and the remarks in page 319.—ED.

can read the Zendavesta in the original. I should fancy a reference to the article ALPHABET in any of the Encyclopedias would exhibit the value of the Zend and Pehlevi characters. I note in a memorandum the equivalent characters of the Greek Bactrian coins to five Greek names and cognomens, and could have carried the subject farther, did time allow\*.

Your messenger brought a letter for the Nuwab from *Osman*, and this caused his detention to-day. I visited the *búrjes* or *topes* in hand: the one I noted as expecting something from is not yet got through: in the centre was a kind of structure in form [as in Plate xxii. Fig 27], the bottom has not yet been reached. I hope to-morrow will produce something. The *topes* with these forms of inferior *gumbazes* or domes, &c. in the centre, are very suspicious; I fear in some instances these are the only tokens they contain, and they do not give much information.

23rd March, 1834.

C. M.

IV.—*Journal of a Tour through Georgia, Persia, and Mesopotamia.* By Capt. Mignan, Bombay European Regiment, Fellow of the Linnean Society of London, and M. R. A. S.

[Continued from p. 280.]

Speaking to Prince GALETZIN of the Russian Cavalry, who had been attached to the Count's staff in Turkey, he said, "We do not lose half so many men as you are inclined to believe; since on the instant a man is infected, we plunge him in *iced water*, wash all his linen, and on the second day he is sure to be convalescent." That the soldiers of the Russian army should be infected, can create no surprise whatever. Their filthiness is proverbial. I once saw a regiment paraded to perform (as I imagined) their evolutions. On being drawn up in line, a serjeant stepped out to the front with a long broom, and rubbed down the men, as our grooms do horses. Had I been on the parade ground, I might have been *murdered* by an attack of lice—a second plague which has smote this land. A punishment parade succeeded this novel scene, and several offenders were brought forward. The drum-major passed down the line, and actually spat into the mouths of the prisoners. The reader is tired of a narrative so disagreeable, I can assure him, that my disgust to this nation is founded on practices that exist not amongst the most barbarous people. I leave them to their admirers.

On the morning of the 8th of February, we quitted Ganja for Zodi, distant four leagues. On leaving the town, my attention was attracted

\* We shall take an opportunity of introducing these in a subsequent plate, with as many more of the same character as are now within our reach from the collections of Shéh KERA'MET ALI, and Munshí MOHAN LAL.—Ed.

by a crowd of women, arranged in a circle, who appeared to be overwhelmed with grief, making a singular noise. Approaching nearer, I observed that they were sitting round a grave, and mourning the loss of a relative or friend whose remains were deposited in it. Some were howling aloud, as if suffering from acute bodily pain, and appeared to feel deeply on occasion of the loss sustained. Others however, I could clearly perceive, were acting a hired part,

—————“ And live upon the dead  
By letting out their persons by the hour  
To mimic sorrow, when the heart's not sad.”

Scriptural passages appear to warrant the conclusion, that the posture of these females, and their manner of going through a scene expressive of grief, must have been a very ancient custom. The description given of the children of Israel, after the destruction of Jerusalem, exactly corresponds with the situation of these mourners. “The elders of the daughter of Zion *sat upon the ground*; the virgins of Jerusalem *hang down their heads to the ground*.” (Lamentations, ii. 10.) The prophet Isaiah thus alludes to the desolation of Judea. “She being desolate, shall sit on the ground.” (Isaiah, iii. 26.) And it may be added as a striking fact, that I have a Roman medal, found during my travels, that represents Judea under the figure of a woman sitting in the attitude of grief. The custom of hiring people professionally to lament obtains among the natives of Greenland.—“The women continue their weeping and lamentation. Their howl is all in one tone; as if an instrument were to play a tremulous fifth downwards through all the semi-tones.”—(Vide Crantz's History of Greenland.)

We now proceeded over an extensive plain, which had a wild heathy aspect, interspersed with irregular hills of gravel, covered with tufts of dry prickly herbage, and withered aromatic plants; among which were vast numbers of the florican, bustard, and black-breasted partridge. The latter is a very singular bird: round the eye it exhibits a warty skin; on the foot a small spur, bare and black; the forepart of the leg covered with short ferruginous feathers; and the bill convex. The male and female are of the same colour, though the former has black spots, which on the latter approach to a yellow.

After proceeding some miles, we crossed the river Kourak in front of some snowy hills, which were one untracked surface. Here, the prince, who was a keen sportsman, obtained some capital shooting; indeed all travellers pursuing this route would find many modes of dissipating the tedium of their journey, as game of every description is most abundant. Our table groaned under the wild ducks, partridges, quails, floricans, and bustards, which were daily supplied by the prince

and Mr. CORMICK his physician. We went cheerily on, over a succession of finely undulating hills and dales, till we reached our halting place at three o'clock P. M. with no more fatigue than if we had taken only a morning ride.

We left Zodi at seven o'clock next morning, still traversing the plain in a direction south 50° east. The country, though so extensive, changed nothing in its appearance, excepting that the hills stood thicker and higher. The weather was delightfully pleasant, and every thing breathed the air of spring. We proceeded along the left side of the Aligez, close to the base of its mountain-wall. Its sloping sides were thickly set with hamlets and enclosures, which produced a most delightful contrast to the regions of barren rock which pended above. Continuing our march, the plain widened between more equally undulating banks, and soon after we discovered an addition to our party in the shape of a greyhound. His service proved an acquisition, for scarcely had we seen him, ere a herd of antelopes presented themselves along the slope of the hills near the low ground. We allowed them to advance upon the plain, and then slipped the dogs. The antelopes darted before us like a flash of lightning, and the Persians halloed like thunder. The sport became both animated and delightful, and the steeds, having a fine even plain before them, kept well up. At length the chased animal finding the dogs gaining upon him, made for the hills with redoubled speed, when Prince KHOSROU, who was in the way as he repassed within musket shot, fired and so wounded him that the dogs were on him before he could traverse another fifty yards. He was placed upon the back of a mule, and proved a capital addition to our travelling stock of provisions.

We now took a descending position, due east, over a stony and difficult road; which carried us through several rocky defiles, and over the river Terter, till we reached a small Muhammedan village named Boulak. We halted there for the night, and slept under the roof of a hospitable Mussulman, who roasted a sheep whole, and gave us some excellent coffee. On the morning of the 10th, we left our kind host, who appeared glad enough to see us depart, having been frightened by the fierce looks, and glittering arms of the Prince's attendants. We set forth over a road leading due south, passing to the westward of Shesha, the capital of Karabagh. On our way, we saw several Cossack stations, where our conductor, the Russian General, changed his baggage horses. These posts consisted of a few miserable straw huts, and the soldiers appeared performing the most menial offices. As we passed along, they stood with their heads uncovered; and the people of the country likewise observing this ceremony looked ridiculous enough, since their heads were closely shorn.

This province is laid down in ancient maps as the country of the Sacaseni, a brave tribe of Scythians, mentioned by STRABO, which the learned now-a-day try to prove are from the same stock as the Anglo-Saxons. To the eastward is the province of Shirwan, the ancient Albania, the scene of so many actions of CYRUS, and subsequently of POMPEY. Not far hence, the Koor mingles its waters with the Araxes, thus forming the apex of a triangle; and the united streams, turning abruptly to the south, discharge themselves into the Caspian Sea. From a series of observations, lately made with Fahrenheit's thermometer in boiling water, at different heights, on the shore of this sea, it appears that water boils at  $212^{\circ}.75$  and the barometer stood at  $28^{\circ} 7' 1''$ \*; hence the surface of the Caspian is 375 feet below the level of the ocean. PALLAS in his travels, speaks of the low level of the Caspian, compared with other seas. ENGELHARDT and PARROT, in their late journey to the Caucasus say, that the surface of the Caspian is 308.8 French feet beneath that of the ocean. The Koor contains a greater body of water than the Araxes, though its course is less rapid. CYRUS is said to have been murdered on its banks by the neighbouring mountaineers.

The weather, which for the last week had been so mild, became suddenly extremely cold, with a cloudy sky, and seven degrees of frost. Our track lay over an uneven plain for nine miles, when we began a gentle ascent up a hill to the south-east; and passing over its brow descended on the opposite side by a narrow and romantic path towards the river Parianzour. Following its course for two miles, we entered a deep wood. The thickets through which we plunged to reach a new ascent were covered to the depth of two feet with snow, and the difficulties our horses encountered from such insecure footing increased at every movement. The track up the height itself did not afford a more secure one, and when the ascent was gained, similar obstacles presented themselves. We had to pass along the ridge of a chain of rugged hills whose situation exposed us to every blast, while the road itself over which we travelled some hours, was slippery and dangerous. At the end of fifteen miles, we reached Gorouzour, where some Cossack horses were changed. That done, we recommenced our march over the same rough ground, till we came up to an encampment, where we halted for the night. The portable houses of the peasantry of the country, we found comfortable enough. They cannot be called tents, although their structure is as simple. Several long rods, regularly disposed at the distance of about two feet asunder, surround a circular space from ten to fifteen feet in diameter, and form the skeleton of the walls, which are firmly tied together by bands of hair ropes, hitched round the end of

\* Sic in MS. perhaps 28.71 French inches.—ED.

each rod to secure it in its position. From the upper ends of these, rods of a similar kind are bent, so as to slope to the centre, and being thus tied with ropes, form the frame work of the roof; over which is thrown a covering of black felt, leaving an aperture in the centre to give vent to the smoke. Similar coverings are wrapt round the sides, and to keep all tight, another frame is bound externally, formed of cane tied together with strong cord, which firmly unites the whole. The aperture at the top is closed, as occasion requires, by a piece of felt, which is drawn off or on by a strong cord. Our next day's journey spread a whole region of snow before us; hill and dale one dreary waste, with a sky threatening a still more deepening fall. Winter had here laid his "cold and shrouded hand" on every object: our halting place for the night was to be Koubat, about six leagues distant in a south-westerly direction. The road was better, which enabled us to reach our quarters early in the evening. It appeared a wretched place; nevertheless, I must do the natives of these wild hamlets the justice to say, that, notwithstanding the unpromising exteriors of their habitations, they evince a frank hospitality within, to be remembered with gratitude by every way-worn traveller. The description of their sepulchral-like abodes I have already given, but it may be as well to picture the interior likewise. On descending a few steps, we enter a room which fills the whole space of the house, being about eighteen feet square, an ill-proportioned size to the lowness of the dwelling. At one side we find the hearth with its chimney, and directly opposite a small aperture in the roof, to admit light and air. The earthen floor is beaten down very flat and hard; but carpets are spread when the inmates sit or sleep. No furniture of any description is to be seen. The walls are of dried mud, with recesses left in them to hold the utensils of the family. A small portion of the habitation is generally assigned to the horses, cows, or sheep, but they frequently mix indiscriminately with their masters.

We left Koubat with the cold at eight degrees of Reaumur, and entered the now expanded channel of the Parianzour under a clear and beautiful sky. Our road led to the south-east, and a few hours' travel brought us to the banks of the river above mentioned, whose impetuous motion was staid in some places, and frozen to the depth of several inches. As we proceeded, the character of the plain gradually disappeared amongst hills, and we soon found ourselves in a narrow valley, which by degrees contracted to a rocky gorge of very steep acclivities. At the bottom ran a stream, whose waters in spring swell to an impassable height; but at the present moment they were hardly more than a rill, and flowed amongst the rocks, while we journeyed by its side, contemplating the beauty of the overhanging cliffs. We rode between

them for upwards of a mile, and then came out on a small plain, which appeared to be completely surrounded by mountains. Through an immense chasm to the east, I had a beautifully distinct view of the windings of the Araxes. Herds of antelopes were bounding over the precipitous sides of the mountains, and pheasants, which are seldom seen to the south of this river, were in great numbers. The source of this celebrated stream, which is boldly described by Virgil, "Pontem indignatus Araxes," is from the mountains a little to the south of Erzeroum, (the Arze of the Byzantines,) whence it flows onwards in a serpentine course; until in gliding through the plain of Irivan, it sweeps to the southward, embracing the provinces of Irivan, Nakshivan and Karabagh; and finishes its impetuous course in the north-east, near the castle of Kalagan, where it mingles its waters with the Koor, when both these famous rivers roll into the Caspian.

An hour more brought us to the margin of the Araxes, at which point the power of Russia ceases—for the present. How long this may continue to be the boundary line, and whether it be politic for us to remain inactive spectators of these rapid advances and encroachments, requires our most serious consideration. Be the intention of the Government what it may, all Russian officers, during my residence amongst them, spoke of the march against India as an ultimate object of its policy; and if we felt alarmed at the proposed attempt of the French on our eastern possessions, we should have far greater apprehensions from any similar designs of the Russians\*.

Through the kindness of Prince КНОСКОУ's Russian Mehmandar, we were accommodated in tents pitched upon the shores of the Araxes, as on neither side were any villages situated. The surrounding scenery was awfully wild. It was like a ruin of nature itself, as if the earth had been convulsed to her very centre, and rocks and mountains had been hurled from their foundations by the violence of her convulsive throes. In the hollow of caverns formed by these grotesque combinations, the shepherd and his flocks had taken up their residence, and secured to themselves dwellings which nothing but a similar revolution could destroy. From the verge of the stream I observed that its utmost velocity in the most obstructed channels was about six miles per hour; while

\* We are compelled to omit here our correspondent's observations on the subject of a Russian invasion, as unconnected with the relation before us, and not adapted for our pages, from which the discussion of political questions has hitherto been scrupulously excluded.—Ed.

through the broad and shallow passages the river ran at the rate of from three to three and a half miles an hour only, in proportion to its depth.

As the day was mild and warm, I waded through the water from one cluster of rocks to another, visiting all the little islands which obstructed the passage of the Araxes: and it must be confessed that, to the admirers of wild and majestic scenery, nothing could be more romantically picturesque. Towering mountains were formed on each side the river of immense masses of basalt and black granite, heaped one over the other, and hanging in an endless variety of fantastic forms, while their broad shadows threw upon the surface of the stream a fine deep gloom, quite in unison with the scene. In the centre of the river were again seen smaller combinations of rocks, which formed innumerable islets, over some of which the water partially flowed, while their sharp points cutting the current in its course, created foaming breakers in miniature, the murmurs of which were the only sounds that disturbed the stillness of the calm. In some of the hollows formed by the annual friction of the rising inundation, when the Araxes was at its height, a bed of rich alluvial soil had been deposited, from which had sprung up young trees and bushes, the isolated verdure of which derived a higher beauty from contrast, and appeared like little Edens encompassed by a wilderness. The very rocks themselves too exhibited all the variety of form and colour; while their adamantine surfaces, exposed to the constant stream, were worn to a smoothness of polish, which art could scarcely give to them; and by the infinite variety of their positions, reflected the rays of an unclouded sun from every point like dark steel mirrors. Here were gigantic mountains of basalt, and rose-coloured granite, the latter crossed with veins of the finest porphyry and smaller lines of brilliant quartz, changing at every yard their hue of shade, and quality of grain: while the sublime solitudes of this dark and silent valley gave to the pure canopy above a brighter blue, and produced altogether a splendid picture of nature in her wildest garb.

Such a magic combination of forms and colours could not possibly be sketched with fidelity. Were the whole to be drawn and coloured on the spot, it would require the pencil of a CLAUDE to catch the beauty and the expression of the shades which vary with every hour, from the dawn to the close of day. The sun was sinking when we returned to the encampment; and I retired to my tent as much overcome by the magnificent impressions of the scenery I had beheld, as by the fatigues of our circuitous and lengthened route of wading through the islets of the Araxes to enjoy their beauty.

The Russian General BARON RENNENKAMPPF came to take leave of our party next morning as early as the day dawned. KHOSROU MIRZA presented him with a bag containing twelve hundred ducats and two pair of handsome Cashmere shawls. The Baron's polite attentions to the whole suite were unremitting throughout: he was very desirous of crossing the boundary line, and of accompanying us to the court of His Royal Highness ARBAS MIRZA, that he might have formed the acquaintance of our highly respected envoy, Colonel MACDONALD KINNIE; but the orders of the Emperor NICHOLAS were so positive, that he could not even transport the Prince's carriage across *the river*. His fear, also, of being thought more favourable to the Persians, than to his own employers, was excessive. Born a Livonian, he was eyed with jealousy by his inferiors in rank, who, if any opportunity served, would doubtless have endeavored to injure his good name and interest with the Government. On pressing my hand, he said, "The Emperor has every confidence in me at present, and I must endeavour to retain it; the Russians hate all my countrymen most cordially, because some of us hold the best appointments in the Empire."

(*To be continued.*)

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V.—*Supplement to the Historical Remarks on the Allahabád Inscription,*  
No. 2. *By the Rev. W. H. MILL, D. D. &c.*

In enumerating the few historical names that remain of the dynasty or dynasties to which I conceive that the Allahabád Inscription, No. 2 may possibly belong, I confined myself to such as are authenticated by ancient testimony: in which I am not aware of any omission except that of two kings, whom the researches of Professor WILSON have supplied: viz. SÁHASANKA, who appears from the *Visva Prakása* to have reigned at Canouje somewhere in the tenth century: and KORA, so called by the Mahometan writers, who was contemporary with MAHMÚD GHAZNAVÍ in the eleventh\*. It is however scarcely pardonable to omit all reference to a series of names with which so indefatigable an investigator as Colonel TOD thinks he has filled the chasm in question, in that most valuable and elaborate contribution to oriental and general literature, the

\* To these I might add the name of VIRA-SINHA-DEVÁ, who is said, at a period somewhat earlier, to have granted to the request of A'DISÚRA, king of Bengal, the five orders of Cányacubja Brahmans, from whom the present brahmans of Bengal are descended.

“Annals and Antiquities of Rájasthan.” The Annals of Marwar contained in his last volume, might well indeed be expected to throw some light upon this subject: since it was by the remains of the Rahtore family that last reigned at Canouje, by two grandsons of the unfortunate JAYA CHANDRA, that this still subsisting principality of the solar race was fixed in Central India, near the beginning of the 13th century, and escaped for several ages the notice of the Musulman princes that had subverted the ancient Hindu monarchies of the north. The professed records of the earlier periods of the family yet remain in the hands of the bards and other dependents of these princes at Marwar: and these traditional legends always deserve attention, though they cannot for various reasons command historical belief.

These chronicles all connect in a loose manner the solar race in the person of SUMITRA (about the sixtieth from RÁMA), the last prince of Ayodhya mentioned in the Puránas, with the sovereignty of the Rahtore family at Cányacubja—thence proceeding hastily to the defeat and death of JAY CHAND or JAYA CHANDRA, and the flight of his grandsons SBOJI and SATRAM to Marwar;—after which, they begin to wear the appearance of circumstantial history. Some of them however assume an aspect of chronological definiteness at the period of NAYN PAL (NAYANA PÁLA,) whom they represent as having conquered Canouje in the year of VICRAMÁDITYA 526, or A. D. 470, from king AJIPÁLA, a descendant of AJAMIDHA, of the Lunar race, which race they represent as having held the sovereignty of Cányacubja or Gádhipura, from the fabulous times of GÁDHI, father of VISVAMITRA, to whom its foundation is generally ascribed, down to this comparatively recent period. From this NAYN PAL, the Marwar chroniclers give a genealogical series of twenty generations to the unfortunate JAYA CHANDRA, thus filling the interval from A. D. 470 to 1193. Some observed incongruities in the testimony on which this series is given have not prevented Colonel Tod from attaching to the former date, and to the whole genealogy, a credit which he does not appear to give to any names preceding NAYN PAL in the same genealogical rolls. He takes it for established fact that the Rahtore family thus reigned for seven centuries at Canouje, and that this was the only principality of the solar race that ever occupied that ancient seat of Hindu empire.

The exhibition of this genealogy, as given by Colonel Tod, side by side with the testimony of indubitable Sanscrit monuments brought to light by COLEBROOKE, FELL, and WILSON, as to the actual reign of the Rahtore princes at Canouje, will bring to the test these assertions of the bards and panegyrists of the royal house at Marwar. It will be seen that it needs not the absence of the names of YASOVARMAN and

SĀHASANKA (who certainly reigned at Canouje within the limits of these seven centuries), to prove this genealogy destitute of all historical authority.\*

Colonel Tod's Rajasthan.  
Vol. ii. pp. 5, 6, 7.

NAYANA-PALA conqueror of Canouje—  
A. D. 470, and thence surnamed  
Cama-dhvaga, with all his descendants  
who follow.

PADARATA or BHARATA, his son, king  
of Canouje.

PUNJA, do. do.

DHARMA-BHUMBO, do. do. whose 12  
brothers were also founders of great  
Rajput families.

AJI-CHANDRA, do. do.

UDAYA-CHANDRA, do. do.

NRIPATI, do. do.

KENAKA-SĒNA, do. do.

SAHASRA-SĀLA, do. do.

MĒGHA-SĒNA, do. do.

VĪRA-BHADRA, do. do.

DĒVA-SĒNA, do. do.

VĪMALA-SĒNA, do. do.

DĀNA-SĒNA, do. do.

MUKUNDA, do. do.

BEVUDU ? do. do.

RĀJA-SĒNA, do. do.

TRIPALA, do. do.

Srī PUNGA, do. do.

VIJAYA-CHANDRA, do. do.

JAYA-CHANDRA, do. do.

Inscriptions published in the Asiatic  
Researches, vols. ix. and xv.

YASOVIGRAHA, or Srī-PALA, whose  
son

MAHI-CHANDRA, was father of

CHANDRA-DĒVA, who became  
by conquest king of Ca-  
nouje about  
1072.

MADANA-PĀLA, his son, who  
succeeded,  
1096.

GOVINDA-CHANDRA, do. do. 1120.

VIJAYA-CHANDRA, do. do. 1144.

JAYA-CHANDRA, do. do. 1160.

Hence it appears, that the Marwar authorities are correct only as to the unfortunate JAYA CHANDRA, who died A. D. 1193, and his father

VIJAYA CHANDRA, who died in 1168. Respecting all his ancestors they are altogether wrong, and have expanded into seven centuries a dynasty which lasted but 120 years ; for the same inscription which relates the conquest of CHANDRA DÉVA is utterly silent as to the crown of Canouje having been his by right of hereditary descent from NAYANA PÁLA, or any other. We have therefore little reason to credit the Marwar chroniclers in the other part of their statement ; viz. that this Rahtore dynasty thus reduced to one century, was the first and only dynasty of the solar race at Canouje. It is far more probable that princes of purer descent than they (whom Colonel Tod suspects on very probable grounds to be of partly Scythian origin) occupied that seat of empire from a period at least as early as that named by their chroniclers, viz. in the fifth century, or perhaps long before it. To some of these the kings mentioned in our inscription may have belonged, whom these authorities, if admitted as true, would exclude altogether.

A greater assistance might perhaps be obtained from Colonel Tod, had he given us the Jain inscription to which he alludes in pp. 140 and 211 of the first volume of the Transactions of the Royal Asiatic Society, as written in an ancient character (very probably that of our inscription) long disused in India, but known to the Jain hierarchs, and of which he promises to the Society a key. For this inscription relates to a certain *Avanti Rája* or Lord of Ujjayini, called CHANDRAGUPTA, and is dated in the year 427\*, which if applied to the era of the great monarch of that city VICRAMÁDITYA will be A. D. 371, but if applied to the Jain era of MAHÁVIRA will be B. C. 106. But the localities specified in the Allahabad pillar all seem to indicate a Gangetic kingdom rather than one whose centre is at Oujein.

In the line of the Chohan princes of Ajmeir, closed by the name of the heroic PRITHU-RAI, (who possessed himself in the 12th century of the ancient kingdom of Indrapritha or Dehli, only to be the last Hindu prince that ever reigned there) we find a CHANDRAGUPTA, son of MAHÁSINHÁ and grandson of MÁNIKYA-RÁI, the latter a king of some celebrity, whose date is fixed to A. D. 695. But the mention of these names, together with that of the son and successor in the kingdom, which is not SAMUDRAGUPTA but PRATÁPA-SINHA, is alone sufficient to remove all idea of this being the CHANDRAGUPTA of our inscription ; even without recurring to the decisive reason, that the *Agnikula* class of Xattriyas, to which this Chauhána family belongs, is ex-

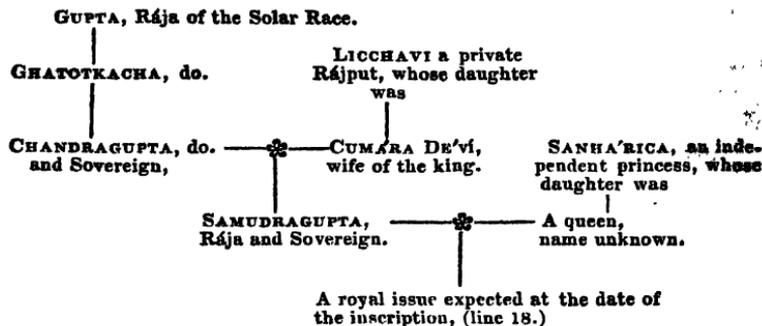
\* On the second mention Colonel Tod, apparently from inadvertency, makes the date of this same monument 466, i. e. 39 years later than before.

cluded as completely as the Lunar race from the character here assigned, of "children of the Sun." The last reason excludes also a more ancient CHANDRAGUPTA who, as Colonel TOD informs us, stands *before* MĀNIKYA-RĀI, in the long line, (which he has not published) of the Chohans' descent from their remote ancestor AGNI-PĀLA : though this prince, if real, may very possibly be the Lord of Oujein who is the subject of the Jain-inscription already alluded to, (T. R. A. S. vol. i. p. 140.)

The same reason prevents us from profiting by another tradition often repeated by the same learned inquirer, both in his Annals of Rājasthán and his contributions to the R. A. S. Transactions, relating to another celebrated branch of the Agni-kula Xattriyas, the Pramaras. One tribe of this Rájput race, the *Mori*, is in the habit at this day of claiming for their own the celebrated CHANDRAGUPTA *Maurya*, founder of the dynasty so called at Palibothra in the days of SELEUCUS Nicator. The account given by all the ancient Sanscrit authorities of the origin of that name is very different from this, viz. that it is the patronymic noun derived from the Sudra damsel MURÁ, of whom the king NANDA MAHÁPADMA became enamoured (being himself also of half-blood, the offspring of the Lunar prince MAHÁNANDA by a slave girl), and thus became the father of CHANDRAGUPTA, who afterwards succeeded by extirpating, with the Machiavelian Brahman's aid, his nine more legitimate brethren. This account is so universal—and it is so visible also even in the inverted accounts preserved by DIODORUS SICULUS, TROGUS POMPEIUS, and others in the west (making SANDRACOTTUS the offspring of a queen and a barber, instead of a king and a barber's daughter) that it requires no ordinary attachment to the later chroniclers of Rājasthán to set aside these statements by making this king a member of a noble tribe of the purest Rájputs, to make him consequently unconnected altogether with those NANDAS whom he succeeded or displaced—and even to suspect the word *Maurya*, (as Colonel TOD does, T. R. A. S. i. 211,) to be an interpolation for *Mori*. There may however be a CHANDRAGUPTA to which such a tradition points with partial truth ; and such I should have suspected to be the conquering CHANDRAGUPTA of our column, but for the objection of family above stated.

Upon the whole, our researches for the subjects of this inscription in the records of Northern and Central India, seem to be hitherto unsuccessful, notwithstanding, the various CHANDRAGUPTAS that have appeared there. Of the name SAMUDRAGUPTA I have not yet seen any trace ; but to facilitate the progress of future inquiries, it may be use-

ful to exhibit synoptically the genealogical facts which the pillar supplies.



Another consideration, however, which should not be overlooked in this research, is the name of the contemporary king, mentioned in line 17 of the inscription, as having been overcome, together with several inferior princes, by SAMUDRAGUPTA. The king is called DHANANJAYA, and is described as of the race of UGRASENA, i. e. most probably the celebrated king of Mathura so called, the father of CANSA, who was slain by CRISHNA, and was, like his enemy, of the great lunar family of YADU. Now in inquiring who this king could be, the دھانی DHANJYE or DHANANJAYA, who is mentioned by ABU'L FAZIL at the head of the royal lists of Malwa, as having founded a dynasty there about 2000 years before, should appear as much out of the question as the fabulous ARJUNA, who also bore the same name. Yet this prince, who in ABU'L FAZIL'S list (Ayin Acbery, vol. ii. p. 54,) has a SALIVAHAN for his grandson—is identified by Colonel WILFORD, with a DHANANJAYA, mentioned in the royal lists of RAQHUNATHA as having sprung from a temple in the peninsula of India, and thence attacked and slain a king named A'DITYA, and then reigned at Ujjayin: and on the strength of this last tradition, he is identified also with the great SALIVAHANA himself, the founder of the era A. D. 78, because this latter is celebrated as the foe of and destroyer of the celebrated VIKRAMADITYA! (See As. Res. vol. ix. pp. 134, 135, 140, 141.) The authorities from which the age, and family, and reign of this DHANANJAYA, might perhaps have been obtained, are so loosely cited by this very learned but fanciful writer, and so mixed up with his own evidently groundless and inconclusive deductions of identity, that we can derive no aid from them in determining whether he be the king mentioned on the column or not, or what could be thence safely concluded concerning the age of the inscription.

## VI.—On the Influence of the Moon on Atmospheric Phenomena.

By the Rev. R. EVEREST, M. G. S. M. A. S.

Having observed one or two coincidences in the Meteorological Registers which I could not but deem remarkable, I was induced to examine them farther, in the hope of being able to furnish some rules which might be of use to those whose occupations are affected by atmospheric changes, such as the planter, the sea-farer, and others, and through them to the whole community. With this view, I have confined my observations to the chances of rain, that being the only uncertain condition in the bringing of our harvests to perfection; of heat and sunshine there is no lack at any time. In pursuance of this object, I now beg to call your attention to

*The influence of the Moon in producing rain.*

Having remarked that a great proportion of the spring showers fell near the time of the new moon, I drew out a table of the quantity of rain that had fallen in the first four months of each year, for eight years, (which was as far back as I could obtain the registers,) showing at the same time what number of days it fell, before, or after, the day of new moon (see Table No. 1). From this it will appear that rain fell most abundantly on the 2nd, 5th, 6th, and 7th days before the new moon, and the 6th day after it, that, out of a sum total of 34.55 inches of rain, 25.31 inches fell within seven days from the day of new moon, and only 9.24 in the rest of the lunar period, being in the proportion of 2.73 : 1, for nearly equal portions of time. If we take the quantities that fell in each year they are as follows:

	Within 7 days of New Moon.	Beyond that period.
1825	1.82	0.58
1827	1.62	1.00
1828	0.16	1.82
1829	1.72	0.00
1830	6.48	0.74
1831	5.55	1.85
1832	4.86	2.25
1833	3.10	1.00
<b>Total</b>	<b>25.31</b>	<b>9.24</b>

If instead of the quantities of rain we take the number of rainy days for the same periods, we have 45 rainy days against 23, being a ratio of nearly 2 : 1. For each year the quantities are—

	Within 7 days of New Moon.	Beyond that period.
1825	8	4
1827	5	3
1828	1	5
1829	3	0
1830	9	3
1831	8	4
1832	6	2
1833	5	2
<b>Total</b>	<b>45</b>	<b>23</b>

Here the days of maxima are somewhat different from what they were before, being the 3rd, 5th, 6th, and 7th days before new moon, the day of new moon, and the first day after.

Upon examining further, I found that this excess of rain towards the new moon obtained in a degree through the succeeding months, May and June, but that the ratio was somewhat altered. For instance (see Table No. 2, of Calcutta year's rain), the rain that fell in the same days, about the new moon, during a period of eight years, amounted to 83.73 inches, and for the rest of the lunar period to 52.04 inches, being in the ratio of 1.6 : 1.0. The numbers of rainy days for the above two periods respectively were 68 and 54, in the proportion nearly of 1.3 : 1. If we particularize the quantities of rain, we find that the 3rd, 6th, 7th, and 8th days before the new moon are now become maxima, as well as the 3rd, 4th, 5th, and 6th, and 10th after it. In the third division of the year, which I have confined to the month of July, the numbers approach still more a ratio of equality, the respective quantities of rain being 43.60 inches and 28.78 inches, or in the ratio of about 1.5 : 1, and the numbers of the rainy days are very nearly equal, being 61 and 60, or in the ratio of 1.017 : 1. In the fourth division of the year, which I have made to comprehend the months August, September, and October, the ratio is altered, the quantities of rain for the two periods being 96.75 and 119.39 inches, or in the ratio nearly of 1 : 1.2, and the numbers of rainy days 159 and 173, being as 1 : 1.1 nearly. The different numbers are here placed, for the sake of comparison in a tabular form.

TABLE III.	Within 7 days of New Moon.	Rest of Lunar Period.	Ratio.
1st Division,.....	25.31 .....	9.24 .....	2.73 : 1.
2nd Ditto,.....	83.73 .....	52.04 .....	1.6 : 1.
3rd Ditto,.....	43.60 .....	28.78 .....	1.5 : 1.
4th Ditto,.....	96.75 .....	119.39 .....	1 : 1.2.
<i>Number of Rainy Days.</i>			
1st Division,.....	45 .....	23 .....	2 : 1.
2nd Ditto,.....	68 .....	54 .....	1.3 : 1.
3rd Ditto,.....	61 .....	60 .....	1.017 : 1.
4th Ditto,.....	159 .....	173 .....	1 : 1.1.

Upon looking over the days of maxima in this last case, we find them to be the 3rd, 9th, and 11th, before the new moon, and the 3rd, 5th, 6th, 10th, 11th, and 12th, after. I must here observe, that the present mode of comparison is not strictly correct. As the lunar period is, properly speaking, only  $29\frac{1}{2}$  days, the fifteenth day on the left hand of the table only occurs alternately. The comparison, however, is sufficient for my purpose. Taking the four periods of the year together, the inequalities may be accounted for by supposing four days to be the principal maxima : one of these being the fifth day after the new moon, and another the 9th day before it. It is true that the 9th day itself is but once a maxi-

imum in the four periods. In the early part of the year, the days immediately succeeding it are maxima, and in the latter part of the year the days immediately preceding it. If therefore any cause can be assigned why the rain at one time should be a little retarded, and at another a little accelerated, there would be no error in supposing the maximum tendency to rain to occur on the 9th day. Two other days of maxima are the 3rd day before the new moon, and the 12th day after.

With a view of ascertaining whether the Barometer was similarly affected, I next put the heights of it at sunrise for five years into a similar table, and on taking the mean of the whole year, found that the fifth day after the new moon was the minimum. (See Table No. 3). My next object was to find whether the dew points varied in a similar manner, and I therefore reduced them from the wet-bulb indications in the registers, and those of Leslie's hygrometer preceding them. The method recommended in the 1st volume of GLEANINGS being too laborious to adopt, and Major OLIVER's tables in the GLEANINGS not having been published, I took the very simple method of multiplying the wet-bulb depression by 1.6, and subtracting the product from the temperature\*. I do not mean by saying so to recommend the operation as a general rule, but only that, where the whole difference between the temperature and dew-point does not amount to more than two or three degrees (as is usually the case at sunrise at Calcutta), and the temperatures are between 80 and 50, the errors will not be important. But another and greater difficulty still occurred to me, which was this. By a copious fall of rain the dew point is immediately lowered, so that on looking over the list of dew points on different days, the day of most moisture will appear to be the driest by its having the lowest dew-point. Thus, for instance, in May, 1830, they stood as follows :

Days of Month.	22nd,	23rd,	24th,	25th,	26th,	27th,	28th.
Dew-points at } sunrise,	72.9	78.2	74.9	75.1	75.6	74.9	77.9
Rain-fall,	—	—	0.10	3.00	4.22	—	—

Here the 25th and 26th were the days of the great storm, but looking at the dew-points alone, no indication is afforded of the quantity of moisture†. Unless, therefore, we could make due allowance for the rain-fall, the dew-points alone would be a very imperfect mode of judging

\* This rule would answer for an aqueous tension of 0.75 at the temperature of 90°. We think it would have been better to have used the aqueous tensions themselves, for which a table is given in the Gleanings, I. p. 81 and 340.—Ed.

† When rain is accompanied with a strong wind, and that from the north, the air is seldom saturated with moisture; the chief cause however for the fall of the dew-point is, the reduced temperature of the air during storms.—Ed.

of the degree of moisture. For this reason I took only the first and last quarters of the year, when the weather is usually dry, and found the means of the different years (see table No. 4). From this it will be seen that the days of highest dew-point in the winter half of the year are the 4th and 5th, before the new moon, and the 10th and 11th, after. This was so near a coincidence with two of the maximum days of rain, (viz. the 3rd before, and the 12th, after,) that little doubt could be entertained of the one being caused by the other. That neither the other two days, (viz. the 9th, before, and the 5th, after,) were maxima might be accounted for by peculiar circumstances. At this stage of the inquiry I was led to attempt to account for the phenomena by the following considerations :

1st. By the united testimony of every observer, the quantity of moisture in the air and the rain-fall become less, as we recede from the great eastern ocean. Thus if we could obtain the mean dew-point for every degree of longitude between Delhi and Dacca, the result would exhibit almost as regular an increase as in a list of temperatures between London and Algiers. I was aware too of the great increase of dew-point here whenever the wind came from the east, and that a continuance of it was usually followed by rain. I could not, therefore, but believe that the force of attraction of the moon as well as of the sun excited an influence over the aerial currents either in modifying their direction or changing it entirely. Mr. DANIELL remarks the excess of dew-point when the wind blows from the Atlantic (he is speaking of the climate of England), and the force of attraction of the moon is stated by D'ALEMBERT to be such as would create a westerly current of eight feet in a second, (see ROBISON'S *Mechan. Phil.*) But to render this force more apparent, we must have recourse to another consideration.

2ndly. The principal cause by which the air is affected is by the heating power of the sun, which expands a column of it  $\frac{1}{180}$ th part for each degree of Fahrenheit. Upon the ocean the heat is counteracted by constant evaporation ; consequently, when a column of air, resting upon a surface of dry land, is heated by the sun, it becomes expanded, and of less specific gravity than an adjoining column in contact with the sea. Hence, as the heavier fluid will press upon and displace the lighter, a current flows in from the sea to the land. This diurnal phenomenon may be observed on almost every tropical coast. We have an annual instance of it in the great heats previous to the summer solstice, and the winds that follow them from every quarter of the ocean, the S. W. the S. E. and E., bringing with them abundant rain. This current must be strongest at the time of maximum heat of the day, and if we suppose

the moon in such a position as to act in conjunction with it, then the two forces would produce a great conjunction tide in the air. As the moon recedes eastward from the sun, it comes upon the meridian about  $48\frac{1}{2}$  minutes later every day; so if the change happened at noon exactly, three days after it would be upon the meridian at 2h. 25m. P. M. As the time of maximum heat of the day is by Dr. BREWSTER 2h. 40m, P. M. we ought on this day to have the great conjunction tide, according to theory. But in comparing the actual tides of the ocean with the deductions from theory, we find that the phenomena occur one day and a half later than they ought to do; thus the greatest spring tide does not happen exactly at the conjunction of the sun and moon, but a day and a half later. Let us make a similar allowance in the case we are considering; then as the moon must be somewhat more than three days old when it is upon the meridian at 2h. 40m. P. M. add one day and a half to its age, and the greatest tide will be produced when it is nearly five days old. I venture to suggest this as the cause of the maximum fall of rain on the fifth day after the new moon, and the minimum of the barometer on that day. Of course, as air is distended and rendered lighter by being mixed with aqueous vapour, the presence of a great quantity of moisture (which would be the case in a current setting in from the ocean) is sufficient to account for the diminution of pressure.

Cor. 1st. This supposition may account for our spring showers happening as they usually do between 2 and 6 P. M. and probably at the time when the superior or inferior tides of the moon are near the meridian.

Cor. 2nd. If the supposition be true, then the excess of rain about the fifth day after the new moon will be greatest, when the heat is a maximum, when the sun is nearest the zenith, and when the moon is nearest the zenith. This would happen at Calcutta in the months of May and June. In the first four months the heating power is great, but the sun has south declination for most part of the time, and the moon too. In July the sun is near the zenith, and so is the moon, but the heating power is counteracted by constant evaporation. In the last three months of the rains the sun and moon are further from the zenith, and the heating power somewhat less than in July. I took therefore the sum of the rain that fell on the 3rd, 4th, 5th, 6th, and 7th days after the new moon, in each of the four periods, and compared each with the quantity that fell during the whole lunar period. Premising then that five days are to the whole lunar period as 10 : 59 I found the sum of rain that had fallen in the 5 days above mentioned, to be to the sum of the whole lunar period,—

In the 1st four months,.....	::	10	:	52
In May and June,.....	::	10	:	36
In July,.....	::	10	:	46
In Aug., Sept., Oct.,.....	::	10	:	51

But besides the superior or direct tide of the moon, the inferior or opposition tide of the moon would be in conjunction with the greatest heat about the 9th day before the new moon. I took therefore the 9th day with three days before and three days after it, and found the proportions the sums bore to the whole period in the same manner as above.

Seven days being to the whole lunar period,	::	10	:	42
The proportion was—				
In the 1st four months, .....	::	10	:	40
May and June,.....	::	10	:	40
July,.....	::	10	:	55
Aug., Sept., Oct.,.....	::	10	:	40

The irregularity in the case of July probably arises from a sufficient series of years not having been taken. If instead of the quantities of rain we take the number of rainy days in the same periods, they give a ratio of 10 : 40

With a view of ascertaining whether similar results were to be observed in the climate of Great Britain, I next made a table of the temperature at Edinburgh, for eight years, (from 1824 to 1831, both inclusive,) from the Edinburgh Philosophical Journal; to this I added a table for three years near London, (from Sept. 1819 to Sept. 1822,) which is to be found in DANIELL's Meteorological Essays, and the results are as follows: (see table No. 5;) taking the days as before, (viz. the 5th day after the new moon, and two days before and two days after it,) the ratio to the whole lunar period was as follows:

In the first four months, .....	::	10	:	46
May, June, July, } .....	::	10	:	50
Aug., and Sept., }				
Oct., Nov., Dec.,.....	::	10	:	70

It was to be supposed that in a high northern latitude, in the three last months of the year, when the heating power of the sun is very small, owing to the great moisture, and also the sun and moon (when it is near the change) have southern declination, that the joint effect of the heat and attractive force would be barely perceptible. There is, however, another cause of mistake. Though the mean time of maximum heat for the whole year is 2h. 40m. P. M. yet that time varies with the different seasons; in summer it is considerably later, in winter it is considerably earlier. I have not the book to refer to, but taking the 6th day in the summer months for the centre of the maxima, instead of the fifth, after the new moon, and the 2nd instead of the 5th for the last quarter, the ratios are as follows:

In the summer months .....	::	10	:	47
Oct., Nov., Dec.,.....	::	10	:	58

Let us next compare the day of the moon's opposition, (*viz.* the 9th before the new moon,) and three days before and three days after, as was done in the former case.

The ratio of the amount to the whole lunar period was

In the first four months, . . . . .	::	10	:	40
Summer months, . . . . .	::	10	:	46
Oct., Nov., Dec., . . . . .	::	10	:	37

But taking the 13th before, instead of the 9th, (for the last quarter,) we get a ratio of . . . . . :: 10 : 28

We may observe then that the amount which falls in these days near the full moon is greatest in winter, when the moon near the full has north declination. On the contrary, in summer, the amount which falls near the new moon, when the moon at that season, and that age, has north declination, is the greatest. We may recollect that in the theory of the tides the height of the tide is said to vary as  $\cos^2 x$  (where  $x$  is the angular distance between the moon and zenith of the place). The above observations seem to point to a law somewhat similar. But of this I have yet to offer some further probability. I have not here compared the number of rainy days as well as the quantities of rain fallen, but they tend to the same conclusions, though less decisively. Nor have I said any thing respecting the two other maxima on the 3rd day before, and 12th after, the new moon, as I have no probable cause to allege for them.

Let us then dismiss from our minds the idea of a sphere covered with a homogeneous fluid, and substitute that of a surface partly of dry land, and partly of water, the first covered with a stratum of air nearly dry, the last with a stratum saturated with moisture; and to carry on the comparison with the tides of the ocean, let us remember that we cannot measure the actual height of the tide, as in that case, but that if an observer, situated on the border of an estuary, were to endeavour to estimate the relative intensity of the currents flowing in from the open sea, by the quantity of salt contained in the water before him, then his case would be somewhat similar to ours, when we attempt to draw a like reference respecting the aerial currents from the heights of the dew-point. If he were to endeavour to conjecture the force of the floods from the country above, by measuring the quantity of earthy matter precipitated from the water, then he might expect to approximate to the truth about as much as we do when we attempt to infer the force of the current of air flowing in from the regions of the ocean, by the quantity of water precipitated. In both cases an approximation only can be expected.

Having gone thus far, the next step to be desired was to make a comparison between the heights of the dew-points at different ages of

the moon, and the heights of the tides of the ocean on the same days. The only table I could refer to was that given us by Mr. NORON, (*Jour. As. Soc.* May, 1833,) of the tides in Bombay harbour, which answered tolerably well, as Bombay, as well as Calcutta, has considerable north latitude. The heights of the tides, day and night, both at change and full, are given there, as well as for three days after, and three days before, the day of change and full. I took, therefore, the average height of the tides in the seven days about each new and full moon, and compared them together. The first comparison was the day (or superior) tide of the new moon, and the day or inferior tide of the full moon. It was as follows :

New Moon,		Full Moon,		Ratio of day tide, New Moon, to night tide, Full Moon,	
ft.	in.			ft.	in.
12	11	Feb. 2.	.. 15 2 Jan. 17.	12	11
13	5	March 2.	.. 15 1 Feb. 16.	13	5
14	3	April 1.	.. 15 March 16.	14	3
*	15	3 April 30.	.. 14 5 April 15. *	15	3
15	9	May 30.	.. 14 5 May 14.	15	9
16	5	June 28.	.. 15 3 June 13.	16	5
16	5	July 27.	.. 14 3 July 13.	16	5
16	1	Aug. 26.	.. 14 6 Aug. 11.	16	1
15	6	Sept. 24.	.. 14 5 Sept. 11.	15	6
14	11	Oct. 24.	.. 14 3 Oct. 10.	14	11
*	14	3 Nov. 22.	.. 14 3 Nov. 8. *	14	3
13	3	Dec. 22.	.. 14 4 Dec. 8.	13	3

It will be observed, that in the winter season, when the new moon has great southern declination, and the full moon has great northern declination, (or, in other words,) comes near the zenith of the place in question (Bombay), then the new-moon tide is not so high as the full-moon tide ; but, in the summer season, when the declinations are reversed, then are the ratios of the tides reversed also. I have marked with an asterisk the places where the ratios change. But we must here notice a remarkable anomaly in the lunar theory. The ratios we have observed above ought only to hold with direct or superior tides of both new and full moon, the reverse ought to hold with respect to the inferior tides of both. For instance, if the declination of the moon were 20° south, and consequently the vertex of her superior tide in 20° south latitude, the vertex of the inferior or opposite tide ought to be in 20° north latitude. So that in places to the north of the equator, as Bombay and Calcutta, the inferior tide would be very large when the superior tide was very small. Thus at Bombay, in winter, the night, or inferior tide, of new moon, ought to be very large ; the day, or inferior tide, of full moon, very small : but on comparing them together, we find the reverse.

New Moon, Night.		Full Moon, Day.	
ft.	in.	ft.	in.
14	6	15	2
14	2	15	1
14	8	15	0
14	3	14	5
14	6	14	5
14	5	15	3
14	6	14	3
14	8	14	6
14	6	14	5
15	5	14	3
15	6	14	3
15	3	14	4

I have noticed this because, by supposing a similar anomaly in the case of the tides of the air, we may explain why the ninth day before new moon has a less proportionate rain-fall in summer, (when the moon at that age has usually south declination,) than it has in winter, when the moon at that age has north declination; and vice versâ, why the fifth day after new moon has a greater excess of rain-fall in summer, when its moon has north declination, than in winter, when its moon has south declination. Were the lunar theory correct, the excess in one tide, owing to the moon's declination, would be compensated by the defect in the opposite tide. Similar anomalies commonly prevail. Thus we read, "At Brest when the moon has great declination the superior tide may be three times greater than the succeeding, or inferior tide; but the fact is, they differ very little. M. LA PLACE says, they do not differ at all."—(Mechan. Philos. iii. 365.) But to return to the matter before us. Having made out a table of the dew-points at Calcutta for 1832, I selected the heights of the same days as are stated in Mr. NORON's paper of the Bombay tides, and took the average in the same way. Comparing the times of new and full, the numbers were

New.	Full.
53·1	46·3
54·3	62·1
66·8	59·2
74·5	72·9
78·1	77·6
77·5	74·9
77·6	76·2
77·3	77·0
75·3	76·4
73·2	74·5
58·8	64·3
51·5	58·0

But as the heating power of the sun (as the year advances) must affect the current of air, and consequently the dew-points, whereas the tides of the sea are affected wholly by the attractive forces of the sun and moon, no correct comparison can be drawn between them. Thus the first item under "Full" is 46·3, which is less than the item under "New," 53·1. But it may be said, that the time of the average 46·3, is near 15 days earlier than that of the corresponding average 53·1; thus as the dew-points increase with the year from January to June, owing to the heat principally, the item under "Full" (46·3) is less than that under "New" (53·1), owing to its being so much earlier, and consequently less affected by the heat of the sun. To obviate this difficulty, we may remark that, if the first item under "Full" is 15 days earlier than that under "New," the next item below it (62·1) is fifteen days later; the mean between them therefore would correct any discrepancy arising from increase or decrease of heat in either case.

Proceeding in this manner, i. e. taking the mean of each number in succession with the one below it, in the column headed "Full," the comparison becomes as follows. I have placed the Bombay tides of the same period in the same line, that the agreement may be more apparent.

Dew-points, Calcutta.		Tides, in Bombay Harbour.			
New moon.	Full moon.	New (Day).		Full (Night).	
		ft.	in.	ft.	in.
53·1 .....	54·2	12	11	.....	17 0
54·3 .....	60·7	13	5	.....	16 1
66·8 .....	66·1	14	3	.....	16 0
*74·5 .....	75·2	*15	3	.....	15 4
78·1 .....	76·2	15	9	.....	13 10
77·5 .....	75·5	16	5	.....	14 1
77·6 .....	76·6	16	5	.....	12 9
77·3 .....	76·7	16	1	.....	13 0
75·3 .....	75·4	15	6	.....	13 1
*73·2 .....	69·4	14	11	.....	13 11
58·8 .....	61·9	*14	3	.....	15 0
51·5 .....	52·2	13	3	.....	15 10

Disclaiming then the wish of speaking positively on a subject where no decisive proof has been adduced, we may yet be allowed to assert, as exceedingly probable, that the dew-points, upon the whole, vary with the declination of the moon, and in the same manner as the tides of the sea do.

I have been induced to publish the above remarks from having seen a popular notice of M. ARAGO's paper on lunar influence. One of the first remarks is, that the number of rainy days is increased by the moon's perigee. The number of rainy days in apogee being to those in perigee :: 1069 : 1169. This would agree very well with the notion of

the atmospheric currents being acted on by the attractive force of the moon\*. The barometer is next alluded to, but the circumstance of the specific gravity of air being diminished by its being mixed with aqueous vapour, must tend to render very uncertain any deductions from inequalities of pressure alone.

Medical men will be able to judge, whether the recurrence of a very high dew-point, or in other words, of great moisture, at certain fixed days in the lunar period, is sufficient to account for the recurrence of certain diseases, in the manner they have been observed to do since the earliest ages. I have now merely to add the several tables alluded to in the text, of rain-falls, dew-points, and barometric heights.

I subjoin a table of the most remarkable storms and falls of rain, which, whatever may be thought of the theoretical suggestions, I hope will be of use.

[We put every confidence in the tables and in the abstracts of them drawn up by our correspondent, but we regret that in calculating some of them he should have selected those columns of the meteorological registers, which were perhaps the most liable to irregularities. At the hour of sunrise, for instance, the mercury of the barometer is in motion : the chance of punctuality in the observer is less (we allude here to the registers of the Surveyor General's Office, where the observer did not reside on the premises) ;—and the light for reading off is bad. Again, at that hour the depression of the wet bulb thermometer is at a minimum, and least trust-worthy for shewing the hygrometric effects of aerial currents, which are also at that hour generally lulled and quiescent. The aqueous tension calculated from the depressions, or if that be too troublesome, the indications of the hair hygrometer, which is not affected by heat, would best answer the purpose desired. But we would venture to suggest that the barometer alone is sufficient, particularly if observed at its hours of rest, its maximum or minimum at 10 A. M. or 4 P. M. to point out the lunar influence if perceptible, on the atmosphere : for its indications are alike affected by the direction of the aerial currents, the moisture present, and the diminution of gravity :—besides which its march in other respects is so regular in these latitudes, that upon a long series of averages very small anomalies ought to be discoverable. It will be seen, from the proceedings of the Asiatic Society on the 2nd July, that M. ARAGO has applied through the French Government for copies of all meteorological registers kept in Calcutta, probably with a view of solving this very question of lunar influence :—The registers have been furnished, and we shall take care to add a copy of the present laborious and useful analysis.—ED.]

\* Rain falls most abundantly about the second octant, which also agrees with our selection of the fifth day after as a maximum.

TABLE

Shewing the quantity of Rain that has fallen in the first four months of each

	○ Before New Moon.														
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
*1825,	.....	.....	.....	.....	0.04	.....	0.08	..	0.08	.....	.....	.....	0.02	.....	.....
1827,	0.02	.....	0.30	.....	.....	.....	.....	.....	.....	.....	.....	0.04	0.46	.....	.....
1828,	.....	.....	.....	.....	.....	1.08	0.10	.....	.....	.....	.....	.....	0.16	.....	.....
1829,	.....	.....	.....	.....	.....	.....	.....	.....	.....	1.40	0.07	.....	.....	.....	.....
1830,	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.04	0.96	.....	.....	2.50	.....
1831,	.....	.....	.....	0.25	.....	.....	.....	.....	.....	.....	1.80	0.30	0.37	0.38	.....
1832,	.....	1.65	.....	.....	.....	.....	0.60	..	0.60	1.71	1.32	.....	.....	.....	0.55
1833,	.....	.....	0.10	.....	.....	.....	.....	.....	1.36	1.30	.....	.....	0.14	.....	.....
Total,	0.02	1.65	0.40	0.25	0.04	1.08	0.78	..	1.96	4.45	4.15	0.34	1.15	2.88	0.55

Number of Rainy Days

1825,	.....	.....	.....	.....	1	.....	1	..	1	.....	.....	.....	1	.....	.....
1827,	1	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	1	2	.....	.....
1828,	.....	.....	.....	.....	.....	1	1	.....	.....	.....	.....	.....	1	.....	.....
1829,	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	1	.....	.....	.....	.....
1830,	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	2	.....	.....	1	.....
1831,	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	1	1	1	1	.....
1832,	.....	1	.....	.....	.....	.....	1	..	1	2	1	.....	.....	.....	1
1833,	.....	.....	.....	1	.....	.....	.....	.....	2	1	.....	.....	1	.....	.....
Total,	1	1	1	2	1	1	3	0	4	5	5	2	6	1	1

\* Only the first three months of 1825 are set down.

TABLE

Shewing the quantity of Rain which fell in each season of the

	○ Before New Moon.														
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
1st 4 months,	0.02	1.65	0.40	0.25	0.04	1.08	0.78	..	1.96	4.45	4.15	0.34	1.15	2.88	0.55
May & June, ..	1.78	1.53	5.41	4.24	1.63	3.18	1.71	7.04	7.22	6.76	2.30	5.54	8.61	1.08	4.97
July, ..	1.88	1.37	2.52	0.77	3.13	0.66	0.53	1.34	3.59	2.81	2.44	0.30	5.67	1.10	4.22
Aug. } Sept. } Oct. }	1.91	6.55	5.26	7.33	9.40	6.60	10.20	6.22	6.84	5.95	4.53	5.12	10.27	2.47	2.05

Number of Rainy Days

1st 4 months,	1	1	2	1	1	1	3	0	4	5	5	2	6	1	1
May & June, ..	2	5	5	6	6	5	4	6	7	5	4	8	6	3	
July, ..	3	4	5	3	6	5	2	4	5	5	4	3	5	2	
Aug. } Sept. } Oct. }	5	10	12	11	13	14	11	10	8	9	10	12	13	8	

NOTE.—The days of maxima are marked with an asterisk, that they may meet the period, but not such as to invalidate the results.

No. 1.

year for eight years; and the distance of it from the day of New Moon:

● *After New Moon.*

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
.10	0.10	0.90	0.60	.....	0.02	.....	.....	.....	.....	.....	.....	0.40	0.06	.....
.....	0.12	.....	.....	0.92	.....	.....	.....	.....	.....	0.68	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.14	.....	0.15	0.35
0.08	0.30	.....	.....	0.44	0.16	2.00	.....	.....	0.08	0.36	.....	0.30	.....	.....
0.45	0.05	.....	.....	.....	.....	2.20	.....	.....	0.76	0.54	.....	0.30	.....	.....
0.68	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
0.30	.....	.....	.....	.....	.....	.....	.....	0.90	.....	.....	.....	.....	.....	.....
1.61	0.57	1.04	0.6	1.36	0.18	4.45	..	0.90	0.84	1.58	0.14	1.00	0.21	0.35

in the same period.

2	1	1	1	.....	1	.....	.....	.....	.....	.....	.....	1	1	.....
.....	1	1	.....	1	.....	.....	.....	.....	.....	1	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	1	.....
1	1	.....	.....	1	1	.....	.....	.....	1	1	.....	1	.....	.....
2	1	.....	.....	.....	.....	1	.....	.....	1	1	.....	1	.....	.....
1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....
7	4	2	1	2	2	3	..	1	2	3	1	3	2	1

No. 2.

year in Calcutta, and their distances from the day of New Moon.

● *After New Moon.*

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1.61	9.57	1.04	0.60	1.36	0.18	4.45	..	0.90	0.84	1.58	0.14	1.00	0.21	0.35
2.08	4.03	3.40	9.98	7.87	8.36	6.72	4.81	3.91	1.10	7.26	1.39	5.02	1.50	5.34
3.38	1.60	2.58	0.59	4.10	5.24	0.98	4.80	2.56	3.86	2.71	0.50	0.66	4.43	1.46
3.52	7.11	6.83	12.62	5.53	9.47	8.13	6.31	7.51	6.61	12.68	11.07	11.98	9.64	6.43

in the same period.

7	4	2	1	2	2	3	.....	1	2	3	1	3	2	1
3	4	3	7	7	5	5	4	3	2	5	4	3	4	7
5	5	3	2	4	4	3	6	5	6	2	4	2	7	2
7	9	8	15	11	10	16	15	11	11	14	14	11	16	10

eye more readily. P. S: some incorrectness has since been discovered in the 4th

TABLE

Showing average height of Barometer at Calcutta,

Before New Moon.

Years.	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
1827, ..	824	813	807	786	783	782	777	779	769	779	780	759	769	802	807
1829, ..	795	773	767	769	770	775	777	769	745	732	748	736	751	734	
1830, ..	770	768	766	769	788	788	802	800	803	843	809	794	783	774	
1831, ..	782	751	744	756	757	744	753	754	751	753	746	761	748	759	
1832, ..	788	798	808	815	814	803	791	787	754	785	797	785	783	765	
Mean, ..	792	781	778	779	782	778	780	776	766	779	772	769	773	768	

TABLE

Showing average Dew-points at Calcutta, for the first and last quarters

1st and last quarters.

1827, ..	66.8	61.0	60.8	59.7	58.7	60.2	62.	62.6	57.5	59.7	60.8	60.2	59.0	59.5
1828, ..	61.2	61.4	60.9	62.5	63.3	64.9	59.6	60.4	61.1	61.4	60.9	60.7	59.9	60.7
1829, ..	63.1	61.9	62.3	63.7	62.4	61.8	61.8	63.2	63.5	65.7	64.6	62.0	63.7	64.1
1830, ..	62.5	63.7	62.9	63.9	61.1	61.8	61.9	61.8	64.3	64.7	65.0	64.8	66.7	65.0
1831, ..	60.3	60.3	60.3	60.2	62.4	62.5	64.5	65.3	66.1	65.2	64.1	65.7	65.2	63.9
1832, ..	61.7	60.5	61.	60.5	61.	39.9	60.1	58.6	61.0	62.2	59.8	59.8	58.4	59.8
1833, ..	66.5	67.1	66.5	64.6	61.7	65.7	65.	63.2	65.7	65.2	65.9	64.2	63.4	64.2
Mean, ..	63.1	62.3	62.1	62.1	61.5	62.4	62.1	62.1	62.7	63.4	63.0	62.5	62.3	62.5

TABLE

Showing quantity of Rain fallen near London, from Sept. 1819, to Sept. 1822,

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
1st 4 months,	0.73	1.25	2.47	2.91	0.97	1.54	2.51	4.92	2.23	2.02	1.48	1.16	1.86	3.61	2.43
Five summer months,	1.04	3.96	4.74	4.55	2.69	4.16	3.35	3.23	2.43	4.87	2.93	3.28	2.64	5.87	5.95
Last 3 months,	3.51	1.72	5.45	2.28	2.72	2.74	3.44	1.62	3.26	2.95	2.05	3.35	1.58	1.62	2.36

No. of Rainy Days in

1st 4 months,	4	11	15	14	9	11	14	14	14	15	14	14	13	17	14
Five summer months,	10	16	19	20	23	23	22	20	15	15	19	19	19	19	16
Last 3 months,	9	12	15	13	15	14	14	12	15	11	13	9	12	11	14

TABLE

Showing the most remarkable Storms and Falls of Rain that

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
1823, ..	.....	.....	.....	.....	.....	.....	.....	1	2	.....	.....	3	.....	.....	.....
1826, ..	.....	.....	.....	.....	16	.....	.....	7	8	.....	9	10	11	.....	.....
1827, ..	.....	21	.....	.....	.....	.....	20	.....	.....	.....	.....	.....	.....	.....	.....
1828, ..	.....	.....	.....	.....	.....	23	.....	.....	.....	.....	.....	.....	.....	.....	.....
1829, ..	.....	.....	.....	32	.....	.....	.....	.....	26	34	.....	.....	29	30	.....
1830, ..	.....	.....	.....	.....	41	.....	43	.....	.....	39	.....	.....	.....	35	40
1831, ..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	52	53	45
1832, ..	.....	54	.....	.....	.....	.....	.....	.....	.....	55	56	.....	59	.....	.....
1833, ..	.....	.....	.....	.....	.....	.....	.....	.....	66	.....	62	.....	.....	.....	.....

1. 2.68 in. rain, Sept. 25—2. 4.60 do. Sept. 26—3. 2.14 do. Aug. 2—4. 3.32 do. only months of 1829, of which the Registers are to be found)—7. 4.06 in. rain, May 9—13. 2.06 July 13—14. 4.48 June 15—15. 2.36 Aug. 4—16. 3.66 Sept. 20—17. 4.40 5.40 Sept. 20—23. 1.08 Jan. 6—24. 3.29 Oct. 14—25 3.04 Oct. 16—26. April 26, 1.4 wind—30. 6.29 June 28—31 2.25 July 5—32. 2.05 Aug. 16—33. 4.60 Sept. 29—29. 4.28 and do. May 25—32. 2.80 May 15—40. 2.15 June 19—38. 2.60 June 25—41. 2.20 288 June 13—47. 305 June 14—48. 285 June 18 49. 2.00 June 20—95. 252 July 8—48 and Nov. 1—54. 1.65 Feb. 11—35. 1.18 March 26—56. 1.32 March 27—57 2.65. Aug. 7—60. 165 and do. Oct. 8—61. 146 Nov. 1—6.200 May 15—63 May 21, 2.90 and hea- 13—67. 2.34 Dec. 21. Note—Where two numbers have been used in the same place

No. 3:

at sun-rise, on every day of the Moon's age.

After New Moon.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
794	779	779	757	759	758	754	751	781	769	777	789	806	810	816
750	737	750	758	761	741	805	783	788	808	794	787	812	807	785
779	758	754	768	739	713	768	773	802	781	789	784	784	776	784
772	782	779	787	794	790	800	785	785	786	786	802	809	823	816
756	749	752	752	753	757	759	776	779	790	794	789	777	772	785
770	761	763	764	761	752*	777	774	787	787	788	790	798	798	797

No. 4.

of the Year, with distance from New Moon (taken at sun-rise).

60.5	58.1	59.9	60.9	61.2	58.9	64.0	64.8	63.7	60.7	61.4	63.1	60.5	60.1	60.4
62.3	61.6	63.7	63.6	63.5	63.3	66.1	66.2	67.3	67.6	68.8	66.7	62.5	61.1	62.2
62.8	65.0	63.3	62.2	61.1	62.6	62.7	63.0	62.0	61.3	61.0	60.8	61.1	61.1	59.5
63.9	63.8	62.7	62.3	63.2	63.5	62.	61.7	60.6	63.4	61.5	62.2	62.5	61.9	63.1
62.6	63.7	61.4	62.6	62.5	61.1	62.2	62.4	62.9	64.1	67.2	65.9	64.4	65.7	62.5
58.4	58.7	59.5	59.8	61.8	58.5	58.9	57.5	60.9	60.2	58.	58.	59.1	59.3	59.1
64.0	67.0	65.6	64.3	62.1	63.6	62.6	64.	62.6	65.3	67.	68.	67.8	67.0	65.7
62.1	62.5	62.3	62.2	62.2	61.6	62.6	62.8	62.9	63.2	63.5	63.5	62.5	62.3	61.8

No. 5.

inclusive, and at Edinburgh, from beginning of 1824, to end of 1831.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
2.52	3.29	1.84	2.79	1.89	2.99	2.31	4.54	2.48	1.70	2.45	2.33	3.06	2.64	1.16
1.58	4.91	2.53	3.32	5.49	4.98	3.85	5.89	4.63	2.86	6.11	7.40	3.16	3.92	2.22
3.06	2.33	1.71	3.34	1.69	1.29	1.92	1.90	2.63	1.24	1.86	2.96	2.06	1.34	1.97

the same period.

12	16	13	12	12	15	11	12	13	12	12	16	18	17	9
19	22	16	16	19	23	22	23	27	16	25	23	19	19	18
15	12	12	13	5	10	11	12	14	11	9	14	10	14	9

No. 6.

have happened in Calcutta in the following years :

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
.....	15	.....	.....	.....	12	.....	.....	.....	13	4	5	6	.....	.....
22	.....	.....	.....	.....	17	18	.....	.....	25	.....	19	.....	.....	.....
.....	27	.....	33	.....	31	.....	.....	.....	.....	.....	.....	28	.....	.....
.....	.....	.....	37	38	36	42	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	46	47	51	44	.....	48	.....	49	.....	.....	.....	50
65	.....	63	64	.....	.....	.....	.....	61	.....	67	.....	57	58	60

Aug. 16.—5. 2.56 do. Aug. 17—6. 3.00 do. Aug. 18. (Note. Aug. and Sept. are the 28—8. 2.03 May 29—9. 2.16 June 30—10. 2.4 June 1—11. 2.26 July 1—12. 2.54 July 29—11. 3.72 June 30—19. 4.45 Aug. 3—20. 202 Aug. 13—21. 3.58 Sept. 6—22. and strong wind 27. 2.18 June 2—28. hurricane and 3.55 June 13—29. 27. violent 3.30 Oct. 22—35. 2.50 April 20—36. 2.00 April 28—37. 3.00 and storm May 25—38. July 8—42 3.90 July 26—43. 2.03 Sept. 7—14. 2.20 April 18—45. 2.00 June 9—36. 2.10 Aug. 16—50. 3.12 Sept. 20—51. 2.36 Oct. 11—52. 53. storm and rain, Oct. 31 6—58. 3.00 Aug. 9—59 2.97 Aug. 23—57. 1.71 and storm Oct. 6—58. 354 and do. Oct. vy storm, 64 May 22 5.34 and do.—65 July 17. 2.14 6.3 2.0 Aug. 17—66. 2.28 Oct. the last is referred to with a dot over it, thus 45.

VII.—On the Measurement of the *Ilahy Guz*, of the Emperor Akber.

By W. CRACROFT, Esq.

[In a letter to the Editor.]

In the determination of the *Ilahy Guz*, given in your useful tables with the June number of the Journal, I observe that Colonel HODGSON has deduced a length of 33.58 inches from the average measure of the marble slabs of the pavement of the Taj at Agra, and that other lengths which he has deduced from that building, vary from 32.54, to 35.8, a difference of 3.26 inches, or nearly one-tenth of the whole measure. Government having fixed 33 inches as an arbitrary value of the *Ilahy Guz*, it is no longer an object of importance in point of practice to seek further for its original length; it may still however be a matter of curiosity, and as that deduced from my own measures of the marble slabs of the Taj, and other parts of the building, (made at the Colonel's request in 1826,) differs from his very much, I send you the detail of my measurement, which you can publish whenever more interesting matter be not at hand. I made use of a surveyor's measuring tape, the error of which I ascertained by marking off lengths of a well executed 2-foot brass scale, by WATKINS, on the terrace of a verandah, with a fine black-lead pencil, carefully covering the pencil marks at each division by the assistance of a magnifying lens, and obtained the following, taken off with hair compasses and measured on the diagonal scale.

	feet.	error of tape.	ft.	error.	ft.	error.
At	56	0.93	58	1.00	60	1.00
	57	0.95	59	.95	65	

All my longest measures, from 44 to 49 slabs, being within these numbers of feet, the error has been assumed at one inch in 60 feet, or 1.720 part of the whole, and is additive, the tape being too long, and giving the lengths less than they really were.

Measures on the east side of the Taj,				South side of the Taj				
Direction North and South.				Direction East and West.				
	Slabs.	feet.	inches.		Slabs.	feet.	inches.	
	1	45	60	2.5	10	49	65	4.8
	2	45	60	1.5	11	49	64	1.8
	3	46	61	3.5	12	49	65	0.5
	4	44	58	7.3	13	49	65	0.2
	5	46	61	3.5	Direction N. and S.			
	Direction E. and W.			14	45	60	1.7	
	6	48	63	6.8	15	45	60	1.2
	7	48	63	8.2	16	45	60	2.0
	8	48	63	8.6	17	45	60	3.1
	9	49	65	2.9	18	45	60	1.2
In other parts of the pavements.								
	19	46	61	6.5	22	49	65	1.5
	20	49	65	0.6	23	49	65	2.0
	21	40	65	1.4	24	45	60	2.5

which give 1127 slabs, equal to feet 1501 00.8 in. of the tape; or adding its error, to 18036.8 inches, and the *Ilahy guz*, 32.012 inches.

To this length, however, it appears to me that a correction for the mortar should be applied, as it is more probable that the marble slabs were cut to half a guz, than laid down by that measure; and from various observations, I assume this quantity at 0.03 inch between each slab, or 0.06 inch. for the guz, leaving 31.952 inches for the deduced length. I am the more satisfied that this correction is necessary; from having observed in several places, larger slabs of marble laid down, with grooves cut in them to match the junctions of the small slabs, and at the end of all of which a space had been left and filled up with mortar, equivalent to the accumulated excess of length caused by the mortar between the slabs of half a guz, and proportional to their numbers. I measured some of the larger slabs, and found their lengths as follows:

	guz deduced from each stone	
	in.	in.
A stone of four guz, .....	128.4	32.2
A stone of two guz, .....	64.0	32.0
A square stone of 1 guz, .....	31.8	31.8
Another, .....	31.8	31.8

the average of the whole giving exactly 32.0 in the *Ilahy guz*.

Assuming then 32 inches to be a very near approximation to the real *Ilahy guz*, it is worthy of observation that almost every principal apartment, or part of the building, has been planned in an integral number of guz: thus each face of the inside of the principal octagon under the central dome is 24 feet = 288 inches, which is exactly equal to nine guz of 32 inches, and the north-east boorj on the river terrace is 16 feet in diameter = 192 inches = six guz of 32 inches. I am therefore of opinion, that the average length of the *Ilahy guz* was, at the time of the building of the Taj, as nearly as can be now ascertained, a minute fraction below 32 English inches.

The two first data, chosen by Mr. HALHED, viz. the measure of an average of barley-corns, or of Musoori pice, appear to me less liable than most others to error, and the mean of these is 31.93 inches. It is probable that the length 2460 barley corns, or 400 pice, divided by 10, would give a still nearer approximation.

[We think the argument deduced from the measurement of the apartments being integrals of the guz to be conclusive, for it is the native mode of laying down the ground plan of a building always to divide the paper off into squares of some unit of length:—See the plan of the Visvesvar Shiwala in PAINSLER'S Illustrations of Benares, first series. In that building the unit was also one guz, but it was the *maimares* guz, of about 26 inches, still commonly employed in the town. From similar measurements of other ancient buildings, Muhammedan and Hindu, might thus be obtained with tolerable accuracy the value of linear measures of different periods.—ED.]

## VIII.—Proceedings of the Asiatic Society.

Wednesday Evening, the 6th August, 1834.

The Reverend W. H. MILL, D. D. Vice-President, in the chair.

Monsieur FERDINAND RENAULD, proposed at the last Meeting, was elected a member of the Society.

Mr. M. LAERULETA, at his own request was allowed to withdraw from the Society.

Read a letter from H. T. PRINSEP, Esq. General Secretary to Government, returning thanks for the Meteorological Registers furnished in pursuance of the resolution of last Meeting.

Dr. J. TYTLER addressed the meeting in explanation of the delay which had occurred in the reply of the local committee of the Oriental Translation Fund to the reference of last April, regarding the publication of Mr. YATES's Nalodaya.

But two members of the original committee now remain in India, and the funds were lost by the failure of Messrs. MACKINTOSH and Co. It was out of their power therefore, to patronize the work to the extent that would be required for its publication in India: and the committee did not feel authorized to pledge the fund at home to adopt the work as one of its own series if printed in India, although such might probably be the event.

Mr. J. PRINSEP moved, seconded by the Vice-President, that the Asiatic Society should subscribe for fifty copies at 12 rupees, as suggested by the author.

Baboo RAM COMUL SEN, seconded by Mr. PRINSEP, moved as an amendment that twenty-five copies would be sufficient for the purposes of distribution to those Societies entitled to receive a copy of the Society's works. The amendment was carried by a majority of 2.

*Library.*

Read a letter from EDWARD T. BENNETT, Esq. Vice Secretary of the Zoological Society of London, forwarding a copy of their proceedings, April—December, 1832.

Read a letter from Raja KALIKISEN, forwarding on behalf of Nawab IQBAL-ODD DOWLUH BUHADDOOR, a copy of his work, called "Iqbal-e-furung, or British Prosperity," accompanied by a literal translation into the English.

Read a letter from NASMYTH MORRIESEN, Esq. W. S. presenting a copy of his work entitled "Hints on the Trisection of an Angle and the Duplication of the Cube in Elementary Geometry."

The second part of the *Christa Sangita*, by the Rev. W. H. MILL, D. D., published at the Bishop's College Press, was presented—by the Author.

Meteorological Register for June, 1834, by the Surveyor General.

Madras Journal of Literature and Science, No. 4, by the Madras Literary Society.

The Calcutta Medical Journal for July—by the Editors.

*Museum.*

An image of Buddha in fine preservation, dug up in the neighbourhood of Kabul, was presented in the name of Dr. J. G. GERARD, through the Hon'ble Sir C. T. METCALFE, V. P. &c.

A paper was read, drawn up by Munshi MOHUN LAL, who accompanied Dr. GERARD, explaining the circumstances of the discovery of this image, from which the following is an extract.

"South of the town of Kábul, two miles distant, a range of rugged and barren mountains commands the ruins of the ancient city, which shews nothing curious but a heap of dust mingled with stones and bricks. In the rainy season the poorer class of people rove about and search the place day and night, and their labours are rewarded by finding small silver and gold leaves bearing the figure of the sun and moon upon them; sometimes they possess themselves of cows and deers made of stone or copper of a very small size but beautiful form. While we remained at Kábul we employed our time in digging the antiquities and the graves of the old inhabitants of that country, which are said to be both Bactrians and Buddhist, but unfortunately none of the mausoleums favored us with any coin or writing by which we could prove the descent of the buried. However some of them contained earthen lamps full of small pieces of bones and also rotten pearls, which confirm the dead to have been idolators. The Hindoos both of the present and former days who believe in the multiplicity of Gods, maintain a peculiar custom of filling the mouth of their deceased with pearls and also with coins. All these monuments flourish at the skirt of the same hill which views the ruins of the ancient city.

On the 7th of November, 1833, we hurried down to the above place, and hired nine men to dig the earth till the day closed, but our labours were fruitless; from the 8th to the 19th of the same month, we continued our operations, and during which space the diggers were checked by a close work of lime structure. We told them to break through it, and after digging seven paces further, they opened in a large and beautiful roofed square; it must have remained long in such a state of preservation that one might suppose that it was freshly plastered with lime. The cell was handsomely gilt and coloured by lapislazuli, which is found in considerably quantities in the mines of Badakhshán, 12 days' journey from Kábul: such was the situation of the place where we found the stone image lying on the ground."

The figure represents Buddha in the usual sitting posture of tranquil repose, clothed to the neck in a thin flowing drapery; flames of sacred fire appear on his shoulders, and a circular glory surrounds the whole, serving as a field for the sculpture, for it is an alto relievo: upon the glory are carved two angels bearing chattas, and on each side a small group representing some acts of Buddha's life: in one he seems to be distributing charity, in the other he is receiving the homage of his worshippers.

We shall take an early opportunity of inserting a sketch of this sculpture, which is highly important from its apparent connection with the history of the Afghan topos.

A letter from Lieut. E. C. ARCHBOLD, Bengal Light Cavalry, dated Bombay, 5th July, 1834, announced that he had forwarded to the Secretary, as a present to the Society, an Egyptian mummy.

The mummy was obtained with some difficulty from the tombs of the kings at Gourvah. The native crew on board the ship which brought Lieut. A. from Mocha, having objected to receive the Mummy with his baggage, he had been under the necessity of requesting one of the officers of the Sloop of War Coete to bring it

onward to Bombay, whence it will be forwarded to Calcutta by the earliest opportunity.

Mr. TREVELYAN introduced Munshi MOHUN LAL to the Vice-President and Members, who proceeded to exhibit the articles brought to Calcutta by him, of which many were presents to the Society from Dr. GERARD.

The collection consisted of ancient coins; seeds of fruits, flowers and trees from Kábul; the sculpture already noticed; and specimens of the manufactures and natural productions of Afghanistan.

Among the coins were the usual variety of Indo-Scythic and Bactrian now so familiar to us: one very beautiful silver tetradrachm, of EUTHYDEMUS, attracted peculiar attention from its rich relief and exquisite workmanship. Several of the copper-moneys of APOLLODOTUS, MENANDER, the AGATHOCLES of Masson, HERMÆUS, KANERKOS, KADPHISES, &c. had very legible inscriptions. These coins had been procured in various places on their route through the agency of MOHUN LAL for Dr. GERARD, but he had unfortunately omitted to notice the localities in which each variety was most prevalent.

The box of seeds was made over on arrival, to Dr. WALLICH, who has examined them with care, and has selected a portion for transmission to the colony of Van-Dieman's Land, where they are likely to thrive and become a valuable acquisition, for the fruit of Kábul is proverbial for its excellence and variety.

The specimens of cloth, silk, carpet, chintz, of the countries passed through on the return of the travellers from Meshid to Kábul may be useful to the commercial community.

Extracts from the journal regularly kept by MOHUN LAL, in *English*, from the day he joined Lieut. BURNES's party were read. They evinced very respectable fluency in the English language, and a laudable and lively curiosity into the new objects and the manners of the people among whom he was travelling for the first time and at so early an age. A wish was expressed by some of the members present that he would publish his notes, scattered extracts of which have already appeared in the Delhi newspaper: we are sure that such an object would meet with general encouragement, and that this first fruit of English education in the mofussil would do credit to the pupil, and to his *Almamater* the Delhi Anglo-Indian College.

The best thanks of the Society, were voted to Dr. GERARD and to MOHUN LAL for these valuable contributions.

Read a letter from W. H. WATSEN, Esq. Persian Secretary to the Bombay Government, communicating a memoir on the Uzbek state of Kokan, (the ancient Ferghana) in central Asia; also the memoir of a Pilgrimage made by an Uzbek and his two sons from Kokan through Russia to Mecca, in the year 1620.

These interesting papers, relating to a state placed betwixt our Indian Empire, China, and the territories of Russia, will form a valuable sequel to the information derived from the expeditions of MOORCROFT, BURNES, and GERARD: we make no analysis; because they will be published at length, in a forthcoming No. of the Journal.

#### *Physical.*

A small collection of the principal fossil shells of the gault and greensand of Hythe was presented in the name of Captain JOHN FINNIS, on his return to India from furlough.

These shells are described in a small work by Professor FITTON, on the Geology of Hastings; he deduces from their presence the identity in time of this formation and the chalk: the collection contains the following shells:

<i>Sphæra corrugata</i> ,	Greenland,	<i>Inoceramus sulcatus</i> ,	Gault.
<i>Cyprina angulata</i> ,	do.	_____ concentricus,	do.
<i>Ostrea</i> _____,	do.	<i>Solarium</i> _____	do.
<i>Terebratula sella</i> ,	do.	<i>Nautilica umbilicata</i> ,	do.
_____ elegans,	do.	<i>Ammonites</i> _____,	do.
<i>Nucula pectinata</i> ,	do.	<i>Pentamerites</i> ,	do.
_____ ovalis,	do.	<i>Belemnites</i> ,	do.
<i>Serpula</i> _____,	do.	<i>Echinus antichites</i> , (chalk.)	
		_____ spatangus, (gravel.)	

A letter was read from Major BURNLEY, Resident at the Burmese Court, dated Rangoon, June 17th, accompanying an extensive collection of fossil bones from Yenang-young and the neighbouring hills in Ava, for the inspection and examination of the members of the Asiatic Society. Also a few in a separate package obtained by Captain McLEON, during his Mission up the Khyendwen river, (a fossil elephant's jaw and teeth.)

Major BURNLEY describes the mode in which this magnificent collection had been made by the natives at his instigation. "Every Burman, from the Governor to the peasant, strove to make the search after fossils a good speculation, and they were brought to me one by one to secure a more advantageous bargain. There was no digging for them: they were found lying on the very surface of the ground, sometimes only partially covered by the peculiar sandy and gravelly soil of that part of the country. Some of the fossil teeth will be observed to be injured: this proceeds from small bits having been chipped off by the Burmese to be used as medicine,—to be ground down with water and taken for the gravel."

The general nature of the Ava fossils has been so ably treated of in Professor BUCKLAND's memoir on the collection taken home by Mr. CRAWFORD, that nothing is wanting on this head: almost all the individuals noted by him may be recognized in the present series: which contains on a rough examination the following species:

- 2 jaws and several teeth of the fossil elephant.
- 7 jaws and teeth of mastodon, hippopotamus, &c.
- 8 fragments of alligators' jaws.
- 47 vertebrae of saurian reptiles.
- 170 fragments of the emys and trionyx shell.
- 1 humerus of the rhinoceros, and nearly
- 200 unclassified fragments of bone.

The Secretary noticed the safe arrival of the gigantic remains of the fossil elephant discovered by Dr. SPILSBURY in the banks of the Omar Nadi near Narsinghpur.

They had been dispatched from Jabalpur across the country to Benares, where Dr. Row had kindly taken charge of them until an opportunity offered for their secure conveyance to Calcutta under charge of Captain SAXENA. The five fragments, consisting of the extremities of two fossil femurs of a mammoth and the head of a buffalo, were placed on the table side by side of modern skeletons of the same nature, to exhibit the contrast more forcibly. Extracts from Dr. SPILSBURY's letters, and a note by the Secretary were read—also a memoir by Dr. SPILSBURY on a geological section which he has recently had an opportunity of making across the

valley of the Nerbudda from *Twadukkera* to *Bittou*, during which he discovered another locality of fossil deposit. It was accompanied by a map of the country.

This paper and the fossil notices shall be given if possible in our next number, to satisfy the great curiosity excited by the uncommon perfection of the specimens.

The geological specimens were accompanied by samples of the coal discovered by Captain QUAMBY, whose report of progress in examination of the strata was also read.

### IX.—Miscellanea.

#### 1.—Note on the Locality of *Rājagriha*, and Description of the Town of that Name in *Behar*, and of a Hot Spring in the neighbouring Hills.

*Rājagriha* was *JARASANDHA*'S capital city:—query—is it the *Rājagriha*, the capital of *Prāchi* proper, which was built by *PRITHU*, and taken by *BALARA'M*, brother of *KRISHNA*, or is the latter the same as *Rājmehal*? The present village of *Rājagriha*, or *Rājgr*, contains about 800 or 900 houses, and is situated about 13 or 14 miles S. S. W. of the town of *Behar*, on the north side of a range of hills of that name (*Rājgr*). A little way up a valley, south of the village, are a number of hot-springs, similar to that at *Monghr*. In the hottest spring the water stood at 108° in October, when the temperature of the atmosphere was about 70°. The water on a rough examination was found to contain a very minute portion of nitre, or a substance resembling it. These springs are considered sacred by the *Hindūs*. Farther up the valley expands into an open plain, surrounded by hills, about one and a half or two miles in diameter, where in several places the remains of the old city of *JARASANDHA* is pointed out. There is a tradition of a great battle having been fought there between the *Jains*, under *SREENIKA Mahārāja*, and *JARASANDHA*, or his successors; and a cave in the side of one of the hills, (similar in shape to those near *Gyāh*.) is pointed out as the place where one of the parties concealed all his treasure: tradition says, it is still to be found.

There is still an establishment of *Jains* in *Rājgr*: they have a number of small temples on the tops of the neighbouring hills, and at a place called *Pava Puri*, six or seven miles east from *Rājgr*, in the centre of a small lake, is one of some importance, which is visited by numerous *Jains* on their way to, and from, *Pārisadh*.

T. R.

#### 2.—Note on the Temperature of Wells at *Nāhan*.

With reference to the Rev. Mr. EVEREST'S Remarks on the Climate of the Fossil Elephant, (Art. III. January No.) the following observations relative to the temperature of *Nāhan*, may (in absence of better information) be useful.

November 7. Temperature of several springs issuing from the north-side of the hill, on which *Nāhan* is situated, 70½ to 71°; water exposed in *Boullis*, 64 to 69°. Observation taken in the evening.

	Open air shortly before sunrise.	Shade. 10 A. M.	3 P. M. shade.	Winds.
7	50°	62°	65	S. W. cloudy.
8	59	64	67°	S. W. 61½ shortly after sun-set.
9	56	64	65	W. 67° 2 P. M.
10	56		64	

From the localities of *Nalwa*, which is situated on a rocky hill, it seems improbable that wild elephants should be found there, since the *Kardak Dán* lies about 5 or 600 feet lower down, it is covered with the rank vegetation; here elephants are found.

Hyaenas are common at *Nalwa*, the number of which is between 50° and 58°; they are found in the mountains at elevations of 5 or 10,000 feet, their winter habitations I know not.

Has Mr. FLEMING explained in what manner we find such tropical plants in regions where such plants no longer thrive? LITTLE remarks, "We cannot suppose the leaves of tree ferns to be transported by water for thousands of miles without being injured." D. S.

### 3.—Fall of Fish.

On the 16th or 17th May last, a fall of fish happened in *moora Sonars*, pergunna *Dasta Eddilak*, zillah *Pattapur*. The residents of the village have furnished the following particulars, which are confirmed by other accounts. About noon, the wind being from the west, and a few distant clouds visible, a blast of high wind, accompanied with much dust, which changed the atmosphere to a reddish yellow hue, came on; the blast appeared to extend in breadth about 400 yards, chappars were carried off, and trees blown down. When the storm had passed over, they found the ground, south of the village, to the extent of two *bighas*, strewed with fish, in number not less than three or four thousand. The fish were all of the *Chajwa* species, (*Clupea cultrata*, Shakespear's Dictionary,) a span or less in length, and from one and a half to half a seer in weight. When found, they were all dead and dry. *Chajwa* fish are found in the tanks and rivers in the neighbourhood. The nearest tank in which there is water is about half a mile south of the village. The *Junna* runs about three miles south of the village, the *Ganges* 14 miles N. by E. The fish were not eaten, it is said, that in the pan they turned into blood! S.

*Allahabad, June 26, 1834.*

### 4.—Transactions of the Batavian Society, Vol. XIV.

[We have given an analysis of the 13th volume of this rapidly increasing collection, in vol. II. page 357.]

The contents of the 14th volume are, "Historical Review of the Proceedings of the Europeans at Japan, by G. E. MEYLAN, chief of the Netherland trade at Japan." Also a "Treatise on Acupuncture, by Dr. VON SIEBOLD."

The whole of the 15th volume is a Grammar of the Java language, by the late Mr. COHN DE GROET, published at Batavia by Mr. GEBLICKS, Director of the Java Institution at *Soerakarta*.

### 5.—Protection of Tinned Sheet Iron from Rust.

Sergeant DODD, late overseer of the *Junna* works, constructed a buoy of tin, which he painted with two coats of white lead; he then gave it a coat of hog's lard, about the thickness of a coat of paint, and laid over this latter, another coat of paint each coat was allowed to dry thoroughly. The buoy was then placed in the river, so as to remain continually under water all the rains, or nearly a year. When taken up, the experiment was found to have succeeded completely. [Had the water penetrated to the tin, a galvanic action would have caused a rapid corrosion of the iron. If the iron however were carefully coated on the edges and joints, the tin would form a perfect protection, without the aid of paint or grease.] A.

*Meteorological Register, kept at the Assay Office, Calcutta, for the Month of July, 1834.*

Days of the Month	Barometer reduced to 32° Fahr.				Thermometer in the Air.				Depression of Moist-barb Thermometer.				State of Hygrometer.	Winds.	Weather.	
	At 4 A.M.	At 10 A.M.	At 4 P.M.	At 10 P.M.	At 4 A.M.	Max. by Reg. Ther.	At 4 P.M.	At 10 P.M.	At 4 A.M.	At 4 P.M.	At 10 P.M.	At 10 A.M.				At 4 P.M.
1	30.0	30.0	30.0	30.0	85.0	85.0	85.0	85.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	30.0	30.0	30.0	30.0	85.0	85.0	85.0	85.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	30.0	30.0	30.0	30.0	85.0	85.0	85.0	85.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	30.0	30.0	30.0	30.0	85.0	85.0	85.0	85.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	30.0	30.0	30.0	30.0	85.0	85.0	85.0	85.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	30.0	30.0	30.0	30.0	85.0	85.0	85.0	85.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	30.0	30.0	30.0	30.0	85.0	85.0	85.0	85.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	30.0	30.0	30.0	30.0	85.0	85.0	85.0	85.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	30.0	30.0	30.0	30.0	85.0	85.0	85.0	85.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	30.0	30.0	30.0	30.0	85.0	85.0	85.0	85.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	30.0	30.0	30.0	30.0	85.0	85.0	85.0	85.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	30.0	30.0	30.0	30.0	85.0	85.0	85.0	85.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13	30.0	30.0	30.0	30.0	85.0	85.0	85.0	85.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14	30.0	30.0	30.0	30.0	85.0	85.0	85.0	85.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15	30.0	30.0	30.0	30.0	85.0	85.0	85.0	85.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16	30.0	30.0	30.0	30.0	85.0	85.0	85.0	85.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17	30.0	30.0	30.0	30.0	85.0	85.0	85.0	85.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18	30.0	30.0	30.0	30.0	85.0	85.0	85.0	85.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19	30.0	30.0	30.0	30.0	85.0	85.0	85.0	85.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20	30.0	30.0	30.0	30.0	85.0	85.0	85.0	85.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21	30.0	30.0	30.0	30.0	85.0	85.0	85.0	85.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22	30.0	30.0	30.0	30.0	85.0	85.0	85.0	85.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
23	30.0	30.0	30.0	30.0	85.0	85.0	85.0	85.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24	30.0	30.0	30.0	30.0	85.0	85.0	85.0	85.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25	30.0	30.0	30.0	30.0	85.0	85.0	85.0	85.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26	30.0	30.0	30.0	30.0	85.0	85.0	85.0	85.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
27	30.0	30.0	30.0	30.0	85.0	85.0	85.0	85.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
28	30.0	30.0	30.0	30.0	85.0	85.0	85.0	85.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
29	30.0	30.0	30.0	30.0	85.0	85.0	85.0	85.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30	30.0	30.0	30.0	30.0	85.0	85.0	85.0	85.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mean	30.540	30.530	30.540	30.530	85.5	85.5	85.5	85.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5

There was a smart shock of an earthquake felt in Nepal on the 11th instant, at 9h. 40m P M The same was experienced at Mungair at 10h. 30m. P. M. It was not observed at Calcutta.  
 The Smead's Barometer, announced at the foot of the last Journal as just arrived per Neptune, was found, on opening the case, to be broken. The ordinary checks, and the necessary had escaped.

# JOURNAL

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- I.—*Memoir on the U'sbek State of Kokan, properly called Khokend, (the Ancient Ferghana,) in Central Asia. By W. H. WATSON, Esq. Persian Secretary to the Bombay Government, &c.*

[Read at the Meeting of the 6th August.]

DURING the last few years, circumstances have taken place which have caused the Muhammedan inhabitants of Central Asia, and even of Chinese Tartary, to prefer, in performing their pilgrimage to Mecca, the circuitous route of Bokhára or Samarkand, Kúndúz, Tansh Kurgáún, Balkh, Kábul, Kandahar, and Kelautí-Nasír, and Bela, to Somniany, whence they pass in boats to Bombay, and from the latter port to Judda, to either the road through Russia round the Caspian viá Astrakhan, or the more direct one through Persia.

The causes which have led to this change of their accustomed route, which was through Russia, are said to be—first, some misunderstanding betwixt the Cossac tribes, under the influence of Russia, and those of the Kokan prince, in consequence of which, the Russian government is said to have stopped the communication through its territory. With regard to Persia, the bigotted feelings of its inhabitants, who are Shiáhs, against the Tartars, who are of the opposite sect of the Sunís, has long deprived the pilgrims from Tartary of all access to its territory, so that there remains no other way of performing the pilgrimage except through the Afghan provinces.

These circumstances have led to the resort of pilgrims to Bombay, from countries situate in the very heart of Asia. I calculate that within the last two years, at least three hundred zealots of this description have arrived at Bombay from the cities of Bokhára, Samarkand,

Kokan, and Yárkend. Among those who arrived during the present year, 1834, was a noble of high rank of Kokan; his name was КНОЈА БЕНÁДУР КНÁН, who held the title of КНУ'Ш БЭ'ГИ, and was prime minister to the prince of that country; his son, said to be foster-brother to the same prince, and a suite of about twenty followers, accompanied him.

On my hearing of the arrival of these illustrious strangers, I took the first opportunity of forming an acquaintance with them, with the view of obtaining information respecting the state of things in a country so little known\* to Europeans, and I collected the following particulars.

In the first place, I shall endeavour to describe the geographical situation of this country, as well as the information received will enable me.

The principality of Kokan appears to be situated between the parallels of from thirty-nine degrees to fifty-five degrees of north latitude, and to extend from the sixty-fifth to the seventy-fifth degree of east longitude.

On the east, it is bounded by the country of Káshgar, in Chinese Tartary, the river Oxus or Amú is its limit; to the south-east, Badakhshan, Kaviategín, and Derwáz; west, it is bounded by the Bokhára territory; and north and north-west, by Russian Tartary, and the Steppes occupied by the roving Cossacs, under the influence of Russia.

This country, with the exception of the Steppes adjoining the Russian frontiers, and the sandy deserts lying betwixt it and the Bokhára territory, is said to be very populous and fertile, and being watered by many streams and rivers, which have their source in the Ulugh Tágh, and other mountains, and which mostly flow into the Sir or Sihún, the ancient Jaxartes, all the fruits of temperate climates are produced in great abundance, especially apples. The melons are very superior. Barley and wheat are also raised, the former in great quantity.

A few words will suffice to give the history of this country:—Tradition states it to have been under the rule of АФРÁСИÁБ, king of Turán, whose wars with the Persians are commemorated in the Sháh-náma of FIRDÓUSI. The present city of Turkistán is said to have been his capital. It was overrun by the Arabs in the third century of the Hijra. Subsequently the Sultáns of the Samání dynasty annexed it to their empire. It then fell, in the thirteenth century, with the rest of Asia, to the conquering armies of CHENGÍZ КНÁН†; afterwards, on the

\* It has not been visited by Europeans, I believe, since the 14th century.

† On the death of CHENGÍZ, it became the portion of his eldest son JA'GHATA'I, or CHAGHATAIR.

decline and division of the Mongol Empire, under his successors, it was conquered by the famous AMÍR TIMU'Z, who bequeathed it to one of his sons: from whom it descended to the famous BÁBER, who reigned at the city called at present Andeján, but which was formerly called Almáj, or "The Place of Apples," from the number of orchards of apple trees, by which it was surrounded. Shortly after the accession of BÁBER, about 1520\*, the U'sbek Tartars were forced by the rising power of the Russians to abandon the southern parts of Siberia, &c., which had formed part of the Tartar kingdom of Kiptchak; on their way southward, under the command of their leader SHUBÁNÍ KHÁN, they overran all the states of Central Asia, Bokhára, Samarkand, &c., and after a brave resistance, BÁBER, among the rest of the princes of that country, was obliged to abandon his patrimonial kingdom, and fly to Kábul, where he fixed his government, and whence having concentrated his forces, he invaded India, took Delhi in 1526, and there established the present Moghul dynasty; ever since the flight of BÁBER, the country of Kokan has been governed by U'sbek princes, who trace their descent from CHENGÍZ KHÁN, and who transferred the capital from Andeján to Kokan.

The state of Kokan consists of eight extensive governments, each deriving its name from its chief town; these are—to the south-west of the city of Kokan the fortified town of Urutippa, and its dependent district; to the west, the ancient city and dependancy of Kojend on the Sihun or Jaxartes; to the south-east, the districts of Uch and Marghílan; to the north-east, Nemengán and Andeján: to north and north-west, the cities of Táshkend and Turkistán, with their districts: these with Kokan form together eight distinct governments.

The districts of Táshkend was till lately under a separate chief, who was a Syed called YONÍS KHOJEN†, but has been taken from his sons by the present KHÁN of Kokan.

The governors of all these provinces are appointed and removed by the KHÁN, or king, at pleasure; they are all military commanders, and generally hold the rank of Ming-Báshís, or commander of one thousand horse. The king is not, as in Persia, dependent for support on the warlike tribes, but keeps up a standing army of cavalry, which is supported by an allowance of grain and forage from the districts in which they

\* They are called U'sbek from a descendant of CHENGÍZ KHÁN, who was the head of the golden horde, and so beloved, that they adopted his name. In like manner the Noghái Tartars have obtained their peculiar appellation; they belonged to the Great Horde.

† Khojeh is a title given by the Tartars to Syeds, as Sherif in Turkey, and Meer and Shah in India.

are stationed, besides a small amount of pay. The use of infantry is unknown. The KHÁN is said in cases of emergency to be able to bring 50,000 horse into the field.

Most of the inhabitants of this kingdom, with the exception of the Cossac hordes, on the borders of Russia and the Karghiz, towards Káshgar, are U'sbeks, who cultivate the ground themselves. In some parts there are Tájiks\*, or people of Persian extraction, who speak that language, and are as serfs to the U'sbek lords, whose estates they cultivate.

Kokan, the capital, is said to be a very large and populous city, it is not surrounded by a wall; its population is reported to exceed that of Bokhára, and it is said to contain one hundred colleges and five hundred mosques†; the number of its inhabitants is rated at 100,000; it has many beautiful orchards, and is situated upon two small rivers, called the Aksái and the Kárásái, which fall into the Sihun or Jaxartes, near Kojend. It contains a large colony of Jews; about twenty Hindus, and many Cashmerians; no Armenians; but there are some Noghai Tartars from Russia, especially one, who is a watch-maker.

The Ulema, or literati, are well read in the Persian classics, and the Persian language is spoken with nearly the same accent as by the Afgháns; the dialect differs much from that now used in Persia, and more resembles that of the 16th century. Many Turki compositions are also read and admired; the Turki spoken in this country, is what is called the Jágghatái‡, and differs much from the Turki of Constantinople, which however derives its origin from it.

The climate seems to verge on extremes:—in the winter, great cold prevails, and much snow falls; in the summer again the heat is oppressive.

The natives are as bigotted Muhammedans as those of Bokhára. A mohtesib goes round and bastinadoes any one caught smoking tobacco.

\* The word Tájik was first used to distinguish those who had been subject to the Arab rule in contradistinction to the invading Turks.

† I suspect my informant of some exaggeration here.

‡ The Jágghatái Turki is the language of Central Asia, from the river Ural to the Oxus, and from the Caspian to Yarkend, (in many of the cities however Persian is generally spoken and understood;) this refined dialect of the ancient Turki was called Jaghatai, from having been much polished and refined during the reign of JAGHA'TA'I KHA'N, the son of CHENGÍZ. From this language is derived the language of the Turki of Constantinople, of the Turkmans, and of the Elluat of Turkish origin in Persia, though these dialects differ considerably now from the mother tongue, and in the Usmalú Turki, so much Arabic and Persian has been introduced as to render this language very difficult to be understood by the natives of Tartary.

Wine and dancing women are most strictly prohibited. They are of the Suní sect, and follow the observances of **ABU HANIFEH**; they detest Shíahs, and call them worshippers of **ALI**. Much smoking and drinking of kimmiz\* privately does take place. Horset† flesh is considered a great luxury, and often sold in the bazars.

The present **KHÁN** or king (for **KHÁN** is considered a very high title in Tartary) is named **MAHOMED ALI**: his father was **OMÁR KHÁN**; his uncle, who reigned conjointly with his father, was named **A'LIM KHÁN**; their father was **NAUR BUTEH KHÁN**, whose grand-father was **SHURUGH BE'G**, who claimed his descent from **CHENGÍZ KHÁN**. The present **KHÁN** succeeded on his father's death, which happened about twelve years ago.

I shall now attempt to portray the political relation in which this state stands with reference to its neighbours, and give an account of them;—and first of Chinese Tartary. That part which is contiguous to Kokan is the government of **Káshgar**, which has under it the provinces of **Yárkend**, **Khoten**, **Auksú**, and **Turfán**, (called by the Chinese **Sining**;) these are all Muhammedan countries, which became subject to China in 1759, in the reign of the Emperor† **KIENLUNG**. Hostilities existed some years ago betwixt Kokan and China, but after a war of some continuance, the cause of which I shall hereafter explain, peace was concluded betwixt the **KHÁN** and the Chinese, and is likely to be permanent.

South of the **KHÁN's** territory is the extensive and mountainous country of **Karrategin**, until of late ruled by sovereigns universally believed by the tradition of the country to be descended from **ALEXANDER THE GREAT**. On the death of the last Shah, or king, his sons disputed and fought amongst themselves for the succession, and in consequence, their kingdom fell an easy prey to the king of **Derwáz**, a **Tájik** prince, and is still under his rule: these unfortunate descendants of **ALEXANDER** are said by my informants to be wandering about in poverty, and subsisting on the charity of the surrounding princes. Several were at Kokan, and others at **Bokhára**.

**Badakhshán**, and the countries of **Kundúz**, **Tash-kurghan**, and **Balkh** are under a powerful **U'sbek** chief called **MURÁD ALI BE'G**, who lately acquired **Balkh**, &c. from the sons of **KILICH ALI KHÁN**. With these states and the **KHÁN** of Kokan a good understanding exists.

\* A spirituous liquor made from mare's milk.

† Horses having any defect, disabling them from work, are fattened for this purpose.

‡ The same Emperor to whose court **LORD MACARTNEY** went as Ambassador.

BEHÁDUR KHÁN, son of MURÁD BE'á, is the reigning prince of Bokhára and Samarkand, and their dependencies; the last named city is at present much reduced in both size and population: there are several magnificent remains of the buildings erected by the famous TIMU'R, and there is among the rest, a block of blue marble or jasper called the *Kúk-Tárish*, formerly used as a throne by the Tartar emperors, and said to have been brought by TIMU'R from one of CHENGÍZ KHÁN'S palaces in Mongol Tartary\*, which to this day is an object of great importance to the Chinese, who wish to take it to China from some superstitious ideas they connect with it, and the prosperity of the present Mantchu dynasty.

The present KHÁN of Kokan is on terms of amity with the sovereign of Bokhára.

The part of the Russian Empire which touches on this territory is dependent on the government of Orenburg and Tomsk. The boundary of the two states is defined by the river called by the U'sbeks the *Kúk-Sú*, or blue river, probably the Irtysh.

The political relations of this state with Russia are as follows:

Much uncertainty having prevailed respecting the limits of the two nations, and disputes having constantly occurred, owing to the Cossac hordes of the one encroaching upon the Steppes occupied by those of the other, and vice versá, about six or seven years ago envoys were deputed by Russia to the KHÁN of Kokan, to fix the limits definitively; these envoys came from Orenburg, and brought with them as presents from the emperor, (whom the U'sbeks call the *AUK KHÁN*, or White King,) several mirrors of very large dimensions, a musical clock, and guns and pistols. After some negociation, it was settled that the river called the *Kúk-Sú*, or blue river, should be the boundary between the two states, the Cossac hordes of Russia keeping to the north of it, and those of either state not to pass that river to the south or north. Beacons also were erected along the line of frontier. My informants said, however, that within the last three years the Russians have encroached upon those limits, and erected forts to the south of the river. The KHÁN on this account lately deputed an envoy to St. Petersburg, with an elephant and some Chinese slaves, as a present to His Czarish Majesty, of whose

\* The following is an account of this wonderful block of marble or jasper, as given by BA'ÁRA in his memoirs:—"Towards the hill of Kohik, there is a small garden, wherein is an open hall, within which is a large throne of a single block of blue jasper, about 28 or 30 feet long, and 10 or 16 broad, and 2 in height. This throne was said to have been brought from Chinese Tartary, probably from one of CHENGÍZ KHÁN'S Urdús."

arrival however no news had been received, when my informants left their country about a year ago.

With respect to the other great empire, China, which lies to the eastward of this country, a good understanding seems to have existed for many years between the two governments, until a circumstance occurred about seven or eight years ago, which led to hostilities; this was the rebellion of **JEHÁNGÍR KHOJA** of **Káshgar**: this person, who laid claim to the sovereignty of that country, and whose ancestors are said previous to the Chinese conquest to have held the chief authority there, having been worsted in some encounter with the Chinese, was compelled to fly the country, and take refuge with the roving hordes of Kirghiz subject to the **Khán**, and subsequently fell into the hands of **MUHAMMED ALI**, who kept him under honorable restraint at his capital. **JEHÁNGÍR** having however effected his escape, made his way again to the Kirghiz encampments, and having prevailed on them to join him, invaded the Chinese territory. The sovereign of **Kokan** also being irritated at the bad treatment shewn to the Muhammedan subjects of **Tartary** by the Chinese authorities, advanced with his troops on **Káshgar**; surprized the Chinese general in his cantonment near that place, and cut up the Chinese army. The **KHOJA** also got possession of the city and fort of **Káshgar**; subsequently the **KHA'N**'s cavalry over-ran the whole of Chinese **Tartary**, and got possession\* of **Yárkend**, **Auksú**, and **Khoten**. **JEHÁNGÍR KHOJA** however becoming jealous of the **KHA'N**, and suspicious of treachery, drew off his troops in a northerly direction, and a large Chinese force advancing, **MUHAMMED ALI** withdrew to his own country. The rebel was eventually seized by the Chinese, sent to the emperor, and cut to pieces in his presence. An envoy was then sent from **Pekin**, (which the **U'sbeks** call **Baujin**.) to negotiate peace, which was made on condition of the Muhammedans at **Káshgar** being subjected to the rule of a deputy of the **KHÁN** in all matters of religion, the **KHA'N** being allowed a share in the transit duties, and binding himself to keep the Kirghiz in subjection, and to assist the Chinese in case of any insurrection in Chinese **Tartary** in future; ever since which time, the two governments have been on the best terms, and a reciprocal interchange of presents takes place. The present Chinese Governor of **Káshgar** is a Muhammedan, called **YUNIS WANG**. The Chinese are said to keep a force of about twenty thousand infantry in their Muhammedan dependencies in **Tartary**, of which ten thousand are stationed at **Káshgar**. The Chinese troops are said to be stationed in separate cantonments, which the **U'sbeks** term **Gulbághs**, outside of the towns. One of my informants had been at **Káshgar**, **Yárkend**, and

\* The **KHA'N** has hence taken the title of **GHAZI** or Victorious over infidels.

Khoten, with the KHÁN'S army; he describes Yárkend as a very beautiful large city, much like Bombay, and abounding in dancing girls, musicians, &c. They made slaves of all the Chinese they took prisoners.

The Chinese viceroy resides at Káshgar; he is generally a Mantchu\* (Mantchu Tartar) appointed from Peking, as are the governors of Turfán, Auksú, Yárkend, and Khoten; they are all however subject to the Urganh Wang, or viceroy. These countries have been subject to China about seventy-five years. The distance from Káshgar to Peking is estimated as two months' journey of a caravan. All these cities contain a considerable population of Chinese colonists, besides the original Muhammedan inhabitants.

The Jágathái Turki is principally spoken; but Mantchu and Chinese are also prevalent.

*On the Commercial Intercourse between Kokan and the  
neighbouring states.*

Free intercourse is allowed by the Chinese government to subjects of Kokan resorting to Káshgar and the other Muhammedan dependencies of that empire, for purposes of commerce. Religious mendicants are also admitted; this permission is however solely extended to those countries. No one of whatever denomination would be allowed to enter China Proper under any pretence whatever, even in case of an embassy: it is necessary for application to be made to the Viceroy YUNIS WANG, at Káshgar, and no one is allowed to proceed until an order be received from Peking.

The trade between the two countries is conducted as follows: caravans come from Southern China by way of Khoten to Yárkend and thence to Káshgar; they bring tea glued together, and formed into the shape and consistency of unbaked bricks; silk piece goods, satin, porcelain, and various other articles. Tea, however, is the principal article of import: its consumption being general throughout Central Asia, where it is made much in the same way as in Europe, excepting that butter or fat is mixed with it. The merchandize is carried chiefly on horses, from thirty to forty bricks of tea form a load for a horse. From Káshgar the U'sbek merchants bring them to Kokan, whence they are exported on camels to Bokhára. The returns are said to be made in shawls, European articles, raw silk, horses, &c. No direct intercourse exists betwixt Kokan and India, owing to the jealousy of the Chinese government. The passage through Tibet to Cashmere, &c. is interdicted. Shawls and other Indian articles are brought by the circuitous route of Kábul, Balkh, and Bokhára.

\* Many are Muhammedans.

The trade with Russia is carried on by means of caravans: the Kokan merchants meet those of Bokhára at Tashkhend, and forming one body, they proceed viâ Turkistan through the Steppes occupied by the Cossacs, part to Omsk, and part to Orenburg. The productions of China, raw silk, camlets, and cotton yarn, are taken to Russia, and the returns are made in furs, gun barrels, and locks, cutlery, Russian leather, and other Russian manufactures. The currency of Kokan consists of gold tillas, equal to about eight rupees in value, and a small silver coin, called a tunkha, nearly equivalent to half a rupee.

The Usbeks who came to Bombay were quite ignorant of the English name and government. The only Feringis they had any idea of were the Russians. On being asked what nation they supposed was the sovereign of Hindustán, they said they thought it was like Kábul and Kandahar, under some Mussulman government; they expressed great horror at the Sikhs not allowing the Muhammedan religion to be publicly performed in the Panjáb. They had first of all intended to go to Delhi, and thence to Calcutta, but this circumstance prevented them. They had strong letters of recommendation from DOST MUHAMMED of Kábul to SULTAN MUHAMMED KHAN of Peshawar, &c. They were generally liberal and well-informed. The young man had read most of the Persian classics, and spoke Persian very well. They were much astonished at every thing they saw at Bombay, which they compared to the Chinese city of Yarkend. I took them a trip in the small steamer, which they considered as the work of magic, nor could I explain the effects of steam so as to remove that idea. His Majesty's ship *Melville*, being in the harbour, I carried them on board her. At first they could not be persuaded that it was a ship: they thought it was a wooden fortress, erected on the bottom of the sea, by some extraordinary power. Subsequently, however, when they found she actually floated, they were more astonished at what they called the great boat, for they had no word to express a ship in their language, nor had they even seen any thing larger than the ferry boats on the Oxus, and the country vessels in which they came to Bombay. Different from most Asiatics, they shewed a great deal of curiosity, and examined every thing narrowly: they measured the ship by the number of paces they took, and the cannon ball by its apparent weight; but what astonished them most of all was the firing cannon with a lock like that of a gun, and ignition as produced by a percussion tube. A native having illuminated his house with gas, I took them to see it: here again they could not account for such an effect, except as produced by magic; they frequently expressed a wish that some Englishman would come to their country, and professed their readiness to assist him in penetrating even into Chinese Tartary; but they said that it would be next to impossible to enter China proper:



II.—*Note of a Pilgrimage undertaken by an Usbek and his two Sons from Khokend or Kokan, in Tartary, through Russia, &c. to Mecca. Obtained in conversation with the parties, by W. H. WATSEN, Esq. &c.*

About fourteen years ago, A. D. 1820. our father had a house and small estate in the city of Kokan: this he sold for four hundred gold pieces, (a tila of Kokan is equal to about eight rupees,) or rather more than three thousand rupees, and having determined to abandon worldly cares, and commence a religious life, he took leave of all his friends and relations, and proceeded on a journey, with the view of performing a pilgrimage to the sacred cities of Mecca and Medina. We went from Kokan to Táshkend, which is eight days journey of a caravan: this is a large city, enclosed with a wall, and had been lately taken by our king from YUNIS KHOJA'S sons; their father had held it as a fief from our government. At Táshkend we waited some days, until the caravan for Russia took its departure: the caravan consisted of about 50 or 60 persons, mostly Bokhára and Táshkend people. From Táshkend we then proceeded to a fortified town, called Turkistán, of rather smaller consequence than Táshkend. Leaving this city, we arrived in about ten days at a small place named Sozák. After this, we saw no more fixed habitations, until we had entered the Russian territory. The country consisted of immense Steppes of pasture land, the grass growing to a prodigious height, and it was occupied by hordes of Kuzzáks, who dwelt in small black tents, and ranged about from place to place. After passing through the hordes of Kuzzáks subject to our sovereign, we arrived at the river called the Kúk-Sú, and on crossing it found the country occupied by Kuzzáks, dependent on the Russian king, (Ak Padshah, or White King.) We then arrived at a small place called Shumí: here the Russians collected a toll from the people of the caravan; but on being told we were pilgrims, they left us alone: the caravan dispersed at Shumí. We staid at this town two months, and lodged with a Nogai Tartar. We were two months on our journey from Tashkend to the Russian territory. We hired three kibitkas from the Nogais, and went in fifteen days to Omsk, which is a large fortified town. The Russian soldiers, dressed like yours, stopped us at the gates, but on being told we were pilgrims, allowed us to pass. We staid ten days there with a Nogai. We got a passport in the Russian language, from a great man, whom they called General; he had long festoons of gold hanging from his shoulders, and was dressed in black (dark-green). We left Omsk, and after passing through many places, the names of which we do not remember, we arrived at a very large and ancient city, called Kazán. We were allowed to pass at the gates on shewing the passport we had obtained at Omsk. We travel-

led in kibitkas, or carriages drawn by one horse. We staid four months at Kazán, during which was the month of Ramazan; we lived with a Nogai Tartar. We resolved to go by water thence to Astrakhán, (the journey by land takes forty days.) At about one hour's distance from Kazán, we came to a large river\*, and we embarked with several other merchants, Tartars, and Russians, on board a large boat about the size of a patéla; the owner of the boat was a Russian. About half way to Astrakhan, on the right bank of the river, our boat came to anchor off a large town named Sarat, where we staid six days: this town is smaller and more modern than Kazán. We then embarked, and arrived at Astrakhan in about forty-four days after leaving Kazán. We were stopped at the gates by the guard; after examining our passport, they let us pass; they were dressed like your people, except that their clothes were black (meaning dark-green). We staid one month with a Nogai there, as it was winter, and the country difficult to travel, owing to the snow and ice. After this, we hired kibitkas, and in twenty days arrived at a town where the Sultan of the Nogais resides. We cannot correctly recollect the name of the place, but it was something like Evel. Three days journey from thence, we met with a river or branch of the sea, where was a Russian fort, with a small detachment of military; our passport was again looked at. We then crossed over and came to a desert of one day's journey in the carriages aforesaid; after which, we reached a village of the Cherkes (Circassians): they gave us a guide who brought us to a Muhammedan village, whence we went with a caravan to Hunufa (Hanapa). We had now entered the Roman (Turkish) territories. After a stay of ten days at that place, we took ship, and arrived safely at Rúm (Constantinople); here we hired a house for three or four rupees per month, staid in that city four months, and passed over in a boat to Eskudari. We here purchased horses, and proceeded on horseback through many villages and towns until after forty or fifty days, we arrived at Shám (Damascus). We hired a house in this city, where we staid some time. We wished to visit Jerusalem, but the country was in such a disturbed state, that we could not go for fear of the plundering Arabs. We then travelled to a town called Ghaza, and thence to Elarish, whence we went in twenty-five days to Cairo, the capital of Egypt; here we hired a house and remained three months. We then left for Suez, which port we reached on camels in four days; here we embarked on board a vessel, and arrived at Judda in seventeen days. We put on the dress of pilgrims on board ship four days before we arrived at Judda. We reached Mecca in two days on camels; arrived there in the month of Ramzán. We hired a house there at four dollars

\* The Volga.

per mensem, and after the pilgrimage was performed, we went with a caravan to Medina, where we arrived in twelve days. From Medina we came to Yambo, a sea-port; thence we took ship to Cossier, thence in four days we reached Kenneh; we then dropped down the Nile to Cairo, whence we went to Alexandria; there we took ship, and sailed to a place called Adania; we thence journeyed to a town called Katahia, thence to Bursa, then to another town called Adania, Scutari, and Rúm. At Constantinople we were directed by the Scutan's minister to apply to the Russian ambassador for another passport. We took ship and arrived at Taridska\*. Here we saw a large Russian fort. Thence we came to Astrakhan, from which place we proceeded round the head of the Caspian to the city of Orenbourg; thence we went to a place called Kezziljer, the last town in the Russian territories. About twelve or thirteen days after passing through the hordes of wandering Kuzzáks, we crossed the Kúk-Sú river, and happily re-entered our prince's territory. On both sides this river are hordes of roving Kuzzáks; those to the north are under Russia, to the south under our king. The river is very broad, and at times very full of water; its current is very strong. We arrived after thirty days on camels at Sozák; hence we bent our steps to Turkistan, Tashkend, and Kokan. When we arrived, the KHÁN, our king, had just returned from his campaign in Chinese Tartary; whither he had gone to assist JEHANGÍR KHOJA WANG. JEHANGÍR KHOJA was no rebel, as treated by the Chinese. His ancestors were the sovereigns of the country before the Chinese conquered it, that is of Kashgar. Our prince in some degree failed in his expedition against the Chinese; this was owing to JEHANGÍR KHOJA's not joining him cordially. Our prince could not infuse confidence into his mind, and JEHANGÍR wanted to conquer the country for himself. The consequence of that campaign, however, was that the Chinese agreed to our king's supremacy over their Muhammedan subjects; on the other hand, he is to keep the country in order, and be responsible for the Kirghiz and Muhammedan population. After our return, our father waited on the SHEKH-UL ISLAM, who paid him great attention, as did all the ulema, and people in general; but his other four sons died, on which he set out with us and our mother on a second pilgrimage, both our parents being determined to leave their bones in the holy land. Our good father however died at Somniány. In the first instance our 400 tilas (gold pieces) carried us to Mecca. After all our expenditure there, we had one hundred† left, and on this we subsisted on our way back. We were seven years in performing our first pilgrimage, and returning to our own country. We had no anxiety about being short in cash, as we knew

\* Taganrog?

† Rupees 800.

we had God for our protector, and that he would bring us through all adversities, according to his holy and immutable decrees.

The two young men, from whom I gleaned the above particulars, came to Bombay in the suite of the vazir of Kokan; their names were HAJI SHAH KU'LI and HAJI SHAH KALENDER; they were very young when they performed the pilgrimage, being now only about thirty and twenty-six years of age respectively. They have received a very good education, having a good acquaintance with the principal Persian authors, and are well versed in Muhammedan science; their father was a Mulla or Doctor of Law, and received his education partly at Kokan, and partly at Bokhara; he also travelled to Kabul to become initiated in Sûfeism by a famous nakshbandy pîr or seer of that place.

III.—*European Speculations on Buddhism.* By B. H. HODGSON, Esq.  
C. S. Resident at Nipal, &c.

In the late M. ABEL REMUSAT'S review of my sketch of Buddhism, (*Journal des Savans*, Mai, 1831,) with the perusal of which I have just been favoured by Mr. J. PRINSEP, there occurs (p. 263) the following passage: "L'une des croyances les plus importantes, et celle sur la quelle l'essai de M. HODGSON fournit le moins de lumières, est celle des avénemens ou incarnations (*avatâra*). Le nom de *Tathâgata* (avenu\*) qu'on donne à SAKIA n'est point expliqué dans son mémoire; et quant aux incarnations, le religieux dont les réponses ont fourni la substance de ce mémoire, ne semble pas en reconnoître d'autres, que celles des sept Bouddhas. Il est pourtant certain qu'on en compte une infinité d'autres; et les lamas du Tibet se considèrent eux mêmes comme autant de divinités incarnées pour le salut des hommes."

I confess I am somewhat surprised by these observations, since whatever degree of useful information relative to Buddhism my essays in the *Calcutta* and *London Transactions* may furnish, they profess *not* to give *any*, (*save ex vi necessitatis*) concerning the 'veritable nonsense' of the system. And in what light, I pray you, is sober sense to regard "une infinité" of phantoms, challenging belief in their historical existence as the founders and propagators of a given code of laws? The *Lallita Vistara* gravely assigns 505, or according to another copy, 550, *avatârs* to SAKYA *alone*. Was I seriously to incline to the task of collecting and recording all that is attributed to these palpable *nonentities*? or, was it merely desired that I should explain the rationale of the doctrine of incarnation? If the latter only be the desideratum, here is a summary recapitulation of what I thought I had already sufficiently explained.

\* A radical mistake; see the sequel.

The scale of Buddha perfectibility has countless degrees, several of which towards the summit express attributes really divine, however short of the transcendental glory of a *tathágata* in *nirvritti*. Nevertheless, these attributes appertain to persons subject to mortal births and deaths, of which the series is as little limited as is that scale of cumulative merits to which it expressly refers. But, if the scale of increasing merits, with proportionate powers in the occupiers of each grade, have almost infinite extent, and yet mortal birth cleave to every grade but the very highest, what wonder that men-gods should be common? or, that the appearance again in the flesh, of beings, who are far more largely gifted than the greatest of the *devatas*, should be called an *avatár*? Such *avatárs*, in all their successive mortal advents till they can reach the estate of a *tathágata*, are the *arhantas*, and the *bodhisatvas*, the *pratyéka* and the *srávaka-Buddhas*. They are gods and far more than gods; yet they were originally, and still quoad birth and death are, mere men. When I stated that the divine Lamas of Tibet are, in fact, *arhantás*; but that a very gross superstition had wrested the just notion of the character of the latter to its own use, I thought I had enabled every reader to form a clear idea of that marvel of human folly, the immortal mortals, or present palpable divinities of Tibet! How few and easy the steps from a theory of human perfectibility, with an apparently interminable metempsychosis, to a practical tenet such as the Tibetans hold!

But REMUSAT speaks of the incarnations of the *tathágatas*: this is a mistake, and a radical one. A *tathágata* may be such whilst yet lingering in the flesh of that mortal birth in which he reached this supreme grade;—and here, by the way, is another very obvious foundation for the Tibetan extravagance—but when once, by that body's decay, the *tathágata* has passed into *nirvritti*, he can never be again incarnated. The only true and proper *Buddha* is the *Maha Yánika* or *Tathágata Buddha*. Such are all the '*sapta Buddha*,' of whom it is abundantly certain that *not one* ever was, or by the principles of the creed, could be, incarnated. SAKYA'S incarnations all belong to the period preceding his becoming a *Tathágata*. Absolute quietism is the enduring state of a *Tathágata*: and, had it been otherwise, Buddhism would have been justly chargeable with a more stupendous absurdity than that from which REMUSAT in vain essays to clear it. '*Plusieurs absolus—plusieurs infinis*' there are; and they are bad enough, though the absolute infinity be restricted to the fruition of the subject. But the case would have been tenfold worse had activity been ascribed to these beings; for we should then have had an unlimited number of infinite ruling providences! The infinite of the Buddhists is *never* incarnated; nor the finite

of the Brahmans. *Avatárs* are an essential and consistent part of Brahmanism—an unessential and inconsistent part of Buddhism: and there is always this material difference between the *avatár* of the former and of the latter, that whereas in the one it is an incarnation of the supreme and infinite spirit, for recognised purposes of creation or rule; in the other, it is an incarnation of a mere human spirit—(however approximated by its own efforts to the infinite) and for what purpose it is impossible to say, consistently with the principles of the creed. I exclude here all consideration of the *dhyáni*, or celestial Buddhas, because REMUSAT'S reference is expressly to the seven *mánushi* or human ones.

The word *tathágata* is reduced to its elements, and explained in three ways—1st, *thus gone*, which means gone in such a manner that he (the *tathágata*) will never appear again; births having been closed by the attainment of perfection. 2nd, *thus got or obtained*, which is to say, (cessation of births) obtained, degree by degree, in the manner described in the Buddha scriptures, and by observance of the precepts therein laid down. 3rd, *thus gone*, that is, gone as it (birth) came—the pyrrhonic interpretation of those who hold that doubt is the end, as well as beginning, of wisdom; and that *that* which causes birth, causes likewise the ultimate cessation of them, whether that 'final close' be conscious immortality or virtual nothingness. Thus the epithet *tathágata*, so far from meaning 'come' (*avenu*), and implying incarnation, as REMUSAT supposed, signifies the direct contrary, or 'gone for ever,' and expressly announces the impossibility of incarnation; and this according to all the schools, sceptical, theistic, and atheistic.

I shall not, I suppose, be again asked for the incarnations of the *tathágatas*\*. Nor, I fancy, will any philosophical peruser of the above etymology of this important word have much hesitation in refusing, on this ground alone, any portion of his serious attention to the 'infinite' of Buddhist *avatárs*, such as they really are. To my mind they belong to the very same category of mythological shadows with the infinity of *distinct Buddhas*, which latter, when I first disclosed it as a fact in relation to the belief of these sectaries, led me to warn my readers "to keep a steady eye upon the authoritative assertion of the old scriptures, that *SAKYA* is the 7th and last of the *Buddhas*†."

The purpose of my two essays on Buddhism was to seize and render intelligible the *leading* and *least* absurd of the opinions and practices of these religionists, in order to facilitate to my countrymen the study of

\* To the question, what is the *tathágata*, the most holy of Buddhist scriptures returneth for answer, 'It does not come again, it does not come again.'

† Asiatic Researches, vol. xvi. p. 445.

an entirely new and difficult subject in those original Sanscrit authorities\* which I had discovered and placed within their reach, but no living interpreters of which, I knew, were accessible to them, in Bengal or in Europe.

I had no purpose, nor have I, to meddle with the interminable sheer absurdities of the Bauddha philosophy or religion ; and, had I not been called upon for *proofs* of the numerous novel statements my two essays contained, I should not probably have recurred at all to the topic. But sensible of the prevalent literary scepticism of our day and race, I have answered that call, and furnished to the Royal Asiatic Society, a copious selection from those original works which I had some years previously discovered the existence of in Nipal. I trust that a further consideration of my two published essays, as illustrated by the new paper just mentioned, will suffice to remove from the minds of my continental readers most of those doubts of REMUSAT, the solution of which does not necessarily imply conversancy on my part with *details as absurd as interminable*. I cannot, however, be answerable for the mistakes of my commentators. One signal one, on the part of the lamented author in question, I have just discussed : others of importance I have adverted to elsewhere : and I shall here confine myself to the mention of one more belonging to the review from which I have quoted. In speaking of the classification of the people, REMUSAT considers the *vajra acharya* to be laics ; which is so far from being true that they and they alone constitute the clergy. The *bhikshuka* can indeed perform some of the lower offices of religion : but the *vajra acharya* solely are competent to the discharge of the higher ; and, in point of fact, are the only real clergy. That the distinction of *clerus et laicus* in this creed is altogether an anomaly, resulting from the decay of the primitive asceticism of the sect, I have endeavoured to shew elsewhere, and cannot afford room for repetition in this place.

The critics generally have been, I observe, prompt to adopt my caution relative to local superstitions, as opposed to the original creed of the Bauddhas. But they have carried their caution too far, and by so doing, have cast a shade of doubt and suspicion over things sufficiently entitled to exemption therefrom. Allow me, then, to reverse the medal,

\* Nearly 50 vols. in Sanscrit, and four times as many in the language of Tibet, were sent by me to Calcutta between the years 1824, and 30. The former had never been before heard of, nor the latter possessed, by Europeans.

[See the notices of the contents of the Tibetan works and their Sanscrit originals by M. CSOMA DE KÖRÖS, and by Professor H. H. WILSON in the 3rd vol. *Gleanings*, and 1st vol. *Journal. As. Soc.*—Ed.

and to shew the grounds upon which a great degree of certainty and uniformity may always be presumed to exist in reference to this creed, be it professed where it may.

Buddhism arose in an age and country celebrated for literature; and the consequence was, that its doctrine and discipline were fixed by means of one of the most perfect languages in the world (Sanskrit), during, or immediately after, the age of its founder.

Nor, though furious bigots dispersed the sect, and attempted to destroy its records, did they succeed in the latter attempt. The refugees found, not only safety, but protection, and honour, in the *immediately* adjacent countries, whither they safely conveyed most of their books, and where those books still exist, either in the original Sanscrit, or in most carefully-made translations from it. The *Sata Sahasrika*, *Prajna Paramita*, and the nine *Dharmas*, discovered by me in Nipal, are as indisputably original evidence of Buddhism as the *Védas* and *Puránas* are of Brahmaism. The *Káhgyur* of Tibet has been *proved* to have been rendered into Tibetan from Sanscrit, with pains and fidelity: and if the numerous books of the Burmese and Ceylonese be not originals, it is certain that they were translated in the earlier ages of Buddhism, and that they were rendered into a language (high Prakrit) which, from its close affinity to that of the original books of the sect, (Sanskrit,) must have afforded the translators every facility in the prosecution of their labours.

But if the Buddhists, whether of the continent or islands of India, or of the countries beyond the former, still possess and consult the primitive *scriptures* of their faith, *either in the original language, or in careful translations, made in the best age of their church*—wherefore, I would fain know, should European scholars, from their study, incessantly prate about mere *local* rites and opinions, constituting the substance of whatever is told to the intelligent traveller by the present professors of this faith in diverse regions—nay, constituting the substance of whatever he can glean from their books? In regard to Nipal, it is just as absurd to insinuate, that the *Prajna Paramita*, and the nine *Dharmas* were composed in that country, and have exclusive reference to it, as to say that the Hebrew Old, or Greek New, Testament was composed in and for Italy, France, or Spain exclusively. Nor is it much less absurd to affirm, that the Buddhism of one country is *essentially* unlike the Buddhism of any and every other country professing it, than it would be to allege the same of Christianity.

Questionless, in the general case, documentary is superior to verbal evidence. But the superiority is not without limit: and where, on the one hand, the books referred to by our closet students are numerous and difficult, and respect an entirely new subject, whilst, on the other

hand, our personal inquirers have time and opportunity at command, and can question and cross-question intelligent witnesses, the result of an appeal to the living oracles will oft times prove as valuable as that of one to the dead.

Let the closet student, then, give reasonable faith to the traveller, even upon this subject; and, whatever may be the general intellectual inferiority of the orientals of our day, or the plastic facility of change peculiar to every form of polytheism, let him not suppose that the living followers of Buddha *cannot* be profitably interrogated touching the creed they live and die in; and, above all, let him not presume that a religion fixed, at its earliest period, by means of a noble written language, has no identity of character in the several countries where it is now professed, notwithstanding that that identity has been guarded, up to this day, by the possession and use of original scriptures, or of faithful translations from them, which were made in the best age of this church.

For myself, and with reference to the latter point, I can safely say that my comparisons of the *existing* Buddhism of Nipal, with that of Tibet, the Indo-Chinese nations, and Ceylon, as reported by our local inquirers, as well as with that of *ancient* India itself, as evidenced by the sculptures of Gya\*, and of the cave temples of Aurungabad, have satisfied me that this faith possesses as much identity of character in all times and places as any other we know, of equal antiquity and diffusion†.

\* See the explanation of these sculptures by a Nipalese Buddhist in the Quarterly Oriental Magazine, No. XIV. pp. 218, 222.

† As a proof of the close agreement of the Buddha systems of different countries, we may take this opportunity of quoting a private letter from Colonel BURNES, relative to the 'Burmese Philosopher Prince,' MEKKHARA MEN, the king of Ava's uncle.

"The prince has been reading with the greatest interest M. CSOMA DE KÖRÖS's different translations from the Tibet scriptures in your Journal, and he is most anxious to obtain the loan of some of the many Tibetan works, which the Society is said to possess. He considers many of the Tibetan letters to be the same as the Burmese, particularly the *b*, *m*, *n*, and *y*. He is particularly anxious to know if the monastery called Zedawuna still exists in Tibet, where according to the Burmese books, GODAMA dwelt a long time, and with his attendant ANANDA planted a bough which he had brought from the great *pipal* tree, at Buddha-Gaya. The prince is also anxious to know whether the people of Tibet wear their hair as the Burmese do? how they dress, and how their priests dress and live? The city in which the monastery of Zedawuna stood, is called in the Burmese scriptures *Thawotthi*, and the prince ingeniously fancies, that Tibet must be derived from that word. The Burmese have no *s*, and always use their soft *sh*, when they meet with that letter in *Pali* or foreign words—hence probably *Thawotthi* is from some Sanscrit name Sawot. I enclose a list of countries and cities mentioned in the

P. S.—Whether REMUSAT'S 'avenu' be understood loosely, as meaning come, or strictly, as signifying come to pass, it will be equally inadmissible as the interpretation of the word *Tathágata*; because *Tathágata* is designed expressly to announce that all reiteration and contingency whatever is barred with respect to the beings so designated. They cannot come; nor can any thing come to pass affecting them\*.

And if it be objected, that the mere use of the word *avenu*, in the past tense, does not necessarily imply such reiteration and conditional futurity, I answer that REMUSAT clearly meant it to convey these ideas, or what was the sense of calling on me for the successive incarnations of these *avenus*? It has been suggested to me that *absolu*, used substantively, implies activity. Perhaps so, in Parisian propriety of speech. But I use it merely as opposed to relative with reference to *mere* mortals; and I trust that the affirmation—there are many absolutes, many infinites, who are nevertheless inactive—may at least be distinctly understood. I have nothing to do with the reasonableness of the tenet so affirmed or stated, being only a reporter.

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IV.—*Geological Section across the Valley of the Nerbudda, from Tendukhéri to Bittoul.* By J. G. SPILSBURY, Esq. *Ben. Med. Est.* Plate XXIII.

In your No. for November last, you expressed a wish that some one should give you a section of the geological features of the country from Tendukhéri to the hills south of the Nerbudda. Opportunity has been afforded me of making such a trip, and as probably you may not receive an account from one versed in the subject, I send you such notes as I made on the excursion, together with specimens of the rocks met with.

The conical hill to the S. E. near Tendukhéri is the point from which I started, the same to which Captain FRANKLIN alludes in the 1st part of the Transactions of the Physical Class of the Asiatic Society, and which he describes as being capped with basaltic columns.

The specimens from this hill are T 1, forming a platform with T 1 a mixed in detached pieces. Above the platform are trap boulders reaching Burmese writings, as the scene of GODAMA'S adventures, to which if the exact site and present designation of each can be assigned from the Sanscrit or the Tibet authorities, it will confer an important favor on Burmese literati." It is highly interesting to see the spirit of inquiry stirring in the high places of this hitherto benighted nation. The information desired is already furnished, and as might be expected, the Burmese names prove to be copied through the *Prakrit* or *Pali*, directly from the Sanscrit originals, in this respect differing from the Tibetan; which are translations of the same name.—ED.

\* *Avenu* signifies *quod evenit, contigit*, that which hath happened.—(*Dictionnaire de Trévoux.*) *Tathágata*; *tathá* thus (what really is), *gata* (known, obtained).—(WILSON'S Sans. Dict.)—ED.

to within some 50 or 60 feet of the summit where the columns T 3 are found. On coming to which, one would almost fancy that some vast temple had been thrown down by an earthquake. At the very top T 3 was lying—(see Pl. XXIII. fig. 1.)

From this hill to Beltari Ghát, on the Nerbudda, is a distance of about 10 miles, the first part of the road much intersected by ravines of the Baranj, a considerable nalá rising in the hills north of Tendukhéri; after which is the black alluvial soil of the valley, until you approach the Nerbudda. About a mile to the east of Beltari, in a water-course of one of the ravines I obtained the accompanying fossil remains\*, the matrix of which is (S C Bel) a conglomerate, very similar to the one forwarded with the fossils from Segouni, on the Omar nadí near Umariá. This conglomerate forms also the bed of the river at this Ghat (Bel. 1.) but is so friable and little coherent that it is difficult to procure a specimen; it is also accompanied by the same nodules, (vide Bel. 2.)

On crossing the Nerbudda, about a mile inland, in a south-east direction, a low detached range of hills, some four or five miles in extent, rising to the highest perhaps 200 feet, is met with B H 1; first occurring at the bottom of a ravine distant some 2 or 300 yards from the range: the strata running nearly east and west, with veins of quartz (B H 2) traversing in the same direction, varying from a line to upwards of two inches breadth. Near is seen the same conglomerate (S C Bel.) of the opposite side of the river, and which appears to me to be spread over a considerable extent of country, if it be the same as mentioned by Captain FRANKLIN, as occurring at Janee Ghat. I have found it in several places along the course of the Nerbudda, as far as Hoshungabad, and one specimen I picked up in the bed of the Duhi, near Gurawára proper.

From this low range to Futtehpoor, the country presents no particular feature for the geologist. Near all the rivers, and nalás, ravines abound: generally a light soil mixed with kankar, on which is grown † cotton, kodo, urhur, juwár, and rain crops. At a greater or less distance from the ravines, the rich black soil of the valley prevails, fitted for gram, wheat, and rubees crops in general.

As from this point I proceeded to visit one of the hot-springs, I shall here insert my remarks on the westernmost of them.

It is situated some 14 miles, in a westerly direction from Futtehpoor, about four miles in a S. S. E. one from the village of Kyrie, belonging to Lala Thakur. A short distance before reaching the spring,

\* The upper jaw of a horse.—Ed.

† My observation does not accord with that of Lieut. MILLS', (p. 65 of your Journal.) Great quantities are grown on the banks of the Heren and Nerbudda, but in soil as described above.

in crossing a small nála (chiefly derived from these springs), the bed was formed by the specimens K 1, 2, and 3; No. 1 formed a small fall (see fig. 2,) and No. 2, intersected the strata running in a E. N. E. direction. No. 3 being the general bed of the river, and giving it a greyish appearance.

There are two springs, distant some five or six paces from each other, the southern one has been squared by stones being placed tank fashion, forming an area of about five feet each way: the other is left pretty much to nature; depth about a foot and half. Much gas is extricated, of an offensive sulphureous odour, temperature 114°; that of the air 86°, time noon, (28th February, 1833.) At 12 paces distant, is a cold spring; the temperature of which I found to be 82°. Of the specimens accompanying, K 4 is the rock from which the springs issue; a pace or two above, K 5 juts out; K 7, is a rocky ledge just below the junction of the hot and cold springs; K 6, is a small detached hill, large masses of which are lying at the junction of the springs, on which are carved the *yoni*. In a water-course between the hill K 6, and the springs, lie large rolled pebbles of different colors, jasper, agate, and boulders of all sizes, precisely similar to those at Futtehpour (F. 1.)

Futtehpour (at which reside three Goand Rajas) is situated first within the gorge of the low range of hills that form the southern boundary of the valley of the Nerbudda. On passing through the town, which is built on both sides of the Unjon nála, the road winds through the low\* hills, varying from 150 to 200 feet in height, composed of F 2, capped with F 3. F 2 descends all the way, and is seen forming the bed of the nála; at one place where they crossed it, the rock puts on the appearance of a platform, covered with rough mortar, in which numerous small siliceous pebbles were mixed. In the nála and all about, are boulders of F 1, as at Kyrie hot spring. About six miles round the western end of Chuttair, the road up to this being undulated low jungle, the country becomes more open, and the soil changes from siliceous to decomposed trap, small hillocks and ridges of which are seen jutting up in this valley. The intermediate spaces, being the black alluvial soil similar to that of the Nerbudda, had crops of gram and wheat on them. About four miles from Maljihir S. S. E. near a small low range of hills (specimen M H) is the other hot-spring. The gas extricated is more offensive than the Kyrie one; temp. 134° air 92°; time 2 P. M. (3rd March, 1834,) cold spring about 20 paces off, 78°. This spring bubbles

\* It is to be noted that although the hills are generally low, yet some high peaks, as Chuttair and Douria, (probably rising to 800 or 1000 feet above the plain,) are met with.

up much more than the other, and a greater volume of water issues. It has also been rudely enclosed, and at a short distance off is a Mahadeo temple in ruins. M S is the rock from which the spring issues, and M N is a ledge of rocks, and G the nála, some 200 yards off.

From Maljihir westward to Kunchari, a ridge of trap is traced, which crosses the river Deinwa at this place, and through which the river has cut its way; changed into the solid compact rock of D at K 1; a similar ledge being seen above the ford: the strata appear to run nearly east and west, with a dip of about 30°, in places traversed by thin veins of quartz and agate. D at K 3, forms the bed of the river at the ford, while large rolled conglomerates D at K 2, are thickly strewn in the bed, varying in size from a small pebble to large masses, a foot in diameter.

From this to Pugara is about nine miles. After leaving the Deinwa, the road is sandy, and a small ridge of sandstone is passed over, leading into a valley of black alluvial soil, up to the village of Singanama; from which commences what may be termed the Mahadeo Hills. The road is one unvaried ascent, but by no means steep, through a forest jungle, (scarcely any low bush jungle,) the rock of which is a sandstone, P 1, (and P 2, much intermixed with it,) the whole very practicable for all sorts of baggage, carts excepted. About seven miles from the river, the chief ascent in this march is attained, and the road keeps along the west of the ridge, which becomes more open and level up to Pugara, a small Goand village, belonging to a Thakur. The scenery about is very picturesque: a small nála, the Kanjundeo, is in front, and on every side fine large trees of mango, jamin, mahwa, semul, &c.; less than a mile to the eastward rises a small stream, the Kanjun Koonr, which after a very small course falls over a precipitous rock, some 3 or 400 feet perpendicular; it has obtained the name of *Butkee Boorán*. Tradition saying that it derived its name from a young Goandee (it might add to the romance to style her lovely, but judging from the faces of this race in our days, it could not be the truth,) being forced over; however Miss Butkee has had her companions, as in the days of Goand rule, obnoxious individuals on being brought before their ruler, had the laconic sentence of "Shew him Butkee Boorán," passed on him. This nála, after winding through the hills, falls into the Deinwa at Pissun.

From Pugara to the table land of Puchmuree, the distance is about seven miles, the road being a series of rocky sandstone ledges, occasionally intersected by small streams; the road on the whole is very practicable for all sorts of laden cattle, there being but one or two places where even camels experience any thing like difficulty. On passing the last elevation, one of the Kodri range (being *the husks of the kodo* thrown aside by Mahadeo when resident here), you come to an open, rather level plain, of irregular size, the longest part probably not exceeding six miles

from Dobgur west to the Kanjee Ghatee, east, by five from the Pugara Ghatee to the cave at Mahadeo. There being no underwood or low jungle, this plain has much the appearance of a park; two or three streams wind through it in different directions.

The whole of these hills are almost entirely one rock, a sandstone (Dok 2) varying a little in color. I visited the top of one of the peaks, Dokgur\* by name, the same which is stated by Captain FRANKLIN to be 4800 feet high. On the pinnacle of this hill the pebbles were lying, evidently detached from the sandstone by the action of weather. These pebbles are to be seen in horizontal strata in many places, where the bare mural rock rises 300 or 400 feet from the plain. The only exception to this sandstone was, Dok 1, forming a water-course about 200 feet below the summit, and which is crossed once or twice in ascending to this peak, and Dok 3, about 150 feet from the summit.

In a cave, through which passed a stream, called Jumbo Dweep, the specimen of silicified tree was found by Captain OUSELEY, the description of which I give you in his own words.

"After having swam in as you know some 40 or 50 yards, with torches, where several passages appear to branch off, and not liking to go farther in water, the depth of which was great but unknown, I came back to the debris on which you stood, formed of broken masses from above, under which the stream runs. On descending with the stream by torch light about 20 feet through the sandstone excavated by the action of water, we came to a small room 10 feet square by 10 or 12 high, the stream falling by a crevice through the floor, about two feet wide. We descended about 15 or 20 feet more, and between the sides of the crevices was jammed the tree, a trunk with apparently stumps above, part of the bark, all fallen forward and caught in a hollow of the sandstone made by water: about 4 feet long by 18 inches wide, from 2 to 6 inches thick: of this I struck off the piece† I gave you, and have brought away the whole fragment, but not the tree, for what appeared was fully four feet wide, but how large it may be I did not carefully observe."

Lieutenant FINNIS, in the Journal for February last, p. 79, appears to me to give a greater degree of extent to these hills, than my observation warrants. More than three sides of them are defined by the Deinwa, taking its rise between the peaks of Bhimgur and Dokgur, and to the westward of Dokgur a deep chasm immediately commences. Whether the geological formation differs on the side towards the Tek, I have no

\* There are two other peaks exceeding this in height, viz. Putta Sunkur, (above the cave of Mahadeo,) and Choura Deo, the highest of all which I conjecture to be about 5000 feet above the sea.

† The one I send.





opportunity of judging, but the Muttoor, divided from the Mahadeo range by the Deinwa and Kuttai nálas, is trap, and that formation is seen from Maljihir to Singanama, at which village the gradual ascent of these hills from the north commences. The steep side is from Bhawun (where the Jatra assembles at the annual festival of Shiv Ratri) : the ascent from this to the cave of Mahadeo (situated some 4 or 500 feet below the peak of Jutta Shunkur) is impassable for laden cattle, horses and elephants with difficulty getting up. Near Bhawun is to be seen a singular shaped hill (see fig. 3), from which all Goands firmly believe the locusts issue, hence its name Terí Kothí. Of the climate of these hills I annex a memorandum, received from Captain FRANKLIN in 1828 :—a season unusually hot on the Nerbudda and in the provinces, the thermometer in that month being at Cawnpoor 118° in the shade, and 144° Fahr. in the sun.

May 21. Puchmuree,	Noon.	Barom.	26.50	Therm.	86.	Fine
Peak of Dokgur,	5 P. M.	Ditto	25.60	Ditto,	85.	Do.
22. Puchuree,	8 A. M.	Ditto	26.50	Ditto,	78.	cloudy.
33. Jhirpa, close to Kunchuree on the Deinwa,	5 P. M.	Ditto	28.35	Ditto,	98.	

being at least 20° cooler than the valley at the hottest period of the day. Is it further confirmation of the coolness of these hills, that ferns and moss are to be seen very luxuriant from Pugara upwards? as I am not aware that we found them lower down. The animals are the same as on the plains, with exception of a beautiful squirrel, described by Major SYKES in his account of the mammalia\* of the Dukhun, and named by him "Sciurus Elphinstonii," his description accurately answering to a pair that Lieutenant WILLIAMS, 29th Native Infantry, and myself, procured. The Goands procure them in the mango season, a tree that pre-eminently flourishes wild in these hills; some trunks issuing from the crevice in the bare sandstone rock of three and even four feet diameter.

My route back was very much over the same ground, except that I examined the river much more to the eastward at Brimhan Ghat. The bed of the river is here formed of a conglomerate, (Br. Ghat,) in which probably the fossil lower jaw of the elephant which I forwarded to you formerly, was found†.

About a mile and a half up the river, the accompanying series of rocks were found from B K 1 to B K 2. Number 1 is first met with on the right bank, a slaty rock, with a dip of about 10° from the vertical, stretching in a north-east direction; next comes No. 2, in the same direction, changing into 3‡, with No. 4 intermixed. Close to the water's

\* Vol. i. Asiatic Journal, p. 165.

† See vol. ii. p. 383.

‡ Of this rock, great numbers of Yonis and Bulls are made, to adorn the temples in this vicinity.

edge, No. 5, the river here being narrowed by these rocks, forms a rapid ; Nos. 5 and 6, shelving down on each side. On the left bank, a rocky platform of considerable width rises from the water, at an angle of about 30° to the top of the bank, the strata running as before, consisting of Nos. 6, 7, 8, in places traversed by quartz 9 in contact with 8, 10 in large masses, 11 overlaying 10, some eight or ten inches thick ; after this to the top of the bank, 10 is seen traversed with much quartz varying from a line to considerable thickness.

About two miles, in a north-westerly direction, is the town of Chawur-puthur, with a low range of hills at the back of it ; the stratification of which is nearly vertical, (Ch. 1.) running in a north-east to south-west direction. I traced it down towards the river, where in a nála it changes to Ch. 2, and then into Ch. 3, forming a ledge of rocks that cross the river at Ram Ghat, and at this point terminate my observations.

N. B. In the construction of the accompanying map, those places written in capitals are laid down from a map of this agency, sent up from the Surveyor's General's Office, on a scale of eight miles to an inch, and this is just half the size. The Tek, a station of the G. T. S. is laid down at per As. Journ. for February last, p. 7, but not according to the map appended, which I know to be erroneous\*. The six peaks and the Tek are all very conspicuous from the valley of the Nerbudda ; those two near Futtehpoor, named Chutair and Dourea, are nothing in height compared to the others, probably not so high by 2000 feet ; but close to the valley they look high. Choura overtops all, and is probably not less than 5000 feet above the sea.

Segouní near to Umuría, is the village close to which the fossil bones were discovered, as described in the As. Journ. for November, 1833.

List of Specimens alluded to in the above paper.

From the insulated hill near Tendukhéri.

T 1	Silicio-calcareous conglomerate, tinged with lithomarge.		Bel. 2 nodule of kankar.
T 1 a	More compact, silicious limestone.	B H 1	Low Hills South of the Nerbudda.
T 2	Columnar basalt.	B H 2	Silicious jasper conglomerate, with Quartz veins.
T 3	Same as T 1.		Khyrie Hot-springs.
	From Beltari.	K 1	Calcareous basalt effervescing in acids, and leaving green wacken ?
S C.	A pebble conglomerate with calcareous cement, same as that of Brimhan ghat.	K 2	Vein of calcareous spar in do.
	Fossil upper jaw of a horse found imbedded in it.	K 3	Silicious limestone like T 1 a.
		K 4	Stratified calcareous sandstone.
		K 5	Columnar basalt.

\* On referring to the map in question, we find that our lithographer has made a mistake of ten miles in laying down the position of the Tek station, as compared with the table of Lats. and Longs. in page 70. The map was compiled from two sketch maps by different officers, which differed in scale and in the position of many of the principal places.—ED.

K 6	Quartz sandstone.	Dok 3	White decomposing sandstone on summit, sandstone and large quartz pebbles.
K 7	Decomposing do. tinged green. <i>Fulteppoor Hills.</i>		
F 1	Conglomerate of jaspers, siliceous felspar, with calcareous cement.		<i>Mahadeo Cave, Soft sandstone.</i> (Silicified wood in a stream within).
F 2	Jasper conglomerate, with red clay cement.		<i>Nerbudda west of Brimhán ghát.</i>
F 3	Quartz vein. <i>Maljühr Hot-spring.</i>	B K 1, 2	Slate.
M H	Friable quartzose sandstone.	B K 3	More talcose do., green.
M N	More compact ditto.	B K 4	Still more compact, with calcareous veins.
M S	Ditto. <i>Deinwa River at Kuncharee.</i>	B K 5	Quartz tinged with 4.
D K 1	Compact basalt.	B K 6	Ditto, and with red spots.
D K 3	Conglomerate of half-rounded pebbles, with jasper cement.	B K 7	Clayey sandstone, with rounded pebbles, size of a pear.
D K 2	Decomposed sandstone. <i>At Pugara.</i>	B K 8	Silicious conglomerate.
P 1	Coarse-grained sandstone.	B K 9	Sandstone, with do.
P 2	Coarser do. with ochreous clay. <i>Dokgur Hills.</i>	B K 10	Ditto, with green earth.
Dok 1, 2	Basalt.	B K 11	Clayey sandstone, slaty. <i>At Chawurputhur.</i>
		Ch 1	Vertical columnar basalt.
		Ch 2	Do. black finty.
		Ch 3	Lighter, more quartz.

Accompanying these specimens were the following found by Captain OUSELEY, at the site of the coal discovered by him marked on the map. As this coal was brought to the notice of the Asiatic Society by Lieut. FINNIS, in 1829, (see p. 73, and by Captain COULTHARD before that time (see As. Res. xvii. 72,) it was not known to whom the discovery was rightly due. We are glad to see therefore that the subject is explained in the following note from Captain OUSELEY, to Dr. SPILSBURY, which accompanied the above geological notice.—Ed.

“ I am between Jamgurh and Bhoragurh : a beautiful jungle scene. I found the strata in a dry nála, thus :

From 10 to 4 feet from the surface.	.. soft sandstone, friable.
9 inches,	.. coal, slaty.
6 inches,	.. marly stone, black.
1½ feet,	.. good coal.
6 inches,	.. soft micaceous shale.
below to the depth of 25 feet,	.. harder sandstones.

The strata dip to the west about one foot in a yard : I was in hopes of finding it nearly horizontal. I have commenced two shafts, and expect to find the real deposit about five feet below the last coal. The only water is in a fissure of this nála, not good : all jungle and hills around. On referring to my journal, I find I sent specimens of this coal on the 9th March, 1827, to Mr. MADDOCK, Captain COULTHARD, &c. and that I sent two servants with Lieutenant FINNIS, a year after, to point out the place. It was upon WESTON's mentioning to Captain COULTHARD that bits of coal were found occasionally in the Towa, that I sent the man, who traced it up to this place.”

V.—*Note on the Fossil Bones of the Nerbudda valley, discovered by Dr. G. G. Spilsbury, near Narsinhpúr &c. By J. PRINSEP, Secretary, &c. (See Plate xxiv).*

[Read at the Meeting of the 6th August.]

The circumstances of the discovery of the gigantic fossil bones now presented by Doctor SPILSBURY, were brought to the notice of the Society on the 30th October last\*. I should feel inclined in pointing to these splendid trophies, to repeat the obligations of Indian geology to this eminent cultivator of the science, but that his modesty will not allow me to designate him 'geologist,' although his zeal and enterprise in the systematic prosecution of geological inquiries, and his continued success in making known these treasures of the ancient world, treasures which had escaped so long the diligent search of professed geologists, have fairly won for him all the fame that the most enthusiastic disciple of the Wernerian hammer could covet.

Dr. SPILSBURY's discoveries indeed forcibly exemplify the truth of the fable of "eyes and no eyes." As it was his conversation with the lime-burner that first brought to light the existence of the *Jabalpúr* fossil shells, so was it an humble native carpenter at *Narsinhpúr* from whom he obtained the knowledge of the *giant* at *Segauni*, which was followed up by an immediate visit to the spot, and the reaping of a rich harvest of discovery. Again, "on mentioning these fossil bones to the medical officer stationed at *Hoshangábád*," says Dr. SPILSBURY, in a private note to myself, "he told me there were *plenty* just below his house, and that he would shew them to me: off we went, and I flatter myself I brought away what you will deem a real acquisition—the head of a horned animal (buffalo?) imbedded in the stone. Dr. LIVINGE had considered them of too recent formation to be worthy of much notice, but I thought differently, and so I submit them to those who are more cognoscent on the subject: claiming for myself no more credit in the matter beyond a wish to contribute to this very interesting science such discoveries as mere accidents have thrown in my way."

We should remember that the specimens, collected on these occasions, are not little hand samples, easily carried about, but bulky masses weighing from one to two maunds each; that they have to be conveyed 3 or 400 miles by land carriage over a difficult country before they can be embarked for another voyage of 600 miles to Calcutta. The care taken in packing them has however been so effectual, that I can safely say we see them now as they left the rocky conglomerate of the *Omar nádí* bank, from which they were detached nearly a year ago.

\* See Journ. As. Soc. vol. ii. p. 586.

More than this,—I believe, from an inspection of CUVIER's plates, that the two femurs of the elephant now on the table are as perfect as, if not superior to, any of the sort in the celebrated museum of Paris.

I will now hazard a few observations on the remains of the *Narsinhpúr* or *Segauní* elephant.

It may be looked upon as most fortunate that the two bones of this animal, selected for dispatch, are the right and left femora, since it is principally upon the conformation of the condyles of the femur that CUVIER has decided the specific difference of the fossil or extinct, from the existing, varieties of the elephant.

I stated on the examination of the fossil jaw-bone of another elephant from the *Brimhán Ghát* near *Jabalpúr*, side by side with a recent jaw in our museum, that it was impossible to discover any such distinction as should constitute a difference of species\*. But the case is very different now: the magnitude, as well as the peculiarities of structure, of the present animal, at once pronounce it to be the "mammoth," or *elephas primigenius* of BLUMENBACH. The head is not forthcoming to confirm this conjecture, having, according to the tradition of the village, been washed down the river seventy years ago: one tooth only was obtained from a Thákur in the neighbourhood, but that has not yet reached us:—Dr. Row (to whose care we are indebted for the dispatch of the specimens from Benares) writes, that he has sent it by another opportunity: however, the expressions and drawings of CUVIER accord so perfectly with the bone before us, that no reasonable doubt can be entertained even in the absence of the teeth. He thus describes its conformation:

"La tête inferieure du femur m'a fourni un caractère distinctif tres-sensible dans son *échancrure entre les deux condyles, qui se réduit à une ligne étroite,*" (see figures 5 and 6,) "au lieu d'un large enfoncement qu'on voit dans les deux espèces vivantes," (see figures 2 and 8.)

The peculiarity was remarked in the Siberian mammoth, in the fossil elephant of Constadt, in that of Florence, and in all others, indeed, which were examined by this eminent naturalist; and here we find the same characteristic in another individual at this distant part of the globe. Doctor J. TYTLER has obligingly furnished me with the femur of a modern elephant, to render the comparison more obvious. (It is depicted as fig. 1 of the plate, in an exact relative proportion to the fossil bones.)

Doctor TYTLER's bone belongs to a young animal, if the detachment of the epiphysis be taken as a test of its age; but the same detachment is apparent in the round head of the left fossil femur also (fig. 9.) and in the condyles of another very large specimen, distinct from the other

two (figure 11); so that as far as regards age the fossil and recent bones are by no means unfit for a comparison of magnitude inter se. Judging from the plates of elephant skeletons, it appears that the height of the crown of the animal's skull from the ground is from  $3\frac{1}{8}$ , to  $3\frac{1}{2}$  of the length of the femur; and the height to the top of the shoulder is  $2\frac{1}{2}$  of this length; the latter is, I believe, the mode of estimating the height of the elephant.

The recent femur, measuring 40 inches exactly, would thus give an animal of nine feet high, which is by no means a small elephant in the present day; while the ratios between several measurements of the fossil and recent bone are as follows:

The length of the femur itself was fortunately taken by Dr. SPILSBURY, while it remained whole, and attached to the rocky matrix; otherwise the length deduced from the measurement of its parts alone would have needed some confirmation to obtain implicit credence.

	<i>Fossil Specimen from the Omar Nadl.</i>	<i>Skeleton of an elephant of 9 feet.</i>	<i>Ratio.</i>
Greatest length of the femur, between extremities, . . . . .	63 inches.	40 inches.	1.6
Circumference of the ball <i>a b</i> ,	27	16.5	1.6
Diameter of ditto ( <i>measured</i> ).	8.75	5.15	1.7
Breadth from tip of trochanter to exterior of ball, <i>a c</i> , . . . . .	18	11	1.6
Circumference of the central or smallest cylinder of the bone, . . . . .	19	11	1.7
Breadth of the condyles, . .	11	6.8	1.6

Mean ratio of the fossil to the existing species, 1.63

There is a very satisfactory agreement between all these measurements, and we may be warranted therefore in fixing as the height of our fossil animal  $9 \times 1.63$ , or  $14\frac{1}{2}$  feet: 15 feet was the estimate at first made from the proportion of the bones in CUVIER's work.

Thus, a femur of an African elephant 1.11 metre, or 43.7 inches long, denoted an animal of  $9\frac{1}{2}$  feet: and

The longest of the entire fossil bones accurately measured by CAMPER was 52 Rhenish inches, = 53.9, indicating a height of 12 feet 2 inches.

"Si l'on pouvoit se fier aux mesures rapportées dans la *gigantomachie*, le femur du prétendu Teutobochus auroit été encore plus grand, puisqu'il auroit eu cinq pieds de long; et néanmoins cette dimension n'indiqueroit qu'un individu de quatorze pieds du haut: ce qui ne surpasse point ce que les relations nous disent des éléphants vivans dans les Indes." It is evident from this passage, that no entire specimen of the magnitude of our fossil had been seen at Paris. There was in the

museum, however, the head of a femur from the Pyrenees measuring 8.6 inches in diameter, indicating an individual of 14 feet 8 inches according to Cuvier: a *tête inferieure* from the *Boy* belonging to an animal of 15 feet: and another from Montserrat of the same dimensions.

All of these support the measurement we have assumed of about 15 feet for our specimen, and prove it to be certainly one of the most complete, as well as one of the largest remains of this magnificent quadruped of which even the museums of Europe can boast.

None of the animal matter of these bones remains: it is replaced entirely by carbonate of lime, not by silex as was the case with the specimen of imbedded bone from *Brimhan Ghât*. In the hollow interior of the femur, long interwoven and pendent stalactites of calcareous matter have been deposited, which shew that the bone must have been incased in the rock in nearly a perpendicular position; it is also remarkable that there are two series of these fibrous stalactites forming a considerable angle with one another, as if the position of the mass had been at one period altered. Towards the ends of the bones the cavity is entirely filled with the calcareous deposit.

Plate XXIV. represents different views of the two fossil femora in their relative proportion to the modern bone.

*References to the Plate.*

- Fig. 1. Modern femur of a young elephant of 9 feet high.  
 Fig. 2. View of the lower end of ditto, to shew the separation between the condyles.  
 Fig. 3. Head of the left femur of the fossil species, broken off towards the shaft, but originally found united with  
 Fig. 4. The lower extremity of the same bone.  
 Fig. 5. Is a portion of the shaft of the same bone at the narrowest part: the stalactitic formation in the interior is partially visible at the lower extremity.  
 Fig. 6. End view of fig. 4, to shew the conformation of the condyles *united*, or *meeting*, as described in CUVIER'S *Ossemens Fossiles*.  
 Figs. 7, 8. are from CUVIER'S Plate in *Oss. Foss. vol. i.* to shew their accordance with the above. 7, the fossil; and 8, the existing, species.  
 Figs. 9, and 10, are the same fragments of the right fossil femur, viewed on the inside. They are in as perfect a state as the left femur, excepting that the epiphysis of the ball of the thigh is detached and lost. Its place is shewn by a dotted line.  
 Fig. 12. Is a petrified bone of still larger dimensions than the preceding, but not so well preserved. It seems from the curved depression at *h*, and the rudiments of condyles at *f*, *g*, to be the lower end of a femur. This fragment weighs  $1\frac{1}{2}$  *maus*, and it is nearly one-fourth larger than *figs.* 4 and 10; *figs.* 12, 13.

*Fossil buffalo.*

With regard to the fossil skull, supposed by Dr. SPILSBURY to be that of a buffalo, from *Hoshangabad*, the same good fortune has in this instance also attended his discovery: for as the condyles of the

femur were chosen by CUVIER for one of the distinguishing types of the fossil elephant, so it happens that the forehead and skull, with or without the horns, are the only parts upon which reliance can be placed for determining the specific character of the ruminantia.

The present specimen is, with exception of the horns, as perfect as could be desired; the expanse of the forehead has its bony surface uninjured, shewing the suture along the middle, (which is a sign that the animal was not aged) and the attachment and bony process of the left horn. On the under side, the condyles of the occiput protrude through the bony mass; and by carefully chiselling away some of the stone, the position and form of the teeth on either side of the jaw have been exposed to view. All the interior of the skull is filled with the hard calcareous sandstone.

The direction of the horns in the *Hoshangabad* fossil skull give it at first sight the appearance of a buffalo's head: and the convexity and breadth of the forehead as well as the angle of the occiput, both tend to rank it with this genus: or at least certainly to separate it widely from the aurochs and the domestic ox, as described in the following perspicuous passage on the specific difference of these animals by the Baron CUVIER.

“Le front du *bœuf* est plat et même un peu concave: celui de l'*aurochs* est bombé, quoiqu'un peu moins que dans le *buffle*; ce même front est carré dans le *bœuf*, sa hauteur étant à peu près égale à sa largeur, en prenant sa base entre les orbites; dans l'*aurochs* en le mesurant de même, il est beaucoup plus large que haut, comme trois à deux. Les cornes sont attachées, dans le *bœuf*, aux extrémités de la ligne saillante la plus élevée de la tête, celle qui sépare l'occiput du front; dans l'*aurochs*, cette ligne est deux pouces plus en arrière que la racine des cornes; le plan de l'occiput fait un angle aigu avec le front dans le *bœuf*; cet angle est obtus dans l'*aurochs*; enfin ce plan de l'occiput quadrangulaire dans le *bœuf*, représente un demi-cercle dans l'*aurochs*. Ces caractères assignés à l'espèce du *bœuf*, ne sont pas seulement ceux d'une ou deux variétés; ils se sont trouvés constans, non-seulement dans tous nos bœufs et vaches ordinaires, mais encore dans toutes les variétés étrangères que nous avons examinées.”

Those acquainted with the comparative anatomy of the Indian species will be able to say whether these distinctions are here also equally marked, and consequently to pronounce at once on the character of the fossil skull. The latter has no point of resemblance to the fossil ox of the Mississippi, described and depicted in the second volume of the *Ann. Lyc. Nat. Hist. of New York*, page 280.

None of the fossil skulls, depicted in the *Ossements fossiles*, at all resemble the present specimen: neither do the dimensions of the

existing diminutive species of cattle bear any comparison to its magnitude. We have not in the museum the skull of a wild buffalo, which would best suit the purposes of comparison, and must therefore be contented with reporting the exact dimensions and appearance of the specimen.

[After writing the above to be read at the meeting, Dr. EVANS was so obliging as to bring to the Society a very fine skull of a buffalo prepared by himself, which on being placed in juxtaposition with the fossil, accorded with it so entirely in character that no doubt could be entertained of their identity. In dimensions there was a considerable difference in favor of the fossil, but Dr. EVANS has another skeleton on a larger scale, so that the magnitude of the fossil is not so remarkable. He was inclined to think sufficient disparity existed in the arch of the forehead to constitute a variety of species. The absence of the horns however makes it impossible to decide this point.]

The following are the dimensions of the Jabalpur fossil head, as compared with Dr. EVANS' buffalo.

	<i>fossil. modern.</i>	
Forehead, between the sutures at the root of the horn processes,	12 in.	8 in.
Length from the crown of the forehead to foremost molar tooth,	18 do.	13
Width of jaw, from exterior of teeth, . . . . .	6 1/2 do.	6
Length occupied by molar teeth, . . . . .	7 do.	5.7
Girth of horn process at the base, . . . . .	13 do.	10.5
Depth of skull from the occiput to the head of the condyles, . .	8 1/2 do.	8
Diameter of the foramen magnum, . . . . .	2 do.	1.8
Probable length of the head, . . . . .	26 do.	22

The largest fossil cranium of an *ox*, in the Jardin des Plantes, is 11.8 inches from the crown of the occiput to the root of the nasal bone, which gives a total length of 25 inches, or somewhat less than ours: the circumference of the root of the horn was 13.4 or 0.4 larger than ours.

Taking for granted that the specimen belongs to the buffalo, it is the **FIRST FOSSIL BUFFALO** known to geologists: for although the bones of the ruminantia are found every where most abundantly in the fossil state, it has been always understood, as asserted by PIERCE, that "As yet no relic whatever has been found which resembles any variety of the Indian or the Cape buffalo." It has moreover been remarked as a singular fact, that while the fossil pachydermata, discovered in all parts of the world, the elephant, the rhinoceros, the hippopotamus, and tapir, all belong to the torrid zone; the whole of the fossil ruminants appertain precisely to the genera at present most common in the northern climates, the aurochs, the musk ox, the rein deer, &c.

It is well known that the bones of sheep, goats, antelopes, camelopards, (unless the conjecture by our curator regarding the specimen from the Jumna should prove to be true\*,) have never been met with in a fossil state, among the immense abundance of fragments carefully examined by CUVIER himself in the course of twenty years. None of these have yet been discovered among our Indian collections. It is necessary therefore to be most cautious in pronouncing upon our buffalo, until the discovery of his horns shall put the question of departure from the rules developed by the great teacher of the science of fossil osteology, beyond doubt: especially as we find from PIGEON that "one species of ox, which accompanies the elephant, has massive limbs and a cranium like the buffalo†."

One point may be looked upon as pretty certainly established by the discovery of the present head: namely, that the teeth of the ruminantia from other parts of the Nerbudda valley, and from the bed of the Jamna, which so exactly resemble these now found in situ, protruding from their rocky envelope, belong to the same animal: at least it is safe so to consider them, being desirable to avoid the multiplying of species, except on the strongest evidence.

Meanwhile, we should particularly direct the attention of our geologists of the Nerbudda, (or philo-geologists, if Dr. SPILSBURY will so have it,) to the neighbourhood of Dr. IRVINE's house at *Hoshangâbâd*. The spot whence this skull was extricated will most likely be prolific of other riches in equally good preservation. They should be chiselled out of the rock by a skilful stone-cutter, to prevent injury, and at the same time, to take off as much of the rocky matrix as possible. A pair of buffalo's horns would indeed be a rich prize.

We see by the section of the Nerbudda, with which Dr. SPILSBURY has now favored the Society‡, that the calcareous gravelly conglomerate extends over a considerable portion of the valley at the foot of the cliffs:—four points, including the spot where the fossil jaw of a horse was picked up in making this very section from Tendukhêra, are now marked upon the accompanying sketch-map as the ascertained sites of fossil bone deposits. More will doubtless be discovered even by the persevering exertions of one individual; but a field of so great promise, were it in Europe, would not be left to such slow cultivation. It would be made the object of a special expedition of scientists, (as they are called at Cambridge) from the Government, or from some geological association, and the impatience of theorists would soon be satisfied with a full

\* See Proceedings of the 3rd July, 1834.

† PIGEON'S Fossil Remains, p. 116.

‡ See the foregoing article.

history of the antediluvial or postdiluvial tenants of the Nerbudda fossil basin: for it is by no means clearly established yet to what epoch the debris belong. We have to learn whether the gravelly breccia ever underlies the alluvium, or any of the regular deposits of the valley? or whether it merely fills up crevices and angles at the foot of cliffs, from which the trickling of springs charged with carbonate of lime might be derived. I have before remarked, that the conglomerate matrix contains rolled pebbles of quartz, felspar, and basalt, and therefore its formation is much subsequent to the deposit of the flötz trap, the most recent of the regular rock deposits of the Ságar district. The trap itself is of course anterior to the black alluvium of the Nerbudda valley, which is principally formed from its detritus. Is the breccia contemporaneous with this black alluvium or subsequent thereto? is the question to be solved.

Professor BUCKLAND was unable to determine whether the Ava bones of mastodons, hippopotami, alligators, &c., were referrible to "the most recent marine sediments of the tertiary formation, like the elephant of the Norfolk crag; or to the antediluvian fresh-water deposits analogous to those of the Val d'Arno; or lastly to the *diluvial* accumulations more modern than either of these formations;" but he inclined to refer them to the latter, because of the rolled gravel cemented to them, which resembled the matrix of many of the European mammalian fossils. So far the Ava fossils agree with those of central India, but they differ in being mineralized (at least such as we have lately received from Col. BURNEY) with hydrate of iron instead of carbonate of lime. Capt. MACLEOD however informs me, that such as were calcareous were rejected by Col. B., not being considered to be thoroughly fossilized.

But I must now quit this interesting subject, hoping shortly to recur to it, armed with additional facts from Sergt. E. DEAN, whose hippopotamus' tooth and other curious and new fragments from the Jamna were lately submitted to the Society, and whose notes are only withheld from publication in expectation of further information from the same source.

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VI.—*Determination of the Errors of Division of the Mural Circle at the Madras Observatory, by T. G. TAYLOR, Esq. H. C. Astronomer, Fort St. George.*

[In a letter to the Editor.]

I beg to trouble you with the result of some observations which I lately made with a view of determining the amount of error of division of the Madras Mural Circle.

Hitherto (with but one exception I believe\*) it has been the practice of astronomers to avoid the effect of error of division by

\* PROFESSOR BRÜSSL.

employing a large number of divisions, and by occasionally shifting the zero point of the instrument to another set of divisions: the employment of several divisions at each observation is objectionable only as far as regards fatigue, and loss of time to the observer; but to the shifting of the zero point there are objections to be urged of a much more serious nature; it is true, in the determination of fixed angles, such as the altitude, or north polar distance of the fixed stars, the plan of shifting the zero point of an instrument is applied with some advantage, but in the determination of the ever-changing places of the sun, moon, and planets, the shifting of the zero point is of no avail whatever; and in the determination of parallax, of the coefficients of aberration, nutation, &c. to which a good set of observations are applicable, the plan cannot be employed at all. With this view of the subject, since the erection of the Madras Mural Circle, in January 1831, I have employed the circle *without* shifting the zero point: and this circumstance, added to the fact of the division of this instrument having been effected upon an entirely new plan, rendered it very desirable that some knowledge of the amount of error of division should be obtained; accordingly I set to work as follows.

It is well understood that parallel rays of light after passing through an object glass, converge and meet eventually at a point which is called the principal focus: the converse of this is, that rays of light which diverge from the focal point after passing through the object glass will pursue a parallel course, and hence will appear distinct when viewed through an astronomical telescope adjusted to the solar focus. To be better understood in what follows, I must here refer to the description of the Madras Mural Circle given in volume I. of the Results of the Madras Observations for 1831: it is there stated, that "the telescope is furnished with an axis of its own, which works into the axis of the circle;" hence it will appear plain that the telescope being unclamped at the two ends from the circle, it moves on its own axis *independently* of the circle, or on being clamped *to* the circle, it moves *with it* at pleasure. Thus much being premised, I clamped the circle, so that 0 corresponded with the zero of the reading microscope A, and read off B, the opposite microscope; I then directed the telescope to the object glass of a DOLLOND's five feet achromatic, in the focus of which I had previously fixed a pair of lines crossing one another at an angle of about  $30^\circ$ ; these lines which were distinctly seen, were bisected by the movable wire of the telescope, the telescope being first firmly clamped to the circle; the circle was now loosed, and moved with the *attached* telescope to the object glass of another telescope, (a 12 inch theodolite telescope for want of a better,) the cross wires of which

had been previously adjusted to subtend as nearly as possible an angle of 90° with the former; the difference between the reading now obtained, and the first reading, gives the exact angle between the two, + or - error of division. The telescope being now released from the circle was again directed to the first-named telescope; again clamped to the circle; and, by means of the movable wire, a bisection again made; releasing the circle, it was with the attached telescope again turned till the telescope bisected the wires of the smaller telescope, when 180° nearly, or double the angle subtended by the pairs of cross wires, was read off; pursuing this course after five readings we arrived at the point of departure: now the difference between the first and last divided by four, or the true value of the angle, being added to the first reading gives the second; being again added gives the third, &c. these compared with the actual reading give the error of division of the points 0°, 90°, 180°, &c. thus:—

A.	B.	Mean of A and B.	Mean Angle.	Interpolated.	Error of division.
0 0 0.0	1.1	0.55	21.90—0.55	0.55	0.00
90 0 5.2	5.2	5.20	4	5.89	-0.69
180 0 10.7	12.2	11.45	"	11.23	+0.22
270 0 15.4	17.4	16.40	"	16.57	-0.17
360 0 22.9	20.9	21.90	=+5.34	21.90	0.00

From the mean of ten repetitions in this way the errors came out,

For 0 and 180 =	0.00
90 and 270	-0.45
180 and 360	-0.03

For the error of divisions intermediate between the above, I placed DOLLOND's 5-feet Telescope as before, and by means of two wooden supports, A. B., a 42-inch Achromatic, by DOLLOND, was supported immediately above, so that a pair of cross lines  fixed in the focus, subtended an angle of 30° with the cross-lines fixed in the other Telescope. I then made the following measures:

A.	B.	Mean of A and B.	Mean Angle.	Interpolated.	Error of division.
0 0 0.0	1.9	0.95	18.50—0.95	0.95	0.00
30 0 5.0	7.0	6.00	3	6.80	-0.80
60 0 12.0	12.6	12.30	"	12.65	-0.35
90 0 18.6	17.5	18.05	=5".85	18.50	-0.45
In a similar manner.			"		
90 0 0.0	59.2	59.60	1.88—0.05	0.05	-0.45
120 0 0.5	59.5	0.00	3	0.66	-0.66
150 0 1.7	59.8	0.75	"	1.27	-0.52
180 0 1.1	2.6	1.85	=0".61	1.88	-0.03

In this case to find the true angle subtended by the pairs of cross lines, it is necessary to apply to the mean of A and B the errors already found above for  $0^\circ$  and  $180^\circ$  and for  $90^\circ$ , and  $270^\circ$  and then to interpolate between these *corrected* readings: from the mean of ten measures in this way the errors come out as follows:

## Error of division.

At $0^\circ$ and $180^\circ$	0.00	This assumed = 0.
30 ——— 210	-0.26	
60 ——— 240	-1.00	
90 ——— 270	-0.45	found above.
120 ——— 300	-1.57	
150 ——— 330	-2.15	
180 ——— 360	-0.03	found above.

To ascertain the error of division at the points intermediate between  $0^\circ$  and  $30^\circ$  and between  $30^\circ$  and  $60^\circ$ , &c. I placed the 42-inch telescope by DOLLOND (already spoken of as the upper telescope) so near to the lower telescope, that the images of the pairs of cross-wires subtended an angle of five degrees nearly, and in a manner similar to that explained above, made the following measures of the angle:

Microscope A.			B.	Mean of A and B.	Mean of Pairs.	True angle.	Interpolated.	Error of division.
°	'	"	"	"	"	" "	"	"
0	0	0.0	1.0	0.50	1.10	15.11—1.10	1.10	0.00
5	0	1.3	1.2	1.25	2.42	6	3.44	-1.02
10	0	3.0	3.0	3.00	4.85		5.78	-0.93
15	0	6.9	7.1	7.00	8.12	"	8.11	+0.01
20	0	8.2	11.0	9.60	10.32		10.45	-0.13
25	0	10.8	14.0	12.40	12.47	=2.335	12.78	-0.32
30	0	15.1	14.6	14.85	14.85		15.11	-0.26
25	0	11.9	13.2	12.55				
20	0	9.8	12.3	11.05				
15	0	9.1	9.4	9.25				
10	0	6.1	7.3	6.70				
5	0	3.5	3.7	3.60				
0	0	1.1	2.3	1.70				

The above differs from the preceding only that I have here returned back to the point of departure in an inverse order, instead of again beginning at  $0^\circ 0'$ .

In a similar manner the following five series were obtained.

Microscope A.			B.	Mean of A and B.	Mean of Pairs.	True angle.	Interpolated.	Error of division.
°	'	"	"	"	"	" "	"	"
30	0	0.0	59.8	59.90	0.17	19.65—0.43	0.43	-0.26
35	0	3.5	5.3	4.40	4.25	6	3.63	+0.62
40	0	6.6	8.7	7.65	7.65		6.84	+0.81
45	0	9.5	10.7	10.10	10.05	=3.705	10.04	+0.01
50	0	12.3	14.5	13.40	13.40		13.24	+0.16
55	0	14.7	16.9	15.80	15.30		16.45	-1.15

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## of the Madras Mural Circle.

60 0 18.2	19.3	18.65	18.65		19.65	-1.00
55 0 13.2	16.4	14.80				
50 0 12.0	14.8	13.40				
45 0 9.6	10.4	10.00				
40 0 6.4	9.3	7.65				
35 0 2.5	5.7	4.10				
30 0 0.6	0.3	0.45				
60 0 0.0	0.3	0.15	1.42		2.42	-1.00
65 0 1.5	2.6	2.05	3.60	15.65-2.42	4.63	-1.03
70 0 4.5	5.1	4.80	6.45	6	6.83	-0.38
75 0 7.9	7.2	7.55	8.70	"	9.04	-0.34
80 0 10.2	11.1	10.65	11.05	=2.205	11.24	-0.19
85 0 13.8	13.3	13.56	13.35		13.45	-0.10
90 0 15.1	15.3	15.20	15.20		15.65	-0.45
85 0 12.8	13.5	13.15				
80 0 10.7	12.2	11.45				
75 0 10.0	9.7	9.85				
70 0 7.3	8.9	8.10				
65 0 4.6	5.7	5.15				
60 0 2.7	2.7	2.70				
90 0 0.0	0.9	0.45	59.90	" "	0.35	-0.45
95 0 59.4	58.0	58.70	58.02	60.35-52.67	59.07	-1.05
99 59 56.1	55.0	55.55	55.15	6	57.79	-2.64
104 59 54.8	53.2	54.15	54.77	"	56.51	-1.74
109 59 53.5	52.0	52.75	52.92	=1.28	55.23	-2.31
114 59 53.0	51.0	52.00	52.17		53.95	-1.78
119 59 52.0	50.2	51.10	51.10		52.67	-1.57
114 59 53.0	51.7	52.35				
109 59 53.2	53.0	53.10				
104 59 55.8	55.0	55.40				
99 59 54.2	55.3	54.76				
94 59 57.2	57.5	57.35				
89 59 59.0	59.7	59.35				
120 0 0.0	57.0	58.50	59.85	" "	1.42	-1.57
125 0 1.5	59.5	0.50	2.52	10.65-1.42	2.96	-0.44
130 0 3.9	0.7	2.30	3.42	6	4.50	-1.08
135 0 5.0	3.0	4.00	5.50	"	6.04	-0.54
140 0 7.7	5.3	6.50	7.32	=1.538	7.57	-0.25
145 0 8.4	7.1	7.75	7.45		9.11	-1.66
150 0 8.9	8.1	8.50	8.50		10.65	-2.16
145 0 7.3	7.0					
140 0 9.9	6.4					
135 0 8.0	6.0					
130 0 5.7	3.4					
125 0 5.6	3.5					
120 0 2.1	0.3					
150 0 0.0	59.0	59.50	0.00	" "	2.15	-2.15
154 59 58.8	57.5	58.15	56.57	62.15-38.98	58.29	-1.72
159 59 51.0	52.3	51.65	51.52	6	54.43	-2.91
164 59 48.0	48.5	48.25	49.55	"	50.56	-1.01
169 59 44.0	44.7	44.35	44.67	=3.862	46.70	-2.03
174 59 42.2	43.0	42.60	42.17		42.84	-0.67
179 59 38.2	39.7	38.95	38.95		38.98	-0.03
174 59 41.8	41.7	41.75				
169 59 44.2	45.8	45.00				
164 59 50.2	51.5	50.85				
159 59 50.8	52.0	51.40				
154 59 55.0	55.0	55.00				
150 0 1.3	59.7	0.50				

From the mean of 10 sets, similar to the above, the errors of division for two opposite divisions are as follows :

Error of 0 and 180	=0.00	Error at	95 and 275	=0.88
5 185	-0.64	100	280	-1.58
10 190	-0.46	105	285	-1.17
15 195	+0.13	110	290	-1.48
20 200	+0.45	115	295	-1.77
25 205	+0.61	120	300	-1.57
30 210	-0.26	125	305	-0.66
35 215	-0.56	130	310	-0.96
40 220	-0.29	135	315	-1.39
45 225	+0.05	140	320	-1.33
50 230	-0.12	145	325	-1.75
55 235	-0.80	150	330	-2.15
60 240	-1.00	155	335	-1.67
65 245	-1.20	160	340	-1.20
70 250	-1.30	165	345	-0.46
75 255	-0.69	170	350	-0.20
80 260	-0.23	175	355	+0.09
85 265	-0.12	180	360	-0.03
90 270	-0.45			

I am not prepared at present to furnish the error of the divisions intermediate between the above, but I may remark that out of a great many which I have examined, the largest error I have found does not exceed that above found for 150° and 330°.

VII.—Table of the Times of high water at the principal places between Calcutta and Point Palmiras, prepared by Mr. P. G. SINCLAIR.

We have much pleasure in giving insertion to the accompanying table, which will be extremely useful not only to navigators here, but also to the philosophers in Europe, who are now engaged in investigating the course of the tidal waves over the entire globe. We published in vol. ii. p. 151, a list of Professor WHEWELL's desiderata regarding the co-tides of the Indian ocean. His memoir on the cotidal lines is published in the Trans. Roy. Society 1833, Pt. 1, and we there find that the coasts of India present nearly a blank: the time of high water at Point Palmiras differs two hours from the time given by Mr. SINCLAIR's observations. We hope to be furnished from our correspondents at other places, such as Masulipatam, Madras, Chittagong, Kyook Phyoo, Penang and Singapur with tables similar to the present, but we would suggest that the other desiderata, of the lift of the tide—the establishment of the place,—the correction for other days of the semi-lunar period, &c. should also receive the attention of observers.

The present table must not be understood as rigidly correct, but rather as an useful practical approximation; for the intervals of retar-

dations of the tide from day to day are made uniform, whereas a correction ought theoretically to be applied for the irregularity of the moon's daily motion: this correction calculated by Professor WHEWELL for the moon's mean parallax is as follows:

Time of  $\delta$ 's transit next before the tide, 0 1 2 3 4 5 6 7 8 9 10 11 12 hours.  
 Correction,..... 0 -16 -31 -41 -44 -31 0 +31 +44 +41 +31 +16 0 minutes.

In registering the time of high water for any place, so as to form the data of calculation, it should be always remembered that the interval between the moon's passage over the meridian, in apparent time, and the tide following it, is what is chiefly required, because it furnishes the direct means of verifying the above corrective equation.—Ed.

*A Tide Table between Calcutta and False Point, prepared by Mr. P. G. Sinclair.*

Moon's age.	Calcutta.	Mya-poor.	Fultah.	Diamond Harbour.	Culpee.	Mud-point.	Kedge-ree.	New Anchorage.	Saugor.	Saugor Point.	Spit Buoy.	Bala-sore River.	Centre of Bala-sore Roads 15 Fath.	Reef Buoy.	Mypur Isle or Pt. Pal-miras.	False Point.
Full & change	h. m. 3..0	h. m. 2..0	h. m. 1..30	h. m. 1..0	h. m. 12..30	h. m. 12..0	h. m. 11..30	h. m. 11..0	h. m. 10..30	h. m. 10..10	h. m. 9..30	h. m. 10..0	h. m. 9..0	h. m. 9..0	h. m. 8..30	h. m. 7..30
1	3..48	2..48	2..18	1..48	1..18	12..48	12..18	11..48	12..18	10..58	10..18	10..48	9..48	9..48	9..18	8..18
2	4..36	3..36	3..6	2..36	2..6	1..36	1..6	12..36	12..6	11..46	11..6	11..36	19..36	10..36	10..6	9..6
3	5..24	4..24	3..54	3..24	2..54	2..24	1..54	1..24	12..54	12..34	11..54	12..24	11..24	11..24	10..54	9..54
4	6..12	5..12	4..42	4..12	3..42	3..12	2..42	2..12	1..42	1..22	12..42	1..12	12..12	12..12	11..42	10..42
5	7..0	6..0	5..30	5..0	4..30	4..0	3..30	3..0	2..30	2..10	1..30	2..0	1..0	1..0	12..30	11..30
6	7..48	6..48	6..18	5..48	5..18	4..48	4..18	3..48	3..18	2..58	2..18	2..48	1..48	1..48	1..18	12..18
7	8..36	7..36	7..6	6..36	6..6	5..36	5..6	4..36	4..6	3..46	3..6	3..36	2..36	2..36	2..6	1..6
8	9..24	8..24	7..54	7..24	6..54	6..24	5..54	5..24	4..54	4..34	3..54	4..24	3..24	3..24	2..54	1..54
9	10..12	9..12	8..42	8..12	7..42	7..12	6..42	6..12	5..42	5..22	4..42	4..42	4..12	4..12	3..42	2..42
10	11..0	10..0	9..30	9..0	8..30	8..0	7..30	7..0	6..30	6..10	5..30	6..0	5..0	5..0	4..30	3..30
11	11..48	10..48	10..18	9..48	9..18	8..48	8..18	7..48	7..18	6..56	6..18	6..48	5..48	5..48	5..18	4..18
12	12..36	11..36	11..6	10..36	10..6	9..36	9..6	8..36	8..6	7..46	7..6	7..36	6..36	6..36	6..6	5..6
13	1..24	12..24	11..54	11..24	10..54	10..24	9..54	9..24	8..54	8..34	7..54	8..24	7..24	7..24	6..54	5..54
14	2..12	1..12	12..42	12..12	11..42	11..12	10..42	10..12	9..42	9..22	8..42	9..12	8..42	8..12	7..42	6..42

VIII.—*Proceedings of the Asiatic Society.*

*Wednesday Evening, the 3rd September, 1834.*

The Reverend W. H. MILL, D. D. Vice-President, in the Chair.

Read the Proceedings of last Meeting.

Read a letter from Mr. M. M. MANUK, intimating his desire to withdraw from the Society.

Read a letter from H. HARKNESS, Esq. Secretary to the Royal Asiatic Society of Great Britain and Ireland, expressing the thanks of that Society for the 17th volume of the Asiatic Researches.

The Secretary apprized the Society, of the arrival per Ship Edmonstone, of the twenty copies of the ancient Canarese Alphabet advorted to on the Meeting of 28th May, 1834, as presented by WALTER ELLIOT, Esq. through the Bombay Branch Asiatic Society.

It was resolved that copies of the Alphabet should be sent to the Bishop's College, the Education Committee, the Sanscrit College at Benares, and to such persons as may be engaged in decyphering ancient inscriptions.

*Library.*

Read a letter from Dr. N. WALLICH, presenting on the part of the Royal Society of Northern Antiquaries at Copenhagen, the following works with complimentary expressions :

A circular accompanied, explaining the objects of the association, and soliciting the co-operation of those, especially of the English nation, who may be able to assist in developing the early history of Northern Europe.

[A copy of the prospectus is printed on the cover of the present number.]

1. E. RASK's *Commentatio de pleno systemate decem sibilantium in linguis montanis, item de methodo Ibericam et Armenicam linguam litteris Europæis exprimendo.* Hafniæ, 1832, 4to.
2. Ditto, *Singalesisk Skriftlærr, (Cingalese Grammar,)* Colombo, 1821, 8vo.
3. Ditto, *Veiledning, or Introduction to the Akra language of the Coast of Guinea, with an Appendix on the Akvambu language.*
4. Ditto, *Lapponic Grammar.*
5. Ditto, *Italian Grammar ? 1827.*
6. Ditto, on *Ancient Egyptian Chronology.* Copenhagen, 1817, 4to.
7. Ditto, on *Ancient Hebrew Chronology, 1828, 8vo.*
8. *Old Northern Saga's (Tales).* Edited by the R. S. of North Antiquities, 11th vol. 1833.
9. *Færeyinga Saga, or A History of the Inhabitants of the Islands called the Færoes.* The original Icelandic text, with translations into Færoe, Danish, and German, 1829.
10. 11. *Tidskrift, Journal of the Northern Antiquities, by ditto.*
12. *Nordisk Tidskrift, Northern Journal of Antiquities.* Edited by the Royal Society of Northern Antiquities, 1826-9.
13. *Paradisa Missir, (Paradise Lost,)* translated into Icelandic, by Joe Thorlaksson.
- 14-15. *Scripta Historica Islandorum, vols. iv. and v. Hafniæ, 1833.*
- 16-17. *Lögbók Islandinga, Codex Juris Islandorum Antiquissimus, I. and II. 1829.*
18. *L. Giesebrecht.* The R. S. of N. Antiquities at Copenhagen.

Read a letter from M. RICHY, Judge of Chandernagore, presenting on the part of M. GABOIN DE TASSY, a copy of his

Notice sur les fêtes populaires des Hindous d' apres les ouvrages Hindoustani.

The following works were also presented :

Commentaire sur Le Yaçna, L'un des Livres Religieux des Parsis, by Eugene Burnouf, vol. I.—by the author.

Origin of the Sikh Power in the Punjab, and Political Life of Muha Raja RUKHET SINGH, &c. compiled by H. T. PRINSEP—by the compiler.

Journal Asiatique, Nos. 71, 72 and 74—by the Asiatic Society of Paris.

Transactions of the Society of Arts, &c. vol. xlix, I and II parts—by the Society.

Proceedings of the Geological Society, Nov. 6, 1833, Dec. 4\*.

Illustrations of the Botany, and Natural History of the Himalayan Mountains, &c. Part II.—by F. J. Royle, Esq. F. L. S. and G. S. M., R. A. S.

Meteorological Register for July, 1834—by the Surveyor General.

The India Journal of Medical Science for September—by the Editors.

The following Books were received from the Book-sellers.

Lardner's Cabinet Cyclopaedia, History of Natural Philosophy.

—————, Rome, 1st vol.

—————, Stebbing's History of the Church, 2nd vol.

*Antiquities.*

A native drawing of a compartment of one of the sculptured slabs of a building near Bhilsa, was presented by Dr. G. S. SPILSBURY.

This appears to be the very building whence Mr. HODGSON took the facsimile of his inscription, presented at a former meeting: the sculpture represents the erection or consecration of a Bauddha temple or *Chaitya*. It was visited in 1817 or 18 by Captain FELL, who described the inscriptions on the walls in one of the news-papers of the day.

Read a letter from Mr. TREGEAR of Jaunpur, descriptive of two gold coins of the Canouj group, recently discovered in digging on the site of an old fort called *Jaichand's koth* near Jaunpur.

[We shall have pleasure in inserting this paper when we have collected sufficient of the Canouj coins to make a plate. The inscriptions on the present coins are very distinct, in the character No. 2, Allahabad column, and the names are new.]

Further observations on the Hindu coins by Major STACY, were also submitted.

A note from Mr. SPIERS, of Allahabad, forwarded 4 coins dug up lately near that place.

They belong to what has been called the Behat group.

A paper by Col. BURNBY, Resident at Ava, was read, giving a translation and copious commentary in illustration of the Burmese inscription at *Bud-dha Gaya*: of which the original facsimile taken by his brother Captain GEORGE BURNBY, on the spot, accompanied.

This will be published at length; the principal discrepancy between Col. BURNBY'S translation and that made by RATNA PAULA is in the date, which the former carries back two hundred years, namely, to 468 Burman era, (A. D. 1106.) The first figure is rather indistinct in the inscription, and may be read either as

\* This day's proceedings contains a notice of Lieut. BURNES' Memoir on the Geology of the banks of the Indus, the Indian Caucasus and the plains of Tartary.

a 4 or a 6. The facsimile must be lithographed to place the data before those who wish to decide the point. Col. BURNEY's interesting paper terminated with a highly curious extract-translation from the journal of the junior Burmese envoy, describing the visit of the mission to "Buddha's holy tree" at Gaya, and the ceremonies performed there in honor of the King of Ava.

*Physical.*

The Secretary exhibited to the members present the head of a mummy, and two mummied preparations of the *ibis* or sacred bird of Egypt, brought round by Lieutenant ARONBOLB, being a part of his present alluded to at the last meeting.

The effect of damp air had already begun to be perceptible on the exposed parts of the head; nothing of the under jaw remaining but the bare bone, tinged of a dark brown colour from the bituminous matter of the wrapper. By keeping it in a glass case hermetically closed, and containing some lumps of muriate of lime, it is hoped that the specimens may be preserved for any length of time in the museum.

A letter was read from Lieut. W. FOLEY, dated Khyouk Phyoo, Rambree, 12th August, forwarding some specimens of fossil shells recently met with by himself in the interior of the island; also some coal from a new site.

The following extract explains the particulars of this new discovery:

"On my return to Arracan I made inquiries respecting the fossil marine shells that were at one time brought to me, and I have been so fortunate as to obtain them. They were found on a hill, in the neighbourhood of "*Chambo*" (a village in the interior of Rambree island), imbedded in a grey sandstone, which is very hard and gritty. The height of the hill may be as much as 100 feet above the plain. The weather has been so wet and boisterous that I have not been able to visit the spot, so that my information has been derived from the Mughs whom I had sent out to the place. They brought me in the shells, as also pieces of the sandstone. In the latter some remains of the shells are distinctly visible. The natives of Arracan attach much value to the shells on account of their supposed medicinal properties; the shells are pounded up, made into a kind of paste, and applied, as a salve, to sore eyes. Along with these shells I have also dispatched to you a specimen of coal discovered in Rambree island, near the village of "*Kyong-Toung*" in the "*Ladong*" circle; it was found resting on a bed of clay, near the surface, and did not appear to be very abundant. For the reason above mentioned I was not able to visit the spot, so sent a man out for the coal. Coal, I have no doubt, exists in abundance throughout Arracan; and of that hitherto discovered, I expect the *Syne-Kyong* coal, if worked, would prove the best. I believe it contains no iron pyrites, as is the case with the "*Oogadong*" and "*Phooringpoo*" coal. The coal I now sent is highly bituminous, and very much resembles the "*Kalabadong*" coal. I observe an error in the *shetoh* of the site of the *Oogadong* coal published in your 2nd volume of the Journal As. Soc. plate 19, for November, 1833; instead of "*Syne-Kyong*" creek, it should have been "*Oodagong*" creek. The former word should also have been *Syne-Kyong*, not "*Syney-Kyong*."

"I have also dispatched to you a specimen of cotton obtained from some Bourbon cotton seed sown by Captain WILLIAMS in the Government Garden at Rambree town in November, 1833, and gathered in March, 1834. The soil was a stiff clay and I believe, too cold and damp to favour the cultivation of the plant. It would however thrive well on the hills, where the soil is light."

Three of the shells are small univalves of 4 whorls, resembling the genus *turbo*; one is a species of *furritella*; the matrix is grey sandstone, containing the debris of trap rocks, and effervescing in acids slightly.

The coal is a lignite, leaving only 1.8 per cent. of ash on incineration.

Read the following extracts of a letter from the Reverend R. EVEREST regarding the fall of an aerolite at Hissar.

"Having seen in the possession of Mrs. METCALFE of Delhi a fragment of meteoric stone, which she informed me had lately fallen near Hissar, I wrote to Capt. PARSONS, Supt. H. C. Stud there, for particulars, and have now the pleasure of sending his answer to you. The fragment I have seen bears the usual external characters of meteoric stone, has the same specific gravity, viz. 3.6, and affects the magnet. There can therefore be no doubt of the fact.

ROB. EVEREST.

*Extract of a letter from Captain Parsons, dated Hissar, 2nd August, 1834.*

"I hasten to give you all the information I possess relative to the meteoric stone. It fell on the 8th of June, (as far as I could ascertain) at Charwallas, a village 23 coss west of this; about 8 o'clock in the morning the sky was cloudy and the weather gusty, or approaching to a north-wester, but no rain; very loud thunder, similar to constant discharges of heavy artillery, was heard for about half an hour before it fell, and in the direction *with* the wind to a great distance; when the stone fell it was accompanied by a trembling noise similar to a running fire of guns. It fell in the jungle close to a palee (or herdsman), who was out with his cattle. The original weight of the stone was 12 seers; but before my man reached the place, it had been broken and pieces taken away to Bikaneer, Puttialah, &c. the piece I have is upwards of 4 seers, and if you would like to send it to Calcutta, you are most welcome to it, and I will send it to you, should you wish for it."

Further specimens of the Jumna fossil bones belonging to Serjeant E. DEAN, were exhibited, and a paper on the subject by the same party was read.

[This will be given at length hereafter.]

#### IX.—Miscellaneous.

*Mr. Trevelyan's Defence of Sir William Jones' System of Oriental Orthography.*

The Hurkaru newspaper of the 29th August, contains a reply to the article in our June number (p. 281), on the Adaptation of the Roman Alphabet to the Orthography of Oriental Languages, by the gentleman who has come forward with such vigour to revive the scientific system, as a necessary concomitant of his more extensive scheme of publishing Oriental books altogether in Roman characters. We have not space to insert the whole of his observations, but to such as bear upon the point at issue, we feel bound to give a place, being more satisfied, the more we reflect on the subject, that it is essential and imperative in the present widely diffused cultivation of the learned languages of India, to adhere to that notation which can alone command general acquiescence throughout Europe, and which is, in fact the system followed in the great majority of the Dictionaries, Grammars, and transcribed works not only of our learned societies, but even of our colleges and schools.

The fundamental maxim of Sir WILLIAM JONES was, that each original sound and its appropriate symbol in the Déva Nágarí or Arabic should have its representative in the Roman, "with due regard to the primitive power of the latter alphabet."

Professor RASK also advocates the making of the Roman substitutes as nearly consonant as possible to the original;—"in his vero, me quidem iudice, hoc præceptum semper servandum, ut *quam proxime ad mentem ipsius nationis exprimantur ejus literæ.*" On this score the JONESIAN far surpasses the GILCHRISTIAN scheme of vowels, the long and short vowels of the same class being expressed by the same character:—but we must allow Mr. TREVELYAN to speak for himself.

"Sir Wm. JONES' plan is systematic and complete in all its parts, so that in every case in which an analogy exists between different sounds, a corresponding analogy will be found to pervade the signs by which they are represented. Thus the long sound of *a* is *á*; of *i*, *í*; and of *u*, *ú*; and the diphthong *ai*, which is compounded of *a* and *i*, is represented by those letters, and *au* (*ow*) which is compounded of *a* and *u*, by *au*. The consequence of this strict attention to preserve an analogy in the sign corresponding to the variations in the sound is, that the acquisition of the Alphabet is greatly facilitated to the learner, who in fact has to make himself acquainted with only five elementary signs which are the representatives of as many original sounds, and the remaining five are only elongated form or composites of these.

"In Dr. GILCHRIST'S plan, with a single exception, there is no analogy whatever between the long and short forms of the vowels, and between the diphthongs and their component vowels. Thus in his system *a* is the long form of *u*, *ee* of *i*, and the diphthong *ai* is represented by *ue*, and *au* by *u o*. It is needless to dilate on the confusion which this want of system must produce in the mind of every learner. No help is here provided for him, and instead of being guided from step to step by a change in the form of the character, sufficient to distinguish the modification in the sound, while enough is retained of the original letter to mark the elementary connexion, he is perplexed by a variety of characters between which no kind of analogy is capable of being traced. In short, instead of having only five signs to get by heart, he has no less than nine. In tracing the analogy between corresponding modifications of sound, this plan is worse than if no assistance were afforded him. In this eccentric system of letters long vowels are actually divorced from their partners and so disguised as to render it impossible to recognize the original connection between them, and diphthongs are in like manner kidnapped from their parent vowels, and disfigured worse than Gypsey children. Who would suppose that *u* is the legitimate husband of *a*, that *ee* is the devoted wife of *i*, that *ue* is the interesting offspring of *a* and *i*, and *uo* the eldest hope of *a* and *u*. This is not a system of *orthography*, but if I may be allowed to invent a word, of *kakography*; of confusion, mystification and absurdity. It is singular that when a man sat down with a *carte blanche* before him to invent a system of letters, he was not able to devise something better than this; and it is still more so that having the labours of his learned predecessor Sir W. JONES to profit by, when he altered he should have altered so much for the worse.

"Another advantage of Sir WILLIAM JONES' plan is that, besides being complete in itself, owing to the perfect analogy which exists between the different letters, it bears a strict correspondence throughout to the great Indian or Deva Nágarí alphabet. All the alphabets derived from the latter are very systematic, and a scheme which is otherwise cannot properly represent them. But Sir W. JONES does it exactly, as will be seen from the following table:

☞	<i>a</i>	in	above	☞	<i>á</i>	in	art
☞	<i>i</i>	in		☞	<i>í</i>		police

उ	u	push	ऋ	ú	rule
ए	e	they	ऐ	ai	aisle [pronunciation.
ऋ	o	note	औ	au	causa, Italian or Latin

"The natives of India are therefore already quite familiar with the idea of distinguishing the modification of sound by a corresponding modification of sign, and when they see the same plan adopted in the anglicized version of the alphabet, they immediately recognize the propriety of it, and enter into the spirit of the scheme. As the new orthography is mainly intended for the people of India, the circumstance of its being entirely coincident with their preconceived feelings and ideas must be allowed to be an advantage of no small importance.

"It is hardly necessary to observe, that no kind of analogy exists between Dr. GILCHRIST's and the Indian Deva Nágari alphabet. When an Indian reads Sir WILLIAM JONES' alphabet, he sees a long á immediately succeeding the short a; a long í the short i, and a long ú the short u, (the long vowel being in each case distinguished by a mark as in the Sanscrit) which is just what his previous knowledge would lead him to expect; but when he comes to Dr. GILCHRIST's plan, he finds a following u, and ee following i. What therefore would be his opinion of the comparative merits of the two systems? Would he not say, that one is in every respect as complete as the alphabet of the gods (Deva Nágari), while the other is an inexplicable mass of confusion.

"Another advantage attending Sir WILLIAM JONES' system is, that it is not only analogous to, but is the very system itself which is used in expressing Latin and all its derivations; that is Italian, Spanish, French, &c. It is true that in England we do not pronounce Latin in this way, but this is only because we have barbarized it, and made it accord with our Saxon pronunciation. Even in Scotland and Ireland, to say nothing of Continental Europe, they read Latin exactly in the way in which it is now proposed to read Hindusthání. This entire coincidence of the new Hindusthání orthography with the orthography of the learned language of the whole of Europe, and with that of most of its colloquia! languages, is a point of great importance. Even in the present age its advantage will be felt, in so far as the learned all over Europe, and in most cases the vulgar also, will by this means obtain direct access to our Indian Literature; and what is still more deserving of consideration, a foundation will be laid for the establishment in due time of a uniform system of orthography throughout the world. This is an object, which, however distant the prospect of accomplishing it may be, no man who has the slightest regard for posterity, should ever lose sight of:—next to the establishment of an universal language, that grand desideratum of the philosopher and the philanthropist, the establishment of an universal system of orthography will most tend to the production of unrestricted freedom of intercourse between all the families of the human race; and the one has also a direct tendency to bring about the other. Now if GILCHRIST's plan were to be generally maintained in India, so far from having advanced a step towards this grand result, we should make a decidedly retrograde movement, and the proceeding would be tantamount to shutting the door to the possibility of a uniform system of writing and printing being ever adopted in the eastern and western hemispheres. GILCHRIST's plan is utterly abhorrent from the Roman family of languages, and it does not even coincide with the English, as will be shown hereafter.

"Sir WILLIAM JONES' plan has a simple character for every simple sound, while in Dr. GILCHRIST's simple sounds are in three instances expressed by double letters

[ee, oo and oo]. This, to say the best of it, is an extremely clumsy contrivance, and in the business of nations and course of ages it would lead to an immense unnecessary expenditure of time and money. That this is the case, may be seen by taking the example of a single sentence,

Bees tees moorghabee huen toomharee peechee,

which in Sir WILLIAM JONES' orthography would be,

Bis tis maughábi hain tumhári pichi.

“There are 37 letters in this sentence written according to Dr. GILCHRIST's plan, and only 30 if it be written according to JONES; that is to say, in only 6 words the former exceeds the latter by no less than 7 letters. Apply this to a book, and conceive the waste of types, paper, and valuable time which must result from it. Supposing an octavo volume, printed according to Sir WILLIAM JONES' plan, to consist of 500 pages, and each page to contain on an average 304 words, the total number of words in the volume would be 1,52,000; and if the same volume were printed according to Dr. GILCHRIST's plan, then at the rate of 7 additional letters for every 6 words, the number of extra letters will amount to 1,77,000, which would make an addition to the book of 116 pages, and instead of consisting of 500 pages it would consist of 619. Apply this to the entire literature of half the world through a succession of ages, and conceive the result, if you can. If this average is considered to be above the mark, I have no objection to suppose that every six of GILCHRIST's words contain only half the number of double letters which those above instanced do, and at this rate the book printed according to GILCHRIST's plan would exceed what it would be if printed according to Sir WILLIAM JONES' plan by 58 pages.

“Lastly, there are three characters in GILCHRIST's alphabet which do not belong to English or to any other language under the sun which we have ever heard of. These are *oo*, *ue* and *uo*. With the exception of the pupils of Dr. GILCHRIST who, from early associations and respect to their master, may naturally be expected to be admirers of his scheme, these three characters are utterly barbarous to every description of people; and it is therefore impossible for them to secure a general recognition for themselves in the breasts either of Englishmen, European foreigners or Indians. Sir WILLIAM JONES' plan, as has been before stated, contains no arbitrary sounds whatever, but is in every respect in strict accordance with the Latin and Latino-European languages. Even the *au*, of which no example is to be found in English, is perfectly familiar to every Scotchman and Irishman who knows Latin; and if a youth at Dublin College, or the High School at Edinburgh, were to pronounce *causa* like *cawsa*, he would be immediately corrected and told to sound it *cawsa*, and the same of course every where on the continent of Europe.

“It should be borne in mind that Sir WILLIAM JONES and Mr. GILCHRIST both drew from the mine of English letters, and that the only difference between them is that one appropriated the dross, while the other called the pure gold. GILCHRIST chose the most corrupt and imperfect parts of our system, while JONES selected those which were consistent with true principles and coincided with the most perfect alphabets both of the East and West. The *i* in *police* is almost as well known in English as the double *ee* in *feel*. The *u* in *pull* is certainly better known than *oo*, which is pure GILCHRISTIAN. The *ú* in *rule* is as familiar as the double *oo* in *cool*. The *ai* in *aisle* is assuredly far more common than *ue*, which is another arbitrary sign to be found no where except in the books printed by Dr. GILCHRIST himself. The *au* in *causa* (Latin pronunciation) is also better under-

stood than *uo*, which is another Gilchristian hieroglyphic; and even the short *u*, the stumbling-block of our GILCHRISTIAN friends, is quite as familiar to us as their favourite *u*, and any body who will take the trouble to look in the English Dictionary, will see it used at the commencement of 500 words like *above*, *about*, *abound*, and so forth."

We have not space to continue our extract, nor does the remainder of the author's reasoning bear upon the precise question at issue. He however mentions one strong fact in support of his object; namely, that the Italian orthography has been adopted by the American missionaries for the language of the Sandwich Islands. To this we may add, that the same as far as regards the vowels is uniformly upheld by Professor RASK of Copenhagen, the celebrated philologist, who has devoted years of study to the fixing of accurate Roman equivalents for the Zend, Arabic, Sanscrit, Armenian, and other alphabets. We recommend his essay "*de Plano Systemate Decem Sibilantium in Linguis Montanis, &c.*" to the serious attention of all those engaged in similar objects; the following caution applies to the case of the Bengálí and other dialects derived from the Sanscrit stock, in which it has been opposed to the uniform system, that the inherent short vowel having the sound of *o* could not be represented by *a*.

"*Altera cautela haud parvi momenti est, ubi lingua quædam antiqua quodammodo adhuc vivit, nimirum ne pronunciatione hodierna, si a litera discedat, pro genuina assumta, scripturam antiquæ linguæ ad eam exprimendam depravemus, vocumque etymologias turbemus.*"

The above remark of course equally opposes any reform of the *spelling* of an established language like the English or the French to suit the modern pronunciation. His concluding paragraph will afford encouragement to those who calculate upon the eventual substitution of the Roman characters for those of India, although he is far from anticipating any such effect even for the limited country, Armenia, (Christian though it be) to whose language his essay refers.

"*His observatis, haud ita difficile est scripturam Europæam cuius linguæ peregrinæ accomodare, atque ita quidem ut ipsa gens, si per commercium Europæorum tale systema existere resciverit, immensum ambitum literaturæ gentium Europæorum intellexerit, fructum, oblectationem, gloriam inde redundantes consideraverit, haud reluctanter id suum facere velit, saltem viri docti non solum voces singulas accuratè et sine ulla confusione citare, sed quodlibet scriptum gentis ita transcribere et facili negotio typis exprimere; immo transcribendo comoda quædam pensa in studio suo hand parva levare poterunt.*" *Commentatio &c. Aut. E. Rask, Hafniæ, 1832.*

*Royal Asiatic Society of Great Britain and Ireland.*

We observe that this Society has come to the determination of publishing its future Transactions in the form of a *Journal* in octavo, to appear once in three months, price 6s. We cannot but feel that this resolution strengthens greatly the arguments in favor of the plan adopted and pursued now for nearly six years by Captain HENBERT and ourselves, for whatever can be urged in support of a quarterly journal—the early appearance of papers, the cheap and convenient form for circulation, &c. will apply more forcibly to a monthly periodical. This is the only form in which the lucubrations of the French Asiatic Society—a Society yielding to none in the erudition and activity of its members—have hitherto appeared.

The cover of the present number contains the prospectus of the new journal.

X.—*Catalogue of Birds of the Raptorial and Insectorial Orders, (systematically arranged,) observed in the Dakhan, by Lieut.-Colonel W. H. SYKES, Bombay Army, F.L.S., F.G.S., F.Z.S. M.R.A.S.*

In the first volume of the Journal, page 161, we presented Col. SYKES'S catalogue of the Mammalia of South India. This officer's fame as a naturalist has, we are happy to see, raised him to a Vice President's chair in the Zoological Society of London. In the proceedings of this active institution for April, 1832, (the arrival of which in India was by some accident delayed,) we perceive the following useful catalogue of the birds of the same country, which we hasten to transfer to our Journal. The list is prefaced by the following remarks :

Lieut.-Colonel SYKES, having brought before the Committee at previous meetings various Birds of the Raptorial and Insectorial Orders, collected by him during his residence in Dakhan, completed on the present evening the exhibition of his collection of those orders. He limited his observations on the several species to brief extracts from the copious notes which he had made in India respecting their habits, internal anatomy, and geographical distribution. In bringing them in succession under the notice of the Committee, he observed the order adopted in the following catalogue :

ORDER 1. RAPTORES, III.

Fam. *Vulturidæ*, Vigors.—Genus *Vultur*, Auct. *Vulture*.

1. *Vult. Indicus*, Lath. *Vautour Indou*, Temm., Pl. Col. 26. *Mahah Dho* of the Maharrattas.

*Irides* deep brown. Length 42 inches, inclusive of tail of 10½ inches. A stone half an inch in diameter was found in the stomach of one bird. The proportional length of the intestine to the body in these birds is 3 to 1, while in the *Neophron Percnopterus* it is 5·20 to 1. They congregate in flocks of twenty or thirty. On a dead camel, or horse, or bullock being thrown out on the plain, numbers of these *Vultures* are found assembled round it in an incredibly short time, although they may not have been seen in the neighbourhood for weeks before. Col. SYKES'S specimens are no doubt referrible to M. TEMMINCK'S species, although the latter bird is described as having whitish *irides*.

2. *Vult. Ponticarianus*, Lath. *Vautour Royal de Pondicherry*, Sonn., p. 182. pl. 104.

The *irides* are described by SHAW as red, while in two of Colonel SYKES'S specimens they were of a deep brown, and in the third of a bright straw-yellow; but as the last had allowed itself to be captured by hand, had only grass and stalks of herbaceous plants in the stomach, and was evidently ill, the pale colour of the *irides* may be attributed to disease. Sexes alike in plumage. Mostly solitary. Colonel SYKES seldom, if ever, saw more than two together. The remarkable flatness of the crown, and very great width of the *cranium*, would seem to indicate a generic difference between this species and the *Vult. fulvus* and *Bengalensis*. Length of bird 36 inches, inclusive of tail of 11 inches.

3. *Vult. Bengalensis*, Gmel. *Bengal Vulture*, Lath. *Geed* of the Maharrattas.

Of a smaller size, and with shorter and stouter legs than *Vult. Indicus*. Habits similar. Sexes alike. Length 30 inches, inclusive of tail of 10 inches. Colonel SYKES was induced to consider this species of Gmelin as distinct from *Vult. cinereus*, with which it has been classed by M. TIMMINCK, in his *Manuel d'Ornithologie*, p. 4.

Genus *Neophron*, Sav.

4. *Neophron Percnopterus*. *Vultur Percnopterus*, Linn. *Rachamah*, Bruce, Trav. Append. p. 163.

*Irides* intense red brown. Gregarious. Sexes alike in adult birds; but non-adult birds vary in plumage from fuscous to mottled brown and white. These birds are always found in cantonments and camps. For the most part of the day they continue on the wing, soaring in circles. When on the ground, they walk with a peculiar gait, lifting their legs very high. They are efficient scavengers. Length 29 inches, inclusive of tail of 11 inches.

Fam. *Falconidæ*, Lench.

Sub-Fam. *Aquilina*. *Eagles*.

Genus *Haliaeetus*, Sav. *Sea Eagle*.

5. *Hal. Ponticarianus*. *Falco Ponticarianus*, Lath. *Aigle de Pondicherry*, Buffon, p. 136, Pl. Enl. 416. Called *Brahmany Kite* by Europeans in India.

*Irides* reddish brown. It is seen constantly passing up and down rivers at a considerable height, but prepared to fall at an instant on its prey. Usually it seizes while on the wing, but occasionally dips entirely under water, appearing to rise again with difficulty. It is quite a mistake to suppose it feeds on carrion. Colonel SYKES has examined the contents of the stomach and crop of many specimens, and always found fish, and fish only, excepting on one occasion, when a crab was

met with. Sexes alike. Female lays two large white eggs. Length, inclusive of tail, 19 to 21 inches: tail 9 inches.

Genus *Circæetus*, Vieill.

6. *Circ. brachydactylus*. *Falco brachydactylus*, Wolf. *Aquila brachydactyla*, Meyer. *Falco Gallicus*, Gmel., p. 295. sp. 52. *Le Jean le Blanc*, Pl. Enl. 413. Colonel SYKES's specimen was a female. Irides deep orange at the external margin, passing to straw-yellow at the internal margin. The remains of a snake and two rats were found in the stomach. Length, inclusive of tail, 30 inches: tail 11 inches.

Genus *Aquila*, Auct.

7. *Aq. chrysaëta*. *Falco chrysaëtos*, Linn. *Golden Eagle*, Lath. Colonel SYKES's specimen differs so slightly from the European bird as not to justify its separation.
8. *Aq. bifasciata*, Hardwicke and Gray's Ind. Zool. Irides brownish yellow ochre. Sexes alike in plumage; non-adult birds paler than adults. A whole rat found in the stomach of one bird. A second bird was shot by Colonel SYKES at the dead carcass of a royal tiger; but it had not tasted the banquet, as the stomach was empty. Length, inclusive of tail, 30 inches: tail 11 inches.

Genus *Hæmatornis*, Vigors.

9. *Hæm. Bacha*. *Falco Bacha*, Daud. pl. 22. *Le Bacha*, Le Vaill., Ois. d'Afr. pl. 15. Colonel SYKES's collection does not possess a specimen, but he identified a specimen in the possession of a friend, shot in the Dakhn.

Sub-Fam. *Accipitrina*. Hawk.

Genus *Accipiter*, Ray. Sparrow Hawk.

10. *ACCIPITER DUKHUNENSIS*. *Acc. supra fusco-brunneus, plumarum marginibus pallidioribus, capite postico nuchæque albo variegatis; subtus albus, pectore abdomineque notis subrotundatis granitibus, femorum tectricibus parvis, rufescentibus striatis; tectricibus fusco fasciatis, fasciis externarum confertioribus; tarsi subbrevis*. Irides stramineo-flavæ, margine gracilli nigro circumdatæ.

Longitudo corporis 14½ unc., caudæ 6½, tarsi 1½.

Sexes alike in plumage. Resembles the *Acc. fringillarius*, but differs in the longitudinal broad reddish patches on the breast, in less red on the sides, in a black narrow streak down the throat, in shorter wings, in the tail having six broad bars instead of four, in the male bird being as large as the European female, and finally in the shorter tarsi and centre toes.

11. *Acc. Dussumieri*. *Falco Dussumieri*, Temm., Pl. Col. 308. female. Irides bright yellow, with an exterior narrow margin of black. Wings short. Tail long and narrow, being only the width of the upper feather. M. TEMMINCK's specific characters are taken from a female, the male being unknown. Colonel SYKES has but one specimen, and that a female, the male being unknown to him. Length, inclusive of tail, 12½ inches: tail 6½ inches.

Genus *Astur*. Auct. Goshawk.

12. *ASTUR HYDER*. *Ast. corpore supra et subtus brunneo, dorso imo rufescenti, plumarum rhachibus fuscis, alarum tectricibus albo notatis; abdomine maculis albis fasciato; frontis fasciâ gracili guttureque albis, hoc lineis tribus latis fuscis, una in medio, cæteris utrinque ad latera, notato; femorum tectricibus crissoque albis, rufo fasciatis; caudâ supra rufâ, fasciis quinque gracilibus, ferè obsoletis, alterâque prope basin latâ, fuscis notatâ; remigibus fusco-brunneis ad apicem fuscis, pogonia interna fasciis quinque fuscis gracilibus, alboque ad basin notatis. Rostrum ad basin flavum, ad apicem nigrum. Pedes flavi; unguibus nigris. Longitudo corporis 16½—17 unc., caudæ 6½—7.*

This bird has the three stripes upon the throat, and the aspect of *Falco trivirgatus*, Temm., fig. 303, but it is a much larger bird than M. TEMMINCK's, and has otherwise characters in the plumage to entitle it to a specific distinction. A couple of mice were found in the stomach of one bird. Sexes alike in plumage. Female a little larger than the male.

Sub-Fam. *Falconina*.

Genus *Faco*, Auct. *Falcon*.

13. *Falco Tinnunculus*, Linn. *Kestrel*. Irides intense brown. A very abundant bird in the Dakhn. Both sexes are absolutely identical with the European birds in their characteristic plumage.

Colonel SYKES, nevertheless, mentions his being in possession of a male bird exactly like the female of the *Kestrel* in plumage and size, and, consequently, larger than the male *Kestrel*: and as this was shot from a party of five or six, perched on the same tree, and without a male *Kestrel* in company, he is induced to believe there is a distinct species, in which both sexes have the plumage of the female European *Kestrel*. Remains of rats, mice, lizards, grasshoppers, and a bird, were found in the stomach of several specimens. In one stomach the remains of no less than four lizards were met with.

14. *Falco Chicquera*, Lath. *Le Chicquera*, Le Vaill., Ois. d'Afr. pl. 22.

*Irides sanguineous*. A common bird in the Dakhn. Sexes alike in plumage. Female usually the larger bird; but Colonel SYKES has a male quite as large as any female. A sparrow was found in the stomach of one male bird, and a young but in the stomach of another.

Sub-Fam. *Buteonina*. Buzzards.

Genus *Circus*, Auct. *Harrier*.

15. *CIRCUS FALLIDUS*. *Circ. pallidè griseus, alis dorsoque saturatioribus; subtus albus, uropygio albo, griseo fasciatim notato; rectricibus, duabus mediis exceptis, griseo alboque fasciatis; remigibus tertiam quartam quintamque fuscis.*

*Irides viridi-flavæ. ♂. Longitudo corporis 19½ unc., caudæ 9½; ♀ corporis 21½; caudæ 10.*

This bird has usually been considered the *Circ. cyaneus* of Europe; but it differs in the shade of its plumage (male and female); in the back-head of the male not being white spotted with pale brown; in the absence of dusky streaks on the breast; in the rump and upper tail-coverts being white barred with brown ash; in the inner webs of four of the tail-feathers not being white; and in the bars of the under tail being seven instead of four. The female resembles the female of *Circ. cyaneus*, but the plumage is two shades lighter, the tail is barred with six broad fuscous bars, instead of four, and the tail-feathers are much more pointed. The remains of six lizards were found in the stomach of one bird. Colonel SYKES never saw these birds perch on trees. They frequent the open stony plains only. The sexes were never seen together.

16. *CIRCUS VARIEGATUS*. *Circ. capite supra, nuchâ, plitibus, pectoreque rufis, plumis in medio latè brunneis; dorso scapularibus, remigibusque externis intense brunneis; pteromatibus, remigibus internis, candidaque griseis; abdomine femorumque tectricibus rufis; caudæ tectricibus superioribus rufo albo brunneoque, inferioribus griseæ saturatiore, notatis. Longitudo corporis 21 unc., caudæ 10.*

This is a very remarkable bird, and in its plumage seems to possess much of the united characters of the sexes of this genus, which are known generally to exhibit a marked difference. Colonel SYKES possesses but one specimen, a male.

Sub-Fam. *Milvina*.

Genus *Milvus*, Auct. *Kite*.

17. *MILVUS GOVINDA*. *Milv. capite, nuchâ, corporeque subtus rufescenti-brunneis, plumis in medio fusco lineatis; dorso, alis, caudâque satis furcatâ saturatè brunneis, illarum pteromatibus pallidioribus, hâc fusco obsolete fasciato. Longitudo corporis 26 unc., caudæ 11.*

This bird differs from the *Falco Cheele* in the want of white spots on the wing-coverts, white before the eyes, and white bar on the tail; in having the inner webs of the tail-feathers barred with numerous narrow bars, and in the shafts of the feathers about the head and neck, and generally underneath, being very dark. Sexes alike. Constantly soaring in the air in circles; watching an opportunity to dart upon a chicken, upon refuse animal matter thrown from the cook-room, and occasionally even having the hardihood to stoop at a dish of meat carrying from the cook-room to the house.

Fam. *Strigidae*, Leach.—Genus *Otus*, Cuv.

18. *Ot. Bengalensis*, Franklin, *Proceed. Zool. Soc. I. p. 115, Goobur of the Mahrattas. Irides*, external margin dark orange, gradually changing to yellow at the internal margin. Very common in the Dakhn. Generally found on the open rocky plains. A whole rat, (the tail hanging out of the mouth, and the head and most part of the body in the stomach, and partly decomposed,) was found in one bird: another had a crab, a third a *pastor*; but the usual food appeared to be rats.

Genus *Strix*, Auct.

19. *Strix Javanica*, Horsf.

Although at a superficial view this species appears to be the *barn-door Owl of Europe (Strix nammea)*, a comparison of several specimens with the European bird satisfies Colonel SYKES that Dr. HORSFIELD was right in separating it. Neither sex is unspotted white underneath, nor has the Indian species a white disc. Sexes

alike, with the exception of the plumage of the female being a shade or two lighter than that of the male. Length, inclusive of tail, 17 inches: tail 5 inches. One of Colonel SYKES's specimens was captured alive while lying on its back on the ground, defending itself against the attacks of a body of crows. *Irides* reddish dark brown.

20. *STRIX INDRANÆ*. *Strix capite supra pallidè brunneo, plumis albido marginatis; dorso imo, pteromatibusque rufescenti-brunneis, fasciis albis fusco marginatis notatis; dorso medio, ptilis, renigibus caudæque brunneis, his rufescenti fasciatis, hæc fasciis albidis gracilibus notata, ad apicem albo marginata; gula crissoque albescentibus; abdominis subrifo, brunneo graciliter fasciato; regione circumoculari nigra; disco rufo, brunneo marginato.*

*Irides* rufo-brunneæ. Longitudo corporis 21 unc., caudæ 9.

Inhabits the woods of the Ghauts: rare. The specimen described is a young bird, and a female.

Genus *Ketupa*, Less.

21. *Ketupa Leschenaulti*, Less., *Traité d'Ornith.* p. 114. *Strix Leschenaulti*, Temm. Pl. Col. 20. *Scops? Leschenaulti*, Steph., vol. 13. p. 53. A rare bird in the Dakhan. Independently of the naked legs of this bird, its aquiline aspect authorizes its separation from the genera with which it had been placed previously to M. LESSON's arrangement.

Genus *Noctua*, Sav.

22. *Noct. Indica*, Frankl. *Peenglah* of the Mahrattas. *Irides*, Kinn's yellow. Sexes alike. Mice and beetles found in the stomach. An exceedingly noisy bird, and frequently heard chattering during the day-time in dense trees. The Mahrattas have a superstition respecting this species; and a class of persons, called from it *Peenglah*, live on the credulity of the people by pretending to consult it, and predict events. Length, inclusive of tail, 9½ to 11 inches: tail 2½ to 3 inches. Numerous in the Dakhan, and found in families of four or five.

## ORDER II. INSESSORES, Vigors.

Tribus FISSIROSTRES, Cuv.

Fam. *Meropidae*.—Genus *Merops*, Linn.

23. *Merops viridis*, Linn. *Indian Bee-eater*, Lath. *Guépier à collier de Madagascar*, Buff.

Fam. *Hirundinidae*, Leach.—Genus *Hirundo*, Auct.

24. *Hirundo alifera*, Steph., vol. 13. p. 79. *Hir. allicaudata*, Frankl. Very abundant in Dakhan, and very beautiful, with its thread-like tail-feathers floating behind when in flight.
25. *HIRUNDO JEWAN*. Mas. *Hir. capite, dorso, tetricibus alarum, uropygio, rectricibus mediis fasciisque latè pectorali metallicè nigris; corpore subtilius rosaceo-albo, gutture rufo; renigibus rectricibusque lateraliibus fusco-nigris, his internè albo maculatis.*  
Fœm. et jun. *Gutturè magis rufo notato.*  
*Irides* intensè rufescenti-brunneæ. Longitudo corporis 6 unc., caudæ 3½.
- This bird differs from the common English Swallow, (*Hir. rustica*), only in its somewhat smaller size, larger bill, and in the lateral tail-feathers not being equally elongated. The tail is less forked, and the rufous colour of the throat extends more on the breast.
26. *HIRUNDO CONCOLOR*. *Hir. fuliginoso-brunnea, sericea; caudæ æquali, rectricibus, externis mediisque exceptis, internè albo guttatis.*  
Longitudo corporis 5 unc., caudæ 2½.
- These birds live on the banks of rivers. The plumage of the sexes does not differ.
27. *HIRUNDO ERYTHROPYGIA*. *Hir. metallicè nigra; uropygio collarique nuchali rufis; corpore subtilis albo, pallidè rosaceo tincto, plumis in medio graciliter brunneo striatis.*  
Longitudo corporis 6 unc., caudæ 3.

This species appeared in millions in two successive years in the month of March on the parade-ground at Poona: they rested a day or two only, and were never seen in the same numbers afterwards.

Genus *Cypselus*, Ill.

28. *Cypselus affinis*, Hardw. *Allied Swift*, Hardw. These birds are so rare in Dakhan that Colonel SYKES obtained only two specimens.  
Fam. *Caprimulgidae*, Vigors.—Genus *Caprimulgus*, Auct.
29. *Caprimulgus monticolus*, Frankl. *Great Bombay Goat-sucker*, Lath.
30. *Caprimulgus Asiaticus*, Lath. *Bombay Goat-sucker*, Id.

31. *CAPRIMULGUS MAHRATTENSIS*. *Capr. pallide cinereo-griseus, brunneo ferrugineoque undulatus variegatusque; thorace, remigibus tribus externis in medio, rectricibusque duabus lateralibus ad apices, albo notatis.*  
Longitudo corporis 8.8 unc., caudæ 3.5.

This species differs from the two preceding in the prevalent grayness of the plumage, and in the absence of the subrufous collar on the nape of the neck.

Fam. *Halcyonidae*, Vigors.—Genus *Halcyon*, Swains. *Crab-eater*.

32. *Halcyon Smyrnenensis*. *Alcedo Smyrnenensis*, Linn. *Smyrna Kingsfisher*.

In the description of this bird authors appear to have omitted to mention the chestnut small wing-coverts, and fine rich chocolate black medial wing-coverts. This species frequents well irrigated gardens and old wells, rather than brooks or rivers. Grasshoppers were frequently found in the stomach.

Genus *Alcedo*, Auct. *Kingsfisher*.

33. *Alcedo rudis*, Linn. *Black and White Kingsfisher*, Edw., pl. 9.

In all Colonel SYKES'S specimens the male bird is distinguished from the female by a single or broken double black bar across the breast.

34. *Alcedo Bengalensis*, Gmel. *Little Indian Kingsfisher*, Edw., pl. 11.

This species affects brooks: it is never seen in gardens.

Genus *Ceryx*, La Cép.

35. *Ceryx tridactyla*, La Cép. Buff., Pl. Enl. 778. fig. 2.

This very beautiful bird differs from BUFFON'S drawing only in a purple spot terminating the ridge of the bill, and in a reddish spot on each side of it.

TRIBUS DENTIROSTRES, Cuv.

Fam. *Muscicapidae*, Vigors.—Genus *Muscipeta*, Cuv.

36. *Musc. Paradisi*, Cuv. Mas. *Musc. alba; capite cristato colloque violaceo-atris; pteromatibus remigibusque atris albo marginatis; rhachibus rectricum atris.*

Fœm. *Dorso, alis, caudæque castaneis; corpore subtus albo; gutture, collo, pectore, nuchæque griseis, hæc saturatiore; capite cristato violaceo-atro; remigibus fuscis.*

Longitudo corporis 10½ unc., caudæ 6.

- Muscipeta Paradisi*, Linn. *Paradise Fly-catcher*, Lath. *Aris Paradisiaca orientalis*, Seba, 1. t. 52. f. 3. *Pied Bird of Paradise*, Edw., pl. 113.

37. *Muscipeta Indica*, Steph vol. XIII. p. 3. Mas. *Musc. corpore supra castaneo, subtus albo; pectore griseo-escenti; capite cristato colloque violaceo-atris.*

Fœm. *maxillâ rectricibusque duabus mediis paulum elongatis.*

Statura præcedentis. *Irides* intensè rufo-brunnæ

- Aris Paradisiaca cristata*, Seba, 1. t. 30. f. 5. *Upupa Paradisiæ*, Linn. *Promerops Indicus cristatus*, Briss. *Crested long-tailed Pie*, Edw., pl. 325.

These two birds have lately been erroneously considered to belong to one species. They were never found however by Colonel SYKES (who shot many) in the same locality, nor did he observe any intermediate stage of plumage. The difference between the females of the two birds noticed above at once decides the distinction of species. The two central tail-feathers of the males (not of the females) are elongated to three or four times the length of the body: in one specimen they are 15½ inches long. They feed principally on the ground, and on very minute insects.

There has been much confusion among the early descriptions of these birds. LINNÆUS describes the *Musc. Indica* as an *Upupa*; BRISSON as a *Promerops*; and others as a *Pica*, *Icterus*, *Todus*, *Manucodiata*, &c. The specific name of *Indica* seems to have the right of priority over that of *castanea* given by M. TEMMINCK, (See M. KÜHL'S 'Systematic Catalogue of the Pl. Enluminees, page 5,) as having originally been assigned to the bird by BRISSON. Other well marked species, nearly allied to the two preceding, the males of which have similarly elongated tail-feathers, are found in Africa and China.

38. *Muscipeta flammea*, Cuv. *Gobe-mouche flammea*, Temm., Pl. Col., 263. Male and Female.

The cry of this bird is *wheet, wheet, wheet*. In the colours, the female has yellow where the male has scarlet. *Irides* brown-black.

39. *Muscipeta peregrina*. *Parus peregrinus*, Linn. *Crimson-rumped Fly-catcher*, Lath.

Genus *Muscipeta*, Auct.

40. *Muscipeta melanops*, Vigors. Figured in GOULD'S 'Century of Himalayan Birds.'

41. *Muscipeta Banyumas*, Horsf. *Banyumas Fly-catcher*, Lath. *Gobe-mouche chanteur*, Temm.

42. *MUSCIPETA POONENSIS*. *Musc. supra cinereo-brunnea; subtus sordide alba;*

*manibulâ superiori nigra, inferiori ad basin alba.*

Longitudo corporis 4.5 unc., caudæ 1.6.

These birds sit on the extreme twigs of trees, and dart on passing insects in the manner of the *Merops viridis*.

*MUSCICAPA CÆRULEOCEPHALA*. *Musc. cinereo-brunnea, cæruleo leuiter tincta; capite thoraceque lazulinis; pectore sublaulino; abdomine crissoque albis.*

Longitudo corporis 5 $\frac{1}{2}$  unc., caudæ 2 $\frac{1}{2}$ .

44. *MUSCICAPA PICATA*. *Musc. supra atra, subtus sordidi alba; strigâ a mento ad nucham utrinque extendente, fasciâ alarum, uropygio, crisso, apicibusque rectricum duarum lateraliûm albis.*

Longitudo corporis 5 $\frac{1}{2}$  unc., caudæ 2 $\frac{1}{2}$ .

Genus *Rhipidura*, Vigers and Horsf. *Fan-tailed Fly-catcher.*

45. *Rhipidura albofrontata*, Frankl.

46. *Rhipidura fuscoventris*, Frankl.

Colonel SYKES has shot both these birds in the same localities. The male has a very sweet note. He spreads and raises his tail over his head in hopping from bough to bough. Both species have the aspect and habits of the Australian bird

*Muscicapa flabellifera*, Gmel. *Irides deep sepia brown.*

Fam. *Laniada*, Vigors.

Genus *Dicrurus*, Vieill.—*Edolius*, Temm.

47. *Dicrurus Balicassius*. *Corvus Balicassius*, Linn.

48. *Dicrurus cærulescens*, Linn. *Lanius Fingah*, Shaw, t. 7. p. 291.

Genus *Hypsipetes*, Vigors.

49. *HYPSSIPETES GANEREA*. *Hyps. griseo-brunnea, subtus pallidior; alis remigibusque brunneis; capite supra vix cristato metallicè atro.*

Longitudo corporis 10 unc., caudæ 4. *Irides intense rufo-brunneæ.*

Tongue bifid, and deeply fringed; sexes exactly alike. Stony fruit found in the stomach. Neck short, and head sunk into the shoulders; flight very rapid. Found only in the dense woods of the Ghauts. The tongue is that of *Pastor*, the legs those of *Dicrurus*.

Genus *Collurio*, Vigors.

50. *COLLURIO LAHTORA*. *Coll. pallidè griseus; strigâ frontali per oculos utrinque ad nucham extendente, alis, reetricibusque mediis nigris; corpore subtus, fasciâ alarum, scapularium marginibus, reetricibus externis, apicibusque duarum sequentium.*

Longitudo corporis 9 $\frac{1}{2}$  unc., caudæ 4 $\frac{1}{2}$ .

This is the variety *C. of Lanius Excubitor* of Dr. LATHAM. It is closely allied to the North American and European *Lan. Excubitor*, but differs in the black bar extending across the forehead. The male has a sweet note.

51. *Collurio erythronotus*, Vigors. Proceed. Zool. Soc. I. p. 42.

This bird differs from the *Lan. Bentet* of Dr. HORSFIELD only in the crown being ash-coloured instead of black, and in the defined black bar across the forehead.

52. *Jun. ? abdomine graciliter fasciato.*

Supposed young of the above. Length 7 $\frac{1}{2}$  inches: tail 3 $\frac{3}{8}$ .

53. *Collurio Hardwickii*, Vigors, Proceed. Zool. Soc., I. p. 42. *Bay-backed small Shrike*, Lath.

Genus *Lanius*, Auct.

54. *Lanius Muscipoides*, Frankl. *Keroula Shrike*, Lath.

A rare bird. Colonel SYKES's specimen, a female, corresponds with Major FRANKLIN's specific characters, and with his specimen, a male bird.

Genus *Graucalus*, Cuv.

55. *Graucalus Papuensis*, Cuv. *Corvus Papuensis*, Gmel. *Papuan Crow*, Lath. *Irides*, rich lake.

Genus *Cebleypris*, Cuv.

56. *Cebleypris Ambriatus*, Temm. *Echemilleur frangé* ♀ Pl. Col. *Irides* orange.

Colonel SYKES's birds, full-grown males, correspond only to the female of *Ceb. Ambriatus*, and not at all to the male. Met with only in thick hedges on the plains.

57. *Cebleypris canus*. *Le Grand Gobe-mouche cendré de Madagascar*, Pl. Enl. 521.

*Irides*, intense red brown. Black ants only found in the stomach. This bird does not correspond with the later descriptions of *Ceb. canus* (*Muscicapa cana*), and the history of both these species of *Cebleypris* requires further illustration. Found only in thick bushes. Specimens of both species from Bengal and Wyand resemble those collected by Colonel SYKES.

(To be Continued.)

Meteorological Register, kept at the Assay Office, Calcutta, for the Month of August, 1834.

Days of the Month	Barometer reduced to 32° Fahr.				Thermometer in the Air.				Depression of Moist-bulb Thermometer.				Hair Hygrometer.		Rain.	Wind.			Weather.				
	At 4 A.M.	At 10 P.M.	At 4 P.M.	At 10 P.M.	Minimum at 4 A.M.	At 10 A.M.	Max. by Reg. Ther.	At 4 P.M.	At 10 P.M.	At 4 A.M.	At 10 A.M.	At 4 P.M.	At 10 P.M.	At 10 A.M.		At 4 P.M.	Inches.	Morning.	Noon.	Evening.	Morning.	Noon.	Evening.
1	299	277	178	290	81.5	86.0	88.0	86.4	80.8	1.5	4.6	3.9	1.0	97	98		n.	n. e.	N.	clear.	showrs.	hard rain.	
2	310	286	110	293	82.0	84.0	85.5	84.9	80.4	4.0	3.0	3.4	1.1	99	98	2.20	N.	n. w.	N. W.	lull	rain.	high wind.	
3	306	308	6.20	303	80.4	82.4	83.8	83.0	77.3	2.6	3.1	3.0	0.0	99	99	4.10	N. W.	N. W.	O. S.	gale. rn.	hd. gale S.		
4	345	338	9.34	344	81.0	82.6	86.7	83.2	79.3	2.8	2.0	3.0	0.5	99	99	.70	S. E.	S. E.	E. E.	rain.	showery.	hazy.	
5	309	446	3.30	306	79.0	83.6	86.0	84.2	82.1	0.6	2.0	3.0	1.1	99	99		E.	S. E.	O.	cum.	stratus.	dull-calm.	
6	450	443	3.62	457	81.0	83.5	86.1	82.2	80.0	0.6	2.7	2.6	1.6	99	99	.10	O.	n. e.	N. E.	cloudy.	cum. str.	rain.	
7	389	396	3.48	447	79.0	81.5	86.1	82.2	80.0	0.8	2.5	3.0	1.0	99	99	1.35	N. E.	S. e.	S. e.	stratus.	rain.	hd. rain.	
8	437	406	3.96	500	80.2	81.4	84.4	82.8	84.0	1.5	2.5	3.3	4.2	99	98	.50	S.	S.	S.	cum.	showery.	do	
9	437	408	4.08	439	81.4	81.6	85.2	83.9	84.9	2.7	2.6	4.1	4.2	99	98	.20	S.	S.	S.	do	rain.	storm N.W.	
10	538	520	4.20	532	83.8	83.2	88.0	86.1	81.0	3.8	2.8	4.5	3.5	99	98	.70	S.	S.	S.	clear.	clear.	clear.	
11	561	534	3.70	616	82.0	84.6	89.2	88.4	84.7	2.2	3.2	5.9	2.0	98	98	.05	S. W.	S.	s. w.	do	cloudy.	steady rain	
12	535	568	4.58	598	82.2	85.6	89.3	88.5	80.1	2.0	4.0	5.0	1.6	98	92	2.45	S. W.	S. W.	O.	do	misty.	rain.	
13	532	590	4.88	573	81.5	85.2	89.7	87.1	82.0	3.1	3.0	3.8	2.8	97	96	.95	W.	O.	O.	rain.	cum. str.	threatening	
14	601	529	4.06	543	83.2	84.3	87.6	86.7	85.4	2.4	3.0	3.7	4.7	97	96		O.	n. w.	w.	base.	fine.	cum. cirri.	
15	619	600	5.22	605	84.2	84.8	89.2	87.4	84.2	3.5	3.4	4.2	3.8	96	92		w.	w.	O.	rain.	do	do	
16	681	686	5.40	614	84.1	85.4	90.2	88.4	85.0	2.1	3.5	6.6	3.6	98	91		n. w.	w. s'	O.	cumulus.	do	clear.	
17	676	598	5.24	630	81.1	86.4	90.0	86.9	82.0	3.9	4.0	5.1	1.2	96	94	.25	n. w.	s. e.	e.	rain.	cumuli.	cumuli.	
18	681	645	5.72	666	81.0	86.6	88.9	85.9	83.1	2.0	3.3	5.2	3.7	97	95		e.	s. e.	s. e.	clear.	showery.	fine.	
19	659	698	6.01	688	81.0	85.5	88.2	87.5	83.3	3.0	4.2	7.6	3.4	96	92	.05	s.	s. w.	s.	cir. cum.	cumuli.	cum. cirrus.	
20	627	698	6.28	695	82.1	85.7	88.0	87.5	80.2	2.8	4.7	6.7	3.4	96	92		s.	s. e.	s. e.	cloudy.	cloudy.	cumuli.	
21	686	694	6.60	740	78.2	85.6	86.3	87.2	80.2	2.5	5.1	7.7	2.3	97	93	.80	O.	S.	S.	hard rn.	showery	rain.	
22	733	758	6.72	759	80.0	84.9	86.0	87.5	80.0	1.9	5.6	6.7	3.5	96	94	.20	s. e.	S. W.	S.	cumuli.	overcast.	clear.	
23	748	780	6.68	688	79.8	84.9	82.4	88.8	85.2	2.6	4.4	9.8	7.9	95	86	.03	O.	S.	O.	clear.	clear.	bright.	
24	686	681	5.52	629	83.1	86.3	92.0	89.6	88.2	3.3	7.3	2.4	7.1	90	87		O.	S.	O.	do	fine.	do	
25	617	648	3.68	622	83.4	87.9	93.0	92.3	87.0	3.2	7.6	9.8	6.5	91	87		O.	s. w.	S.	do	cumuli.	do	
26	676	624	3.89	586	84.4	88.4	93.6	90.6	85.5	3.4	5.4	5.8	3.7	96	94		S.	O. S.	S.	do	do	do	
27	669	697	4.96	699	83.2	88.0	91.8	89.5	84.3	2.5	6.0	5.9	3.3	93	93	.20	O.	O. w.	O.	do	thunder.	cl. hv. rd.	
28	676	615	5.12	685	86.5	88.5	93.0	87.8	81.9	2.0	5.9	5.4	2.1	95	95		O.	O. w.	O.	cumuli.	overcast.	bright.	
29	632	630	5.00	698	81.2	87.9	89.8	87.0	81.2	0.9	5.9	5.7	1.0	96	95		O.	S.	e.	clear.	do	do	
30	623	614	5.16	642	81.0	87.2	91.1	87.6	83.0	1.4	5.0	5.2	2.8	96	96		O.	O.	n. e.	do	showery.	do	
31	634	635	5.65	685	80.7	83.2	90.0	87.5	82.2	0.7	5.1	5.3	2.4	90	95	.40	s. e.	s. e.	s.	do	clear.	do	
Mean	29.518	5.40	4.66	5.80	81.4	85.1	88.8	86.7	82.6	2.3	4.2	5.3	2.9	96.5	95.3	15.25				severe gale.	heavy rain-latter half fine.		

Meteorological Register.

[August, 1834.]

The barometer fell during the lull of the storm on the 3rd at 4 P. M. to 28.820. At Allahabad, whither the same storm extended, the Barometer stood on the 30 July at 29.230 on the 31st 4 P. M. at 29.160; 1 August, at 29.165; 2nd do, 29.18; 3rd do, 29.145 storm about 7 P. M. from the south-east. Great inundations occurred about the 28th in Burdwan, Monghyr, Patna, and Arrah; also at Nagpur, and on the west of India at Surat.

# JOURNAL

OF

## THE ASIATIC SOCIETY.

No. 33.—September, 1834.

I.—*Further Remarks on M. Remusat's Review of Buddhism.* By B. H. HODGSON, Esq. Resident at the Népal Court, &c.

Adverting again to REMUSAT's Review in the *Journal des Savans* for May, 1831, I find myself charged with another omission more important than that of all mention of the Avatars. It is no less than the omission of all mention of any other *Buddhas* than the seven celebrated Mánúshis. The passage in which this singular allegation is advanced is the following: "Les noms de ces sept personnages (the '*Sapta Buddha*') sont connus des Chinois, et ils en indiquent une *infinité d'autres* dont le Bouddhiste Nipálien *ne parle pas*."

My Essay in the London Transactions was the complement and continuation of that in the Calcutta Researches. REMUSAT was equally well acquainted with *boih*; and, unless he would have had me indulge in most useless repetition, he must have felt convinced that the points enlarged on in the former essay would be treated cursorily or omitted, in the latter. Why, then, did he not refer to the Calcutta paper for what was wanting in the London one? Unless I greatly deceive myself, I was the first person who shewed clearly, and *proved* by extracts from original Sanscrit works, that Buddhism recognises "une infinité" of Buddhas, —Dhyáni and Mánúshi, Pratyéka, Srávaka, and Mahá Yánika. The xvth vol. of the Calcutta Transactions was published in 1828. In that vol. appeared my first Essay, the substance of which had, however, been in the hands of the Secretary nearly three years before it was published\*. In that vol. I gave an *original list of nearly 150*

\* According to usage in that matter provided: a statement in which I request the present Secretary will have the goodness to bear me out.

*Buddhas* (p. 446, 449) : I observed that the Buddhas named in the Buddhist scriptures were "as numerous as the grains of sand on the banks of the Ganges;" but that, as most of them were nonentities in regard to chronology and history, the list actually furnished would probably more than suffice to gratify rational curiosity; on which account I suppressed *another long list*, drawn from the Samádhi Raja, which was then in my hands, (p. 444.) By fixing attention on that cardinal dogma of sugatism, viz. that man can enlarge his faculties to infinity, I enabled every inquirer to conclude with certainty that the Buddhas had been multiplied ad libitum. By tracing the connexion between the Arhantas and the Bodhisatwas; between the latter again, and the Buddhas of the first, second, and third degree of eminence and power; I pointed out the *distinct steps* by which the finite becomes confounded with the infinite,—man with Buddha; and I observed in conclusion that the epithet Tathágata, a synonyme of Buddha, *expressly portrays this transition*. (London Transactions, vol. ii. part i.) Facts and dates are awkward opponents except to those, who, with RAMUSAT's compatriot, dismiss them with a 'tant pis pour les faits!' For years before I published my first Essay, I had been in possession of hundreds of drawings, made from the Buddhist pictures and sculptures with which this land is saturated, and which drawings have not yet been published, owing to the delay incident to procuring authentic explanations of them from original sources. All the gentlemen of the residency can testify to the truth of this assertion; and can tell those who would be wiser for the knowledge, that it is often requisite to walk heedfully over the classic fields of the valley of Nipál, lest perchance you break your shins against an image of a Buddha! These images are to be met with every where, and of all sizes and shapes, very many of them endowed with a multiplicity of members sufficient to satisfy the teeming fancy of any Brahman of Madhya Déés! Start not, gentle reader, for it is literally thus, and no otherwise. Buddhas with three heads instead of one—six or ten arms in place of two! The necessity of reconciling these things with the so called first principles of Buddhism\*, may reasonably account for delay in the production of my pictorial stores. Meantime, I cannot but smile to find myself condoled with for my poverty when I am really, and have been for 10 years, accablé des richesses! One interesting

This delay was and is a necessary evil of the publication of an occasional volume of Researches. It was to obviate the inconvenience in some measure that the present form of the Journal was adopted, but still this is inadequate to the production of papers of any magnitude, as we fear Mr. HANCOCK feels by experience.—E.

\* See BRINKIN'S Essays in the Bombay Transactions.

result only have I reached by means of these interminable trifles; and that is, strong presumptive proof that the cave temples of Western India are the work of Buddhists *solely*, and that the most apparently Brahmanical sculptures of those venerable fane are, in fact, Buddhist. A hint to this effect I gave so long ago as 1827, in the Quarterly Oriental Magazine, (No. XIV. p. 219;) and can only afford room to remark in this place, that subsequent research had tended strongly to confirm the impressions then derived from my very learned old friend AMIRTA NANDA. The existence of an infinite number of Buddhas; the existence of the whole Dhyani class of Buddhas; the personality of the Triad: its philosophical meaning; the classification and nomenclature of the ascetical or true followers of this creed; the distinction of its various schools of philosophy; the peculiar tenets of each school, faintly but rationally indicated; the connexion of its philosophy with its religion; and, as the result of all these, the means of speaking consistently upon the general subject\*, are matters for the knowledge of which, if REMUSAT be not wholly indebted to me and my authorities, it is absolutely certain that I am wholly *un*indebted to him and his; for till he sent me, 10 months ago, (I speak of the date of receipt,) his essay on the Triad, I had never seen one line of his, or any other continental writer's lucubrations on Buddhism.

I have ventured to advance above that in the opinion of a learned friend, the Chinese and Mongolian works on Buddhism, from which the continental savans have drawn the information they possess on that topic, are not *per se* adequate to supply any very intelligible views of the general subject.

As this is an assertion which it may seem desirable to support by proof, allow me to propose the following. REMUSAT observes, that a work of the *first order* gives the subjoined sketch of the Buddhist cosmogony. "Tous les êtres étant contenus dans la très pure substance de la pensée, une idée surgit inopinément et produisit la fausse lumière; Quand la fausse lumière fut née, le vide et l'obscurité s'imposèrent réciproquement des limites. Les formes qui en résultèrent étant indéterminées, il y eut agitation et mouvement. De là naquit le tourbillon de vent qui contient les mondes. L'intelligence lumineuse étoit le principe de solidité, d'où naquit la roue d'or qui soutient et protège la

\* A learned friend assures me that "a world of Chinese and Mongolian enigmas have been solved by means of your general and consistent outline of the system, but for which outline the said enigmas would have continued to defy all the continental Oedipuses."

terre. Le contact mutuel du vent et du metal produit le feu et la lumière, qui sont les principes des changemens et des modifications. La lumière precieuse engendre la liquidité qui bouillonne à la surface de la lumière ignée, d'où provient le tourbillon d'eau qui embrasse les mondes de toute part."

Now I ask, is there a man living, not familiar with the subject, who can extract a particle of sense from the above passage? And are not such passages, produced in illustration of a novel theme, the veriest obscurities thereof? But let us see what can be made of the enigma. This aperçu cosmogonique of the Long-yan-king, is, in fact, a description of the procession of the five elements, one from another, and ultimately from *Prajna*, the universal material principle, very nearly akin to the *Pradhán* of the Kapila Sánkhyá. This universal principle has two modes or states of being, one of which is the proper, absolute, and enduring mode; the other, the contingent, relative, and transitory.

The former is abstraction from all effects, or quiescence: the latter is concretion with all effects, or activity. When the intrinsic energy of matter is exerted, effects exist; when that energy relapses into repose, they exist not. All worlds and beings composing the versatile universe are cumulative effects; and though the so-called elements composing them be evolved and revolved in a given manner, one from and to another, and though each be distinguished by a given property or properties, the distinctions, as well as the orderly evolution and revolution, are mere results of the gradually increasing and decreasing energy of nature in a state of activity\*. *Upáya*, or 'the expedient', is the name of this energy;—increase of it is increase of phenomenal properties;—decrease of it is decrease of phenomenal properties. All phenomena are homogeneous and alike unreal; gravity and extended figure, no less so than colour or sound. Extension in the abstract is not a phenomenon, nor belongs *properly* to the versatile world. The productive energy begins at a minimum of intensity, and increasing to a maximum, thence decreases again to a minimum. Hence *ákásh*, the first product, has but one quality or property; air, the second, has two; fire, the third,

\* Causes and effects, quoad the versatile world, cannot be truly alleged to exist. There is merely customary conjunction, and certain limited effects of proximity in the precedent and subsequent, by virtue of the one true and universal cause, viz. *Prajna*. With the primitive Swobhávikas cause is not utilised: for the *śástra*, their tenets are very much the same with those above explained in the text, only their conclusions incline rather to scepticism than dogmatism. It may also perhaps be doubted whether with the latter school, phenomena are unreal as well as homogeneous. In the text, I would be understood to state the tenets of the *Śaivika*s only.

has three; water, the fourth, has four; and earth, the fifth, has five\*.

These elements are evolved uniformly one from another in the above manner, and are revolved uniformly in the inverse order.

*Sūnyatā*, or the total abstraction of phenomenal properties, is the result of the total suspension of nature's activity. It is the *ubi*, and the *modus*, of the universal material principle in its proper and enduring state of *nirvṛiti*, or of rest. It is *not* nothingness, except with the sceptical few. The opposite of *Sūnyatā* is *Avidyā*. Now, if we revert to the extract from the Long-yan-king, and remember that la pensée l'intelligence lumineuse†, and la lumière précieuse‡ refer alike to Prajñā the material principle of all things, (which is personified as a goddess by the religionists,) we shall find nothing left to impede a distinct notion of the author's meaning, beyond some metaphorical flourishes analogous to that variety of descriptive epithets by which he has characterised the one universal principle. *Tourbillon de vent*, and *tourbillon d'eau*, are the elements of air and of water, respectively; and le principe de solidité is the element of earth.

"Tous les êtres étant contenus dans la pure substance de Prajñā une idée surgit inopinément et produit la fausse lumière:"—that is, the universal material principle, or goddess Prajñā, whilst existing in its, or her, true and proper state of abstraction and repose, was suddenly disposed to activity, or impressed with delusive mundane affection (*Avidyā*). "Quand la fausse lumière fut née, le vide et l'obscurité s'imposèrent réciproquement des limites." The result of this errant disposition to activity, or this mundane affection, was that the universal void was limited by the coming into being of the first element, or *ākāśh*, which as the primary modification of *Sūnyatā* (space) has scarcely any sensible properties. Such is the meaning of the passage "les formes qui en résultèrent étant indéterminées," immediately succeeding the last quotation. Its sequel again, "il y eut agitation et mouvement," merely refers to mobility being the characteristic property of that element (air) which is about to be produced. "De là naquit le tourbillon de vent, qui contient les mondes." Thence (i. e. from *ākāśh*) proceeded the element of the circumambient air. "L'intelligence lumi-

\* There is always cumulation of properties, but the number assigned to each element is variously stated.

† Prajñā is literally the supreme wisdom, *videlicet*, of nature. Light and sense are types of this universal principle, in a state of activity. Nothing but extreme confusion can result from translating these terms au pied de la lettre, and without reference to their technical signification. That alone supremely governs both the literal and metaphorical sense of words.

neuss' étoit le principe de solidité, d'où naquit la roue d'or qui soutient et protège la terre." *Prajna* in the form of light (her *pravrittika* manifestation) was the principle of solidity, whence proceeded the wheel of gold which sustains and protects the earth. Solidity, the diagnostic quality of the element of earth, stands for that element; and the wheel of gold is mount Merú, the distinctive attribute of which is protecting and sustaining power: this passage, therefore, simply announces the evolution of the element of earth, with its mythological appendage, mount Merú. But, according to all the authorities within my knowledge, earth is the *last* evolved of the material elements. Nor did I ever meet with an instance, such as here occurs, of the direct intervention of the first cause (*Prajna*) in the *midst* of this evolution of the elements. "Le contact mutuel du vent et du *metal* produit le feu et la lumière, qui sont les principes des changemens." The mutual contact of the elements of air and of *earth* produced fire and light, which are the principles of change. This is intelligible, allowance being made for palpable mistakes. I understand by it, merely the evolution out of the element of air of that of fire, of which light is held to be a modification. To the igneous element is ascribed the special property of heat, which is assumed by our author as the principle of all changes and transformations. Metal for earth is an obvious misapprehension of REMUSAT'S. Nor less so is the false allocation of this element (earth) in the general evolution of the five, and its introduction here.

"La lumière précieuse engendre la liquidité qui bouillonne à la surface de la lumière ignée, d'où provient le tourbillon d'eau qui embrasse les mondes."

*Prajna* (in the form of light) produces the liquidity which boils on the surface of igneous light, whence proceeds the element of water embracing the world.

This figurative nonsense, when reduced to plain prose, merely announces the evolution of the element of water from that of fire. Our terrestrial globe rests upon the waters like a boat, according to the Buddhists; and hence the allusion (embracing the world) of the text: What is deserving of notice is the direct interference, a *second time*, (and in respect to earth, a third time,) of the *causa causans* with the procession of the elements, one from another. All my authorities are silent in regard to any such repeated and direct agency; which amounts in fact, to creation properly so called—a tenet directly opposed to the fundamental doctrine of all the *Swobhāvikas*. Certain Buddhists hold the opinion, that all material substances in the versatile world have no existence independent of *human* perception. But that the Chinese

author quoted by Mr. RANUAIK was one of these idealists, and his means certain. His more immediate object, in the passage quoted, evidently was, to exhibit the procession of the five material elements, one from another. To that I at present confine myself, merely observing of the other notion, that what has been stated of the homogeneity and unreality of all phenomena, is not tantamount to an admission of it. The doctrine of *Avidya*, the mundane affection of the universal principle, is not necessarily the same with the doctrine which makes the sentient principle in man the measure of all things\*. Both may seem, in effect, to converge towards what we very vaguely call idealism; but there are many separate paths of inquiry by which that conclusion may be reached.

Népál Aug. 1834.

II.—*Note on two Coins of the same species as those found at Behat, having Greek inscriptions. By Major D. L. STACY, (Plate XXV.)*

[In a letter to the Sec. As. Soc. read at the Meeting of the 2nd July.]

I have the honor to enclose a facsimile of a copper coin purchased by me at Chittore Gurh.

It was my intention to reserve any notice of this coin, till I ascertained if my good fortune would send me others, more distinct, and consequently more satisfactory; but on reading the description of the famous stone pillar at Allahabad, given in your number for March, 1834, (No. 27,) I am induced to submit a few remarks with the copy of the coin†.

The style of the Greek character would, alone, be sufficient to stamp this coin as provincial, were the chungahs or symbols on the obverse, and monogram on the reverse, less distinct, or even obliterated. The suggestions of Lieutenant BURT, and Mr. STIRLING, viz. that the characters on the Allahabad Pillar No. 1, resembled the Greek, drew my attention to the plate, when it immediately occurred to me, vice versa, that these provincial Greek characters, on my coin, might have taken their style or fashion from the writing of the dynasty, or descendants of the dynasty, which owned this pillar.

\* *Manas*, the sixth element, is the sentient principle in man. The Chinese author mentions it *not*, unless the passage beginning "la même force," and immediately following that I have quoted, was designed to announce its evolution. That passage as it stands, however, does not assert more than the homogeneity of this sixth element with the other five.

† The original coins were subsequently sent, and are depicted as Nos. 2 and 3, of plate xxv.—Ed.

That the Greeks did send as a subsidiary force to the assistance of CHANDRAGUPTA, son of NANDA, Rájá of the Prachi, I believe no one doubts: and contrasting all circumstances on the subject within our knowledge, we may fairly presume, that the services of this subsidiary, were paid by a grant of land (Jaédad).

In CONDER'S "Modern Traveller," speaking of these times, after relating the death of the aged NANDA by poison (given by his minister SACATARA), he proceeds, vol. vii. page 123. "The crime did not, however, go unpunished; SACATARA and all his sons, except one, were put to death; and to secure himself against hostile claimants of the crown, UPADHANWA gave orders for the massacre of all his half brothers, the children of NANDA by different mothers. CHANDRAGUPTA alone escaped, and fled to the court of PARVATESWARA 'Lord of the Mountains' or King of Népal; to whom he offered one half of his kingdom if he would assist him in taking the field against his enemy.

"In conjunction with this powerful ally, aided by a body of *Greek auxiliaries*, CHANDRAGUPTA defeated UPADHANWA with great slaughter under the walls of his capital, the monarch himself being among the slain, and took possession of the throne of his father. His promise to PARVATESWARA was now disregarded. He retained a large body of *Yavans* or *Greeks* in his pay, and fortifying his capital, set his enemies at defiance."

Concluding the Greek auxiliaries were paid by a grant of land, as by agreement the Nepális were to have been, and at the period CHANDRAGUPTA sought Greek assistance, he could have had no other means of paying them. Considering also, that the high estimation they were held in, caused them to be retained after the object, which brought them to Pryag, was accomplished, we may naturally conclude that the "Jaédad" granted to this subsidiary was very considerable.

The value of the services of the Greeks had been shewn, 1st, in the aid lent in placing CHANDRAGUPTA on the throne of his ancestor; 2ndly, in enabling the newly made king to retain that half of his territory, which he had pledged in case of success as a recompense to the Lord of the Hills.

These were services already performed: and to people, who had proved themselves so useful in his recently acquired kingdom, CHANDRAGUPTA, must for every reason, have given a substantial proof of his consideration. The marriage of CHANDRAGUPTA to the daughter of SELEUCUS\*, must have added strength to the position of the Greeks amongst

\* TODD in his *Rajast'han*, vol. i. p. 671, makes SELEUCUS marry the daughter of CHANDRAGUPTA, instead of CHANDRAGUPTA marrying a daughter of SELEUCUS. This is evidently an oversight.

the Prachi, and the appointment by ΣΑΥΚΟΥΣ of the celebrated ΜΕΓΑΣΘΕΝΗΣ as resident at the court of his Rájá son-in-law, went as far as human wisdom could do, in adding stability to their footing.

It requires more experience in numismatic lore than I can boast to explain the meaning of the different symbols or "Chungahs" on this coin. The obverse has the word "Soter" very distinct; what letters follow I cannot say; they certainly are not the same character, but what they are, must perhaps remain a secret till further research gives us a more complete coin by which to determine. The j'has or branch is distinct, (can this be the olive branch?) the other Chungahs I cannot decipher. The monogram on the reverse is the same as that on some coins in my possession, having an elephant on the obverse\*.

The Greek jaédad or territories we may suppose grew into consideration much the same as did the Honorable Company's after their first footing: and like the infant Company too, we may suppose, the Greeks established a currency of their own, though more perhaps with a view of handing down their achievement to posterity than as a necessary medium of barter, and I think the coin (the subject of this communication) bears every mark of being of those times, of the Chandragupta dynasty.

*Note on another Coin of the same type procured by Lieut. A. Conolly, at Kanouj, by the Secretary.*

At the moment of perusing Major STACY'S remarks on the indications of a Greek inscription on the *Behat* type of coin, as it may continue to be designated until its origin be better determined, and with his two coins before me, (Pl. xxv. figs. 2, 3,) corroborating his reading†; I am most opportunely put in possession of another coin of the same stock speaking a totally different language!

Lieut. CONOLLY has already had the good fortune to make known a valuable Kanouj coin with a legible inscription, in the language and character of the Allahabad column, (inscription No. 2.) His zealous exertions have again conducted him to a brilliant discovery at the same place, of the very nature we could have desired at this moment— a coin of the Behat type, bearing a clear and distinct inscription: and that inscription in the *unknown character* No. 1. of the Allahabad column! Two of Mr. MASSON'S coins, it will be remembered, bore characters which were pronounced to be of this alphabet. They were

\* No. 27, Journal Asiatic Society, page 121, line xvii. The Elephant appears to have been one of the Symbols of the CHANDRAGUPTA dynasty.

† It should be remarked however that the apparently Greek letters when inverted resemble closely the Delhi character: it will be wrong therefore to assume positively that they are Greek.

of AGATHOOLE and of PANTALON, of rude fabrication, and connected through the device of a lion with another singular coin having the  $\text{A}$  symbol. These are now again brought into a double alliance with the coins of Behat and Kanouj, by the character in which the inscription is cut.

On the present silver coin there are five distinct letters, all of which will be found in the analysis of the alphabet, page 112 of the present volume. I cannot attempt as yet to transcribe these mysterious symbols in any more familiar character, but it is not too much to hope that ere long another prize from Kanouj may put us in possession of an inscription in two languages, one of which will be known and will serve as a key to the whole: meantime I proceed to describe the peculiarities of the present coin.

*Obverse.* A horse standing unattended and naked. In front appears a line of double curvature, which from analogy may be a faint trace of the lotus stalk held by the female in the Behat coin (fig. 1. Pl. xviii.)

*Reverse.* On the left, the tree symbol with its chequered frame: on the right, a new form composed of two circles touching, traversed by a common diameter, which continues above and supports an inverted crescent. Below comes the inscription before mentioned in large and clear letters: in the centre of the field is a crescent, or new moon. Above the recumbent moon is a small animal standing upon her horns, which resembles very closely that depicted on the reverse of the coin from *Behat*, fig. 1, plate xviii. The connection of this animal with the moon seems to imply some astronomical allegory: were it clearly a horse, we might imagine it to signify the new moon in the month of Aswini or in the lunar mansion of that name, the first of the 27 *Nakshatras* of the lunar zodiac, corresponding as is supposed with the star  $\gamma$  or  $\beta$  *Arietis*; in which case it might be thought to point to some event that happened at a particular epoch. Should the animal be of the deer genus, it may be taken for *SASIN*, the antelope or roe (sometimes translated a hare) always attendant on *CHANDRA*, and supposed to have been allotted to him from a fancied resemblance of the marks on the moon's face to the spotted skin of this animal\*. Sir *WILLIAM JONES* alludes to this attribute of the moon in his hymn to *SURYA*:

"Thou nectar beaming Moon,  
Regent of dewy night—  
From yon bright roe that in thy bosom sleeps  
Fawn spotted, *SASIN* hight—"

The compound image may further be emblematical of princely dignity; similar in import to the various armorial bearings among European nations; thus, in the ancient copper plate grant of land dug

\* See *Moon's Hindú Pantheon*, p. 293.

up at Tripura in 1803, and decyphered by Mr. CONNOR, (Cat. Num. x. 403,) we find the expression:—

“From him sprung the happy chief of ministers, who exhibits the joys of unscathed glory: a spotless moon, among mortals, at sight of whom the spotted luminary appears swollen with envy and distempered with alternate increase and wane.”

I will here close this unsatisfactory tissue of conjectures, regretting that the time is not yet ripe for doing justice to Lieut. CONOLLY'S second boon towards the solution of a faintly dawning point in the pervading obscurity of Indian history.

J. P.

After engraving the figures of the three coins just described, Dr. SWINEY arrived in Calcutta with his rich cabinet of ancient coins. In it I discovered several connected with the same groupe, which he was kind enough to place in my hands. I had however reserved only room for one or two, (figures 4 and 5,) and have been obliged to content myself with the legends of the others (*b, c, d* and *e,*) to show the resemblance of the character to the Kanouj Nágari alphabet. I cannot describe these coins better than in Dr. SWINEY'S own words.

“Several of them are rare, particularly the two larger with the antelope goat on one side and the warrior on the other; smaller ones of this description are not uncommon in the neighbourhood of Seháranpur. I mean in the smaller towns, and certainly not all brought from the newly discovered deposit at Behat. The first of the kind that I met with was stated to be brought from *Hardvár*; and there was so marked a character of the *hill goat* upon it, that it was natural to connect it with some long forgotten dynasty in the Sewálic range. There is an account to be met with somewhere, of a certain Rájá of Kemaon, by name SAKWANTA, whose domain was invaded by a certain RAJPA'L of Indrápresthá. It seems that in this case the aggressor was defeated, and SAKWANTA obtained and kept possession of the regal abode for fourteen years.

But perhaps mythology is a better key to the true interpretation of old coins. Here we have a series of coins more or less connected one with another by some common symbol of a Jain type: on one coin the horse, on another the antelope or goat, on another the hieroglyphic called Swastiká, on another the *sankh*, or sacred shell; the character of the reverse or obverse bearing some common *jantra*, sufficient to indicate the series.

Then we possess Colonel Top's testimony to the existence of such a series; for he says, he has in his possession a full series of Jain coins. I do confess however, that my belief in these coins being Jain was

spoken by the discovery of the two larger coins (figs. 4 and 5) on the obverse of which we have the warrior figure of SIVA with the Saanda Késhava, with the long Sivian spear, allied to the Hindu Pantheon. On comparing this figure with the obverse of Nos. 37 and 38 of Wilson's plates, it will be difficult to admit one and not the other among Jain coins. If rejected as a Jain coin, it may be worth while to read Wilson's story of SIVA's *rusticating* himself on the banks of the Bagmati, hence called, as writes the same authority, in some vol. of the Asiatic Researches, *Mrigasringo*: the tradition is that once upon a time SIVA appeared in the shape of an antelope, whence he took the name of *Hariniswara*, or in other words *Harinisá*, or lord of the antelope.

Perhaps as we progress to perfection in the newly discovered Sanscrit letters, the inscription upon at least three of the coins now sent will throw some light upon the subject."

Figures 12, 13, 14 and 15, of plate xxvi. are four coins dug up in the Doáb near Allahabad, and presented to the Society, by Mr. SPIERS on the 3rd September. They appear to belong to the same class as the preceding, having a rudely executed bull on one side, and the *jhár* or branch on the other, with some ill-defined letters in strong relief and a straight chequered border below. The *jhár*, in the present day it should be remembered, is the symbol distinctive of the Jaipur and Chitore coins. The *trisul*, of those of Srinagar and Sagar. In due course of time we may be able by means of these marks to trace each species to its original locality.

Fig. 9. is a small copper coin among Dr. GERARD'S series, bearing a bull on one side and the well defined Kanouj Nágari letters राजा श्री *rāja sri* on the reverse. There are two or three others of the same kind, in his collection.

J. F.

### III.—Continuation of Observations on the Coins and Relics, discovered by General VENTURA, in the Tole of Mánikyála. By J. PRINSEP, Sec. &c.

It is with some diffidence that I now proceed to offer a few remarks in illustration of the *Mánikyála* treasures, knowing the great disadvantages under which any attempt to investigate even what may be thought so simple a matter as the antiquity of the monument must labour, when unassisted by previous knowledge of the history, mythology, or current languages of the period and of the locality to which it belongs. My object, however, is to place all the circumstances which the collateral discoveries of Messrs. MASSON, MARTIN, BURNES, GARDNER, and





KERÁMAT ALI, have brought to light, before the authorities of Europe, and then to await their decision on the facts:—being my own duty, to act as a faithful witness before this superior tribunal, nothing exaggerating, and nothing extenuating, in the delineation of figures and inscriptions, such as they appear in the originals now in my possession.

The subject which I propose to elucidate on the present occasion is, that of *the coins connected with the temple of Mithradata*; as they naturally stand forward most prominent in offering materials for fixing the date of the building.

We learn from the "état des travaux," that forty-four copper medals were found buried along with the principal cylinder, and several others in different parts of the masonry, besides the gold and silver coins enclosed in the cylinders themselves. On attempting a classification as far as their mutilated condition would allow; these were all (with the exception of two) found to be referrible to the five species depicted at the foot of plate xxii. : being in the following proportion :

Of figure 31, (shewn hereafter to belong to the Kanerkos groupe),—large, ..	20
Of the same type, but smaller, (fig. 9, pl. xxv.) .....	17
Of the elephant type, (fig. 28, pl. xxii.) .....	15
Of the figure sitting with one foot up, (fig. 29, of do.) .....	12
Of the figure sitting cross-legged, (fig. 32, of do.) .....	4
Of the bull and raja, or Kadphises coin, (fig. 4, of pl. xxvi.) .....	2

with ten others which were too much defaced to admit of classification.

Although among these coins very few have legible inscriptions, the collections of Dr. GERARD and of SAYED KERÁMAT ALI, in conjunction with the specimens depicted by Mr. MASSON, have furnished materials for decyphering them, in considerable abundance; indeed, of the several groups specified above, I have before me upwards of three hundred coins, of which thirty-two exhibit more or less of the bull and raja inscription: twenty that of the elephant coin: as many more that of the Kanerkos legend; and half a dozen that of the seated figures.

But, before entering upon the description of these coins, of which it must be remarked that we do not know the date *a priori*, although from their possessing Greek inscriptions, we necessarily refer them to an age not very distant from the Bactrian dynasty, it will be more satisfactory to bestow a little further attention upon the silver coins found in the first gold box (see page 317,) which I have already stated generally to belong to the known dynasty of the Sassanidæ, without however venturing to contract their date within narrower limits than the duration of that monarchy, namely, from the third to the seventh century of the Christian era.

*Sassanian Coins of Mānikyāta.*

The characters on the obverse of the Sassanian coin (fig. 8, pl. xxi.) are not sufficiently distinct to enable us to decypher the name, even by placing it in juxtaposition with others of the same kind, which Sir R. KEE PORTER states to have been read by himself "on the principles laid down by the Baron DE SACY."

There is one peculiarity however, which (supposing his reading to be correct) will serve our purpose equally well in identifying it. I allude to the very curious ornament of two wings embracing a crescent and star on the cap of the monarch. The same ornament is visible in a coin depicted by the author just mentioned in fig. 8, pl. lviii. of his travels in Georgia and Persia, and the following is the account given of it in page 130, vol. ii. of the same work.

"This piece of money is more frequently met with than any other of the Sassanian dynasty. It is larger than most of the ancient currency, and on the whole very slightly executed. The diadem of the king has the singularity of being more in the shape of a helmet than a crown; it is winged, but surmounted by a crescent and star, instead of the customary globular form. The bust is encircled by a triple range of pearls, marked in equidistant divisions by a star and crescent. The letters which compose the legend are very complicated, running into each other like rapid writing. On the face of the medal they produce *shapūri mezdean*, &c. and on the reverse, *shapūri*, with other letters too defaced to decypher. This SHAPUR must be the second of that name, (the seventh in descent from the first, who was the conqueror of Valerian;) and he also was a great man, being surnamed *Zūlaktaf*, and renowned for his victories over the Roman emperors JULIAN, CONSTANTIUS, &c."

It must be remarked however, that the head-dress of the coin differs from that of the sculpture of this monarch at *Takht-i-Rustam*, where his name and titles are inscribed in legible Pehlevi\*.

ŠAPUR II. came to the throne on the hour of his birth, in A. D. 310, and reigned nearly seventy years, which is itself a strong reason in favor of his coins being more numerous than those of other Sassanian princes, and so far corroborates the appropriation of the winged head-dress to him. He was more than once engaged in repelling the Tartar and Arab invaders of his territories. It was from his clemency to the Arabs that he obtained the surname of *Zūlaktaf*, which HERBELOT

\* I was not aware until seeing it in KEE PORTER that this character had been satisfactorily decyphered; unfortunately, the As. Soc. Library does not contain a copy of DE SACY'S *Mémoire sur les divers antiq. de la Perse*, which furnished KEE PORTER with the key to its alphabet.

explains to signify "aux épaulés." Other Persian historians however, according to HERBELOT, make the title of this monarch Zákshy "aux ailes," or with the wings, interpreting it as an allusion to the clemency towards his Arab enemies, whom he on some occasion spared from massacre; taking it in its literal sense it may have applied to his usual head-dress, or metaphorically the title may have perhaps been typified by the device of wings upon his cap in the coins and effigies of the monarch. Assuming it to be satisfactorily proved any at rate that the silver coin in question belongs to this sovereign, we have at once a limit to the antiquity of the tope of Mánikyála, in the reign of SAFOUR II.; that is, between the years of the Christian era 310—380; for it is natural to suppose that the coins deposited were of the species current at the time, as it has always been customary in the nations of the west so to deposit the current coins of the place on laying the foundations of temples, bridges, and other public works. Thus then we contract the date of the erection within the narrow space of these seventy years, which may be esteemed a sufficient approximation, in the absence of more positive information on the subject.

Before quitting the subject of the Sassanian coin, I must notice the other two coins already stated to assimilate with the Sassanian type, namely, figs. 10 and 11, of plate xxi. The headdress in these is also remarkable for the wings; although the absence of bushy hair and beard, attended with a difference of feature, forbid their being ascribed to the same prince, or at least to the same year of his reign. The chief peculiarity of these coins is their Devanágari legend, which however illegible it may be in parts, contains the initial title of respect, *Sri*, repeated twice and in the same relative position—before the title and before the name itself,—as is customary with Indian monarchs; for instance, *Sri* Maharájádhi Rája *Sri* Chandra Gupta, &c. The name itself may probably be foreign.

The reverse of these coins, no longer a fire-altar with its attendant priests, bears a rudely executed front face with a head-dress of a peculiar form. Fortunately among the coins procured at Kábul by SAYED KERÁMAT ALI, there is one which serves in a great measure to clear up the mystery of this ornament. I have depicted it as figure 6, of plate xxv. On one side of it we see the front face, and winged crown of Zúlaknaf, SHAPUR II., with the precise ornaments on the margin of the obverse described by KEMPESTER, and no Sanscrit epigraphic; while on the reverse we have the mysterious head-dress of figs. 10 and 11, and the legible Devanágari inscription *Sri* Vásu deva, which is the patronymic appellation of KRISHNA the Indian Apollo.

At the epoch now established as the date of the tops, the ancient religion of Persia, the worship of the sun, or *Mithras*, had not only been retained in its former splendour among the Persians themselves, but it is acknowledged to have exercised a powerful influence on all other religions prevailing at the same time: even the Christian religion was tinged with many of the mysteries of the *Mithriac* worship\*, and an attempt had been made by *SCYTHIEN*, *TRAPANZEVST*, and lastly by *MANI*, in the latter part of the third century, and in the very court of the Persian monarch, to incorporate the doctrines of *CHRIST* with the mysteries of *ZOROASTER*, in a system of his own, known to the Alexandrine Church as the Manichean heresy.

It is not surprising therefore that on the Indian side of the Persian monarch's dominions, in a part probably under his influence if not directly under his sway, we should find the fire-altar, or the image of the sun, replaced by *KRISHNA* among the Hindus, or *BUDDHA* among the Bauddhists; both of them personating the sun in their respective mythologies.

Whatever forms of the Hindu religion were prevalent at the time, the adoption of the sun as the ostensible representation of divine power, either in accordance with the commands of the ruling prince, or from a natural tendency towards an union of the Brahmanical and Magian faith, could not present many difficulties. "We must not be surprised," says Sir *WILLIAM JONES*, "at finding that the characters of all the pagan deities, male and female, melt into each other, and at last into one or two; for it seems a well-founded opinion, that the whole crowd of gods and goddesses, in ancient Rome and modern *Varânes* (*Benares*), mean only the powers of nature, and principally those of the sun, expressed in a variety of ways, and by a multitude of fanciful names†."

\* "La fête pommée 'Celle de la naissance du soleil invincible' (*natahs solis invicti*) tombait au VIIIe des calendes de Janvier, ou au 25 Décembre. Environ à la même époque, quelques jours après le solstice d'hiver, se célébrait la grande fête des Perses appelée *Mirr-hagan* (*Mihira*, soleil; *gâhan* fête) mot qui exprime une idée analogue. L'une et l'autre de ces deux solennités avaient également rapport à *Mithras*. Les chefs de l'église d'occident fixèrent au même jour la célébration de la naissance du Christ, dont l'époque était demeurée inconnue jusques là." *Religions de l'antiquité, traduit de l'allemand du D. F. CREUZER, par J. D. GUIGNIAUT.*

† The assumed name of *TEREBINTHUS*, (*BUDDAS*), has given rise to conjectures of his connection with the Hindu sacred personages of the same name, and the ancient fathers actually ascribed many of the traditions of the Buddhists to this heretic. *HUX*, however, shews the origin of their mistake. *Buddas* in Chaldaic has the same signification as *Terebinthus* in Greek, and this was the cause of his changing his name. See *WILFORD*'s speculations on the subject, *As. Res.* ix. 215.

‡ *As. Res.* vol. i. page 267.

The kind of radiated *coma* which surrounds the head-dress of *VÁSV DE'VA* in our coin (fig. 6, pl. XXV.) may be readily imagined to represent the glory or brilliant effulgence of the sun; it resembles somewhat the glory round the head of *Surya*, in *Mooa's Pantheon*, plate LXXXVII. The same ornament appears on the reverse of the two coins from *Mánikyála* (figs. 10 and 11, pl. XXI.) but the name *VÁSV DE'VA* is wanting in these, and the Sanscrit legend is confined to the obverse, where it evidently marks the name of the young king with the winged helmet.

If the winged headdress be considered then the exclusive mark of *SHAPUR II.* we may suppose him to have possessed provinces in India, wherein he struck money, with his name and titles in the *Nágari* character; and where, to avoid offending the prejudices of the people, he omitted the altar of *Mithra*, and adopted the Hindu divinity which coincided nearest with the object of his own worship.

While we have this evidence of Indo-Sassanian rule in some quarter of the *Panjáb*, another of our coins, though but one, would seem to point out a similar connection with the *Bactrian* provinces. Among the coins of the *Kadphises* group sent down by *KERAMAT ALI*, are two gold ones of very inferior fabrication, thin like the *Sassanian* coins, and differing in many respects from the class of coins to which they are otherwise allied. One of these is depicted as fig. 10, of plate XXVI. The other is similar, except that the headdress of the prince is surmounted by a pair of wings and globe, as separately shewn in fig. 11. I thought at first that the coin might be spurious, being of gold and so vastly inferior in execution to its fellows, but it will be seen hereafter that its authenticity is well established: it is sufficient in this place to point out the above curious fact; and I therefore now proceed to review the other coins of the *Mánikyála\** tumulus, with the hope rather of applying the epoch already found from the *Sassanian* coin, to the history of these, than to draw from the latter any additional light regarding the age of the monument.

#### *Obverse of the coins of Kanerkos.*

Beginning then with the two gold coins preserved in the cylinders of the same metal, the first remark which occurs on their inspection is, that Greek characters were still in use in the provinces of *Kábul* and the *Panjáb* in the fourth century: corrupted to be sure, but still retaining more of their original form than those of the latter *Arsacidæ*, or of the first *Sassanidæ* of *Persia*, a century anterior to them in date.

\* The Sanscrit legends on the two *Mánikyála* coins, have resisted the attempts of all the pandits to whom I could refer; even with the aid of a conjecture that they might refer to *SHAPUR II.* of *Persia*, or, though less likely, to *KRISHNA.*

The next observation which offers is, that none of the words of the inscription are Greek; neither the titles of the Indoscythic sovereigns of Bactria, ΒΑΣΙΛΕΥΣ ΒΑΣΙΛΕΩΝ, nor even Greek terminations to the words, being any longer apparent (with exception of two ΚΑΡΦΙΣΕΣ coins upon which the Greek legend was barely perceptible). It was not until I had carefully analyzed all that was legible of the fresh supply of coins of the same nature, that I was able to distinguish the direct *consanguinity* of the whole of these barbaric descendants with their comparatively pure progenitors above mentioned.

Nearly the whole of the Bactrian series of coins is now known to us.

Those of pure Grecian fabrication, such as the beautiful silver medal of EUTHYDEMUS brought down by Lieut. BURNES, of which Dr. GERAËRD has recently favored me with a duplicate, simply bear the head of the sovereign on the obverse, and his name, along with a figure of JUPITER, HERCULES, or some other god, on the reverse, after the fashion of their Syrian prototypes\*.

The coins of MENANDER, APOLLODOTUS, and EUCRATIDES, as well as those of ANTILAKIDES, HERMÆUS, UNADPHERROS, and other princes made known through Mr. MASSON'S successful researches, have invariably an inscription in Pehlevi or some unknown character on the reverse, while the name and titles of the sovereign, instead of running straight across the field as in the Macedonian coins, encircle the device on the obverse, in the manner of the Roman coins of the same period, which were then no doubt current extensively in the east.

The Pehlevi inscription continues on the coins of ΚΑΡΦΙΣΕΣ, which we may conclude from their comparative rarity in the Μάνικυάλα collection to have belonged to a different province from those of *Kanerkos*, or to have been antecedent to them by a period sufficient to render them scarce in the district.

The fortunate discovery by Dr. MARTIN HONIGBERGER of one of the coins of this prince in a tope near Kábul, corroborates the idea of a separate seat of government; and the device of the bull (and SIVA ?) points to a different creed from that of the *Kanerkos* series, which bear an image, as will presently be shown, of the sun; and thus appear more nearly allied to the Persian creed.

At the period however, of the erection of the Μάνικυάλα monument, a considerable change had taken place in the designation of the princes of *both* countries: at least we find a similar alteration in the inscription of the coins of both; the devices in other respects remaining unaltered or only deteriorated in execution.

\* See Journal As. Soc. vol. ii. plate xi.

The alteration to which I allude, is the omission of the Greek title ΒΑΣΙΛΕΥΣ ΒΑΣΙΛΕΩΝ, and the substitution of ΠΑΟ ΝΑΝΟ ΠΑΟ, or simply ΠΑΟ. That such was the case may be proved from numerous coins in Mr. MASSON'S plates; I have however endeavoured to make the transition still plainer by placing together in Plate XXV, drawings of the coins which I imagine to be thus allied. Figures 7 and 8, are from very perfect specimens of the genuine Kanerkos coin in copper, the first sent me by ΚΕΡΑΜΑΤ ΑΛΙ, the second by Dr. GERARD: while figures 10 and 11, are from other equally well preserved coins in my own enriched cabinet. The devices will at once be pronounced to be identical.

Of the legend on the first two coins I need add nothing to what has been before said: of the others, I have collected, to the right hand of figure 10, the various readings extant, and, beginning on the right hand, we find as before stated ΠΑΟΚΑ . . . ΝΗΡΚΙ, which I suppose to be equivalent to βασιλευς Κανηρκου\*; the break between ΚΑ and ΝΗΡΚΙ seeming to have been merely caused by the want of space below the device, while the dots between the Α and the Ν may be intended to denote their immediate connection.

If we now turn to the Kadphisés group in Plate XXVI, we find precisely the same change of designation, at the foot of the plate on the right-hand side, where for the sake of saving space, the terminating words only of the Greek inscription are engraved.

The first part of the full inscription on the elder type of these coins, both the large and the small, is correctly given by Mr. MASSON, as ΒΑΣΙΛΕΥΣ ΒΑΣΙΛΕΩΝ ΣΩΤΗΡΜΕΓΑΣ†. The name ΚΑΔΦΙΧΗΣ is itself not very distinct in any of the ten coins whence my inscriptions are copied, but coupled with Mr. MASSON'S authority, it may be fully relied on. The intervening letters are more uncertain: the various readings are ΟΟΧ, ΟΚΜΟ, ΟΟΚΜΟ, ΟΟΗΝ, ΟΟΜΟ. The two *omicrons* cannot well be intended

\* We have no authority for writing it *κανηρκος*, since it always occurs with the genitive termination *ου*, although united to *βασιλευς* in the nominative.

† Mr. MASSON'S Memoir is so full on the subject of the Kadphisés coins that I have not thought necessary to add any thing thereto. I may here however point out that the portion of Colonel TOD'S bull and raja coin, which SCHLEGEL could make nothing of (*As. Res.* xvii. 579), has been successfully developed by the more perfect specimens now obtained. What the Professor decyphered as ΙΗΡΝΙΕΙΟ and ΕΛΟΒΙΠΠΙΟ are evidently (supplying the two first letters of *aspivour*) ΣΩΤΗΡΜΕΓΑΣ ΚΑΔΦΙΧΗΣ. SCHLEGEL considered the name to be of a Tartar Khan, or Indo-Scythian prince. Colonel TOD however leaned to a Parthian origin, whilst the Bactrian kingdom was subject to Parthian kings; this view seems the most probable from several considerations, such as the fire-altar, the costume, and the *Pelevi* inscriptions.

as stops to denote the termination of the inscription, to which purpose they would be applied in the Zend, or Pehlevi; nor can the intervening word be an epithet, coupled with *μεγας*, for the same word occurs on the gold medal found by Dr. MARTIN\*, with the simpler form ΒΑΣΙΛΕΥΣ ΟΟΗΜΟ ΚΑΔΙΧΗC. The only probable conjecture is this, that *Ookmo* or *ohemo* may be a part or an adjunct of the name of the prince.

Quitting this dubious ground, and descending to the inferior coins of the bull type, we find legends 11, 12, 13, 14, and 15, expressing more or less legibly the same term PAO NANO observed on the Kanerkou group.

In the same manner, fifteen of the elephant coins afford, some entire, and some in part, the legend PAO NANO PAO in place of the title, and some few, as that depicted in the figure 31, of Plate XXV. have the word KENPANO, which until contradicted by more satisfactory testimony we may assume to be the prince's name on this coin. In some coins this name seems written KENOPANO.

The two copper coins having seated figures, 29 and 32, of the Mánikyála Plate, XXII; also 32 of Plate XXV., and 3 of Plate XXVI.; have, though in fewer examples, furnished unequivocal fragments of the same legend or title, PAO NANO....

The coin with the running figure, on the contrary, has only (in the three legible samples of our collection) yielded portions of PAO KA.... NHPKI, and is therefore in all respects similar to the secondary form of the *Kanerkou* medals. The above includes all of the Indo-Scythic type yet known: Mr. MASSON restricts them to four distinct sets (page 174), and in fact so judicious had been his survey of the group, that we have not been able to add one new type to his list.

We now turn to the two gold coins of the Mánikyála cabinet, having, from the above cursory survey of the more numerous copper coins, become possessed as it were of a key to their solution.

It was some little time before I discovered that the inscriptions on the larger gold coin of the first Mánikyála deposit, (Plate XXI. fig. 2,) and the little gold coin of the lower cylinder (Plate XXII. fig. 24,) bore precisely the same legend on the obverse. The first half of the writing on the small coin was not legible; and it was only after perceiving the analogy of the latter half, with the second part of the larger coin, that I was led by careful examination, to trace and recognize the rudiments of each letter of the first part of the obliterated coin. I have in the present Plate, XXV., placed the two in juxtaposition, (figs. 25 and 26,) to shew their identity, and the whole line thus restored becomes very evidently

\* See the drawing of this coin by MASSON, in Plate XIII.

## PAO NANO PAO .. OOHPKI KOPANO.

There is some indistinctness, and perhaps an omission, about the central portion of this inscription, where portions of the letters are cut off, or entangled with the ornamental head-dress of the prince; but we are fortunately able to clear up this uncertainty from a coin depicted as No. 2 of Professor WILSON'S plates, in the seventeenth volume of the *Researches*, and stated by my predecessor to have been discovered in a field near Comilla in Tipera. The inscription on this coin, of which the fac simile in type metal, cut for the *Researches*, is fortunately in my possession, is now rendered legible by our acquired knowledge of its associates; I here place the corrected reading under the fac simile:

PAONANO PAOKA NHPKIKOPANO

PAONANO PAOKA NHPKIKOPANO

and it at once enables us to supply the omission in the centre of the *Mánikyála* gold coins by the name already so familiar to our ears, as *Kanerki* or *Kanerkou*.

Are these various coins then all the production of one sovereign, or was the superscription of that prince maintained by his successors, and gradually lost by the corruption of the Greek characters, in which it was endeavoured to be conveyed? To these questions a satisfactory answer cannot be given in the present state of our knowledge; but we cannot avoid remarking that the *KENOPANO* of the elephant coin may, by a very trifling alteration, be read as . . . . *KI KOPANO*, which will bring it to coincide with the other coins of this extensive family.

The degeneration of individual letters is sufficiently visible in the various forms of the P, the A, the K, and the M, in the specimens engraved, but a more wholesale abandonment of the primitive form may, I think, be pointed out in the third gold coin of Mr. WILSON'S plates, being one of what we have called the bull and raja, or Kadphises, coins. The legend on this is very prominent, and contains, under a trifling disguise, the very letters of the same sentence; the first letter P is wanting, and the three final letters of the last word

*Fac simile,*

ΑΟΝΑΝΟΡΑΟ ΟΟΗΚΟΡ

*Corrected reading, (ρ) A O N A N O P A O O O H O K O P (αο)*

The collection received from KERAMAT ALI has put me in possession of two gold coins of this curious species; (which was indeed held to be of doubtful origin, from Colonel MACKENZIE having apparently multiplied fac similes of his in silver;) they are thin, and of exceedingly clumsy manufacture, but the legends in both are plain, though much more transformed than the specimen just given. Fig. 10 of Plate XXVI represents one of these coins, and fig. 11, the principal characteristics of the other, namely, the inscription, the king's head, (already alluded

to as wearing the winged cap of the Sassanian monarchs,) the fire-altar, and the symbol, all more or less varied. The inscription now possesses but three characters, P, N, and O, the latter having swallowed up all the angular A's and P's; and the N assuming all the functions of M and K. Bearing this in mind, the lower line may be read without any fanciful straining, O PAONANO P. O KOPA...

Fig. 10 is equally capable of the same interpretation, for beginning on the left hand, at the bottom, what appears to be

POOHOPOOBO UOVO VOPOHO

is evidently letter for letter a corruption of

PAONANOPAO OHO KOPANO

The *letter* of the whole series of these curious relics of a dynasty entirely unknown from other sources having been so far developed, as regards the obverse of the medals, it remains, before we proceed to consider the variable motto on the reverse, to offer a few observations on the *meaning* these enigmatical words *rao nano rao* and *korano* may be intended to convey.

First then, as regards the termination in the short Greek O;—we learn from M. EUGENE BURNOUF's very learned commentary on the Yaçna, in the introductory essay on the Zend alphabet, that the latter contains a short *o* unknown to the Sanscrit alphabet and used as the equivalent of the short Nágari inherent *a*, while on the other hand it has precisely the value of the Greek omicron\*. To express therefore any native word, so terminating, in the Greek character, the omicron would necessarily be employed. We know from the circumstance of the Zend or rather Pehlevi characters on the obverse of the Bactrian coins, that this dialect must have been the prevailing language of the country. Moreover from the learned, authority above quoted we learn, that the termination in *do* is of very frequent use in the Zend, the final *o* being the regular permutation of *s*, the sign of the Sanscrit nominative in words common to the two languages: thus in *ahura-mazddo* (ormuzd), the latter word is precisely the Sanscrit *mahá-dás* 'qui magna dat,' an attribute of the

\* It is unnecessary to state that in the Zend as in the European alphabets, the vowels are all expressed by distinguishing symbols. M. BURNOUF in speaking of a change of vowel orthography between the Sanscrit and Zend says; "Ce changement devra peu étonner sans doute, si l'on pense que dans l'Inde même l'*a* bref Dévanágari vaut *o* suivant la prononciation Bengálie, et *e* bref comme nous l'avons déjà remarqué plus haut. Dans ce cas l'*ó* Zend n'est pas en réalité l'*ó* Dévanágari c'est plutôt l'*omicron* grec, en tant qu'il répond à l'*a* Sanscrit et à l'*e* Latin dans les mots que ces trois langues possèdent en commun."—*Commentaire sur le Yaçna par Eugene Burnouf, vol. I. p. 59.*

deity : again " la lune porte en Zend le nom de *māto* : et *māhya*, lunaire, avec le suffixe des adjectifs *ya* est dérivé de *māh*, qui est exactement le Sanscrit *mas*, (lune)."

The reiteration of the term *rāo* in the expression *rao<sup>nāno</sup> rao*, contrasted with its single employment in other instances, bears so strong an affinity to the duplication *βασιλευς βασιλεων*, in Greek ; *malkan-malkā*, in Pehlevi ; *rājādhi-rāja*, in Sanscrit, &c. that it is hardly possible to resist the assumption of a similar interpretation for the words in question, more especially when it is known that the term *rao* is to this day a common affix to the names of native Marhatta and Rajpút princes ; such as MULHAR RAO, GOVIND RAO, TRIMBAK RAO, &c. The Persian title *rāy*, conferred by the Delhi emperors on Hindu princes as an inferior grade to *rājá*, had doubtless a similar meaning, and like *rex*, *ré*, *roi*, may be all traced to the original Sanscrit root राज्, the 'quality of rule or passion (both equal privileges of royalty !)

The title *Bala-rāya*, or *Bala-rao*, is stated by WILFORD to have been equivalent in the spoken language of Gujerat, to *Bala-rāja*, ' the great king.' The *Bala-rāya* dynasty of that country was composed of petty kings, and the title was contra-distinguished from *Rājendra* the superior or imperial sovereign\*. Mr. WILSON in his notes on the ancient inscriptions on Mount Abu† enumerates the following titles as denoting progressively decreasing grades of rank ;—*mahdrājádhirāja*, *rāja*, *rāna*, *rāvel*, *rāsi*, and *rúo*. The appellation *ravel*, according to Col. TOD‡, was the ancient title of the princes of Mewár. It was only changed to *rāna* in the twelfth century. *Raoul* or *ravel* is still the designation of the princes of *Dungurpur* and *Jesalmér*.

That *rao* was an inferior title will not injure its applicability to the princes of the Panjáb and Bactria, at the time in question, for it is known that the country was divided into petty sovereignties, and it is probable that many were tributary to the Persian monarch.

Without a dictionary of the Zend, the right interpretation of the word *nāna* can only be attempted in the same hypothetical manner : as a name it is frequently met with among the Parsis of the west of India, and equally among the Marhattas of Guzerát and the Dakhan ; NANA GOVIND RAO, NANA COWASJEE, NANA FARNAVÍZ, the Púna minister, and many other familiar names might be adduced in evidence. That it is some title of nobilitude (if I may use the expression) can hardly be doubted, though its precise import be not known : the word *Nāna*

\* Asiatic Researches, vol. ix. p. 179.

† Asiatic Researches, vol. xvi. p. 314.

‡ Tod's Rájasthan, vol. i. p. 213.

is inserted in Wilson's Sanscrit dictionary as bearing the signification, 'without, except; ' many, various; ' double, or two-fold, as *ninārasa*, many-flavoured; *nanāraḅga*, many-coloured:—in the same way we might read, knowing the close connection of the Zend with the Sanscrit, *rāo nāna rāo*, 'royal doubly royal,' which has so far a strict analogy with *rajādāki raja—rex—super—rex*. I am unable to offer any more probable conjecture on the meaning of this word.

The final designation *korāno*, bears at first sight a strong resemblance to the Greek *καρπασ*, 'princeps, dominus': but as the introduction of a word, seldom or never used in this sense upon coins, would imply an increasing knowledge of a foreign tongue at the very time when in other palpable instances it was falling into disuse and oblivion, such an explanation cannot be allowed for a moment. The next analogy which strikes the imagination is, to the modern title *sāhib-i-qirān*, borne by those of the Delhi monarchs, TIMUR, SHAH JEHAN and MUHAMMED SHAH. The explanation of this epithet has been given in various ways, as "lord of the fortunate conjunction of the planets;" "the august hero;" "the sovereign who has reigned through a certain term or lustrum," (10, 20, 30, 40, 80, or 120 years,) "lord of the horns or rays." In the latter sense it bears an analogy to *zū-l-karnāin*, the common title of ALEXANDER the Great, literally "aux cornes," with the horns, in allusion to the horns of Ammon depicted upon his head in most of his medals. Here again is a connection not to be passed over unobserved with the application of *zū-l-aknāf*, "aux ailes," to the parallel instance of the winged head-dress of SAPHOR in the Sassanian coin before described.

*Kirana* is Sanscrit as well as Persian: no doubt therefore some derivative form of the same root will be found in the Zend: it signifies a ray of light, a sun or moon beam: *karana* also signifies an interval of time. It is probable therefore that the epithet *korāno* may have some reference to the designation of the Moghul emperors, who, it may be remarked, brought it into Hindustān, though many centuries afterwards, from the country which was the scene of KANERKI's rule.

Of the word preceding *korāno*, the variations in reading on different coins are so great, OOH, OOMO, OMKO, &c. that I cannot venture an opinion on the subject further than, as it appears also in the pure Greek inscription of ΚΑΡΦΗΝΗΣ' coin, it must probably form part of a proper name. On the two Mānikyāla gold coins however, the reading is distinctly OOMPKI (or OOHPKI, for the H and M are nearly alike), while on CAREY's coin before described the initial is equally distinct, and the testimony is strong in favor of reading it as KANHPKI, with the same termination as is found on the well-preserved coin fig. 10. of Plate XXV.





Should this prove to be the right reading, we have thus the full inscription on the obverse PAO NANO PAO KANHPKI KOPANO, which may be interpreted "king of kings, *Kanerki* the splendid."

I have not alluded to the hypothesis advanced in my former note, that *KANERKOS* might be the *Canishka* of Cashmirian history, because the discovery of the Sassanian coins, and the consequent modern date of the present monument, at once overthrow that supposition. It may however be urged in explanation of the great abundance of the *Kanerki* coins, that this name may be one of a family, or dynasty, like that of *Arsaces*, on the Arsacidan coins, repeated without further distinction than an alteration in the features and dress of the monarch, throughout the whole line from the real *Kanerki* downwards.

*Inscription on the reverse of the Kanerki coins.*

I now proceed to offer a few remarks touching the inscription and device on the reverse of the *Manikyála* coins of the *Kanerki* group.

That the image represented on all these coins is a sacred personage may be gathered from the glory which invariably encircles its head. In this respect they resemble their Grecian prototypes, upon which we behold the figures of Jupiter, Hercules, Apollo, and Castor and Pollux.

The costume of our mythological figure however, differs greatly from the Grecian model, and in the specimens best preserved, as fig. 10, of Plate XXV., it resembles the Persian dress with its peculiar turbaned hat, and a thin flowing robe hanging from the shoulders.

There are four varieties of attitude, attended with other peculiarities, which it will be better to couple in description with what we have to say on the epigraphe of each.

The first variety is already well known from Lieut. BURNES' and MASSON's specimens: a beautiful coin of this type is engraved in Plate XXV. from one of KERÁMAT ALI's collection.

The figure is wrapped in a flowing muslin robe, of the Indian character: it faces the right hand; it is apparently a female, and it bears a lotus. The motto is, NANAIA. Portions of the same name are seen on all of the copper coins in which the figure faces to the right hand. It is also discoverable in the Tipera gold coin (No. 2, of WILSON's plates) already alluded to, in the before inexplicable fragment , the first mark of which is part of the device and not a letter: the next three letters are evidently NAN.

Mr. MASSON has conjectured very plausibly, that this name is identical with *Náni*. There are he says, numerous shrines throughout that country known to the Muhammedans as the *searats* of *Bibi Náni*. The Hindus also resort to them, claiming the lady as one of the numerous forms of the goddess *Párbati*.

Colonel WILFORD mentions in the third and fourth volumes of the Researches a goddess called by STRABO, ANAIA and equivalent to the Sanscrit *anáyasá dévi*, which seems to have a near connection with the object of discussion. "Even to this day," says this learned mythologist, "the Hindus occasionally visit the two *juwá-lá-mukhís* or the burning springs (of naphtha) in *Cusha-dwípa* within: the first of which dedicated to the goddess DÉVI with the epithet *anáyasá* is not far from the Tigris; and STRABO mentions a temple on that very spot, inscribed to the goddess *Anaias*:" again, "*anáyasá-dévi-sthán* (now Corcur) was the  $\tau\eta\varsigma$  *Anaias* *Ioppo* of STRABO\*."

He afterwards alludes to some Hindus who had visited the place: "I have been fortunate enough to meet with four or five pilgrims of India who had paid their devotions at this holy temple of the goddess ANAIA or ANAIAS, with its burning mouth or *juwá-lá-mukhí*: it is near Kerkook, east of the Tigris†."

The circumstance of the burning fountain is of material importance, as it will be seen by the sequel that it connects *nanaia* with the other devices of the reverse, and with the general and national fire worship to which it is imagined they may all be traced. The inscriptions accompanying this appellation are generally speaking of pure Greek; had they been otherwise, it might have been doubted whether *nanaia* were not the adjectival or feminine form of the word *nána* on the obverse.

The goddess *Nanaia*, or *Anaia*, again bears a close analogy in name and character to the *Anaitis* of the Greek, and *Anahid* of the Persian, mythology; that is, the planet Venus, and one of the *seven fires* held sacred by the latter people. M. GUIGNIAUT's remarks on the subject may be applied to the figure on our coin:—"Le culte simple et pur du feu, dominant dans les premiers âges, se vit bientôt associer le culte des astres et surtout des planètes. . . Les feux, les planètes, et les génies qui y président sont au nombre de sept, nombre le plus sacré de tous chez les Perses; mais trois surtout se représentent sans cesse comme les plus anciennement révéérés, le feu des étoiles ou la planète de Vénus, *Anahid*; le feu du soleil, ou feu *Mihr*; le feu de la foudre, ou feu *Bersin*, Jupiter. Le culte du feu *Guschasp* ou d' *Anahid* figure comme un culte fort antique dans les livres Zends et dans le Schah Nameh, de même que celui d' *Anaitis* dans une foule d'auteurs Grecs depuis Hérodote. . . Or *Mitrá* (féminin de *Mithras*) et *Anahid* ou *Anaitis* sont une seule et même déesse, l'étoile du matin, génie femelle qui préside à l'amour, qui donne la lumière, et qui dirige la marche harmonieuse

\* As. Res. vol. iii. p. 297 and 434. † As. Res. vol. iv. p. 374.

des astres avec les sons de sa lyre dont les rayons du soleil forment les cordes\*.”

The object in the hand of our *Nanaia*, fig. 7, Plate XXV., is not however a musical instrument, but rather a flower, or perhaps the mirror appertaining to Venus.

The larger gold coin from Manikyála has apparently an expanded form of the same name: it is read MANAOBAO in page 316, but from the similarity of M and N in the corrupted Greek of the period in question, I entertain little doubt that the correct reading is NANAQ (for *vavaia*), with some affix or epithet BA or BAFO or BAAO, which could only be made out by one acquainted with the Zend language.

On the other hand the horns of the moon projecting from the shoulders of this figure, assimilate it strongly to a drawing in HYDE'S *Rel. Vet. Pers.* p. 114, of *Malach-baal*, to which also the last four letters of the inscription bears some resemblance. *Malach-baal* or *rex-baal* is only another name for the sun. Those who incline to the latter interpretation will of course class this reverse with those of HAIQC, to which I shall presently advert.

A remarkable variation from the genuine Greek reading occurs in one of the specimens published by Colonel FOD in the *Transactions Roy. As. Soc.* vol. i. plate xii. fig. 14, on a coin of PAO KA . . . . (*vnpκi*). The word *nanaia* here appears under the disguise of NANAQ, and this is an important accession to our knowledge, both as shewing that the Greek name corresponded to the vernacular, and as proving from the Zend termination in *áo* the link with the Sanscrit *antyaśa*.

The second type of the Kanerkou reverse represents a male figure, dressed in a frock, trowsers, and boots: he is in a graceful attitude, facing the left, with the right arm uplifted and the left a-kimbo. He has a turban and a glory, which is in some instances radiated.

The designation on the higher class of this type is uniformly HAIQC the sun, and there can be no doubt therefore concerning its nature: moreover in the subsequent series, wherein the Greek language is suspended and the letters only retained, a corresponding change is observed in the title, while the same dress of the 'regent of the sun' is preserved, and enables us to identify him.

The Romans and Greeks, as we learn from HYDE, always dressed Mithra in the costume of a Persian king: thus on various sculptures inscribed *Deo Mithra Persarum*, "visitur MITHRA seu Sol, figurá humaná Regis Persici qui subijit taurum eumque calcat necatque." This very

\* Religions de l'Antiquité du Dr. CREUZER, par GUIGNIAUT, ii. 731.

† *Historia Religionis veterum Persarum*, 112.—The expression of Lucian's *De Deorum Consilio*, is also thus rendered by GUIGNIAUT:—"Ce Mithras qui vêtu de

common attribute of ΜΙΤΗΡΑ slaying the bull, which is supposed to typify the power of the sun subjecting the earth to the purposes of agriculture and vegetation, might lead to the conjecture that the figure on the reverse of the Kadphises coin was also ΜΙΤΗΡΑ with his bull; the dress however is different: neither is there any appearance of a sacrifice; the reading of the Zend inscription can alone clear up this difficulty, and I will in a future plate collate all the inscriptions which are sufficiently legible for the examination of the Secretary of the Paris As. Soc., whose researches in this language point him out as the most competent scholar to undertake the solution of the problem.

In Plate XXV. (figs. 12 to 24). I have engraved such of the substitutes for ΗΑΙΟC as are most distinct in my cabinet, beginning with the well developed characters of fig. 10. It requires no stretch of imagination to discover in the first six of these, the word ΜΙΟΡΑ, written ΜΙΘΡΟ or ΜΙΟΡΟ, according to the Zend pronunciation, *Mihira* being the Sanscrit and Persian name for the sun.

Thus when the reformation of the mint nomenclature was effected, by the discontinuance of Greek appellations, we perceive that the vernacular words were simultaneously introduced on both sides of the coin; and the fortunate discovery of two coincident terms so familiar as *helios* and *mihira* or *mithra*, adds corroboration to the identity of the titles of the monarch on the obverse, and his names, Kanerki and Kanerkou.

The number of coins on which ΜΙΟΡΟ appears is very great: it always accompanies the ΡΑΟ ΚΑ . . . . ΝΗΡΚΙ form: see Colonel Top's plate in the Royal Asiatic Society's Transactions, vol. i. plate xii. fig. 11, in the 3rd series; also figure 12, which belongs to the sitting-figure type. It is frequently found also on the elephant coin, see fig. 12, of Top: and fig. 31, of WILSON (Asiatic Researches xvii.) Figure 33, of my own Plate XXV. is a small copper coin from the Μάνικυάλα tope in which it is also recognizable. I find it likewise on several of the sitting-figure coins, figs. 29 and 32, of Plate XXII: but what is of more consequence in our examination of the Μάνικυάλα relics, it is discernible on the reverse of the small gold coin (Plate XXII. fig. 24,) although I did not recognise the individual letters when I penned the description of it in page 319.

As we proceed down lower in the list in Plate XXV. the purity of expression is altogether lost, and the word ΜΙΟΡΟ degenerates into ΜΑΟ or ΗΑΟ, and ΜΑ or ΗΑ, for the Μ and Η are with difficulty distin-

la candys et paré de la tiare, ne sait pas dire un mot de Grec au banquet de l'Olympe, et n'a pas même l'air de comprendre que l'on boit le nectar à sa santé."—*Rei. de l'Asi.* 738.

guished. Many of the coins, containing this form of the word, are complete, and seem to have borne no other letters. We might almost be tempted to discover in this expression another cognomen of the Sun or of Bacchus, IAO and IA, about which so much discussion appears in the works of the Fathers, on the Manichean heresy and the doctrines of the magi, in the third century\*. The Greek mode of writing the word, to be sure, is different, but the pronunciation will be nearly alike, and as the word was of barbaric origin, (being taken from the Hebrew *Iaho* or *Jehovah*,) some latitude of orthography might be expected in places so distant. This is however but a vague hypothesis to account for the presence of a name in connection with a figure, which is known from its identity with the ΗΑΙΟC type of figure 8, to represent that deity. A multitude of symbols and names, under which the sun was worshipped or typified at the time that the Christian doctrines were spreading, and the old religions as it were breaking up and amalgamating in new groupes, will be found enumerated in the learned work of BEAUSOBRE. The engraved stones, amulets, and talismans ascribed to the Gnostics and the followers of BASILIDES, &c. bear the names of *Iao*, *Adonai*, *Sabaoth*, and *Abraxas*, all of which this author traces to divers attributes of the sun. But it is impossible to pursue the subject into the endless labyrinth of cabalistic mythology in which it is involved:—That the image on our coins represents the sun or his priest is all I aim to prove.

There are two other forms of the inscription on this series that it is more difficult to explain: many of the coins with the elephant obverse have very legibly the whole, or a part, of a word ending in ΑΘΡΟ; in some it is as clearly ΜΑΘΡΟ.

Now, although both these words may be merely ignorant corruptions of the original form *Mithra*, it is as well to state that they are both independently pure Zend words, and capable of interpretation, albeit more or less strained and unnatural, as epithets or mythological attributes of the sun, or as we may conjecture, through that resplendent image, of Zoroaster the son and manifest effulgence of the deity.

\* “ Il faut convenir aussi qu'*Iao* est un des noms que les Payens donnoient au Soleil. J'ai rapporté l'oracle d'*Apollon* de Claros, dans lequel *Pluton*, *Jupiter*, le *Soleil* et *Iao* se partagent les saisons. Ces quatre divinités sont au fond la même: *Eis Zeus*, *eis Adης*, *eis Ηλιος*, *eis Διονυσος*. C'est à dire “ *Jupiter*, *Pluton*, le *Soleil* et *Bacchus* sont la même chose. Celui que est nommé *Dionysus* dans ce dernier vers est le même qui est nommé *Iao* dans l'oracle. *Macrobius* rapporté un autre oracle d'*Apollon*, qui est conçu en ces termes: *φρδξω τον παντων υψαρον θεων Ίμαρ 'Ιάω*: je vous declare qu'*Iao* est le plus grand des dieux.' *Macrobe* bien instruit de la *Theologie Payenne*, assure que *Iao* est le *Soleil*.”—*Histoire de Maniché* par *De Beausobre*, tom. ii. p. 60.

Thus in the last number of the *Journal Asiatique*, in a learned essay on the origin of the word *Africa*, the Zend word *athro* is quoted as equivalent to the Greek *αἶθρῆ*, the pure subtle spirit or region of fire, or of the sun, very imperfectly expressed by our derivate *ether*.

Of the word *Máthra*, or *ΜΑΘΡΟ*, we find a lucid explanation in M. BURNOUR's commentary on the *Yaçna*, a part of the *vendidad-sadé*. In the passage where he analyzes the Zend compound *tanumáthrahé*, 'corps de la parole,' *mathra* is thus shewn to be the equivalent of the Sanscrit word *mantra*:—

" Il faut reconnaître que cet adjectif est un composé possessif, et traduire : 'celui qui a la parole pour corps, celui dont la parole est le corps ;' et peut-être par extension : 'parole faite corps, incarnée.' Cette interprétation ne saurait être douteuse ; car le sens de *tanu* est bien fixé en Zend, c'est le Sanscrit *tanu*, et le Persien *تن* (corps) ; et celui de *máthra* n'est pas moins certain, puisque ce mot Zend ne diffère de Sanscrit *mantra* que par l'adoption de l'*a* qui aime à précéder *th* et les sifflantes, et par l'aspiration du *t* laquelle résulte de la rencontre de la dentale et de la liquide *r*."

'La parole' is explained by M. BURNOUR to signify 'la parole d'Ormuzd,' the word of God, or incarnation of the divinity. A title frequently used in the *Zendavesta*, to designate Zoroaster (*Zarathrusta*).

Thus I have endeavoured to prove, that all of this class of figures refer to the sun, under his various names and attributes:—the only exception I can adduce is in figure 11 of Plate XXV. exhibiting the reverse of a copper Kanerki coin, in very good preservation. The context of its long inscription has hitherto baffled my attempts at decyphering ; but I am inclined to class it along with the *NANAIA* reverses.

Under the risk of being tedious, I have now gone through the whole series of corrupted Greek coins connected with the Mánikyála tope, and I trust that the result of my investigation will serve to throw some new light on the subject. I have ventured to give the appellation of "Mithriac" to the very numerous coins which have been proved to bear the effigy of the sun, for they afford the strongest evidence of the extension of the religion of ZOROASTER in some parts of Bactria and the Panjáb at the time of its re-assumption of consequence in Persia ; while the appearance of Krishna on the field at the same time proves the effort that was then afloat, as testified by the works of the Christians, to blend the mysteries of magiism with the current religions of the day. I cannot conclude this branch of the Mánikyála investigation better than in the following extract from Moor's *Hindú Pantheon*: " So grand a symbol of the deity as the sun, looking from his

sole dominion like the God of this world,' which to ignorant people must be his most glorious and natural type, will of course have attracted the earliest adoration, and where revelation was withheld, will almost necessarily have been the primary fount of idolatry and superstition. The investigators of ancient mythology accordingly trace to this prolific source, wherein they are melted and lost, almost every other mythological personage; who, like his own light, diverge and radiate from his most glorious centre."

*Postscript on the image of Buddha from Kábul.*

The Bauddha image represented in figure 1 of Plate XXVI. is described in the Proceedings of the Asiatic Society, of the 6th August last, page 363.

It was discovered by Doctor GERARD in the course of some excavations made by him in the ruins of an ancient town about two miles south-east of Kábul, and near a modern village called *Béní hissár*.

According to the description given by MOHAN LÁL, the image was not found in an insulated tope, but in a mass of bricks and rubbish, which more resembled the ordinary ruins of a desolated town. After penetrating through a mound of such debris, a chamber of masonry was by accident found in entire preservation, the walls of which were ornamented with coloured stones and gilding; and here the statue was discovered. It was evidently the ruin of some Bauddha temple, or oratory in a private dwelling, that had been deserted on the demolition of the town. The image itself has been partially mutilated, as if in a hurried manner, by striking off the heads of the figures with a hammer; one only has escaped: the principal figure has lost the upper part of the head. This mode of desecration points to an irruption of Muhammedans in their first zeal for the destruction of graven idols. The faces at Bamián are described by Lieut. BURNES to have been mutilated in a similar way, while the rest of the figures remain tolerably perfect. The town was probably plundered and destroyed; such of the Buddhist inhabitants as escaped, taking refuge in the neighbouring hills, or in Tibet, where the religion of Buddha continued to flourish. The age of the image, if this conjecture be well founded, will be about ten centuries, falling far short of the antiquity of the topes themselves, and having no immediate connection with them, unless as proving the continued prevalence of the Bauddha doctrines in Kábul to the latter period, a fact well known from other sources.

The lambent flame on the shoulders is a peculiarity not observed in any image or drawing of Buddha that I have seen. It seems to denote a Mithriac tinge in the local faith. The solar disc or glory behind the

figure is a common appendage to sacred persons in every creed; and the angels above, as well as the groupes on either side, are of frequent occurrence.

IV.—*Journal of a Tour through Georgia, Persia, and Mesopotamia. By Capt. R. MIGNAN, Bombay Eur. Reg. F. L. S. and M. R. A. S.*

[Continued from p. 339.]

It was a fine morning when we quitted our encampment *en grande tenue* to descend to the shores of the Araxes. On reaching its banks, we found its width about three hundred and fifty feet, and we crossed it by a stone bridge of fifteen arches in a very dilapidated state. The vestiges of a second stood a short way up the river, and in its ruined condition presented one of the most deserted scenes that could be imagined. A little to the eastward lies the extensive plain of Mogaum, which during summer is rendered nearly impassable from the innumerable heaps of snakes which cover its surface. I saw several of their cast skins, which resembled the *Cobra di capello*. This sufficiently establishes the account given by Plutarch of POMPEY the Great, who after having overcome the Albanians wished to follow the enemy to the shores of the Caspian, but was reluctantly obliged to abandon his design in consequence of the snakes which occupied the intervening plain. GIBBON doubts the account of the existence of venomous reptiles in this country as related by PLINY.—(GIBBON'S Roman Empire, vol. iv. chap. 46, note 5).

On leaving the Araxes, or according to the present appellation, the Arras, the country assumes a wild aspect. It consists generally of high mountains, divided by narrow valleys or plains environed by elevated hills, accessible only by narrow passes and defiles. Hence, it is one of the strongest countries in the world, and its inhabitants have always preserved a partial independence. They have been often defeated, but never subdued; and although tributary to ABBAS MIRZA, the Governor of Azerbijân, are in general free. In fact the country is almost impracticable, and of very easy defence. Having traversed a narrow plain on the river's border of about three miles in extent, we arrived at the foot of a steep bank, which we ascended, and travelled on a farsang, or four miles further in a direction S. S. E. when we gladly saw the village of Khomorlu, situated upon a deep ravine, between steep calcareous and barren mountains. The inhabitants, who dwell in wretched hovels scooped in the ground, are notorious plunderers and assassins; but excuse their own depredations from a conviction

that the whole world are their enemies. These villagers appeared the poorest I had yet seen. Both sexes were clad in rags, and the children to the age of seven or eight were invariably naked. They appeared to me to possess neither food nor furniture beyond the milk of a few sheep and goats, and a scanty supply of grapes, which in the summer season grow on vines that spring up between the clefts of the rocks. I ascended a lofty eminence behind the village, which commanded an admirable view of the Araxes. No outlet for the stream appeared in any one direction, the curves of the river's banks enclosing the opposite points gave it the appearance of a lake completely 'land-locked;' while detached rocks rising at a distance in a pyramidal form gave an increased magnificence to the scene.

Quitting these poor borderers, who were ground and crushed by Prince КНОСРОУ like corn between the upper and nether mill-stones, we proceeded in an easterly direction, and crossed the bed of a river, or rather mountain-torrent, in which the actual stream of water when we passed was not above four yards in breadth, though the channel itself was at least forty. It falls into the Araxes about ten miles eastward of the bridge, in a direction north and south. We travelled to a village called Molaun, distant about seventeen miles from Khomorlu. The general direction of the road was south by east. The country was singularly wild; indeed, our road lay over a succession of mountains, which stretched in continual lines as far as the view extended. No soil covered the rocks, no verdure enlivened them; a few bushes of the melancholy wild cypress, and some stunted oaks, comprised the whole of the vegetable world at this season. The approach to the village was both difficult and dangerous. From this the direction of our road varied from S. E. by S. to S. S. E. a distance of three farsangs, or twelve miles, to the hamlet of Ruswár, standing in a scene as desolate, and in a valley as gloomy, as can well be imagined. Not even a tree marks the course of a stream that gives water to the inhabitants. All bespeaks misery and mistrust, as the neighbouring hills are haunted by a number of predatory tribes. My host, whose poverty was perhaps his greatest crime, had on the preceding evening lost his only daughter. The robbers had stolen her in lieu of tribute! At this place we certainly had an opportunity of observing the extreme misery of the peasantry, who in addition to heavy taxes, by which they were already oppressed, were subject to such perpetual depredation from free-booters, that those who were not already ruined by contribution and pillage, found it prudent to present an appearance of the most abject wretchedness as their only security against further exactions.

The road continued over an uninterrupted succession of mountains, and was almost impassable for loaded cattle. We continued ascending until mid-day, when on arriving at the summit of the highest range of hills, a most beautiful scene suddenly and unexpectedly burst upon the view. The prospect was rendered doubly interesting from our having so long traversed a barren waste. The sloping sides of the mountains were thickly studded with the stunted oak. From this point, on looking back, the eye reposed upon successive ranges of mountainous ridges, which gradually decreased in height until they marked the more level country on the banks of the Araxes. Upon the extreme and broken line of the horizon, the lofty hills of the fruitful province of Kárabágh arose in towering grandeur; while immense piles of rock in the foreground, appearing as if thrown up from the very bowels of the earth by some great convulsion of nature, completed the sublimity of the scene. The general direction of these ranges seemed nearly east and west, and they might extend from two hundred and fifty to three hundred miles. Their outlines in Káradágh were more even, and their summits less elevated than those of Kárabágh, as we saw no snow on the former, whereas the latter presented most extensive patches of the purest white. The northern sides of both these ranges might, however, be more thickly covered with snow, from their being less exposed to the dissolving influence of the sun. The great eastern plain of Mogaum presented an horizon like the sea, broken only by small eminences, arising like cliffs and islets out of the water.

We still continued to ascend some barren hills, and felt the weather excessively keen. The thermometer by dawn of day (February 19th) sunk to 28°. Our beards were frozen, and the nostrils of the baggage horses completely choked up with ice-balls, which made it necessary to halt frequently and rub them off. We suffered most severely from thirst and the dazzling reflection of the sun's rays upon the snow, which tanned our faces to such a degree, that we could not wash without suffering extreme pain. It was noon when we reached a small village called Dombry, where we were served with *lubbun*, or curdled sour milk. The elevation of this place above the level of the sea must exceed five thousand feet, for the boiling point on a thermometer of large dimensions varied from 207° to 203°, which, allowing five hundred feet to each degree, gives an elevation of from two thousand five hundred, to four thousand five hundred feet. In three hours from Dombry we descended the rugged mountains which bound the northern side of the plain of Ahar. These ranges appear to be a branch of Mount Caucasus, which bound the territories of Irivan and Nacjivan,

and here take an easterly direction. To the south of us, about three miles, were seen a few trees on the brow of a hill. These surrounded the town of Ahar, and were now become remarkable objects; for since leaving the shores of the Araxes, with the exception of a few hilly tracts in the hamlet of Ruswar, we had scarcely seen a tree throughout our track. This general bareness of wood gives a very forbidding and melancholy aspect to a country, however productive it may be in other respects. A lover of the picturesque would soon become tired of this monotonous appearance. We descended across the plain of Ahar for nearly an hour, and opened a full view of the Ahar river winding in its course to the westward. Still descending, and going nearly south, over deep snow, we came near the water's edge. There was here a ruined building with a domed top, and some arches in its walls; it was perhaps an old well, as the tombs of the Mohammedans are often enclosed. We went from hence to the westward along the northern bank of the stream, over a flat shelving land, when we came immediately opposite to Ahar, which stands on the southern side of the river.

We found no difficulty in crossing, as the river's greatest depth did not appear to be more than five feet. Its waters were extremely turbid, more so than those of the Kur, and much inferior to them in taste. The town of Ahar is the capital of Karadaugh, or the "Black Mountain," as the whole district is designated. It would appear to be the Hara of antiquity, one of the three cities mentioned in 1 Chron. ch. v. 26 ver., to which the Reubenites, the Gadites, and the half tribe of Manasseh, were carried away by PUL, King of Assyria, and TILGATH-PILNESER, King of Assyria. The letters in Hara exist also in Ahar, and a transposition of syllables, or letters having the same sound, is very common in the east. Its relative position with Khalcal, and Ahar would also favour the conjecture. The river runs nearly east and west, and is extremely narrow, infinitely more so than the Araxes. It undergoes a variation in its height during the year, but this is irregular, as there are no periodical rains; and if in spring these give an increase of waters to the tributary streams, the melting of the snows on Mount Savalan, in the autumn, contribute an equal portion.

Ahar contains about six hundred houses, and from five to six thousand inhabitants. It has four mosques, a public bath, a spacious caravansary, and a good bazar. Its streets are narrow, but apparently clean, and some of its houses are plastered with Persian inscriptions, bearing the date of their erection. On the southern side of the town, upon an elevated spot, stands the tomb of Sheikh SAAB-UL-DEEN, the teacher of Sheikh SEFFI, the founder of the family of Seffeviah, better

known in Europe as the Sophis. The mausoleum is of brick, with a foundation of stone, and faced by a portico flanked by two pillars encrusted with green tiles. The whole forms a decoration to the town, and is in good taste. This place is under the dominion of H. R. H. Prince **ABBAS MIRZA**, and is governed by his eldest son **MOHAMMED MIRZA**, who has only a few personal attendants, and no soldiers whatever, although the town is supposed to be fortified and of great strength. The reception given to **KHOSRO MIRZA**, by his elder brother, was like that of a slave to his master, and the manner in which this "sprig of nobility" treated his entertainer in return, was quite *à la Persienne*; or, in other words, as much in the spirit of the despotic Shah whom he served. The quarters which were provided for us were sumptuous and elegant when compared with those of the villages through which we had passed before, and our several entertainers vied with each other in proffering their choicest collations. We were lodged in the house of a lively and intelligent Persian, who was the governor's *ferosh bashee*. He was most anxious to know how his countrymen had behaved during their late mission, and on my assuring him that they all got dead drunk every night of their lives, he exclaimed, "Would to God Prince **KHOSRO** had permitted me to accompany him, what delights I have lost! In your company I might have committed any excesses with impunity!" I told him that the debauchees in the metropolis of my own country would have stood no chance with the young Prince, and as to his proceedings since we had crossed the Araxes, such as sheep-stealing and village-plundering: these were little foibles done in so gentlemanly a manner that they gave *eclat* to his pedigree. My host remarked with a laugh, that such proceedings were the inevitable consequences of his calling, and that all his family, including the old Shah himself, had practised them before. He seemed to think that the axiom "*Il faut vivre*" was a very compulsory one in Persia. "And what has the Prince Royal been doing lately?" I asked: "has he been performing the same sort of achievements?" "Even so," he replied, "His Highness is gathering in his due to pay the troops." "You mean," I rejoined, "for the support of his haram, a prosperous harvest to him." "God's will be done," continued my friend, "a few hundred men can do any thing." In this, however, he was mistaken, for the "few hundred men," we afterwards heard, were attacked by a superior force from the hills, and most of the "posse comitatus" laid on the field! So much for Persian finance. It is even worse than rent-collecting in Ireland.

The height of the town of Ahar above the sea, as estimated by the temperature at which water boils (205½ of Fahrenheit) may approach

to 3,300 feet. LESLIE'S hygrometer only fell to 30°, which may be attributed to the moisture of the air by the melting snow, for the climate is naturally very dry. Our position appeared so close to Mount Savalan that I was desirous of attempting its ascent, but the natives informed me that we were at least nine farsangs, or thirty-six miles off; and that there was no regular road leading to it. Such is our deception of the distances of mountains, in an open and bare country, which presents no succession of objects by which the eye may calculate relative distances.

This mount is greatly venerated by the Persians. It derives its name from a Sherif, or lineal descendant of the prophet Mohammed, whose dead body they say still lies in one of its numerous chasms in the highest preservation. The peasantry of the surrounding plain insist that upon its summit the ark of NOAH rested, and describe the curiosities in its neighbourhood as very numerous. Its ascent would doubtless be most interesting, and at the same time most dangerous. I saw a man who assured me he had some years ago accomplished it.\* He described the undertaking as extremely hazardous, as it is surrounded with high, and partly snow-covered, walls of rock, which must be ascended to reach the top, immensely steep and fatiguing to attain: but when attained, a magnificent and striking view of Alpine scenery astonishes the beholder. The peak is surmounted with a wreath of snow, whose border is beautifully fringed and fantastically shaped.

While we were smoking our kaliuns in the evening, immediately before Savalan, with a bright moon throwing her silver touches along the line of its rugged points, I was apprized that the Prince's astrologer had been examining the stars, and according to his divination, the suite could not depart for Tabriz until the expiration of *seventy hours*; it was then to quit the town gates at midnight, to enable KHOSRO MIRZA to enter his father's capital three hours and a half after sunrise, that being the most fortunate moment of the day, agreeable to astrological calculation. This caused us to make preparations to complete the remainder of the journey alone, and consequently we departed from Ahar on the 22nd of February, at the hour of noon, with a thick mist, which at this time of the year is common to Karadaugh. After having cleared the suburbs, the fog took off, and we traversed the plain on a bearing of west. The river Ahar wound its way through

\* Captain SNEE of the Madras Infantry effected its ascent in 1827 with a party of English travellers: an account of the trip is given in Monteith's *Survey-Tour*, Journ. Geog. Soc. iii. 27. The tomb and skeleton were found on the summit, some of the dried flesh and pieces of the winding sheet still adhering to the bones.—ED.

the white unbroken surface, till it terminated in the horizon. This stream takes its rise at the village of Uzumdil, and flows throughout the district. In an hour after leaving the town of Ahar we stopt at a poor hamlet to quench our thirst. During the whole journey I suffered exceedingly, and by eating snow found that my lips were parched and burnt the more. In fact my mouth became more and more inflamed, my desire for drink fearfully augmented, and a lassitude crept over me which water alone could dissipate. The most essential article in our equipment was a small pot, in which we melted and boiled the snow water. This last is the most necessary part of the process; for if the snow is merely melted, the water has a smoked and disagreeably bitter taste; but if the water is allowed to boil, and then cooled by throwing in plenty of snow, it becomes most refreshing and delightful to the taste, and perfectly satisfies the thirsty and harassed traveller.

We traversed the plain in a westerly direction still, and commenced the ascent of an abrupt mountain, composed of schistus and pudding stone. Upon our left appeared the lofty Savalan, and although the sun's last beams had quitted our airy position, they still illumined the mount.

“ It stood before us

A mount of snow fretted with golden pinnacles.”

On descending the south-eastern face of the mountain, we obtained an extensive view of the valley below, whose romantic scenery I had not seen equalled in the stupendous regions of the Caucasus. At nightfall we reached a village on an eminence called Shehruk, and halted for the night. A crowd of women and young children collected about us, and vied with each other in proffering their assistance, some ran off for sour milk, and others to prepare bread and cheese. These lively females wore no veils, and their plumpness was well set off by large turbans, loose jackets, and capacious trousers. They all spoke the Turkish language, and appeared disappointed on finding that we were unable to converse together. Our next evening's halt was made at Khojah, a small village seated on a hill, and beside a salt stream. Our quarters at this place were most wretched, and to complete our misery, the fleas which had always been extremely troublesome were here as voracious as bull-dogs. We discovered nothing which prevented their biting the exposed part of the body, though the natives spoke of a particular grass which drove them away. The natives of the country suffer in some degree from them, but their flesh does not swell much. Nothing will keep them at bay, but smoke from wood-fires, nor will this do unless we completely envelope ourselves in the midst of it, which would nearly cause suffocation or blindness. They are

extremely greedy, and if the body of one that is sucking is cut in half, it still appears to suck, and the blood flows from where it was severed in two. Night and day they are equally annoying: it is vain to lie down at any prescribed hour, for no sleep can possibly be obtained, unless we are completely exhausted by fatigue; and in the morning the face is rendered frightful to look at, and the hands and legs covered with blood. The flies also were almost as bad as the fleas; they were larger, though not so poisonous.

Khojah is the property of one MIRZA BABA, who holds the appointment of Physician to the Prince Royal. Some years ago this erudite pupil of Esculapius was sent to London by ABBAS MIRZA, for the purpose of studying medicine, and he resided in the metropolis for a considerable time, but it appears he was too lazy to obtain his diploma. As he was temporarily attached to the suite of Prince ΚΗΟΣΡΟΥ, I had an opportunity of seeing a good deal of him; and like most Asiatics that I have met, his countenance was so entirely at variance with his conduct as to defy the boasted science of a physiognomist. He always considered his kaleun a part of himself; and in excuse for being "Entre deux vins," he stoutly maintained that owing to the cold and moisture of the weather, it was highly salutiferous to swallow a dram whensoever it could be obtained. His sobriety, however, was unimpeachable, he could drink all day with impunity: you might as well have attempted to intoxicate a sponge. In fact, the only advantage he appeared to have gained over the rest of his countrymen was that of having added *our vices* to his own.

[To be continued.]

V.—*Observations on the Golden Ore, found in the Eastern Provinces of Mysore in the year 1802.* By Lieut. JOHN WARREN, H. M. 33rd Regiment.

[On looking over the manuscript papers of the Asiatic Society, we have found the following account, dated in 1802, of the mines near Venkatagiri in the Carnatic, which, as it gives the original observations of an officer of ability, known as the author of the *Kala Sankalita*, we are induced to publish at this moment, when the gold mines of the opposite coast are attracting public attention both at home and in India.—Ed.]

As I was employed in surveying the eastern boundary of Mysore in the month of February, 1802, I heard a vague report that gold had been found in the earth somewhere near a small hill, about nine miles east of Budicatta\*, and on which the frontier I was then describing

\* Yerra Baterinc Hill.

was shortly to take me. I accordingly directed my people to make every inquiry which might tend to establish the fact, and offered a reward to any who would communicate information respecting it.

This being held out throughout the country within my reach, a ráyat of a small village called Wurigam, presented himself and offered to show the place, which he asserted was close to his village.

Being unwilling to interrupt the service on which I was then employed, I requested, before taking any steps, that a quantity of the impregnated earth might be brought and examined in my presence : accordingly on the 11th of February, this man returned to Battaman-galam, where I then was, with twenty loads of earth, which being tried, yielded a proportion of gold dust as had been asserted.

Having thus satisfied myself that there actually was in the neighbourhood a certain spot where the earth was impregnated with gold, I resolved on visiting it : and accordingly sat out for Wúrigam on the 17th of February, accompanied by the man who originally gave the information.

On my arrival at Wurigam, my guide assembled all the women in the village, for the purpose of collecting and washing the impregnated earth : this part of the business being entirely assigned to them, and each being provided with a small broom, a vaning basket, and an hollow board to receive the earth, moved to a thin jungle which lies close west of the village.

On arriving at the ground, they separated, and took to small nálas, or rather rutts and breaks in the ground, into which the course of the water is most likely to drive the ore, and removing the gravel with their hands, they swept the earth underneath into their vaning baskets, by the help of which they further cleared it of the smaller stones, and threw it in the hollow board above-mentioned.

Having collected a sufficient quantity of earth, they removed to a neighbouring tank, in order to separate the metal which it contained, and this was done by placing the hollow board, which contained it, in such a situation in the water as to be just overflowed when resting on the ground, and no more. They then with great dexterity stirred the earth about with the hand, so as to keep it as much as possible over the centre of the board, that the metal should fall into the pit of it, by its own weight, and that the earth should wash off over the edges. This operation (which generally lasts a few minutes) being performed, they returned the metallic substance, which they thus cleared, into a piece of a broken earthen pot, examining beforehand whether or not it contained any gold. This process is performed by inclining the board, and with the hand passing water over the metallic sediment which ad-

heres to it; a method which from the superior specific gravity of the gold drives the iron particles before it, and leaves the heavier metal behind just at the edge, where from the contrast with the dull color of the iron, the golden ore appears perfectly distinct, however small the quantity.

I also caused the women to take up some of the earth at the higher places, and having seen it washed as before, a nearly equal quantity of gold was obtained, which evidently shows that the ore is homogeneous to that soil, and not fortuitously driven into the rutts from any distant place by a casual fall of rain.

Soon after, I heard that considerable quantities of that metal were formerly extracted from mines near Marcupam (a village about three miles south of Wurigam): I accordingly moved on the same evening to that place.

On the next day (18th), having collected a sufficient number of the men\* who gain their livelihood by this apparently unprofitable trade, I went to these mines, which lie about one mile west of Marcupam, in a thin jungle connected with that near Wurigam, and situated alike with respect to the range of small hills above described.

I descended into the first mine, which was shewn me, preceded by two of the miners with lighted lamps, by means of small holes made in the sides of it for that purpose. I shall not enter at this place into any circumstantial detail of it, having subsequently had an opportunity of examining these mines with more attention than I did at this period; and consequently shall refer the reader to the separate account given of them at the end of this paper; I remained long enough in the present one, to see some of the stones extracted, and passed from hand to hand in baskets by the miners who were stationed at different stages of the mine, for the purpose of conveying them above ground.

Having procured about four cooley load of stones, I removed to a second mine, which proved to be about ten feet deeper than the former, and having caused the people to extract a sufficient quantity of stones from the second pit, I then returned to Marcupam, in order to try the materials I had just collected.

Here the women resumed their part, and having taken charge of the stones, they took them to a large rock, where they pounded them into perfect dust, which being placed in the hollow board above mentioned,

\* The extracting of the ore from the bowels of the earth being attended with considerable danger, owing to occasional falls of the earth, which they have neither the means or the skill to support, as is usual in mines; also the bodily strength which the breaking of the stones requires, makes it that men alone attend to this part of the business.

they took it to a well where the stony substance being washed off (as in the first case), a sediment likewise remained, which yielded an equal quantity of gold, as would have been extracted from an equal bulk of the earth near Wurigam. I then tried the earth at the surface at several places, and also that which was extracted along with the stones; the former yielded a small quantity of metal, the latter contained nothing but iron.

Having thus convinced myself that a considerable tract in those parts was impregnated with gold, as had been reported, I returned to Battamangalam on the 19th, where having been met by the Amildar, I inquired of him whether he had heard of those mines before. His answer was "that they had been known many years since, and that Tippú had formerly sent a Bramin (named Rája RAMCHANDER) to examine them; but as it was found after a trial of several weeks, that the produce just balanced the expence, and left no profit to the sircar, it was dropped as a bad concern."

This account exactly corresponded with that given me by the rayats at Wurigam (near which place the Rája RAMCHANDER had carried on his investigation); having however inquired more particularly of them, how he had proceeded to business, it appeared that he never visited personally any part of the impregnated ground, and that he relied through the whole of his inquiry on the information given him by his servants. The rayats assured me that he never visited the mines at Marcupam.

Having traced this golden ore (however thinly spread) through an extent of about 10 square miles, I thought it probable that more of it might still be discovered at a greater distance. I accordingly continued my inquiries, when an old woman inhabiting a village called Buksagar\* gave an account that gold was occasionally found on the banks of the Pal-aur river, near that village, and that she had frequently attended to the extracting of it.

My public calls requiring that I should at some period or other visit that part of the parganah of Colar, I resolved on moving immediately to it, for the purpose of verifying this new intimation.

I arrived at Buksagar on the 22nd of February, and soon collected a sufficient number of persons to carry on the inquiry. They took me to the southern bank of the river, and I saw them gathering the earth at the surface to about the depth of three inches, which yielded a product fuller than that collected near Wurigam. I observed more-

\* A village on the north bank of the Pal-aur river, five miles east from Battamangalam, eight miles from Wuriam, and under the same parallel of latitude with the latter.

over that the earth being washed off, there appeared hardly any iron mixed with what remained, and I frequently perceived the golden ore (though in very small quantity) adhering by itself to the board into which it had been collected.

Any metal found in dust on the banks of a river may fairly be supposed to have been driven and deposited there by the stream. I was accordingly induced to suppose that this ore was not homogeneous to the soil where it was found, and in order to convince myself of it, I examined the stratum on the course of the river, about one mile higher up towards its source, and found it equally impregnated with the ore, I then returned to the spot where it was found in greatest abundance, and having extracted earth from a hole about two feet deep, the same being tried yielded nothing but iron. Though this experiment was favourable to my opinion, I had cause afterwards to regret not having examined the stratum at this part of the river in a more extensive manner.

A variety of circumstances compelled me at this time to extend my observations no further; and my want of professional knowledge would have induced me to give up the pursuit, had not it been for the following circumstances:

My preceding observations on this subject having been communicated to several persons high in rank under the Madras Presidency, and the report having gone abroad that gold mines had been discovered in Mysore, it excited the curiosity of some friends, who recommended that I should revisit the impregnated tract and extend my inquiries as far as I was able.

From a consciousness of my inability, I confess that I did not undertake the task without some hesitation. Having however had an opportunity of meeting the Dewan of the Rája of Mysore at Bangalore, in April, and having found him disposed to assist my exertions as much as lay in his power, I resolved on revisiting the mines at Marcupam, and leaving Bangalore on the 19th of April, I arrived at Cargury on the same day\*.

When once a subject has been started, the mind easily follows it up, and a variety of circumstances, originally slightly considered, recur naturally to our recollection, as they tend to support a favourite opinion, and to forward the object of our pursuits.

As I surveyed the pergunnah of Uscotta, in the year 1800, I heard a story told by the Bramins, the purport of which was, that "in pros-

\* A small village on the west bank of the Poni-aur river, in the province of Uscotta, fifteen miles distant from Bangalore.

perous years, when the gods favoured the zillah of Cargúry with an ample harvest, now and then *grains of gold were found* in the ears of the *padu* which grows under the tank laying close north of that village."

I treated this at the time as a fabrication, and took no farther notice of it. But now that my mind was taken up with inquiries of that nature, on my return to Cargúry, I began to conceive that there might be more truth in the story than I at first had imagined; as it was by no means impossible that the banks of the Poni-aur might be equally impregnated with golden ore as those of the Pal-aur, its sister river, and that the plant cultivated in its vicinity might very well in that case carry up now and then a grain of gold in its growth. I accordingly resolved on trying the stratum on the banks of the Poni-aur near Cargúry; but the natives at that place being totally ignorant of the method of washing the earth, and having no utensils with me for that purpose, I was reduced to collect a certain number of loads from various places at random, and to take them along with me until I could procure gold searchers to examine their contents.

On my arrival at Daseracottapilly\*, (22nd,) I soon procured people from Wurigam to attend me, and by my experiments obtained three sparkles of gold from a load collected on the banks of an anicut or dam, which crosses the Poni-aur opposite to Cargúry: so that although the other specimen yielded nothing but iron, this instance alone was sufficient to establish that the Poni-aur, as well as the Pal-aur, rolled gold dust in its stream.

The next object for consideration was, at which place these two rivers so near to their source could have collected this ore: this I thought was a question which came home to myself, as having surveyed them to a considerable distance towards the hills from which they flow, I ought to know best the different tracts over which they went. It then occurred to me that the gold which I had formerly collected near Wúrigam and Marcúpam was generally found near certain small hills, consisting of deep red clay, mostly flat at the top, and covered with that sort of hard metallic stone which in Bengal is called kankar, forming a hard crust, appearing as it were a cover to the hill.

Now, with regard to the Poni-aur, I recollected that there were three small hills of this description† about half a mile S. W. of Cargúry, which in the rainy season supply water to the tank which lays north of it, and that this river passed pretty near a long range of this kind

\* This village is on the road from Bangalore to the Carnatic by Malure, distant forty-nine miles east of Bangalore, and ten miles west of Battamangalam.

† Pattendore Hills.

near Uscotta, Sattiar, Suluvehelly, and Jangamcotta, an extent of nearly twenty miles. Again, with respect to the Pal-aur, I noticed that I had lately traced it through similar hills towards the centre of the province of Colar. From this I concluded that all such hills in this neighbourhood might be alike impregnated with the golden ore, and be the original mines where it was created. I accordingly determined on following up the tract in which they lay, and examining the stratum near every one of them up to certain high grounds near Rondúr Papanhelly, where they seem to terminate.

The small hill north of Daseracottapilly\* being of this description, it naturally became the first subject of investigation. Having now collected a regular working party, consisting of a Duffadar, or overseer, and thirty Dheru women, I began to search the adjacent ground, and the first place which I examined on the N. E. side of the hill, yielded an ample produce of very fine gold dust. I was equally successful when I examined the other sides, and particularly noticed that a sort of red earth generally two feet deep, and succeeded by a white calcareous earth of equal depth, the under-stratum of which is composed of large white decayed stones, seldom failed to contain an ample proportion of metal,—a circumstance which induced me to think that the same sort of earth, though remote from the hills, might be likewise impregnated with ore; and in order to satisfy myself of it, I removed to a rutt, distant about one and half mile from Baterine Hill, and totally unconnected with it, where having collected a few loads of red earth, and washed it, the first load which was examined yielded (a circumstance wholly to be ascribed to chance) as much as twenty from any other impregnated place. This agreeable surprize, however, did not last longer than the time of trying the remaining loads, which yielded exactly the same proportion as the earth near the hill had done.

Having thus satisfied myself of the merits of this red clay, I directed the gold searchers to spread in various directions at a distance from the hills, and to gather in preference wherever they found it. I had the satisfaction to find my conjectures proved invariably well founded, having tried on that day the tract near Daseracottapilly at more than twelve different places, every one of which yielded a satisfactory product.

It will surprise persons unacquainted with the character of Indians to hear, as I inquired of the inhabitants of the village close to which I had discovered gold dust, whether they ever had noticed particles of it on their ground (some of which are actually large enough to be dis-

\* Baterine Hill.

cernible when mixed with the stratum), their answer was, "That their business being to cultivate the ground, they never troubled themselves to look for gold in the earth, and consequently had never observed it before." I did not hesitate in agreeing with them that they had taken to the most profitable pursuit of the two. Having thus explored the tract near Daseracottapilly, I moved on the 26th to Pedipilly (a small village east of the pass, and about four miles east of Daseracottapilly), and with a view to save a number of useless repetitions, I shall briefly say, that in order to establish the opinion which I had broached respecting the merits of the small hills and red earth above alluded to, I successively examined the whole tract from Baterine to Yerra Baterine Hills, an extent of about twelve miles in length by four in breadth; during which inquiry I only was disappointed twice on more than thirty experiments, and I remained satisfied that the gold dust was not more peculiar to the tract near Wúrigam and Marcúpam than any where else within two miles on each side of the range of small hills or pass above-mentioned: these places being only noticed in preference by the natives on account of their inhabitants devoting more exclusively their time to the searching for gold than those at any of the surrounding villages.

From Pedipilly to Yerra Baterine Hills, the superior stratum is generally composed of a brown earth, mixed with gravel about two feet deep; it is almost every where succeeded by a sort of grey argillaceous earth, and at some places by a white calcareous earth, when the superior stratum alters to a bright red.

During the three days I halted at Marcúpam, I kept twelve men in constant employment, both to assist me in collecting specimens of the strata, and to extract gold from the stones. Ten of them were employed the first day in digging out stones, and half of the next in pounding them and extracting the metal—the produce of their labour was in weight *two grains of gold* only.

So small a quantity of metal for so much labour induced me to think that I had not been fairly dealt with; for were these the usual products, it could not possibly be worth these men's while to attend to so unprofitable a trade. I had moreover observed that two mines had been sunk since I had last visited Marcúpam, a sure sign that the business was carried on very briskly. The people who devote their time to the searching for gold, are exclusively of the Dheru (or Pariah) caste. The following is their mode of carrying on the work:

When they resolve on sinking a mine, they assemble to the number of about ten or twelve men from different villages. They next proceed in appointing a Duffadar (or head man) among themselves, whose busi-

ness is to superintend the work, and to convert the products into money. They then make a purse to purchase a sufficient quantity of lamp oil, and the necessary iron tools. This being done, partly from a prejudice they entertain that the tract over which a peacock has been observed to fly and alight is that of a vein of gold, they fix upon a spot, and then proceed to business.

Having examined the mines near Marcúpan, I proceeded in carrying into execution the plan which I had formed of investigating the stratum about the small hills extending north of Daseracottapilly, and also the banks of the Pal-aur river.

The service having taken me to a different tract from the 1st to the 4th of May, I had no opportunity of making any observation until I arrived at a small village called Nellore on the western bank of the river, one and half mile north of Battamangalam. I turned my attention in the first instance to the banks of the Pal-aur, from the bed of which I obtained a few particles of gold, much the same in point of quantity as what I had found at the second place, which I examined near Baksagur.

Having noticed on the same day a deep rutt in the ground, exhibiting the same sort of red clay as I have formerly described when near the hills, running from west to east towards the river, I thought it offered a good opportunity to establish whether the golden tract extended so far to the eastward; as it would at the same time (in case of success) explain whence came the gold dust found in the river, my experiments proved perfectly satisfactory, and I remained well assured (this impregnated spot lying far beyond any possible overflow of the river) that it did not receive its contents from the stream, but on the contrary, supplied it with golden ore. I also formed an opinion that the metal was not more peculiar to the hills than to the whole tract in which they lay, comprehending a space of several miles east and west of them, and extending more particularly to the eastward, somewhat beyond the banks of the Pal-aur river. This induced me to examine the interval between Mútiál Ghát and Manigatta Hill, an interval of about eleven miles in extent, through which the range is interrupted, and presenting a tolerably even surface, only encumbered with large granite stones, which bespoke more of iron than of gold.

On the 5th of May, moved to Carapanhelly, near Baterine Hill: on this and the following day, examined successfully the whole of the tract north of the hill. The stratum being at some places of a deep brown earth, succeeded by a grey argillaceous earth; at others of a red clay, succeeded by white calcareous earth and stones.

On the 7th, moved to Shapúr, examined the ground at several places in the interval; stratum as before; found it everywhere equally impregnated. On the same evening, visited the banks of the river (about two miles east from Shapúr) with equal success, noticed a bed of white calcareous stones (the common under-stratum of the metallic earth) crossing the river from bank to bank where I stood.

On the 8th, moved to Manigatta, close north of which place the range of small hills resumes; found gold at every place which I examined in the interval, but evidently decreasing in point of quantity. Strata as before.

On the 9th, examined the course of the river which crosses the impregnated tract close north of Manigatta, and touches the south extremity of the small hills north of it. Made trial of the soil, and more especially of the highest earth collected at the surface within reach of the stream for upwards of two miles west of the hills, and gave up the pursuit when still obtaining a few particles of gold from the earth taken at random within reach of the course of its water.

On the 11th, 12th, 13th, and 14th, examined the tract about the Manigatta, Wúllúr and Yeldúr Hills; found it every where (though extremely thinly), impregnated with gold, the upper stratum being generally composed of a deep, brown earth, and succeeded by a livid-flesh-colored calcareous earth at some places, and particularly about Yeldúr, changing to a beautiful pink color.

On the 15th, 16th, and 19th, examined successfully the cluster of small hills which lay east of Randúr Papanpilly. These small eminences terminate, to the northward, the frequently interrupted range which has been the subject of the present investigation, and were the winning goal I had kept in view ever since I began this second inquiry. Having however taken notice of a small hill lying about seven miles due east of these, near Ramasandra, and apparently of the same description; on the 26th I examined the stratum both in the interval and about it, and found the earth every where impregnated with gold: having thus traced it uninterrupted right across this extensive pergunnah, and being precluded of any farther investigation by the chain of large hills which lay north of Ramasandra, and are connected with the eastern gháts north east of Panganúr.

The country north of the Randúr Papanpilly hills loses altogether its ardent and ungratifying appearance, it exhibits an extensive plain, beautifully variegated with cultivated fields, tanks, and mango groves; a scenery very seldom to be met with near the golden tract, which is almost every where covered with a scanty, unthriving jungle, the soil being supposed by the natives to contain certain foul substances inimi-

cal to agriculture. Eager as they seem every where else to avail themselves of the vicinity of rising grounds to construct tanks, here on the contrary, hardly any structure of this sort is to be seen. Nay, at many places, the rávats turn by means of artificial water-courses the noxious streams, which during the rainy season descend from those chalky pits, towards their fields, thus unknowingly exemplifying that great common-place of moral philosophy, which teaches us to disdain the hidden and corrupting treasures of the earth, and look to the plough for abundance and prosperity.

*Particulars of the mines examined by Lieut. WARREN, in the month of April, 1802.—1st Mine, west of Kembly.*

The entrance of this mine is at the level of the tract in which it stands. It is in breadth two feet; in length, four feet; in perpendicular depth, about 30 feet; in extent 50 feet.

The upper stratum is composed of a deep-brown earth to the extent of about  $1\frac{1}{2}$  feet, (No. 1.) Then succeeds a stratum of grey argillaceous earth, mixed with gravel, about one foot deep, (No. 2.) Next follows a bed of deep-brown earth, similar to that at No. 1, four feet deep, (No. 3,) under this is a stratum of hard grey and yellow clay, four feet deep (No. 4,) where the mine ceases to descend perpendicularly; and an even space is met at this stage, intended as a place of rest.

From this the mine descends at an angle of about  $10^{\circ}$  from the foot for four feet deeper. It then branches off into two separate galleries, one of which strikes to the southward, and at six feet offset subdivides into two branches, one of which follows the original southerly direction to the extent of 36 feet, the stratum being of a hard whitish argillaceous earth, (No. 6.) The other branching off in a south-easterly direction, to an extent of 20 feet, the stratum being the same as at No. 6.

The other principal gallery extends westerly in a straight direction,\* at present only accessible to 24 feet, where it is encumbered with fallen earth, (the stratum being the same as No. 6, in the two preceding galleries,) in each of which the metallic stones are found.

These stones are generally of a siliceous nature, of a black, changing to deep rust colour, where they seem to decay. A few parallel streaks are observable in them, about which adheres a green and yellow substance, which marks their value to the natives as they search the mines, (No 7.)

N. B. Although this mine appears to have been much searched, it is still very productive, at least in the ideas of the natives.

*2nd Mine.*

Being the same with that visited by me on the 28th of February.

The entrance of this mine is in a hollow place, about six feet below the level of the surrounding tract, and lies nearly due west of Súrú-pally. It is in breadth two feet ; in length, four feet ; in perpendicular depth, about 45 feet ; in extent, 56 feet.

The upper stratum is composed of a black argillaceous earth, mixed with gravel, about three feet deep, (No. 1.) Then succeeds a stratum of dark-brown earth, mixed with stones, about six feet in extent (No. 2), under this is a bed of hard clay, at some places in black and yellow streaks, in an oblique direction ; about four feet deep, (No. 3.) Next follows on the north and west sides a bed of large black stones, of a hard, compact argillaceous nature (No. 4); the stratum on the east and south sides being of the same sort as (No. 2). Next follows a stratum of black earth, mixed with gravel, about four feet in extent (No. 5), where the mine ceases to descend perpendicularly, and where (as in the preceding one) a resting place is found.

The mine then descends at an angle of about 20° from the foot, for 32 feet direct ; the stratum being composed of hard black clay (No. 6,) in which are found two sorts of stones. The one similar to that described No. 4, containing in the opinion of the natives no metallic substance whatever. The other being a hard white siliceous stone, about which generally adheres a deep orange soft substance, which marks its value to the miners, and generally appears where the stone splits as it is broken (No. 7).

[The particulars of two other mines differ in no material respect from the preceding ; they are accordingly omitted.

In the Madras Literary Gazette for May 10th, 1834, appeared an interesting editorial notice, derived from official documents, of the gold mines in the province of Malabar, the first printed account, as it is stated, of these gold works.

There is also a notice of the same mines in the Mechanic's Magazine for 1834, page 43, which states that although they became known to Mr. DUNCAN, Governor of Bombay, in 1793, they had remained neglected for forty years, until the Madras Government lately issued an order for registering all gold found in the collectorate of Calicut. Surveyors were also deputed to examine the district.

The principal mines examined by the late Dr. WARD, according to his report, were five miles S. W. of Nelambúr : their depth, and the mode of working them, resemble the foregoing description. The produce from 66 lbs. of the earth was about one grain. The African sands sometimes yield as much as 36 in the same quantity. The total quantity extracted per annum does not exceed 750 ounces, or 30,000 rupees value. The mines now worked are Cherankode, Devala, Nelyalam, Ponery, and Puiyode, in the Wynaad district: the rivers Srupumjee, Polwy, and Tirumpaddy rivers in Calicut ; Punaur and Malapuram rivers in Kurmenad ; Pandalúr and Aliparamb rivers in Nedinganad ; Kadalaondy and Ferpanangady on the sea shore in Shernad ; Kapii, Aripamad, and Trúmalý Hills in the Ernaad district ; besides twenty river works unnecessary to enumerate.—Ed.]

VI *Abstract Statement of 412 Villages in Zillah Bareilly, Settlement under Regulation VII. 1822. By H. S. Boulderson, Esq. Collector.*

The following statement, for which we are indebted to the Secretary of the Allahabad Sudur Board of Revenue, will give a just notion of the produce of land in the Rohilcund districts.

Pargannah.	No. of Villages.	Total Area in Acres.	Deduct excluded from Assessment.	Málguzári Land.			Jamma per annum of years subsequent to 1241.	Average per acre on Málguzári Land.	Average on Cultivation.	
				Cultivated.	Culturable.	Total.			R. A. P.	R. A. P.
1 Bisalpur, . . .	13	5,128	1,252	3,050	826	3,876	9,357	2 6 6	3 1 0	
2 Chaumehalla, . . .	13	4,984	1,170	2,180	1,534	3,714	5,475	1 7 7	2 8 0	
Ditto, . . .	8	2,339	414	1,340	585	1,925	2,524	1 4 10	1 14 0	
3 Krór, . . .	58	25,980	8,626	12,740	4,614	17,354	29,724	1 11 5	2 5 0	
Ditto, . . .	30	17,203	5,320	7,895	3,988	11,883	17,587	1 7 8	2 3 7	
4 Faridpur, . . .	29	11,459	2,558	5,230	3,671	8,901	13,571	1 8 5	2 9 0	
5 Nawárganj, . . .	51	23,835	6,667	13,294	3,974	17,268	35,296	2 0 8	2 10 0	
Ditto, . . .	10	3,844	877	2,427	540	2,967	6,897	2 5 2	2 13 0	
6 Aunla, . . .	28	17,834	6,754	5,614	5,466	11,080	13,431	1 3 5	2 6 0	
Ditto, . . .	2	1,919	600	1,033	286	1,319	2,237	1 11 2	2 2 7	
7 Shahie, . . .	53	23,577	6,997	12,320	4,260	16,580	30,527	1 13 5	2 7 0	
Ditto, . . .	31	16,742	5,365	7,200	4,237	11,437	20,016	1 12 0	2 12 0	
8 Sirsaweh, . . .	23	12,254	2,904	8,310	1,040	9,350	21,360	1 4 6	2 9 0	
Ditto, . . .	38	17,239	4,226	11,600	1,413	13,013	34,229	2 10 1	2 13 0	
9 Saúeha, . . .	14	6,230	3,380	2,260	590	2,850	5,438	1 13 6	2 6 0	
10 Tissúa, . . .	2	419	144	154	121	275	413	1 8 0	2 10 10	
11 Ajaon, . . .	2	2,262	802	1,035	425	1,460	2,454	1 11 0	2 6 0	
Ditto, . . .	3	2,655	612	1,675	371	2,046	4,351	2 2 0	2 9 0	
12 Kábar, . . .	1	529	105	367	57	424	912	2 2 5	2 8 0	
Ditto, . . .	3	3,489	1,117	2,085	287	2,372	4,286	1 12 10	2 0 10	
Grand Total, . . .	412	1,99,524	59,730	1,01,809	38,285	1,40,094	2,60,080	1 13 8	2 8 10	

VII.—*Proceedings of the Asiatic Society.*

*Wednesday Evening, the 1st October, 1834.*

[Col. Sir JEREMIAH BRYANT, Sen. Mem. present, in the Chair.]

Lieutenant MACLEOD, Madras N. I., attached to the Burmese Embassy, and Lieutenant-Colonel JAMES LOW, Resident at Lucknow, proposed at the last Meeting, were balloted for, and duly elected as members of the Society.

Read a letter from N. WALLICH, Esq. M. D. Acting Secretary of the Agricultural and Horticultural Society of Bengal, expressing the thanks of the Society for their present of Kandahar tobacco, cotton-seeds, &c.

Read a letter from Professor FRANK, expressing his best thanks for the 17th volume of the Asiatic Researches received through their late Secretary, Professor H. H. WILSON.

Also one from CH. D' MEIGS, Secretary of the American Philosophical Society, acknowledging receipt of volumes 16th, 17th, and 18th of the Asiatic Researches, and volume 1st of the Journal As. Soc.

Extracts were read of private letters from Professor Wilson, and Mr. GEORGE SWINTON, on subjects interesting to the Society.

The celebrated sculptor, CHANTREY has at last undertaken to execute the bust of our late Secretary. Some delay is anticipated, as he is at present engaged in a colossal equestrian statue of Sir THOMAS MUNRO for Madras, and a full length of Sir J. MALCOLM for Bombay.

A fresh supply of the 15th volume, Asiatic Researches, was required, all hitherto sent home having been disposed of.

Sir DAVID BREWSTER is at present engaged in a work on the crystalline lenses of animals, and he is anxious to procure specimens of the eyes of all the fishes of the Ganges. Those who have opportunities of supplying this desideratum are requested to wrap the eyes up in thin-sheet-lead, numbered with reference to a catalogue of their names and species, and then all may be enclosed together in spirits of wine. Mr. SWINTON thus sent home the eyes of elephants, tigers, &c. on a former occasion.

Mr. SWINTON, referring to the notice in page 304 of the Journal for July 1833, intimates that he has received back from Sir D. BREWSTER the amount of Indian subscriptions for the polyzonal lens, with bank interest at 2 per cent., and that he holds it at the disposal of the subscribers to be paid to their agents in England. (A notice to this effect is printed on the cover of the present month.)

*Library.*

Read a letter from J. VAUGHAN, Esq. Librarian of American Philosophical Society, forwarding the undermentioned books for presentation.

Transactions of the American Philosophical Society, volume 4th, part 3rd, new series.

Facts, observations, and conjectures relative to the Generation of the Opossum of North America, in a letter from Professor BARTON to MONS. ROUME of Paris.

Laws and Regulations of the American Philosophical Society.

Note of the effect upon the magnetic needle of the Aurora Borealis visible at Philadelphia on the 17th May 1833, by A. D. Backe.

Observations on the disturbance in the direction of the horizontal needle, by A. D. Backe.

Memoirs of the Historical Society of Pennsylvania; and various pamphlets on the subject of canals and institutions for education.

The following works were also presented :

Memoirs of the Astronomical Society, volume 7th—presented by that Society, through the Honorable the Court of Directors.

Select papers on expressing the languages of the East in the English character—presented by Mr. Trevelyan.

A brief account of the religion and civil institutions of the Burmans—by H. N. Thakoor.

Journal Asiatique, Nos. 73 and 75,—by the Asiatic Society of Paris.

Bôornâni Qâtiû, a Dictionary of the Persian language, a new edition, edited and printed by Hâkîm Abdulmojid—by the editor.

*Museum.*

Model of a musical instrument and a battle-axe used by the hill people near Hazaribagh—presented by Lieutenant J. Awdry.

Specimens of the shells and corals from the Isle of Cooson were presented by Mr. J. CURRIE; on the part of Mr. H. V. LYNN.

Specimens of the rocks in the jungle mehals, particularly of the strata exposed to view by the new road, cut in the Katjor pass of the Dalma range of hills, separating Burrabhum and Pátkún from Dhoibhám and Singhbhúm; were presented by Lieutenant Western, Engineers.

The fossil tooth alluded to in Dr. SPILSBURY'S last communication, was received from Dr. Row.

Specimens of basalt, white porcelain clay, coal, and pyrites from Sadiya in Assam were presented by Lieutenant H. L. BIGGE, Adjutant, Assam Light Infantry.

A note was read from Lieutenant ARCHBOLD, enclosing a letter from an Officer of H. C. Sloop Coote, stating the impossibility of finding a conveyance for the mummy left there by him, in consequence of the prejudices of the Mahomedan seamen. It had become necessary, after many endeavours to get it away from Mocha, to bury it at that place!

Read a letter from Lieutenant W. FOLEY, dated Khyook Phyo, Arracan, 6th September, transmitting Journal of a tour through the *Island of Ramree*, with a Geological Sketch of the country, and brief account of the customs, &c. of its inhabitants.

Extracts from Lieutenant FOLEY'S journal were read, and the thanks of the Society were voted for his valuable communication.

[The journal will be published in an early number.]

A notice of a new coin with the monogram of figs. 1 and 8, Plate ix. of Hindu coins, volume iii. Asiatic Society's Journal, was received from Major STACY, and read.

A note by the Secretary was read, on the perfect identity of the inscriptions of the *lath* of FERUZ SHAH at Dehli; BHIM SEN'S *lath* at Allahabad; and the column bearing the same name near Bettiah.

[The notice of this curious and important fact will appear in the next number.]

### VIII.—Miscellaneous

1.—On the making of Chinese Paper; translated from the 23rd Volume of the *Pun Tsau Kang Muk*.

[From the Trans. Soc. Arts, xlix. pt. 2.]

In ancient times, bambus were connected together, and letters burnt on them, to form books; and hence the several characters employed to denote papers and documents are formed partly with the character for "bambu."

In the time of the Tsín and the Han dynasties, letters were written upon silk cloth; and hence the characters for silk and cloth are component parts of the character used for paper.

In the time of the Emperor Ho Te, (A. D. 100,) Tsao Lun began to take the bark of trees, old silk of different kinds, fishing-nets, and hemp, and boil them in rags, and make paper of them, which was used throughout the whole of the empire.

Another authority says, the people of Shuh, on the western side of China, use hemp or linen to make paper; the people of the East, in Fokin, use tender bambus; the people of the North, the bark of the mulberry; others use the rattan; some, mosses or lichens; some, the straw of wheat or other grains; some, the cocoon of the silk worm; and others, the bark of the Chu-tree (syn. of Ruh), the *Brousonettia*.

*Sha Che, or Grape Paper.*

This paper is brought from among the mountains of Nanking, in the province of Kwang Se.

In spring, during the first and second moons, they take the bark of a tree called Ruh-muh (*Brousonettia Papyrifera*), and having pounded it, throw it into a stone reservoir of pure water, where they leave it to steep till it is fit for use. They then take it out with the sediment, and pouring into it cow-skin glue, boiled with water, stir all together. Taking up this mixture with a mould of bambu screen of the size required, they put it out into the sun to dry, and it becomes grape paper.

The Chinese paper called touch-paper (or paper fuel) is made at the village called Peih Keang, a few miles from Canton, of the variety of bambu called Lang.

At the beginning of summer, during the fourth and fifth moons, the young sprouts of the bambu are cut off just as the leaves are beginning to grow, and, having been beaten flat, are thrown into a lime-pit to steep for about a month. They are then taken out, washed clean, and dried in the sun. After which, they are pounded small, passed through a sieve, and laid up. The kernel of the Longan fruit (*Dimocarpus longan*) is also used, being pounded small, dried in the sun, and passed like flour through a sieve. When making the paper, this powder is put into clean water, stirred about, then taken up with a mould made of bambu screen, and the water left to run off. It is afterwards applied to a heated wall to dry, and the paper is then complete.

For coarser or finer paper, a coarser or finer mould is used.

The person who made the drawings says, the bambu is cut into lengths of about three feet, tied up into bundles of seventeen each, and put into running water, where it stays six months. It is then put (in the same bundles) into pits made in the ground, mixed with quick lime made from the shells of the Venus *Sinensis*, pressed down with weights, and left for six months longer. The bundles will have been thus soaked for twelve months: they are then taken out, cut into short lengths, put into one of the usual Chinese pounding mills, and beaten down into pulp; being stirred occasionally, so as to present a new surface; about four hours' labour will break it down.

Pits, twelve covids deep and ten long, contain 2000 bundles of seventeen pieces each, weighing about 24 catty, or 32 pounds.

Cisterns are about eight covids long, in two partitions, two and six broad, and two pailfuls of water are used to one of the pulp.

*King Yucca Paper.*

During the fourth moon, at the close of spring and commencement of summer, the bambu shoots are cut off at the length of three or four covids, (14-625 inches,) and the size of six or seven inches, and then thrown into a lime-pit to steep for about a month. They are then taken up, washed clean, and bleached every day, till they are of the purest white; after which, they are dried in the sun, pounded small, and passed through a very fine sieve, and the finest and whitest part of the pow-

der taken for use. With this is used also the best white cotton of Leo Chow, ten times bowed (or bolted), and the very light cotton which is uppermost taken for use.

Rice-water, made from the whitest rice, being mixed with these two ingredients, the whole is taken up with a mould made of bambu screen of the size required, and then applied to heated wall to dry.

This forms the whitest and finest King Yuca paper.

The above notes were accompanied by seven outline drawings, made in China, of the various processes of manufacturing paper from the bambu, which drawings, by the liberality of Mr REEVES, have been placed in the Society's Library.

## 2 — Preventing the Adhesion of Earthy crust to the Inner Surface of Steam Boilers.

[From the Trans Soc Arts, xlix pt 2 ]

Almost all natural waters hold in solution both carbonate and sulphate of lime, two earthy salts, of which the former is thrown down by bringing the water to a boiling heat, and the latter by evaporation. On this account it is, that if the inside of a steam-engine boiler be examined, after having been in use for a few days, it will be found to contain muddy water, and an earthy crust will be seen adhering to the iron plates of which the vessel is formed. The rate at which this crust is deposited depends on the hardness of the water employed, that is, on the proportion of the above mentioned earthy salts which it contains. This crust is a much worse conductor of heat than iron is, and therefore, a boiler lined with it, even to the thickness of the tenth of an inch, possesses the following defects. The water which it contains is not so soon brought up to the boiling point, and a greater quantity of fuel is required to produce a given quantity of steam, because a large proportion of the heat given out during its burning is carried up the chimney and lost. It becomes, therefore, necessary, from time to time, to remove this crust, which is naturally done by a hammer and chisel, but this operation not only incurs a waste of time, but the boiler is often seriously injured, and rendered leaky by means of it.

It has been found, if a few potatoes are thrown into the boiler when it is again filled, after having been cleaned out, that the formation of crust is sensibly retarded, and that the adhesion of it to the sides of the boiler is greatly weakened, so as to allow of its being detached more speedily, and with much less hazard.

Another method of producing the same effect has been pointed out to the Society by Mr. JAMES BEDFORD, of Leeds, druggist. He put into a large steam boiler between two and three gallons of sperm oil foots, and found that, after eight weeks constant use, the deposit of crust was very small compared to what it used to be from the same water alone, and also that the crust could be cleared off by means of a common stiff broom. The application of oily matters for this purpose, though original on the part of Mr BEDFORD, is not absolutely new, for the Society have been informed by one of their members, that he has known an iron boiler using Thames water preserved in constant use for seventeen years by cleaning it often, and smearing the inside with oil or tallow after each cleaning.

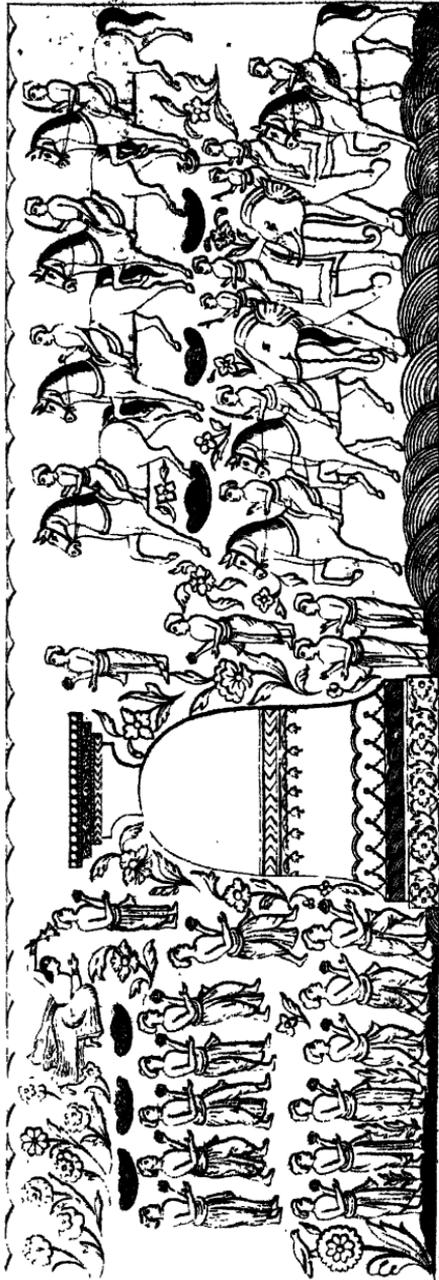
The Society, however, have reason to believe that neither of the above methods are in common use, and have, therefore, directed this short statement to be published for the benefit of those whom it may concern.

Meteorological Register, kept at the Assay Office, Calcutta, for the Month of September 1854.

Days of the Month.	Barometer reduced to 32° Fahr.				Thermometer in the Air.				Thermometer Most-bulb Thermometer.				Hair Hygrometer.		Rain.	Wind.		Weather.	
	At 4 A.M.	At 10 A.M.	At 4 P.M.	At 10 P.M.	Minimum	Maximum	Max. by Reg. Hyg.	At 10 P.M.	At 4 P.M.	At 10 A.M.	At 4 P.M.	At 10 A.M.	At 4 P.M.	At 10 A.M.		At 4 P.M.	Morning.	Noon.	Evening.
1	661	716	660	653	80.8	88.1	88.1	82.2	0.4	3.5	6.2	2.9	47	50	.60	S. E.	e	clear.	
2	646	684	672	640	81.1	87.0	87.0	82.4	1.7	5.8	4.9	2.0	50	50	.80	S. E.	e	clear.	
3	673	616	680	654	80.4	87.0	87.8	80.7	0.7	5.8	6.2	2.0	50	50	.80	S. E.	e	clear.	
4	645	681	682	663	79.8	86.1	86.8	80.8	1.5	4.7	3.8	2.8	50	50	.70	S. E.	e	clear.	
5	633	612	668	648	79.1	86.0	87.1	81.8	1.3	3.7	6.7	7.8	50	50	.80	S. E.	e	clear.	
6	627	639	678	650	80.0	86.3	86.3	80.3	0.8	5.3	6.7	7.8	50	50	.80	S. E.	e	clear.	
7	628	639	678	650	80.0	86.3	86.3	80.3	0.8	5.3	6.7	7.8	50	50	.80	S. E.	e	clear.	
8	636	660	663	638	82.5	87.3	87.3	82.2	1.7	6.6	6.9	4.5	50	50	.80	S. E.	e	clear.	
9	636	660	663	638	82.5	87.3	87.3	82.2	1.7	6.6	6.9	4.5	50	50	.80	S. E.	e	clear.	
10	630	669	670	640	82.0	87.3	87.3	82.2	1.7	6.6	6.9	4.5	50	50	.80	S. E.	e	clear.	
11	631	678	669	640	81.9	87.3	87.3	82.2	1.7	6.6	6.9	4.5	50	50	.80	S. E.	e	clear.	
12	611	628	667	638	81.3	86.6	86.4	82.1	2.4	4.1	5.4	1.6	50	50	.80	S. E.	e	clear.	
13	611	628	667	638	81.3	86.6	86.4	82.1	2.4	4.1	5.4	1.6	50	50	.80	S. E.	e	clear.	
14	611	628	667	638	81.3	86.6	86.4	82.1	2.4	4.1	5.4	1.6	50	50	.80	S. E.	e	clear.	
15	616	680	667	638	81.0	86.9	87.4	83.1	1.0	6.1	6.6	3.4	50	50	.80	S. E.	e	clear.	
16	616	680	667	638	81.0	86.9	87.4	83.1	1.0	6.1	6.6	3.4	50	50	.80	S. E.	e	clear.	
17	611	670	667	638	81.0	87.3	87.3	83.1	1.2	5.6	6.3	3.4	50	50	.80	S. E.	e	clear.	
18	611	670	667	638	81.0	87.3	87.3	83.1	1.2	5.6	6.3	3.4	50	50	.80	S. E.	e	clear.	
19	603	710	660	640	81.0	87.3	87.3	83.1	1.2	5.6	6.3	3.4	50	50	.80	S. E.	e	clear.	
20	603	710	660	640	81.0	87.3	87.3	83.1	1.2	5.6	6.3	3.4	50	50	.80	S. E.	e	clear.	
21	612	704	661	640	81.0	87.3	87.3	83.1	1.2	5.6	6.3	3.4	50	50	.80	S. E.	e	clear.	
22	612	704	661	640	81.0	87.3	87.3	83.1	1.2	5.6	6.3	3.4	50	50	.80	S. E.	e	clear.	
23	612	704	661	640	81.0	87.3	87.3	83.1	1.2	5.6	6.3	3.4	50	50	.80	S. E.	e	clear.	
24	612	704	661	640	81.0	87.3	87.3	83.1	1.2	5.6	6.3	3.4	50	50	.80	S. E.	e	clear.	
25	612	704	661	640	81.0	87.3	87.3	83.1	1.2	5.6	6.3	3.4	50	50	.80	S. E.	e	clear.	
26	612	704	661	640	81.0	87.3	87.3	83.1	1.2	5.6	6.3	3.4	50	50	.80	S. E.	e	clear.	
27	612	704	661	640	81.0	87.3	87.3	83.1	1.2	5.6	6.3	3.4	50	50	.80	S. E.	e	clear.	
28	612	704	661	640	81.0	87.3	87.3	83.1	1.2	5.6	6.3	3.4	50	50	.80	S. E.	e	clear.	
29	612	704	661	640	81.0	87.3	87.3	83.1	1.2	5.6	6.3	3.4	50	50	.80	S. E.	e	clear.	
30	612	704	661	640	81.0	87.3	87.3	83.1	1.2	5.6	6.3	3.4	50	50	.80	S. E.	e	clear.	
Mean.	678	674	674	666	81.2	85.9	86.1	82.6	1.3	4.0	5.9	2.5	96.4	94.0	8.62	light variable.		much rain this month.	

The instruments were all situated as usual.





Some detail in one of the compartments of the Bharhukha monument at Varanasi



Malliah Lath near Bettiah, on the river Gandak.

# JOURNAL

OF

## THE ASIATIC SOCIETY

No. 34.—October, 1834.

I.—*Notice of some Ancient Inscriptions in the Characters of the Allahabad Column* By B H HODGSON, Esq Resident in Nepal.

[In a Letter to the Secretary, read at the Meeting of the 28th May, 1834.]

With reference to the remarks in No. 27 of the Journal on the Allahabad Column, and, more particularly, to the note at the foot of page 116, I hasten to inform you, that some 8 or 10 years ago, I sent to the Asiatic Society drawings and descriptions of a column, and inscription, which I found in the Tarai of zillah Sárun, half way between the town of Bettiah and the river Gandac, west and a little north of Bettiah, and very near to the Nepal frontier. There is a similar pillar, and similarly inscribed, close to the high road from Segony to Patna; and though this be, I suspect, in zillah Tirhut, not Sáran, and though STIRLING call his Láth, the Sáran pillar, yet I believe him to allude to the latter monument, and not to mine: because the latter is situated in a frequented country, and commonly traversed route to and from sundry familiar places, and if not in Sáran, it is, at least, close to its boundary, whereas the former stands in a desert out of the way of all ordinary routes. At all events, whether STIRLING alluded to one or the other monument, it is certain, that there are two in north Bengal, that both bear inscriptions of an identical character with your No. 1, and that both columns resemble in size and shape the Allahabad one, and that of FEROZ SHAH. I possess likewise an inscription, procured from the Sagar territories, written in the very same character. When therefore we consider the wide diffusion over all parts of India of these alphabetical signs, we can scarcely doubt their derivation from Deva Nágarí, and the inference is equally worthy of attention.

language is Sanscrit. I use the words Deva Nágari and Sanscrit in the largest sense, and mean thereby, the language and literal symbols of the learned Hindus; for, you know, it is a question whether the existing Deva Nágari and Sanscrit be the primitive types, or, only the last results of refinement of older forms. The learned among the Hindus, so far as I know, adhere to the former opinion, and insist that all the Bháshas and their written characters, are derivatives from the primitive and perfect types, viz. Sanscrit and Deva Nágari. And, with reference to the variety of alphabetical signs, which are daily being discovered by us, the common assertion of the Pandits of both the Brahmanical and Bauddha faiths is particularly worthy of observation. They say that there are, or were, no less than 64 Bháshas, each with its appropriate alphabet, derived from Sanscrit. Now, though the round number, 64, should probably be received with a grain of reserve, yet the many new varieties (so to speak) of Deva Nágari, which we have discovered in the last 10 years, obviously drawn from that type, tend to confirm the general truth of what the Pandits assert; and, at the same time, warrant the expectation that we shall find many more yet, as well as countenance such presumptions as that your Nos. 1 and 2 are essentially the same, and that both are essentially Indian, or, (in the language of the Pandits, varieties of the Deva Nágari type.

When I forwarded the drawing of the *Mathiah* pillar, (for so it is called by the neighbouring peasants,) with copy of the inscription upon it, to Dr. WILSON, I noticed the resemblance of the letters to those of Tibet, as well as that of the couchant lion\* on the top of the monument to the effigies of the same animal, forming the most common sculptural ornament of a certain class of temples in Nepal. And I observed to Dr. WILSON, that those circumstances had led me to hope that some Nepalese Pandit of the Bauddha faith would have been found capable of expounding the inscription:—an expectation in which, I added, I had been disappointed. If you examine the records of your museum, you will, I hope, find the *Mathiah* pillar and inscription; but, if not, and I still retain (of which I am doubtful) copies of them, I will forward them to you; and also, if you desire it, the Ságari inscription.

*Kathmandú, 24th April, 1834.*

I have just ascertained from LOKRÁMAN UPADHYA, the Nipalese Vakil, that there are three Láths in North Behár, inscribed with the

\* Lieut. BURR's Bull, which crowned the Prayág Láth, is or rather was, I suspect from analogy, a *Lion*.

character No. 1., and, moreover, a Déhgóp, or hemispherical Bauddha mausoleum and temple, in the same region.

The first of the Láths is the well known one near Bakia in sight of the high road to Hajipur, and this is surmounted by a lion. The second is at Radiah, near Arahráj-Maha Deva, district of Majhous, and zemindary of Bettiah, and it has no lion.

The third is the Mathiah one, between the town of Bettiah and the Gandac, eight or ten miles (perhaps more) west, and a little north of Bettiah town. It has a lion. I find that my copy of the Mathiah inscription is gone home; you shall have a new one made, if you need it. And I have ordered drawings and inscriptions to be taken from the other two pillars.

I have likewise directed a drawing to be made of the Kesriah mound, which is undoubtedly a Bauddha Déhgóp or Chaitya, and such also is the Mánikayála tope. There are scores of them in this valley.

II.—*Note on the Mathiah Láth Inscription.* By JAS. PRINSEP, Sec. &c.

Since writing the above, Mr. HODGSON has favoured me with a native drawing of the column near Bettiah, which is engraved as figure 2 of Plate XXVII.; and a copy of the inscription it bears is given at length in Plate XXIX. The accuracy of the copy from the MS. has been verified by careful examination, but the native engraver, to save space, has unfortunately carried on the whole text continuously, so that it does not shew the commencement of each line according to the original. This defect I have endeavoured to remedy by placing small figures to mark the beginning of the lines, as it was hardly worth while to re-engrave the whole plate.

The character of this inscription was at once of course recognized to be the same as that of the Allahabad column and FERON'S Láth. The initial word of each paragraph was also soon perceived to agree with the specimen given at the foot of Plate V. of the present volume—the identity continuing even further than the five letters there marked, and extending, in all the numerous cases where the form occurs, to the following fifteen letters—

ॐ ॐ ॐ ॐ ॐ ॐ ॐ ॐ ॐ ॐ ॐ ॐ ॐ ॐ ॐ ॐ

The trifling variations which may be perceived in one or two of the readings of this sentence, which may be supposed to be some formula of invocation, are evidently attributable to errors of transcription.

Upon carefully comparing the Bettiah inscription with that of

Allahabad and Delhi, with a view to find any other words which might be common either to two or to all three of them, I was led to a most important discovery; namely, that *all three inscriptions are identically the same*. Thus, the *whole* of the Bettiah inscription is contained *verbatim* in that of FAZOL'S LATH, published in four consecutive plates, in the seventh volume of the Asiatic Researches: and *all* that remains of the Allahabad inscription can with equal facility be placed in the same plates, with exception of the five short lines at the bottom, which appear to bear a local import. The last eleven lines of the *east* inscription of the obelisk of Delhi have indeed no counterpart in the other two; but this may be also owing to the destruction of the corresponding lines of these two texts, which happen to be, on them, the final and nethermost portion of the sculpture.

To enable the reader to judge of the agreement of the three inscriptions, I have added to Plate XXIX. since it has been engraved, marginal references, to point out the corresponding sheets of the Delhi inscription. I have also marked all the variations, omissions, and redundances that occurred on a careful comparison of the two texts, omitting only the mere errors of vowel marks, the correction of which would have confused the already painful closeness of the writing. Considering that the Bettiah inscription was taken down by a native artist, the errors of copying do not appear to be very numerous. There are more considerable discrepancies found on collating the Allahabad transcript of Lieut. BURT, with the original from Delhi, owing no doubt to its dilapidated condition. It is a fortunate circumstance that the Delhi sculpture remained in so perfect a state of preservation, when it was first discovered and examined by the English. It seems moreover to have been most carefully taken down by Captain HOARE.

On referring to my former note on the Allahabad column it will be remarked, that most of the anomalous letters, which I had thrown out of the classification of this alphabet in Plate V., are, on comparison with the other texts, now reduced into simple and known forms. A few other remarks that occurred on passing my eye carefully over the whole three inscriptions, may perhaps help in determining the value of some of the letters.

1. I asserted on that occasion that there appeared to be no compound letters:—several very palpable instances however occur in the Bettiah inscription, of double letters substituted for two single ones in the Delhi column. These are as follows:

In the fourth line of the Bettiah version **ꣳ** is found to be substituted for **ꣳꣳ** of the Delhi text. In the first line the same substitution

is made, with the addition of one of the vowel marks,  $\ddot{\text{A}}$  for  $\text{A}$ . In the eleventh line  $\text{K}$  occurs for  $\text{K}$  : in the thirteenth,  $\text{L}$  for  $\text{L}$  : in the 28th, we find  $\text{Q}$  taking the place of  $\text{Q}$  : and the same contracted form occurs also in the Allahabad version (vide scheme of Alphabet, Plate V.) The commonest double letter however in both these two texts is  $\text{J}$ , which corresponds with  $\text{J}$  of the original or Delhi column.

Other contractions of less certainty may be remarked in the body of the inscriptions : for instance,  $\text{J}$  for  $\text{J}$  ;  $\text{O}$  for  $\text{O}$  ;  $\text{T}$  for  $\text{T}$  . It is probable also that  $\text{K}$  and  $\text{L}$  are contractions of  $\text{K}$  and  $\text{L}$ , though this is not borne out, like the others, by actual example of the separated letters.

2. From the frequent and almost exclusive occurrence of  $\text{J}$  as the secondary consonant in the above enumeration of double letters, as well as from its resemblance in form to the corresponding letter of the Gya alphabet (No. 2, see Plate VI.), I think a strong probability is established that this letter is equivalent to  $y$  or  $\text{य}$  of the Deva Nágarí alphabet.

The other subjoined letter has a great analogy to the Sanscrit  $\text{व}$ . The letter, with which these two are most frequently united, may with equal probability, be set down as equivalent to the Deva Nágarí's,  $\text{व}$  ; whence the compounds may be pronounced to be  $\text{व}$  and  $\text{व}$ , the two perhaps of most common occurrence in the Sanscrit language.

3. The letters  $\text{D}$  and  $\text{D}$  are found to be frequently interchangeable in the inscriptions ; corresponding in this respect to the  $\text{व}$  and  $\text{व}$  of the Nágarí alphabet, and strengthening the assumption just made.  $\text{L}$  and  $\text{L}$  are also very commonly confounded, and it is most probable that they are the same letter. The triangle (No. 28 of the alphabet in Plate V.) of the Delhi inscription, is invariably represented by the half-moon letter  $\text{D}$  (No. 13) in the Bettiah Láth, and therefore the former may be erased from the alphabet : the anomaly of the same character, shaped like the letter V, proves on comparison to be the same letter as the foregoing.

4. The letter  $\text{M}$  (No. 14 of the alphabet) is very commonly omitted in the Láth of Bettiah, especially when it occurs before No. 24. This character also is subject to no vowel inflections ; its variations of form though numerous prove to be merely accidental.

5. In the Delhi text as printed in the Asiatic Researches the words are separated from each other, according to the European fashion. This circumstance is of great consequence, (especially as it is not observable in the other two transcripts,) because it enables us to form

some notion of the terminations and inflections of the words. Thus where we perceive an instance, (and many such occur,) of five or six consecutive words ending in the same letters, we may fairly presume them to be connected in case and gender, like the long compound epithet of the second inscription described by Dr. MILL, (p. 260.)

6. The characters most often forming the termination of words in the Delhi text, are **।** and **॥**, of both of which upwards of 40 instances occur. Next to them in frequency, come **३**, **४**, and **५**, about 20 of each: then **६** and **७**, **८** and **९**, about a dozen each: the other letters are comparatively rare as finals. It may be remarked, that the vowel inflection, which has been set down as *é*, is affixed to most of the final consonants, affording another argument in favor of the language being Sanscrit.

7. The order in which the inscription should be read is wrongly given in Captain HOARE's plates, where he makes the east portion follow that of the north. That the north is the proper commencement is proved by its being the uppermost of the Allahabad column; then follow the west, the south, and the east respectively.

For convenience of reference, I may here remark, that the first eight lines of the Allahabad Lath inscription include to the third letter 19th line, Plate X., Asiatic Researches, vol. vii. They are here cut off by the Persian inscription. The following half line, partially clipped on the upper surface of the letters, begins with the eleventh letter of the fourteenth line, Plate XIII. of Delhi. The next three lines finish the same plate; but three letters are missing from the beginning of each line (owing probably to the peeling of the stone).

The three following lines (13, 14, 15,) correspond with the commencement of Plate XII., and also with the uppermost part of the Bettiah inscription in the present plate; the three or four initial letters of each line are here also cut off by some accident.

Line 20 of Allahabad begins with the sixth letter of Plate XI. of Delhi, and the detached portions of the neighbouring lines may easily be found in their respective places.

In the second half of the Bettiah inscription (which should come first in the order of reading), one circumstance tends very much to perplex the comparison with that of Delhi, which is, that from the last letter of the 20th line onwards, the native copyist (at least I imagine the fault must be his) has transposed every half line of the text, placing *first* what by the Delhi column should be the *last* half of each line. This defect I have attempted to correct by placing intermediate figures over the first letter of each transposed passage: thus, the

order of the figures being now in the engraving 12, 13, 14, 15, &c., the order in which the text should be read to make it agree with the Delhi text is, 12, 13, 13½, 14, 14½, and so on in the natural progression of the figures:

These circumstances prove how very important has been the discovery of the identity of the three inscriptions; for when to the numerous errors of copying, is superadded the perplexing transposition in a complicated manner of one half of the inscription now before us, we may readily imagine the almost insuperable difficulties it would have presented to a translator, even had he a perfect acquaintance with the alphabet and language! The case is now very much altered, and those who have the desire to signalize their learning and ingenuity by decyphering the purport of the document, may go to work with perfect confidence, that by collation of the three manuscripts, he can provide himself with a faithful copy of the original type. Whoever also undertakes to make a facsimile of the other inscriptions stated by Mr. HOBSON to exist in Behár and Nepal, should have a copy of the corrected version before him, that he may note the variations as he proceeds.

Of the origin and nature of these singular columns erected at places so distant from each other as Delhi, Allahabad, Bettiah and Patna, all bearing precisely the same inscription (as far as the unknown character is concerned), I will not venture to offer any speculations. Whether they mark the conquests of some victorious rájá;—whether they are as it were the boundary pillars of his dominions;—or whether they are of a religious nature, bearing some important text from the sacred volumes of the Bauddhists or Brahmins, can only be satisfactorily solved by the discovery of the language, and consequently the import these curious monuments are intended to convey. The new facts now brought to light, will I hope tend to facilitate this object, especially the discovery of the double letters which, added to the mode of forming the vowels, leaves little doubt that the alphabet is a modification of Deva Nágari, and the language Sanscrit\*, as suggested by Mr. HOBSON.

\* After sending the above to the press, I was favored with an interesting communication from the Rev. Mr. STEVENSON, a distinguished Orientalist, well known as the author of the *Maharashtra Grammar*, on the *Ancient Inscriptions in the Caves of Carli*, which is inserted as Art. IV. of the present number. Although I am not prepared to confirm in toto the scheme of Mr. STEVENSON'S alphabet, since when applied to the Allahabad inscription, it does not convert the context into intelligible Sanscrit,—it is most satisfactory to find that many of his equivalents for the ancient letters are the same as those to which the discovery of the double letters above described has led myself; affording thus, a stronger argument in favor of their being correctly interpreted. Of these it is only necessary to mention the *s* and the *y*, of which we may now be quite certain. One more effort by a competent Pandit, with the aid of Mr. STEVENSON'S labours, will

### III.—*Second Note on the Bhilsá Inscription. By the same.*

An original facsimile of the inscription in the neighbourhood of *Bhilsá*, to which the foregoing note of Mr. Hodgson also alludes, was fortunately in his own keeping, and was transmitted to me for the purpose of having an accurate copy transferred to copper-plate. This has been done in Plate XXVIII. with the greatest care and fidelity, but still with little success as to useful result, further than the certainty now acquired that its character is the same as that of the Allahabad column No. 2, which from the circumstance of its occurrence on all the gold Kanouj coins, we may properly distinguish by the title of “*Kanouj Nágari*.” There is however a considerable admixture of the more ancient character, so much so that the period of its sculpture might seem to form an intervening link in the history of the two alphabets.

None of our orientalistes have yet been able to make any thing of the *Bhilsá* or *Sanchí* inscription, although they are far from abandoning their attempts to decipher it. I am perhaps to blame in exhibiting it prematurely to the world before it has been read, but I justify myself in the reflection, that the more it becomes known the better chance have we of a solution of the enigma. We may find duplicate and triplicate versions of part or the whole in other places, as in the remarkable example just brought to notice, and may thus correct dubious forms and render effaced ones legible. As the present inscription was a facsimile taken by compressing the paper on the surface of the stone, there can be no doubt of its exhibiting every impression precisely as it exists there; but every slight chip or flaw is also made manifest, and in a few cases the true letters may thus be rendered imperfect. On the whole, however, it appears very authentic, and only difficult to read from the rude execution of the stone-cutter's chisel.

This inscription, it is known, belongs to a *Bauddha* edifice. A few months since Dr. SPILSBURY sent us a native drawing of the sculpture on one of the compartments of the same monument, which puts the matter beyond doubt; for it represents the consecration of the *Chaitiya* or *dehgope* by a procession of nobles, priests, and votaries. This curious drawing is engraved in Fig. 1, Plate XXVII. It is much to be wished that some amateur artist would pay a visit to the spot, and bring away accurate drawings of the whole details of this highly interesting object

doubtless unravel the whole mystery of the pillar inscription. It might, perhaps, be deemed by some more prudent to make this attempt before publishing the present notice; but, it is precisely because I have not the necessary acquaintance with Sanscrit myself, that I desire to make known generally the progress and results of fortuitous discoveries, which may be of service to others in their investigation of the inscription. J. P.





of antiquity. One addition to its elucidation chance has enabled me to contribute. \*

The late Mr. S. V. STACY picked up at auction some original sketches of architectural monuments in central India, signed "BOBBUCK, 1819." Most of them are without any memorandum to explain to what monuments they belong: but one of them fortunately bears the title "Plan of the Jain or Buddhaic Building at Sanchee Kanikhera, on the west bank of the Betwa near Bhilsá, called '*Sas buhoo ka Bittha*.'" From the hand writing I should judge that the sketch must have been prepared by the late Dr. YELD, apparently for the guidance of some person about to visit the spot, probably Captain FELL. I have introduced the plan and elevation in Plate XXXI. as an appropriate accompaniment to the preceding plates. Some of the marginal notes are worthy of being transcribed:

"In visiting this place, remember also to inquire for some buildings at a place called *Jhinneah ka puhar*, three miles to the north-west of Oodygiri." "There is also an unfinished figure of a horse and a recumbent figure on an adjacent hill in the direction marked M," "The arrow H points in the direction of Oodygiri, where there is a rock with some curious sculpture, and apparently the quarry whence the stone of the present building was derived."

"K points to a temple containing an image of *Buddha*."

L, to another of a similar nature, 200 yards off.

N, to a smaller temple.

A is the site of a pedestal imbedded in a square basement: near which lie the broken parts of a large image.

B, B, and B are three images of *Buddha* within the enclosure.

C is a standing figure, with a smaller figure having curly hair, on his left hand: resting on an elephant on the right.

D is a large broken pillar, the sum of the pieces exclusive of the capital, forming originally a single stone, measure 31 feet 10 inches."

Whether or not this sketch was prepared for Captain E. FELL, it agrees precisely with the description published by him in the Calcutta Journal of 11th July, 1819. This account has not appeared in any work of a more permanent nature, nor is it alluded to by Mr. ERSKINE in his Dissertation on the Bauddha monuments of India, in the Bombay Transactions. I shall therefore make no apology for reprinting it from BUCKINGHAM'S Journal, and if hereafter I am favored with any further drawings of the antiquities in its neighbourhood, they shall be added to the present plates. Captain FELL talks of 'numerous inscriptions,' especially one which gives the date of the erection, in *Samvat* 18, or 40 B. C.

This point requires to be confirmed by a facsimile of the document before it can be credited. If it were possible to perforate the structure without injury, some coins might probably be found deposited in the interior which would better serve to determine its antiquity.

*Description of an ancient and remarkable Monument, near Bhilsá.*

On the table-land of a detached hill, distant from Bhilsá four miles and a half, in a south-westerly direction, is an ancient fabric, of a hemispherical form, built of thin layers of free-stone, in the nature of steps, without any cement, and to all appearance solid; the outside of which has been faced throughout with a coat of chunam mortar, four inches thick; most of this still remains in perfect preservation, but in one or two places a small portion has been washed away by the rain.

The monument (for such I shall term it) is strengthened by a buttress of stone masonry, 12 feet high and 7 broad, all around the base, the measured circumference of which is 354 feet. The diameter of the superior surface is 35 feet, the ascent to which is easy by the assistance of the projections of the different layers. Originally it was crowned with a cupola, supported by pillars; but the cupola is now split, and lies, as well as the pillars, on the top. A line drawn from any given point of the base to the centre of the crown measures 112 feet.

The weight, together with the age and extent of the structure, has forced a portion of the buttress to jut out and give way, by which I had a fair opportunity of fully determining that no cement has been used in the interior of it.

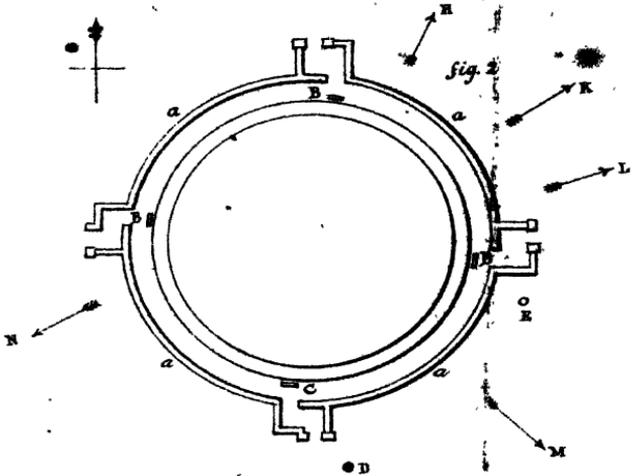
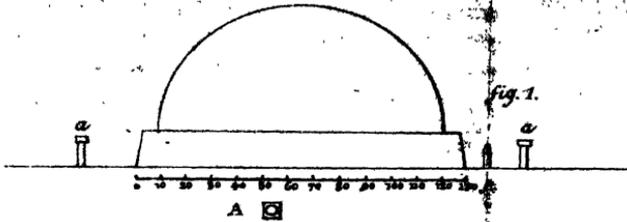
From the different buildings near it having fallen into decay, whilst this stands entire, together with its immense extent, which would rather aid dilapidation than otherwise, I am induced strongly to suspect (enforced by the general impression the structure made upon me whilst examining it, and an aperture appearing in every representation of the monument, sculptured in the different compartments of the gate-way, and even on detached stones), that it is supported by internal pillars. If so, apartments undoubtedly exist within, highly interesting, and worthy of being further examined. Indeed when you view so large a mass of stone, placed in such neat order, without any cement in the interstices, it must forcibly strike the most superficial observer, that inner supporters were requisite to its completion, and were undoubtedly used in the construction.

This point could not be ascertained without much time and labour, and would require also, I presume, the acquiescence and countenance of the Nawáb of Bhopál, in whose territory it is situated; but I conceive that no hesitation would be made to this on the score of its creating jealousies, as the monument is of a nature which prevents the orthodox Hindu from visiting it, and the Jains, as well as every other class, have become totally indifferent regarding it.

As dilapidation has commenced, the ravages of a few years, most probably, will cause the whole to fall into a mass of ruin, destroying the inner apartments and images, if any, and thus for ever depriving the curious from knowing what so wonderful a monument of human genius contains.

It is surrounded by a colonnade of granite pillars, 10 feet high, distant from each other a foot and a half, connected by parallels also of granite, of an elliptical form, united by temons, leaving an area of 12 feet clear of the base of the monument, to which it strictly conforms.

*Section and Plan of the Buddhist Monument at Satchee  
on the west bank of the Beloa river near Bhamo.*



*a*, railing  
 A, Pedestal and broken image  
 B,B,B, Images of Buddha.  
 C, Ditto with elephant.  
 D, Broken pillar 32 ft. high.

E, Small polished pillar.  
 F, Ruins of a hall.  
 G, Small temple.  
 H,K,L,M,N, Bearings of other temples &c.



At the east, west, and north points, are gate-ways, plain parallel grama, the extreme height of each of which is 40 feet, and the breadth within the perpendiculars, 9 feet. They all measure 20 feet to the lintels, which are slightly curved and sculptured, with circlets of flowers. In the northern gate-way, which is the principal one, the lintel rests on elephants, four feet in height, richly caparisoned, borne by a projecting cornice, 16 feet from the case. The perpendiculars are divided into four unequal compartments; in the lower are statues of door-wardens, in long loose drapery, the left hand of each figure resting on the left side, and the right grasping a battle-axe; their head dresses are not unlike the matted-hair tiara of Hindu devotees, with the top-knot thrown forward.

The other divisions are filled as follows: In one is a groupe of females, some sitting, others kneeling in homage to a tree and altar, their hands uplifted, and faces towards the tree, their countenances bearing marks of extreme devotional fervour. In another, the principal figure is a male, clothed in a long flowing garment, resembling a surplice, standing with joined hands, and in the act of adoration to the tree and altar, which throughout the sculpture appear to be the objects of veneration. This male figure is attended by females, some holding umbrellas over his head, others using chowries; above these, on a level with the top of the tree, are small winged figures, making offerings in censers.

The drapery throughout the groupe is generally, for the females, a long flowing vest, resembling that which we observe in Grecian sculpture; that of the males, light lower garments from the navel as far as the middle of the thigh, tied with a knot in front, and hanging down as low as the instep, as in the present Indian mode of dressing. The upper part of the body is naked, without any mark of a sacerdotal thread; and, with a very few exceptions, the head dresses a high turban, with plumes.

In another compartment is a representation of the monument, surrounded by figures in groupes, some standing, others sitting cross-legged, others bowing, all with joined hands, and in the act of worship. On the monument and resting on a square pedestal, are three layers jutting out beyond each other, crowned by a lofty umbrella, supported by small winged figures, naked, their hands joined, and heads covered with numerous serpent hoods.

On entering the different gate-ways, is seen a statue of Buddha, as large as life, seated cross-legged on a throne, which is supported by lions couchant; the back of the image rests against the buttress, and has attendants on both sides using chauris. All of these are much mutilated, and one is removed and thrown across the area.

The perpendiculars of the western gate-way, are also divided into four unequal compartments; in the lower are statues of door-keepers, one of whom is armed with a mace: his head dress, a helmet, without visor or plumes; another division is filled with groupes of figures sitting cross-legged, and standing, their hands joined, and all paying high homage to the sacred tree and altar. In another is a small convex body in a boat, the prow of which is a lion's head, and the stern the expanded tail of a fish, over which is suspended a long cable. In the boat are three male figures, two of whom are rowing, and the third holding an umbrella over the convex. The vessel is in an open sea, in the midst of a tempest; near it are figures swimming and endeavouring by seizing piles, &c. to save themselves from sinking. One on the

point of drowning, is making an expiring effort to ascend the side ; the features of all fully portray their melancholy situation.

In another compartment is the sacred tree and altar, surrounded by groupes of figures, both male and female, some beating tympanus, others playing cymbals, others dancing ; the winged figures before described attend above the groupes. The lintel of this gate-way is borne by the uplifted hands of five uncouth dwarf figures, five feet high, with thick lips and flat noses, their hair curly, and having large protuberant bellies, appearing as if on the point of being crushed beneath the immense burthen they are supporting ; in short, it is hardly possible to conceive sculpture more expressive of feeling than this.

A representation of the grand monument fills another compartment of one of the perpendiculars. (See plate xxvii.)

The eastern gate-way is of the same dimensions as the others, with door-wardens armed with maces. Two of the compartments in each perpendicular comprise a procession leaving the gates of a city in progress to the tree and altar, near which is a human being, his hands strongly corded above the wrists, and held by another. The procession consists of horsemen, footmen, elephants, and short-bodied cars, drawn by horses : the latter crowned with plumes, all highly finished. The head-dress of the figures seated on the cars is the Roman helmet, with the plumes and hair. The whole is preceded by footmen, armed with circular shields and clubs, followed by a band of musicians playing flutes. The head-dress of the groupe running by the side of the cars differs from that of all others, being a closely-fitting turban of circular folds, most exquisitely delineated, on the top of which is a small globular crown.

Another compartment is filled with figures of devotees of different orders, performing various penances. In another division are three figures, with long beards, (the only figures of this description seen throughout the whole building,) seated in a boat in an open sea, at the bottom of which are seen various kinds of shells, alligators, &c. Underneath the ocean, and as if supporting it, are three male figures, and one female, the central male figure with uplifted hands, and his back outwards, the female in the act of praying to him. The whole of this groupe are clad in long loose vests, and the head-dresses of the males resemble mitres. On both sides of the groupe are the winged figures, the tree, and altar.

The lintel of this gate-way is supported by elephants, richly caparisoned, and resting on projecting horizontal cornices.

The capitals of the several gate-ways are crowned by figures of lions, elephants, naked and clothed statues, and images of various birds and beasts.

On the south, there is a plain entrance, near which is a double colonnade of quadrangular pillars, 20 feet high, most curiously set up, and forming an almost oval apartment. Near this lies a large obelisk, in circumference nearly equalling the Láth of FÍROZ SHÁH, near Delhi. On the part which is uppermost, I could not observe any inscription ; it is worked with a string of flowers.

At the door of the apartment above mentioned, is the lower part of a statue of Pársvánáth, smaller than those of Buddha in the gate-ways, resting on a throne which is supported by lions couchant on a pedestal, on which is an inscription, but so much obliterated, that I could make nothing of it, although the few letters that partially remain are Sanscrit. Near this is also a pillar, 14 feet high and 3½ in circumference, crowned with lions and tigers.

In front of and about 60 feet from the eastern gate-way, lie the shafts of two obelisks, about 10 feet in length, broken from the bases, which formed an entrance 14 feet in width ; on these I confidently expected to find an inscription, but was disappointed.

The whole has been surrounded by a stone wall, varying in distance from the monument, from 60 to 400 feet. It is 12 feet thick, and 8 feet high, built without cement ; at the four intermediate points were gate-ways, similar to but on a smaller scale than those in the colonnade around the monument.

The wall has fallen into general decay, and only one gate-way now remains, which is on the north-east.

In the upper compartments of the perpendiculars are female figures, naked and fettered, supporting on their heads a circle divided into 27 equal parts ; there are also figures holding snakes, standing close to a small relief representation of the monument, in the body of which is a small aperture. This, as I have before said, serves to strengthen the opinion of apartments existing within. The lintel is slightly sculptured with circles of flowers in the same manner as in the others. It is supported by five uncouth dwarf images, with thick lips, curly hair, and their features expressive of the immensity of their burthens.

The upper parallels are beautifully sculptured with hooded serpents, passing through them in spiral wreaths. In that part of the outer hall which is still entire, are small flat-roofed apartments, 12 feet square, in most of which are large mutilated images of Buddha.

In a larger apartment, which stands opposite the eastern entrance to the monument, the roof of which is flat, and supported by a double row of granite pilasters, is a gigantic statue, the profile of the face measuring 13 inches from the fore-curly to the chin ; the nose and lips are much disfigured, and both arms are broken off below the elbows. This appears to have been more highly finished than any other. In the same apartment, on the right, is an image of Brahmá, with the sacerdotal thread, the front face mutilated ; the remaining, as well as all the tiaras, in excellent preservation. It measures three feet and a half from the throne, which is supported on two cobra capellas.

At the bottom, and in the centre of the supporters, which are diamond-cut, are alto-relievo figures of the Brahmánical order, their bodies thrown back in the act of attempting to avoid the heads of the serpents, which are not expanded, but projecting from under the throne, and turned as if endeavouring to ascend the columns.

On projecting pedestals, and in a line with the diadem, are small figures of Pársvánáth, cross-legged ; another also crowns the centre. This is the only statue of the Brahmánical mythology which I observed throughout the different subjects of sculpture. In a corner of the same apartment, is an image of Pársvánáth, over which are five expanded serpent-hoods, the only one which possesses this distinguished mark.

I was highly gratified at finding, on one of the pilasters, a Sanscrit inscription, with a date, which determined the structure to have been completed in the 18th year of the Samvat æra, or 40 years anterior to the birth of our Saviour.

There are numerous inscriptions on different parts of the colonnade around the monument, in a character almost totally unintelligible to me, though some of the characters are Sanscrit. I have taken fac-similes of a few.

About a quarter of a mile to the northward of this monument, is another, exactly similar to it in shape, but smaller, and built of free-stone, without any cement, each layer closely fitting, and not projecting over each other as in the former; neither has this been covered with a coat of mortar. It has a buttress, which measures round the base 246 feet; the diameter of the superior surface, 19 feet. It is in perfect repair, not a stone having fallen, and is surrounded by a colonnade of granite pillars, of the same description as that encompassing the large one, giving a clear area of 8 feet.

Almost every stone of this bears an inscription in characters similar to each other; there is no sculpture, nor gate-ways, but numerous stones lie strewn around in the vicinity of both monuments, being parts of columns, capitals, mutilated images of Buddha, pedestals, tablets covered with sculptured figures of horsemen, elephants, lions, and almost obliterated inscriptions, &c. There is no reservoir for water, nor a single well within the whole enclosure, nor on the hill; but there is a pucka tank, and several wells lined with masonry, about a mile from the monuments, both of which are undoubtedly co-eval.

Any antiquary, skilled in research, would here find employment and amusement, for some time; even the taking fac-similes of the numerous old Sanskrit inscriptions that I observed, (and more would perhaps be found if sought for,) would occupy some days. I lament exceedingly my want of sufficient ability in the art of drawing, to do justice to the highly finished style of the sculptures; and also my deficiency in technical knowledge, and in experience in the power of description, for which these monuments afford ample scope.

These defects, together with the very limited time I possessed for inspection, will, I fear, render my account less satisfactory than I could wish: indeed I am fully aware my description can convey but a very faint idea of the magnificence of such stupendous structures, and exquisitely finished sculpture,—but as I know of no previous description of them that has been given to the world, I have been emboldened to send it you with all its imperfections on its head.

*Hasingabad, Jan. 31, 1819.*

E. FELL.

#### IV.—*Inscription on the Iron Pillar at Delhi.*

Having prepared also in Plate XXX, an engraving of the inscription on the Iron Pillar at Delhi from a facsimile taken by the late Lieut. WILLIAM ELLIOT, of the 27th Regt. N. I., at the request of the Rev. Dr. MILL, I think it as well to insert it in this place, although unprepared to give any account of its contents. Many of the letters agree with those of the Canouj alphabet, but the general aspect of them, I think, has greater conformity to the classical Deva Nāgari.

Those who are acquainted with Sanscrit are invited to aid in decyphering it. The first few letters appear to contain figures, probably conveying the date of the monument.

J. P.

V.—*Restoration and Translation of some Inscriptions at the Caves of Carli, by the Rev. J. STEVENSON.*

[In a letter to the Secretary, read at the Meeting of the 5th Nov.]

I have the pleasure to send you a copy of some of the inscriptions engraved on the excavated temple at Kárlí, near Pung (Poonah), along with an alphabet for decyphering them, and a translation.

It is now about a year since I first began to search among the learned natives of this place, for a key to these inscriptions; but I was provokingly sent by the Marathás to the Kánarese, and by them again to the Támulians, and so on, without any result in an endless succession. I then made a collection of all the alphabets used on this side of India, and made the attempt, through means of them, to decypher the inscriptions; but still with no encouraging success. While engaged in these attempts, happily the March No. of your Journal was sent me by a friend, and through the aid it afforded me, in furnishing me with the alphabet of Inscription No. 2. on the Allahabad Pillar, with some little assistance from the sources above mentioned, I have been able to decypher some of our inscriptions; and hope that if you have not found the key to the character of Inscription No. 1, my alphabet may carry you several steps towards its attainment, and so repay the debt I owe for the assistance derived from your Journal.

Indeed I think the first 13 letters on the Allahabad stone, repeated again in lines 5th and 8th, and several times on the Delhi pillar, may, without much difficulty, be read as containing an address, probably to the Sun, in pure Sanskrita, as follows: *द्वेषारं पिये पिय द्मेभाजनेदं* which perhaps may be translated as follows:—"In the two ways (of wisdom and works?) with all speed do I approach the resplendent receptacle of the ever-moving luminous radiance." I do not however enter farther upon the decyphering of the inscriptions, found on the banks of the Ganges. Many important duties prevent me from allotting much time to studies of this nature, and the time I can spare for such a purpose, will be better spent in endeavouring to illucidate the history of the Dakhan (Deccan), from the numerous inscriptions in this, and the other ancient character, which are to be found up and down the country; assured, that the learned in Calcutta will soon reveal to us whatever mysteries the Allahabad and Delhi pillars conceal.

The inscriptions marked (A) (B) and (E), are in a letter of a different cast, and of about twice the size, of the others; and I almost fancy them somewhat more modern than the construction of the cave: but

the others, from the position they occupy, the apparently more ancient east of the letter, and the damage they have sustained from time, are evidently coeval with the excavation of the temple. The other inscriptions on the temple, which I have not sent you, are all more or less imperfect, and are retained at present for farther investigation; as is also an inscription found in an adjoining cave written in the same character as No. 2, of the Allahabad pillar. The inscription A is all contained in one line of about 12 feet long, and the height of each of the letters is about five inches.

I give you no description of the temple itself, as I am informed that a particular description of it, will soon be published in the Transactions of the Royal Asiatic Society of London. It seems only necessary to say, that the images inside are all of the Buddhist class, while on the outside, the Buddhist and Bráhmical are intermixed with one another.

From the inscriptions already decyphered, the following facts may, I think, be gathered.

1st. That the temple in question was excavated sixteen and a half centuries ago. The inscription (E), which contains the date, seems coeval with the sculptured images, and though in several places a little defaced, that part of it which contains the numeral figures, and a few letters both before and after, are happily in a state of perfect preservation. In order that no doubt might rest on this important point, I kept the inscriptions by me for two months, after decyphering them, and at last made a journey in the midst of the rains to the place, in order to ascertain whether or not my friend Lieutenant JACOB had copied them with perfect accuracy, before mentioning publicly the discovery I had made. The result of that examination was quite satisfactory, and left a full conviction on my mind, that there would be no doubt about the numeral figures. As to the era being any other than that of SHÁLIVÁHÁNA, though that is not quite clear from the inscription taken singly, the mention of one of his successors by the unambiguous title, of "Ruler of the Shakas," in an adjacent inscription, of the same cast of letter, carries this point also beyond all reasonable doubt.

2nd. It seems evident that SHÁLIVÁHÁNA's empire in the Dakhan, continued in great splendour, in the persons of his successors, for at least a hundred years after the commencement of his era, as is plain from their executing works of so much labour and expence:

3rd. It would appear, that the Buddhist was the religion at that time most favoured by the ruling party, though the Bráhmans, probably from their extensive influence among the lower orders, were thought of sufficient consideration, to have some of their images admitted into the society of the deified sages.

4th. That the Shakas did not come in numbers sufficient to supplant the language or literature of the Brahmans, whose learned language, the Sanskrita, they adopted to carry the memory of their deeds down to posterity.

5th. That since a character much simpler, and less artificial than the Deva Nágari, was in use for writing the Sanskrita language over all the western parts of India, it, and not the Deva Nágari, was, most probably, the character in which the Vedas, and most ancient compositions of the Hindus, were first committed to writing; and should those writings ever be carefully studied, and need conjectural criticism, this ancient character will also require to be studied.

6th. That the Arabic numeral cyphers had been introduced into India at the period above mentioned. The figure for one, and the two zeros in inscription E, are formed very nearly as they are formed in the Dakhan at the present day, and are united by a kind of hyphen as is still customary.

7th. That great caution must be exercised in admitting local traditions, in regard to such distant times. The universal tradition among the inhabitants of the Dakhan is, that all these caves were formed by the sons of PÁNDU, when in banishment, wandering about the country; and I was at first inclined to believe, that when the Pándavas came to power, they might so perpetuate the memory of the places of their former retreat; but the temple at Kárlí belongs to a much later era, as we have seen, and probably the same is the case with those also at Verúl, (Ellora,) some of which greatly resemble it. The truth is, that it would be too much for modern Bráhmans to allow, that those who rejected the divine authority of the Vedas, could perform works, which the orthodox Hindus of modern times cannot equal, even though it should be at the expence of making the Pándavas encouragers of atheism.

I make no remarks on the proper names of kings, in the inscriptions, as I do not know that we have any lists of the descendants of SNA'LIVÁHANA, that can be depended on. In proper names where the letters are not perfectly distinct, doubt must remain, from the absence of all aid from the construction and context.

That your efforts for the promotion of science may be still more and more instrumental in clearing away the mists with which the Hindus have enveloped the history of their nation, and become the means of arousing many of them also to the zealous pursuit of true knowledge, is the ardent wish of

Your obedient servant,

Poona, 17th Sept. 1834.

J. STEVENSON.

[The inscriptions will be found in the following page.]



(D) Where the man-slaughtering demon Old-Age, of immense power, and muttering hoarsely, might, formerly, frantic, roam amid the horrid world-destroying devils, there, during the currency of the year of the prosperous cherisher of the world, (SHĀ'LIVA'HANA) 100\*, this mountain-topping, hell-opposing, divine hermitage [was constructed], that the assembly of the illustrious immortals, and every noble and pious personage, might there take up their abode.

(E) Blessings attend thee. O Devotee, of an auspicious spiritual mind, having an unimpeded utterance, who art purified, and sound in all thy members; thou who art journeying towards our Supreme Lord, thou art now approaching the door.—Blessings attend thee.

[Mr. STEVENSON has, since the type for the above was cut, favored me with a lithographic copy of the same inscriptions, which differs in one or two trifling forms from the above. The transcript in Nágari has been corrected by the lithographic version.—J. P.]

VI.—Remarks on M. Remusat's Review of Buddhism. By B. H. HODGSON, Esq. Resident at the Court of Népál, &c.

I resume my notice of REMUSAT'S speculations on Buddhism in the Journal des Savans.

He observes, "On ne seroit pas surpris de voir que, dans ce système, la formation† et la destruction des mondes soient présentées comme les résultats d'une révolution perpétuelle et spontanée, sans fin et sans interruption;" and afterwards remarks, "Il y a dans le fond même des idées Bouddhiques une objection contre l'éternité du monde que les théologiens de cette religion ne semblent pas avoir prévue. Si tous les êtres reutroient dans le repos réel et définitif à l'instant que les phénomènes cesseroient et disparaîtroient dans le sein de l'existence absolu, on conçoit un terme ou tous les êtres seroient devenus Buddha, et on le monde auroit cessé d'exister."

This Buddha, it is said, is "l'intelligence infinie, la cause souveraine, dont la nature est un effet."

Now, if there be such a supreme immaterial cause of all things, what is the meaning of alleging that worlds and beings are *spontaneously* evolved and revolved? and, if these spontaneous operations of nature be expressly allowed to be *incessant and endless*, what becomes of the apprehension that they should ever fail or cease?

As to the real and definitive repose, and the absolute existence, spoken of, they are as certainly and customarily predicated of *Diva natura* by the Swabhávikas, as of God or Adi Buddha, by the Aiswárikas; to which two sects respectively the two opposite opinions confounded by REMUSAT exclusively belong.

\* A. D. 176.

† The question of formation is a very different one from that of continuance. Yet REMUSAT would seem to have confounded the two. See the passage beginning "Mais ce qui merite d'être remarqué."

Again, "Tout est vide, tout est delusion, pour l'intelligence suprême (Adi Buddha, as before defined). L' Avidyá seul donne aux choses du monde sensible une sorte de réalité passagère et purement phénoménal." Avidyá, therefore, must, according to this statement, be entirely dependant on the volition of the one supreme immaterial cause: yet, immediately after, it is observed, "on voit, à travers des brouillards d'un langage énigmatique, ressortir l'idée d'une double cause de tout ce qui existe, savoir l'intelligence suprême (Adi Buddha) et l'Avidyá ou matière." But the fact is, that Avidyá is not a material or plastic cause. It is not a substance, but a mode—not a being, but an affection of a being—not a cause, but an effect. Avidyá, I repeat, is nothing primarily causal or substantial: it is a phenomenon, or rather the sum of phenomena; and it is "made of such stuff as dreams are." In other words, phenomena are, according to this theory, utterly unreal. The Avidyálists, therefore, are so far from belonging to that set of philosophers who have inferred two distinct substances and causes from the two distinct classes of phenomena existing in the world, that they entirely deny the justice of the premises on which that inference is rested.

REMUSAT next observes, "Les effets matériels sont subordonnés aux effets psychologiques"—and in the very next page we hear that "on appelle lois les rapports qui lient les effets aux causes, tant dans l'ordre physique que dans l'ordre moral, ou, pour parler plus exactement, dans l'ordre unique, qui constitue l'univers."

Now, if there be really but one class of phenomena in the world, it must be either the material, or the immaterial, class: consequently, with those who hold this doctrine, the question of the dependence or independence of mental upon physical phenomena, must, in one essential sense, be a mere façon de parler. And I shall venture to assert, that with most of the Buddhists—whose cardinal tenet is, that all phenomena are *homogeneous*, whatever they may think upon the further question of their reality or unreality—it is actually such.

It is, indeed, therefore necessary "joindre la notion d'esprit" before these puzzles can be allowed to be altogether so difficult as they seem, at least to be *such* as they seem; and if mind or soul "have no name in the Chinese language," the reason of that at least is obvious; its existence is denied; mind is only a peculiar modification of matter; et l'ordre unique de l'univers c'est l'ordre physique! Not 50 years since a man of genius in Europe declared that "the universal system does not consist of two principles so essentially different from one another as matter and spirit; but that the whole must be

of some uniform composition; so that the material or immaterial part of the system is superfluous."

This notion, unless I am mistaken, is to be found at the bottom of most of the Indian systems of philosophy, Brahmanical and Buddhist, connected with a rejection in some shape or other of phenomenal reality, in order to get rid of the difficulty of different properties existing in the cause (whether mind or matter) and in the effect\*.

The assertion that "material effects are subordinate to psychological" is no otherwise a difficulty than as two absolutely distinct substances, or two absolutely distinct classes of phenomena, are assumed to have a real existence; and I believe that there is scarcely one school of Buddha philosophers which has not denied the one or the other assumption; and that the prevalent opinions include a denial of both. All known phenomena may be ascribed to mind or to matter without a palpable contradiction; nor, with the single exception of extent, is there a physical phenomenon which does not seem to countenance the rejection of phenomenal reality. Hence the doctrines of Avidyá and of Mayá; and I would ask those whose musings are in an impartial strain, whether the Buddha device be not as good a one as the Bráhmanical, to stave off a difficulty which the unaided wit of man is utterly unable to cope with?

Questionless, it is not easy, if it be possible, to avoid the use of words equivalent to material and psychological; but the tenet obviously involved in the formal subordination of one to the other class of phenomena, when placed beside the tenet, that all phenomena are homogenous, at once renders the former a mere trick of words, or creates an irreconcilable contradiction between the two doctrines, and in fact REMUSAT has here again commingled tenets held exclusively by quite distinct schools of Buddhist philosophy.

If I have been held accountable for some of the notions above remarked on, I suspect that these my supposed opinions have been opposed by something more substantial than "des arguties mystiques." REMUSAT expressly says, "M. HODGSON a eu parfaitement raison d'admettre, comme base du système entier, l'existence d'un seul être souverainement

\* REMUSAT desired to know how the Buddhists reconcile multiplicity with unity, relative with absolute, imperfect with perfect, variable with eternal, nature with intelligence?

I answer; by the hypothesis of two modes—one of quiescence, the other of activity. But when he joins "l'esprit et la matière" to the rest of his antitheses, I must beg leave to say the question is entirely altered, and must recommend the captious to a consideration of the extract given in the text from a European philosopher of eminence. Not that I have any sympathy with that extravagance, and that I wish merely to state the case fairly for the Buddhists.

parfait et intelligent, de celui qu'il nomme Adi Buddha." Now, I must crave leave to say that I never admitted anything of the sort; but, on the contrary, carefully pointed out that the 'système entier' consists of four systems, all sufficiently different, and two of them, radically so—viz. the Swabhāvika and the Aiswārika. It is most apparent to me that REMUSAT has made a melange out of the doctrines of all the four schools; and there are very sufficient indications in the course of this essay that his *principal* authority was of the Swabhāvika sect.

In speaking of the two bodies of Buddha he remarks, that "le véritable corps est identifié avec la science et la loi. Sa substance même est la science (Prajná)." He had previously made the same observation, "Le loi même est son principe et sa nature." Now those who are aware that Prajná (most idly translated law, science, and so forth,) is the name of the *great material cause*\*, can have no difficulty in reaching the conviction that the Buddhist authority from whence this assertion was borrowed,—of Prajná being the very essence; nature, and principle of Buddha,—belonged to the Swabhāvika school, and would have laughed at the *co-ordinate* doctrine of his translator, that Buddha is the sovereign and sole cause, of whom Nature (Prajná) is an effect.

The Swabhāvika Buddhas, who derive their capacity of identifying themselves with the *first cause* from nature, which *is that cause*, are as all-accomplished as the Buddhas of the Aiswārikas, who derive the same capacity from Adi Buddha, *who is that cause*.

In this express character of sovereign cause only, is the Adi Buddha of the Aiswārikas distinguishable, amid the crowd of Buddhas of all sorts; and such are the interminable subtleties of the 'système entier' that he who shall not carefully mark this cardinal point of primary causation, will find all others unavailing to guide him unconfusedly through the *various* labyrinths of the *several schools*.

Did REMUSAT never meet with passages like the following?  
 "And as all other things and beings proceeded from Swabháva or nature, so did Vajra, Satwa, Buddha, thence called the *self-existent*,"

\* *Prakritésvari iti Prajná*; and again, *Dhāranatmika iti Dharma*. *Dharma* is a synonyme of *Prajná*. *Prajná* means Supreme Wisdom. Whose? Nature's—and Nature's, as the sole, or only as the plastic, cause.

So, again, *Dharma* means morality in the abstract, or the moral religious code of these religionists, or material cause, in either of the two senses hinted at above; or, lastly, material effects, viz. versatile worlds. These are points to be settled by the context, and by the known tenets of the writer who uses the one or other word: and when it is known that the very texts of the Swabhāvikas, differently interpreted, have served for the basis of the Aiswārika doctrine, I presume no further caveat can be required.

Even the Swabhāvikas have their Dhyāni Buddhas, and their *trid*, including, of course, an *Adi Buddha*. Names therefore, are of little weight; and unmeasured epithets are so profusely scattered on every hand that the practised alone can avoid their snare. I did not admit a Theistic school, because I found a Buddha designated as *Adi*, or the first; nor yet because I found him yclept, infinite, omniscient, eternal, and so forth; *but* because I found him explicitly contradistinguished from nature, and systematically expounded as the efficient cause of all. Nor should it be forgotten that when I announced the fact of a Theistic sect of Buddhists, I observed that this sect was, as compared with the Swabhāvika, both recent and confined.

If, in the course of this, and the three preceding letters, I have spoken harshly of REMUSAT'S researches, let it be remembered, that I conceive my labours to have been adopted without acknowledgment, as well as my opinions to have been miserably distorted. I have been most *courteously* told, that "the learned of Europe are indebted to me for the name of *Adi Buddha*!" The inference is palpable that *that* is the extent of the obligation. Such insidious injustice compels me to avow in the face of the world my conviction that, whatever the Chinese and Mongolian works on Buddhism possessed by the French Savans may contain, no intelligible views were thence derived of the *general subject* before my essays appeared, or could have been afterwards, but for the lights those essays afforded\*. I had access to the original Sanscrit scriptures of the Buddhists, and they were interpreted to me by learned natives, whose hopes hereafter depended upon a just understanding of their contents. No wonder therefore, and little merit, if I discovered very *many* things inscrutably hidden from those who were reduced to consult barbarian translations from the most refined and copious of languages upon the most subtle and interminable of topics, and who had no living oracle ever at hand to expound to them the dark signification of the written word—to guide their first steps through the most labyrinthine of human mazes†.

For the rest, and *personally*, there is *bienséance* for *bienséance*, and a sincere tear dropped over the untimely grave of the learned REMUSAT.

\* The case is altered materially *now*; because my original authorities, which stand far less in need of living interpreters, are generally accessible. I have placed them in the hands of my countrymen and of others, and shall be happy to procure copies for any individual, or body of persons, in France, who may desire to possess them.

† I beg to propose, as an *experimentum crucis*, the celebrated text—*Ye Dhammanitya* of the *Sata Sanaṅṅika*. If the several theistic, atheistic, and sceptical meanings wrapped up in these few words, can be reached through Chinese or Mongolian translations uninterpreted by living authorities, I am content to consider my argument worthless.

VII.—On the Use of the Siddhantas in the Work of Native Education.  
By LANGRLOT WILKINSON, Esq. Bomb. C. S., Ass. Res. at Bombay.

May I request that you will be so kind as to give insertion in your Journal to the accompanying few verses, extracted from the *Goldadhya*, or Treatise on the Globes, by BHÁSKAR A'CHÁRYA, Hindu Astronomer, who flourished about 800 years ago.

In order to make the tenor of the arguments here used by BHÁSKAR A'CHÁRYA intelligible to readers generally, it may be proper in the first place, briefly to notice the popular belief and tenets entertained with regard to the earth and the system of the world, (for to these subjects my remarks will be confined,) by the two grand classes of Hindus here, so boldly and ably exposed by this celebrated Astronomer.

The Hindus of India seem to have been at the time when he wrote, as at the present day, divided into three grand classes; viz. 1st, the Jains or Bauddhas, followers of the Bauddha Sútras; 2nd, the followers of the Brahmánical or Puránic system; and 3rd, the jyotiahís or followers of the Siddhántas or Astronomical system.

The Jains at that time maintained, and still maintain, that the earth is a flat plane of immense extent; that the central portion of it, called Jambudwíp, is surrounded by innumerable seas and islands, which encompass it in the form of belts; that the earth now is, and has been, since its first creation, falling downwards in space; that there are two suns, two moons, and two sets of corresponding planets and constellations; viz. 1st, for the use of that part of the earth lying to the north of the mountain Merú, believed to be in the centre of Jambudwíp; and the other for the use of the southern half of the world. The moon they believe to be above the sun, but only 80 yojans\*; Mercury, four yojans beyond the moon; and Venus, to be three yojans beyond Mercury. The Jain banyas, scattered through the cities and towns of Rájputáná, Málwá, Guzerát, and the north-west provinces of Hindusthán, profess this belief. The opulent Márwári merchants and bankers, whom we find established at the three presidencies, and in all the large cities of India, are also chiefly of this persuasion. Their Gurús are the Jattís; the Sarangís are also a stricter sect of Jains.

2nd. The followers of the Puráns believe in a system very little different from that of the Jains. They also maintain that the earth is a circular plane, having the golden mountain Merú in its centre; that it is 50 crores of yojans in superficial diameter; that Jambudwíp (which immediately surrounds Merú, and which we inhabit) is

\* A yojan is four oós.

one lakh of yojans in width ; that this *dwípa* is surrounded by a sea of salt-water, also one lakh of yojans in width ; that this salt sea is encompassed by a second *dwípa* of two lakhs of yojans in breadth, and it again by a sea of sugar-cane juice of the same width ; that five other belts of alternate islands and seas (each island being of double the width of its predecessor, with a sea of the same width as its adjacent island), succeed each other in regular order. The seas are of fermented liquor, *ghí*, milk, *dhaí*, and sweet-water. The *Puráns* assert, that the earth is not falling in space as the Jains maintain, but is supported by the great serpent *Shesha*. Such at last is the assertion of the *Bhágavata*, the most popular of the *Puráns*. In others, the task of supporting the earth is allotted to the tortoise, or to the boar *Varáha*. The *Puráns* maintain that there is but one moon and one sun ; that the moon however is at a distance from the earth double of that of the sun ; that the moon was churned out of the ocean ; and is of nectar ; that the sun and moon and constellations revolve horizontally over the plane of the earth, appearing to set when they go behind *Merú*, and to rise when they emerge from behind that mountain ; that eclipses are formed by the monsters *Ráhu* and *Ketú* laying hold of the sun or moon, against whom, as well as against all the other deities of heaven, they bear implacable enmity. *Vyásji* is believed to be the author of all the *Puráns* ; he was probably the compiler of them ; he is revered as divinely inspired. *SHANKAR A'CHÁRYA*, who flourished about 400 or 500 years ago, distinguished himself as a supporter of this system and as an enemy and persecutor of the Jains ; he was also a reformer, but his reforms were confined to morals, and to religious institutions and sacraments. The followers of the *Puráns* are by far the most numerous of the three classes. The *bráhmans*, generally the *rájpúts*, *káiths*, and indeed the mass of the population throughout India, all belong to this class.

3rd The *gyotishís* or followers of the *Siddhántas* believe in a system widely differing from both of these. Their system is, with the exception of a few inconsiderable differences, that of Ptolemy. They teach the true shape and size of the earth, and the true theory of eclipses. The earth they place in the centre of the universe, around which revolve in order, as taught by Ptolemy, the moon, Mercury, Venus, the sun, Mars, Jupiter, and Saturn. The irregularities in the motions of the sun and moon they account for by supposing them to move, as also did Ptolemy, in epicycles, whose centres revolve in their circular orbits. The authors of the *Siddhántas*, and especially *BHASKAR A'CHÁRYA*, the author of the most recent and most popular *Siddhánta*, called the "*Siddhánta Siromani*," have spared no pains to expose and

ridicule the monstrous absurdities of the Jain Sutrās and the Purānas. They have always professed in their writings the greatest admiration for the learned men of the West, the Ionians or "Yavans;" whilst the Purānas have denounced those who hold any communication with men of these nations, termed by them the lowest of the low. A'RYA BHĀṬ, the author of the A'rya Siddhānta, expressly maintains the daily revolution of the earth on its own axis, though not its annual revolution.

It is the object of this essay to draw the attention of the public, and especially that of all friends of native education to these Siddhāntas, and to recommend them to more general attention and study than they have yet found. It will be asked, "Are you of opinion that they contain any thing which has escaped the research of DAVIS, COLEBROOKE, and BENTLEY, and which may yet throw some new light on the science of Astronomy, on Chronology, or on History?" I must answer, No. But I feel assured from experience, that they afford us beyond all comparison the best means of promoting the cause of education, civilization, and truth, amongst our Hindu subjects.

4th. Here I shall be at once met with the question, "Why go back a thousand years in search of truth avowedly containing some admixture of error, when the pure and the unadulterated truth is at hand, and may be communicated with equal facility?"

To this I reply, that the pure and unadulterated truth not only cannot be communicated with equal facility, but is absolutely rejected by the mass of the Hindu population of India; but that with the aid of the authority of the Siddhāntas, the work of general and extensive enlightenment may be commenced upon at once, and will be most readily effected, the truths taught by them being received with avidity. To explain and correct their errors will at the same time be easy.

5th. With regard to the population of the three Presidencies, the argument of my supposed opponent may, and I believe, does, apply. The native mind there is fully prepared, nay, eager, to receive any cultivation that can be given to it; but what has led to this? For generations, indeed, I may say for centuries past, the native populations there have enjoyed the humanizing advantages of daily intercourse with enlightened Europeans and foreigners of all nations; of a moderate and steady government; and of an extensive foreign commerce; there too the brāhmins and the studious have for the same long period, had the benefit of many schools, colleges, and learned institutions, superintended by English teachers, distinguished for their learning and science; there the Press, English and Native, disseminating its daily modicum of knowledge, has at length succeeded in awakening a spirit of inquiry

and discussion, and taught the people the grand uses and advantages to which it may be applied; and there the Missionary, for generations past, has never intermitted in his sacred labours to root out the wide-spread degrading superstition, and to plant in its stead the seed of the purest morality and of true religion. There, in short, the populations have already advanced far in their course of civilization.

6th. But how widely different is the state of all the rest of the vast continent of India; at least of all Central India, including Nágpur, Berár, Málwá, and Rájputáná, in which my own personal experience has lain. The mass of the population is as rude and barbarous, and ignorant, and superstitious, as it was 17 years ago, when the supremacy of the British Government was first established. Of all the advantages, which have contributed to the enlightenment of the Native mind at the several seats of Government, it cannot be said to have enjoyed even one. What reception then can the announcement of the pure truth be expected to experience amongst a people in such state? With what reason can it be hoped, for a moment, that the English language and English literature, with its varied stores of knowledge, can here receive any cultivation? Even the most learned of the Hindu population find it impossible to comprehend, without assistance, the very best of our translations into their own languages. The native mind, habituated to the idlest absurdities, has neither relish nor taste for plain sober truth.

7th. Is it your opinion then, it may be asked, that the example of the Jesuit Missionaries of the south-west of India should be followed, and that the truth, to make it agreeable to the present state of the native mind, be dressed up in all the fantasies of a foolish superstition? By no means; I would on no account or in any degree degrade or compromise the simple dignity of sacred truth. But what prevents our availing ourselves of the circumstances which afford us the most powerful means of dispelling from the land a darkness otherwise so hopelessly impenetrable; if it be at once seen, that the Siddhántas do afford to us these most favorable and encouraging circumstances, and that to give a command and powerful influence over the native mind, we have only to revive that knowledge of the system therein taught, which notwithstanding its being by far the most rational, and formerly the best cultivated branch of science amongst the Hindus, and notwithstanding its being the foundation of such little knowledge as they display in predicting eclipses and the like, has, from the superior address of the followers of the Puráns, and the almost universal practice amongst the jyotishis, of making all their calculations from tables and short formulae, couched in enigmatical verses, been allowed to fall into a state of utter oblivion?

8th. But how is this lost knowledge to be revived ? I shall proceed to explain. In every petty hamlet, not only in Málwá, Rájputáná, and Berár, but throughout India, you will find the joshí or astronomer and astrologer : in towns you will find many, and in large cities, even hundreds. It is their business to expound the pancháng, or almanac, to proclaim feasts and fasts, to fix the marriage-day, to tell the times of sowing and reaping ; and forewarn their flocks of unlucky days : their services in short are in constant requisition. They are conjointly with the Patwáris, the village school-masters. The village joshí can expound, but not work out the results given in his pancháng ; that high qualification belongs only to the city joshí. But it must not be supposed, that the power to make a pancháng, requires a knowledge of even the first principles or elements of his science. The utmost of his knowledge is 20 verses composing the Tithí Chintámaní, and 100 verses of a little book called the Graha Lágghava, with a power of using the tables attached to them. By these few verses he can not only find the places of the sun, moon, and planets, but also work out eclipses. But the operation may be called purely mechanical, or an effort of memory. He can find the equatorial gnomonic shadow, from thence deduce the latitude (or acshánsha) ; he can tell you the amount of chará (or ascensional difference) ; the deshantará (or distance in longitude) ; the sun's declination (or krántí) : but is wholly ignorant as to what things in nature are expressed by these terms. The verses of the Graha Lágghava and Tithí Chintámaní contain only abbreviated formulæ for calculations ; their wording is uncouth, and to the uninitiated, more unintelligible than an enigma. But though the ingenuity displayed in thus abbreviating calculations is considerable, it has had the effect above noticed of superinducing an utter neglect of the Siddhántas, in which the principles of the science are so fully, and in many respects so rationally, explained. I have met and cross-questioned many hundreds of joshis of late years ; but in this large number, have found only two men who had a rational and full acquaintance with their own system. One is VAIJNA'TH, purohit of the Maháráo of Kotah ; the other, JINCHAND, a jattí of great celebrity at Ajmere, and late of Jhuláí in Jypur. It is singular that neither of these are professed jyotishis ; the former is expounder of the Puráns, and the latter a Gurú of the Jains. Oujain, once so famous for its learning, has not now a single Siddhántí jyotishí to support its great name. Indeed, so general and entire is the ignorance of most of the joshis of India, that you will find many of them engaged conjointly with the Puránic bráhmans in expounding the Puráns, and insisting on the flatness of the earth, and its magnitude of 50 crores of yojans in superficial diameter, as explained in them,

with a virulence and boldness which shew their utter ignorance of their proper profession, which had its existence only on the refutation and abandonment of the Puránic system. The Jains and all the followers of the Puráns of whatever caste you will find, on the other hand, betraying equal inconsistency in daily appealing to the panchánga of the jyotishí, and confidently maintaining the infallibility of their contents, though founded on a system with which the truth of their own is utterly inconsistent.

Of the sincerity of the ignorance of both parties there can be little doubt, from the profound veneration with which they, but especially the joshís, regard all the Siddhántas. The Súrya Siddhánta they firmly believe to have been communicated to men by the sun himself, the authors of all they believe to have been divinely inspired. These works are now thought to be, like the Vedas, wonderful displays of Divine wisdom, but totally beyond ordinary human comprehension. That man who has mastered their contents, they regard, and even fear as one possessed with superhuman powers.

10th. With this blind veneration and strong prejudice in favor of the Siddhántas, prevailing particularly amongst the joshís scattered all over India (and the latter are by no means an inconsiderable part of the learned of India), and in some degree, now also amongst the Jain and followers of the Puránas, can we for a moment hesitate in admitting the vast benefits to which the proper employment of these prevailing prejudices will lead? How readily may a knowledge of the science, as taught in the Siddhántas, be recomunicated, especially to the joshís, whose lives are now idly spent in wading through unintelligible calculations deduced from the Siddhántas? With what exultation will every man of ingenuous mind amongst them receive explanations making plain and clear what is now all unintelligible and dark! They will not stop in simply admitting what is taught in the Siddhántas. Grateful to their European Instructors for bringing them back to a knowledge of the works of their own neglected, but still revered, masters, they will in the fulness of their gratitude, and from the exercise of their now improved powers of understanding, also readily receive the additions made during the last few hundred years in the science.

11th. From the extract now forwarded it will be at once seen, that there can be little or nothing which we have to teach in Geometry, Surveying, and Trigonometry generally, in Geography or Astronomy, of which BHÁSKAR A'CHÁ'RYA has not already given us the first principles, and for enabling us to explain which, he will not afford us many new and also the most appropriate arguments, in as much as they will be

best suited to Hindu taste. And what can be more flattering to the vanity of the Hindu nation, or more grateful to their feelings and prejudices as men, than to see their own great and revered masters quoted by us with respect, to prove and illustrate the truths we propound. At the presidencies, and even at many large stations, we may prosecute with success a scheme for educating the people, by at once teaching them English, or by other means equally directly attacking all that is false and absurd in their belief. At these places, all the causes above enumerated concur to prevent the failure of such a scheme. But this plan of educating the mass of the people in the interior of India, where English can never be of any practical avail to any but a very few, is perfectly visionary; to hope to educate them by translations in the Roman character, is little less so. Even translations into their own language and in their own character are frequently, as above mentioned, wholly unintelligible to the best educated natives. I could quote many proofs of this, but the mention would be invidious; the obvious cause of failure in all these cases is, that in these schemes we make no account of men's passions and weaknesses and prejudices, and have neglected to consult their tastes and present state of knowledge. By pursuing the course I now advocate we sail with the current, favorable gales vastly accelerating our progress; by directly attacking on the other hand the strongest prejudices of our nature, as is done in the other case, we struggle with an adverse stream, and with baffling winds, and will be found to have struggled comparatively in vain.

12th. May I quote my own experience in proof of what is here advanced? Since I entered the country, I have been, I hope, a warm and zealous friend of the cause of education, and have always bestowed much time and much labour upon the superintendence of such schools as have been located within the sphere of my influence. The school-books used, have been those printed at the Presidencies of Calcutta and Bombay.

But about two years ago, wishing to know how the joshis, generally so ignorant, succeeded in predicting eclipses, I went through the Tithi Chintámaní, and Graha Lágava. Finding them to contain only unintelligible and abbreviated formula, I was referred to the Siddhántas. These I had great difficulty in procuring, and still greater in procuring men capable of explaining their contents. By perseverance I have succeeded in gaining a limited acquaintance with their first principles. During the last four or five months, I have availed myself largely of these Siddhántas in teaching not only the boys of the Sehere school, but also adults, the joshis and bráhmans of the town. I beg leave to assure you, that in this short time I have succeeded in communicating

more real knowledge and information than I have done in the previous ten years of my Indian life.

A few days ago, the boys of the Sehore school and the joshis and bráhmans above mentioned, were examined by me in the presence of Captain WINFIELD and Dr. INGLIS, of this station, and Mr. MacLEOD, Assistant to the Agent to the Governor General at Jabbalpur. I confidently appeal to these gentlemen to pronounce whether the acquisitions of the students were not, considering the time devoted to the study, perfectly astonishing.

13th. It may be thought that I am here advocating too exclusive an attention to scientific education and the abstract sciences. I feel assured, however, that this will prove our shortest course also to moral improvement. Till the situation of the countries spread over the face of the globe is known, what credit can our histories gain; what impression can they make on men's minds? They may as well relate to nations existing in the moon. Till conviction of the truth of the Siddhántic system, as to the size and shape of the earth, is felt, the popular absurdities of the Puránic cosmogony will never be abandoned. I rest not merely on my own opinion and experience; I adduce that of an institution founded by a society, whose labours for the improvement of India have been most useful and exemplary. I allude to the American Mission's Seminary at Jaffna, in Ceylon, in the 2nd page of whose 3rd triennial report, published in 1833, it is stated, "that an examination of the Puránic system of geography and astronomy, compared or rather contrasted with the Copernican system, has been attended to with greater interest, and been productive of more obvious advantages, than almost any other branches of study."

The Professors of this establishment, however, do not seem to have been aware of the existence of the Siddhántas; or to have known that BHÁ'SKAR A'CHÁ'RYA had already spent the whole force of his science and ridicule in exposing the absurdities and impossibilities of the Puránic system. What European, gifted with the utmost tact and wisdom, with the most intimate knowledge of the native character, their customs, beliefs and languages, and the highest flow of eloquence in the use of them, can, by appeals to reason, by arguments and proofs, hope to work upon an ignorant and prejudiced people any effect compared to that which may be produced by a dexterous use of its blind and prejudiced veneration for authority?

14th. I may here quote another instance of the practical service recently rendered to me in my official capacity, when I was officiating as Political Agent at Kotah, by these Siddhántas. The officers employed on the grand trigonometrical and other surveys, have always experi-

enced, in almost every part of India, the greatest obstructions in the discharge of their duties, from the prejudices and ignorance of the people and their native princes. At Kotah, no less ignorance and prejudice had been displayed than elsewhere: so strong were the suspicions entertained by the late Ráj Ráná MADHU SINGH, of the designs of the British Government, when Captain PATON, the Deputy Quarter-Master General at Nímach, entered his territories to survey certain roads, &c. and so reiterated his objections in reply to the Agent, Captain Ross's assurances, that the last-mentioned officer was at length obliged to request Captain PATON to withdraw. Whilst at Kotah, I received orders from Government, desiring me again to use my influence with the Ráj Ráná to prevent all further obstructions. Upon this, I sent for VAIN-NA'TH, the astronomer above mentioned, and for the Ráj Ráná's joshí, and found no difficulty, by the help of the 33rd versc here quoted, and others treating more at length on the subject, in satisfying them of our real object. They equally soon procured for me an intimation from the Ráj Ráná, that his co-operation would in future be readily given to the officers deputed to survey his territories.

15th. From the arguments and facts above recorded, the natural conclusion appears to me to be, that it will be our wisest course, at the same time that we afford every encouragement to the study of English by those who are likely to find use for it, or have leisure and talents to prosecute it with effect, to give every encouragement to the study of the Siddhántas; and to the explanation of their contents, first to the jyotishís, whose profession is founded on the principles given in them, and through them to all their flocks. Where is the native of India, however poor, who is not constantly consulting his jyotishi?

I would therefore recommend that no time be lost in giving to the world the best printed editions of the Siddhánta Siromaní of BHA'S-KAR A'CHÁRYA, including the Goládhyaýa, or Treatise on the Globes, and the treatises on Algebra and Trigonometry; of the Súra Siddhánta, and of that of A'RYA BHÁ'T, with PRITHUDAK's commentary, the author who maintains the diurnal though not the annual revolution of the earth.

The Graha Lágghava (which, as far as my inquiries extend, seems to be in almost universal use over the greater part of India,) will perhaps be even of more use than the Siddhántas, if accompanied by the most excellent and rational commentary of MALLA'RÍ. Almost all these works contain a chapter on the construction and use of the globes. These the natives at our colleges should be encouraged to construct accordingly, and to compare and contrast them with our globes, without which no school or college in India ought to be. My own pandit and

the brahmins of Sehoré, who have become converts to the Gospel, and our system, all express the utmost anxiety to get globes if possible in Hindi, convinced that they will prove to others as they have done in their own case, the readiest means of demonstrating to them the truth.

16th. It is strange and deserving of remark, that though astronomy is the science which has been most cultivated by the Hindus, and has most attracted the notice of the learned in Europe, and, as above shewn, is also best calculated to promote the work of education, still not a single standard, or indeed any work whatever on this subject, has yet been printed in India. From Mr. LUSHINGTON'S History of the Calcutta Institutions, it appears in pp. 126, 127, that in the Government Sanscrit College the Jyotisha Shástra is not even embraced in the course of study pursued there. It surely has incomparable advantages over the Hindu systems of Logic, Rhetoric, Prosody, and even over Law and Grammar, as far as education is concerned, essential though the last mentioned be. So entirely have we neglected the study of late years, that PROFESSOR SCHLEGEL (as I observed from a late number of your Journal) takes credit to himself for being the first to expound to the European scholar, the method used by the Hindus in their astronomical works, of expressing numbers by symbolical words. You seem inclined to give to the learned Professor great credit for having unravelled this mystery in the absence of native paadits. It is by no means my wish to detract from the merits of the learned Professor; but surely when every astronomical work is accompanied by a commentary, explaining in plain language, and also in figures, the symbolical expressions of the text, little credit is claimable for unravelling a mystery already made plain. Under these circumstances, it is by no means strange, that MESSRS. COLEBROOKE, DAVIS, BENTLEY, and JONES, thought it unnecessary to offer any explanations on a method at first sight so mysterious, but so palpable on referring to the commentary which almost invariably accompanies the text.

17th. But to return to the subject in hand, it seems to me most desirable, that the books above-mentioned should be published without delay; at present revered though they are, they are exceedingly difficult to be procured. Any gentleman moderately conversant with Sanscrit, and with the elements of the science of astronomy, will, if he have leisure, readily master all they contain in a very few months. This accomplished, how largely will his powers of superintending the work of education, and especially that of translation, be augmented! I trust that not a few of the many ardent friends of education will avail themselves of the advantages to be derived from these

works here set forth, and give to the native public, translations in the vernacular languages, with such corrections, improvements, and additions, as will place the Hindus at once in possession of all the recent discoveries of Europeans. At no place have more elementary scientific works been translated and printed than at Bombay, chiefly under the superintendence of the late zealous and accomplished Secretary to the Bombay Education Society, Major GEORGE JARVIS of the Engineers; but the usefulness of his labours is much detracted from, by his omission to make use of the terms, and mathematical phraseology, perfectly well understood by scientific Hindus, if not by bráhmans generally, and by substituting others of his own coining, which must be wholly unknown to them. The term Spársha Rekhá, (for the tangent,) and several others for lines, &c., which the Hindus have never used or known, are in themselves highly appropriate and unobjectionable.

18th. I now beg to draw your particular attention to the original extracts, which appear to me most curious, and calculated to prove to others as it has done to myself, most valuable and useful.

In the first three verses BHA'SKAR A'CHA'RYA, after stating the earth to be a sphere poised in space, exposes in a most rational and forcible manner, the Puránic doctrine of its being supported by the grand serpent Sheshá, or any material thing.

In the 24th and 25th verses, our author shews, that he had got a glimpse of the true nature of attraction and gravity; he then proceeds in the 26th, 27th, 28th, and 29th verses, to expose in his own way (not altogether philosophical), the Jain articles of belief, that the earth is perpetually falling in space, and that there are two suns, two moons, and two sets of constellations.

In the 30th, 31st, and 32nd verses, by a very rational argument, the modern Bráhmanical belief of the earth's flatness is exploded; he ridicules the idea of their immense mountain of gold, called Merú, and accounts for the apparent flatness of the earth.

In the 33rd, 34th, and 35th verses, he gives succinct general directions for the measurement of an arc of the meridian, and thence deduces the real magnitude of the earth, deriding the absurdity of the dimensions alleged in the Puráns.

In the 36th verse, he shews such a limited knowledge of geography, as would entail a whipping on any boy of eight years of age in Europe; but in the three last verses, he shews that he, 800 years ago, had such a perfect knowledge and conviction of the consequences resulting from admitting the spherical form of the earth, viz. of the existence of anti-

poets, &c. as the priests and princes of Europe could not be persuaded to entertain four or even but three hundred years ago; and for asserting which, they were sending our earliest philosophers to the dungeon.

19th. I take this opportunity of informing the public of the existence of a native observatory at Kotah, or rather of a valuable collection of astronomical apparatus, made by the late Maháráo UHMAID SINGH; and posited on one of the bastions of the citadel, fitted up for their reception. This apparatus consists of a very splendid and large armillary sphere; of the celestial and terrestrial globes, dials, gnomons, and also the Ráj Yantra, or astrolabe, borrowed from the Musalmáns about 250 or 300 years ago. The axes of the globes are fixed at an elevation of  $24^{\circ} 30'$ , the supposed altitude of the North Polar Star at Kotá. But the latitudes given by the native astronomers, for all the principal cities of Rájputána and Málwá, are under-rated by about  $40'$ ; that of Kotah is, I believe,  $25^{\circ} 10'$ . The authority of BHA'SKAR A'CHA'RYA has led to this error. In the 34th verse here quoted, the latitude of Oujain is stated at  $\frac{1}{8}$  of  $360^{\circ}$ , which would give just  $22^{\circ} 30'$ . This accordingly is always stated by Native Astronomers as its latitude, and when I have stated the result not only of Dr. HUNTER's but also of the celebrated Rájá JAY SINGH's more accurate observations (vide vol. vi. Asiatic Researches); this verse has always been quoted to me to prove their assertions.

The Maháráo's collection contains also a Túriya Yantra, or quadrant, with a radius on one side of 30 digits, and linear rectangular intersections, rising from each digit, representing their whole canon of sines, cosines, and versed sines adapted to this radius. From the Maháráo's astronomer I procured a copy of the Sanscrit treatise on the quadrant, called the Yantra Chintámani, by CHAKRADHARA, son of SRI WÁMÁNA, containing directions for the construction and use of the instrument, with the mathematical proofs and demonstrations of all the many problems which may be worked by it. The reverse side of this quadrant contains the signs and degrees of the ecliptic, and an hour circle, with an index-hand by which you are enabled to tell at once the lagna (or horoscope), that is, the exact point or star of the ecliptic, rising in the horizon at any given time.

I am unable at the present moment to fix the date of this work, but I am inclined to think that it is not of a much more ancient date than the astrolabe, and that it, like the astrolabe, has been borrowed from the Musalmáns.

To the European public, translations of this and the other works alluded to in this letter, would be highly curious and highly valuable. To enable us to communicate our greater knowledge in the sciences

they treat of, the study of them would seem indispensable, to give us a due command of their mathematical modes of expression. I earnestly hope, that some persons better qualified than myself, may be induced to undertake the task of translation. I do not refuse the task; but I confess my present incompetence, from my own limited knowledge of mathematics, to understand and follow the authors of these learned works in their more abstruse calculations; and the never-ceasing pressure of arduous and responsible public duties, prevents my devoting such time to the study as would better qualify me for the duty. It would be unjust in the public to expect, and imprudent in me to promise much; what I can, I will do. But the public may with much justice turn their eyes upon those men of science at the head of our schools, colleges, and literary institutions now scattered over India. To a MILL, a YATES, a TYTLER, a SUTHERLAND, a THORESBY, and many other distinguished scholars of this Presidency, and to the two JERVISES of the Engineers, and to many gentlemen of the Scotch and American Missions, so much distinguished for their labours in the cause of education, on the Bombay side of India, the task would be easy; I hope it will not be declined.

*Extract from Bhaskar A'charya's Treatise on the Globes.*

भूमेः पिण्डः प्रमाद्वन्नकविरविकुजेव्याकिंनचचकक्षा  
 द्रुतेर्दोहनः सन् दृढनिलसलिलज्योमतेजोमयोयं ।  
 मान्याधारः समस्तैव विद्यति नियतं तिष्ठतीवास्मि वृष्टे  
 निष्ठं विश्वं शश्वत्सद्भुजमनुजादित्यदेत्यं समन्तात् ॥ २१ ॥

Verse 21st. This sphere of the earth, formed of the five elementary principles, viz. earth, air, water, the ethereal atmosphere, and fire, is perfectly round, and encompassed in the orbits of the moon, Mercury, Venus, Mars, Jupiter, Saturn; and lastly, by that of the constellations. It has no material supporter, but stands fixed in air by its own inherent force. On its surface, all living and inanimate objects subsist throughout, as well titans, as human beings, gods, as well as daityus.

सर्वतः पर्वतारामप्रागश्चेत्यश्चैचित्तः ।

कदम्बकुसुमपत्रिः केसरप्रसरैरिव ॥ २२ ॥

Verse 22nd. Its surface is bespread on all sides with numberless mountains and groves, towns and buildings, as the bulb of the flower of the Kadamb tree is covered with filaments without number.

भूमौ वर्ता चेद्विरिद्याकदम्बकक्षाद्यभ्योद्येवसवानवस्था ।

चैत्ये कस्या चैत्यमग्निः किमाद्ये किञ्चो भूमेः सादभूतेषु भूमिः ॥ २३ ॥

Verse 23rd. Let it be admitted, that this earth is supported by any material substance, or living creature, still for the support of that, a second supporter is

required, and for that second in like manner, a third is necessary. Here you have the absurdity of an interminable succession : if reduced to admit a power of self-support in that which you place the last of the series, I would ask, why not admit the same power in the earth itself, the first of the series? for the earth is one of the forms of the eight-fold divinity.

यद्योऽन्तर्धानस्यैव शीतता विधौ इतिः के कठिनत्वस्यपि ।

अथलौ भूरस्यैव स्वभावतो यतो विविधा वत वज्रवृत्तयः ॥ २५ ॥

Verse 24th. As heat is the inherent property of the sun and of fire ; as cold of the moon, fluidity of water, and hardness of stones ; as the air is volatile, and the earth is immovable, and as other-wonderful (oh! how wonderful!) properties belong to other things :—

आकाशवृत्तश्च मदी तथा यत् सख्यं भूव खाभिमुखं खगत्त्वा ।

आकाशते नम्यततीव भतति सने समन्तात्क पतन्निर्णये ॥ २६ ॥

Verse 25th. In like manner, the power of attraction is inherent in this globe of earth. By this inherent power, any thing heavy projected into the air is attracted down to it. The thing so projected appears to be falling of itself ; but in fact, it is in a state of *being drawn downwards by the earth*. If, with the Jains you suppose the earth to be perpetually falling in space, in what direction, I ask you, is it falling? Above and below and all around the ethereal expanse is equally outspread.

अपञ्जरस्य अमहावलोकानादाधारशून्या कुरिति प्रतीतिः ।

सख्यं न दृष्टुं भूवच्चमातः खेऽधःप्रयातीति वदन्ति वैद्याः ॥ २६ ॥

Verse 26th. That the earth is poised in space, and without support, the fullest assurance is felt from beholding the revolutions of the circling constellations ; but the Jains maintain, that it is perpetually falling downwards in space ; resting the proof of this assertion on the fact, that all heavy things naturally fall downwards, and that the earth is the heaviest of heavy visible things.

द्वौ द्वौ रवीन्दू भगशो च तद्दृष्टेकान्तरान्ना बुद्धयं प्रजेतो ।

एतद्भूवशेवमनं वराया प्रवीम्यसखाप्रति युक्तियुक्तं ॥ २७ ॥

Verse 27th. The Jains and others likewise maintain, that there are two suns, and two moons, and also two sets of constellations, which are rising in constant alternation. But to them I give this appropriate answer.

भूःखेऽधः खलु यातीति बुद्धिबौद्ध मुषा कथं ।

जाता यातं तु दृष्टापि खे यत् क्षिप्तवृत्तं चितिं ॥ २८ ॥

Verse 28th. Let it be admitted, that the earth is falling downwards in space ; but O Jain, dost thou not see that every heavy thing projected into space, comes back again to, and overtakes, the earth? How then can your idle proposition hold good? If true, a heavy thing once projected into air would keep at an uniform distance from, but never overtake, the earth.

किं जगत् तव वेगुर्णं देगुणं यो दृष्टा कृत्वाः ।

माकेन्द्रीं विळोक्त्वाका भुवमत्स्यपरिधनं ॥ २९ ॥

Verse 29th. What can I say to your folly, O Jain, who without object or see supposit a double set of constellations, two suns, and two moons? Canst thou not at times see the circumpolar stars revolving round the polar star, even in broad day-light?

यदि सन्ना सुकुरोदरसन्निभा भवन्ती भवती तरङ्गिः किं  
उपरि दूरततोपि परिभक्तं किमु नरेनरेरिव जेष्यते ॥ ३० ॥

Verse 30th. If this blessed earth were like the surface of a looking glass—an extended plane, why should not the sun, even when removed to a distance from the earth, as at night, (the Purāns assert that it revolves in a horizontal circle, as it does when seen from the poles,) still be visible in every part of its revolution to men, as well as to the gods?

यदि निशाजमकः कनकाचक्षुः किमु तदन्तर्यः स न दृश्यते ।  
उदयं नमु मेव रथाश्रमान् कथमुदेति च दक्षिणभागे ॥ ३१ ॥

Verse 31st. If (the intervention of) Merú causes night, why is not this mountain, when between us and the sun, visibly developed to our eyes? Let it be granted that this Merú is, as is stated in the Purāns, situated to the north, pray tell me why should the sun ever rise at all in the south, as it does when it has southern declination?

सो यतः खान्परिधेः शतांशः पृथ्वी च पृथ्वी नितरां तनीयान् ।  
नरश्च तन्पृथगतस्य कृत्वा सनेव तस्य प्रतिभात्यतः सा ॥ ३२ ॥

Verse 32nd. The fact is, that one hundredth part of the circumference of the earth is or may be assumed to be a plane. The earth is an excessively large body; a man is immeasurably smaller; and hence it is, that to him, as he stands on its surface, the whole earth has the appearance of being a plane.

पुरातरं चेदिदमुपरं खान्दक्षविष्टेष्वख्यैस्तदा किं ।  
चक्रांशैरित्यनुपातयुक्त्या युक्तं निबन्तं परिधेः प्रमाद्यं ॥ ३३ ॥

Verse 33rd. The measurement of the circumference of the earth is easily and correctly ascertained by the simple rule of proportion, in this way—there is a town situated to the south; you are residing in another lying due north of it; ascertain the distance between the two, and the difference of their latitudes; then say if the number of degrees (difference of latitudes) give this distance, what will the whole circumference of 360 degrees give?

निरक्षदेशात् क्षितिषोडशांशे भजेदवनी गणितेन यस्मात् ।  
तदन्तरंषोडशसंगुलं सङ्गमानमस्माद्ददु किं तदुक्तं ॥ ३४ ॥

Verse 34th. Onjain, for instance, is ascertained by calculation to be distance from the equator, where there is no latitude,  $\frac{1}{16}$  part of the whole circumference of the earth—this distance multiplied by 16, will be the measurement of the circumference of the earth: what reason then is there in asserting such an immense magnitude of the earth?

संज्ञोन्नति पश्यति पक्षोदयास्तथायादिकं परिधिना घटतेऽनुना हि ।  
नान्येन तेन अमुच्यमानोप्रमाद्यप्रमाद्यसम्बन्धयुजा यतिरेककेव ॥ ३५ ॥

Verse 35th. By assuming as true this circumference thus ascertained, the calculations of the position of the moon's cusps, the conjunctions of the planets, eclipses, the times of the rising and setting of the planets, and the lengths of the shadows of the gnomon, and the like, correspond with the observed facts. By assuming any other circumference, no such correspondence is found to exist. The truth of the above-mentioned measurement of the earth is thus plainly established by the law of "rule and exception" set forth in the Nyāya Shāstri.

लंका कुम्भो बलकोटिरस्याः प्राक्पश्चिमे रोमकवपनकाः ।  
 अथस्ततः सिद्धपुरं सुमेरुः सौम्योष साम्बो वरुषानकस्य ॥ ३६ ॥

Verse 36th. Lanká is situated in the middle of this globe; Yankothí is situated to the east of it; to the west is Rome or Romaka Patan; the city of Siddhapur is on the opposite side of the globe to that of Lanká. Sumerú is situated to the north, on the North Pole, and Baravanala to the south, at the South Pole.

क्रुष्टपादाभोरिमानि तानि स्थानानि यज्ञोक्तपिदो बहन्ति ।  
 वसन्ति मेरौ सुरविद्वंसंघा खोर्वे च सर्वे नरकाः सदैत्याः ॥ ३७ ॥

Verse 37th. These six places are situated at a distance of one-fourth part of the earth's circumference, each from its adjoining one; so say those who are acquainted with the globe. At Merú the various classes of the gods and pure spirits have their abodes: at Baravanala, at the South Pole, are situated the residences of all the evil spirits.

यो यत्र तिष्ठत्यवनिं तत्र स्यामात्मानमस्या उपरिस्थितं च ।  
 स मन्यतेऽतः कुचतुर्थमंस्या निवस्य ते तिर्यग्निवासनन्ति ॥ ३८ ॥

Verse 38th. A man, on whatever part of the globe he is placed, thinks the earth to be under his feet, and that he is standing upright upon it; men placed at the distance of 90 degrees, or one-fourth of the earth's circumference, from each other, fancy each other to be standing as it were at right angles to each other.

अथः शिरसाः क्रुष्टकांतरस्याः श्यामनुष्याश्च नीरतीरि ।  
 अनाकुलास्त्रिर्यगधः स्थिताश्च तिष्ठन्ति ते तत्र वसं यथाच ॥ ३९ ॥

Verse 39th. Those who are placed at the distance of half the earth's circumference from each other, are antipodes each to the other, and fancy each that the others have their heads turned into directions exactly opposite, in exactly the same way, as a man beholding his shadow on the bank of a river.

But neither do those who are standing at right angles to each other, nor those with their heads turned into directions opposite to each other, feel any difficulty in maintaining their several positions. They stand as perfectly at ease in their respective positions, as we do here.

[We have had much pleasure in giving insertion to the above article, in the sentiments of which we entirely concur. While we endeavour to push our own systems of instruction and science in this country, we are too apt to spurn and decry the literature, the science, and even the languages of the east, as if they were not only incapable of imparting the smallest particle of knowledge, virtue or truth, but incapable also of improvement by engrafting upon them the new growth of western knowledge, which has sprung ahead of the Asiatic and elder stock only within the last century or two. Were the moralist to follow Mr. WILKINSON'S example, he could doubtless produce from the mental philosophy of the Hindus parallel maxims for most of those in our own moral code:—the selection of these;—their separation from the dross of the ancient schools;—and their presentation to pupils in this form, would doubtless work the same wonders in moral education, as has the Siddhanta system in the astronomical classes of Mr. WILKINSON. We trust this gentleman, evidently qualified by taste as by ability for the task, will favour the English reader with a full translation of the *Sironam*. The astronomical formulæ of the *Siddhanta* have been fully made known to us, but not the arguments and reflections with which they are accompanied.—Ed.]

VIII.—On the Land Shells of India. By Lieut. THOS. HUTTON, 37th  
Regt. N. I.

[Continued from the 26th No. of the Journal.]

I have the pleasure to inform you of the discovery of a few more species of Land Shells, made during a hurried trip between Nemuch and Mhow, in the month of December last.

26. The first is a species of *CYCLOSTOMA*.

*Animal*—furnished with two cylindrical tentacula; eyes black, and placed at the exterior base of the tentacula; there are also two blackish points at the summits of the tentacula, which have the appearance of eyes; head very long, proboscidiform, and emarginate. The eyes causing a thickening of the tentacula. Colour pale brown; skin transversely wrinkled like that of a leech.

*Shell*—with five whorls; spire prominent; whorls rounded: the sutures well defined; colour of the shell above varying considerably in different specimens; some being of a purplish brown, others brown, and some nearly white—this appears to be owing to the degrees of exposure to the sun, which the individuals may have undergone, as well as age. The colours are laid on in short crooked lines, transversely; alternately a brownish and a whitish stripe, very minute. The under side is white. Aperture circular, margins united and more or less reflected. Umbilicus well defined, discovering the three previous whorls. Operculum calcareous. Diameter half an inch.

Found buried at the roots of grass growing beneath low shrubs in uncultivated plains between Nemuch and Mhow.

27. *CAROCOLLA* ———?

*Animal*—unknown.

*Shell*—white with a purplish band longitudinally placed on the body whorl above. Aperture oval and obliquely transverse. Umbilicus discovering the previous whorls—margins of the mouth reflected and interrupted on the body whorl, a thin plate interposing. Diameter about five and half or six lines; aperture longer than broad.

With the exception of the more contracted and obliquely transverse aperture of the present species, it would appear almost identical with the shell described by me, as a doubtful *Cyclostoma* (No. 2) in the 26th No. of the Journal. Specimens of both were buried together.

Found in uncultivated plains, buried in the earth at the roots of coarse grass—between Nemuch and Mhow.—I found no operculum.

28. *HELIX* ———,

*Animal*—with four tentacula, the superior pair longest, and bearing the eyes at the summits—colour freckled brown.—Foot long and rather tapering posteriorly.

*Shell*—with six whorls, globose, and the body whorl forming the greater portion of the shell.

In the living animal it is mottled with pale brown and black, from the thinness of the shell rendering the colours of the animal visible; but when dead, wholly of a dull white:—spire very little raised above the whorls; aperture lunated, margins acute; diameter 9 lines.

The animal stops up the mouth of the shell with a hard calcareous operculum, but which is only temporary, not being attached to the body.

Found buried in the earth with the foregoing beneath shrubs, in uncultivated grounds, between Nemuch and Mhow.

29. *HELIX* ———,

*Animal*—with four tentacula, the superior longest and bearing the eyes at their summits; foot elongated and rather truncated posteriorly; colour pale yellowish brown.

*Shell*—with six whorls; spire moderately raised above the plane of the whorls; colour sandy; diameter, half an inch.

Found with the preceding.

These two specimens appear to be true *Helices*.—Unlike the species No. 3, described in the 26th No. they have no tentaculiform processes on the right side, playing over the surface of the shell when the animal is in motion, nor have they the fleshy hook on the tail.

The shell of the species which I formerly described with a mark of doubt as a *Helix*, is very like in form and general appearance to the present species, No. 29: but the polish of the shell is very superior to this last.

30. *ACHATINA* ———?

*Animal*—unknown.

*Shell*—with 10 whorls; pale sandy brown; spire obtuse; cylindrical; aperture longitudinal, subovate, right lip edged; pillar smooth, straight, and truncated at the base; length, 1½ inches, smooth and shining.

Found buried in the earth, foot foremost, at the roots of shrubs, in uncultivated grounds, between Nemuch and Mhow.

Among these shells, I could observe no partiality for any particular aspect, nor any thing to confirm the opinion which I formerly hazarded, of this being one of the habits of the Land Shells. Nevertheless, I am still inclined to retain that opinion, because the circumstance may hold good with regard to those species which are more particularly found in rocky situations, and where the hot winds, striking throughout the day against the rocks, would of necessity impart a great and overpowering degree of heat to the retreats of these animals, even when

buried in the earth—while on the other hand, the species, which I have here endeavoured to describe, inhabiting wide and flat plains, are under no necessity of placing a farther barrier between themselves and the wind, than that which is afforded by the earth in which they lie torpid, in as much as meeting with no obstruction, the scorching blast sweeps rapidly over the hardened surface, without penetrating sufficiently deep, or at least with sufficient power to cause any injury or inconvenience to the animals buried some 6 or 8 inches deep, and protected by the branches of the dwarf shrubs beneath which they are found.

Of these shells, I shall take an early opportunity of forwarding specimens.

IX.—*Account of the Bearded Vulture of the Himálaya. By the same.*

I know not if this magnificent bird has yet been recognised by ornithologists as an inhabitant of the lofty mountain ranges of Tibet, and I have therefore little hesitation in recording the fact. A specimen sadly torn and mutilated by insects was a short time since pointed out to me as a Golden Eagle (*Aquila chrysaetos*), from the hills, and having often before seen those noble birds both living and in museums, I paid no attention to it at the time.—On an after occasion, when the specimen was thrown away as useless, I happened accidentally to cast my eyes on it, and saw at a glance that it was not a Golden Eagle. A suspicion of the truth at the same time crossing my mind, from the circumstance of the black beard, which in this bird is so conspicuous, being still a very prominent feature, notwithstanding the ruinous state of the specimen, accordingly I took the skin home with me to examine at my leisure, and the following description is the result :

GYPRATUS BARBATUS ?

Length from the tip of the beak to the end of the tail 3 ft. 11 in. Beak, from the tip to the gape, 4 in. : breadth from tip to tip of the expanded wings, 9 ft. 6 in. From the base of the upper mandible arises a black stripe of short hairs or bristles, passing over each eye, and turning round the back of the head, where it joins the stripe from the opposite side ; the crown of the head, which is much flattened, is covered with small whitish feathers ; but across these, running longitudinally from the base of the upper mandible to the black which passes round the back of the head, is a black stripe of narrow feathers. The chin, throat, back, sides, and forepart of the neck ; the breast, belly, vent, thighs, and under tail coverts, deep ferrugin-

ous; darkest on the chin, throat, and fore-neck, whiter on the vent and thighs.—A band or collar of dark brown feathers across the bottom of the knee, joining the black on the back, and thus forming a ring round the neck—back, scapulars, greater and lesser wing coverts, brownish black; the shafts of the feathers white, towards which the webs also grow lighter—upper-tail coverts and the quills of the wings and tail, greyish, or ashy black.—The first quill of the wing is  $3\frac{1}{2}$  inches shorter than the second, and the third is the longest.—Tail feathers twelve in number, and gradually decreasing in length from the centre to the outermost ones, forming a well-marked wedge.

Beak, feet, and claws faded to yellowish horn, the original colour not ascertainable.

The nostrils are entirely concealed beneath the jet-black bristles which stand forward over them, and which are a continuation of, or rather take their rise from, the point whence springs the black stripe which passes over the eyes.—At the angle of the lower mandible is a bunch of long black bristles, diverging and hanging down like a beard.—The beak is straight from the base to the end of the cere, which is very thin, and it then rises into an arch, and curves strongly to the point.—Legs short and feathered to the toes; outer and hinder claws, the largest: the inner one about half their size.—All moderately hooked, and much worn at the points.

In all other respects it appears to agree accurately with the description given of the Bearded Vulture in the "Gardens and Menagerie of the Zoological Society."

This specimen will be found to differ from the bird there figured in the following particulars:—The Bearded Vulture is stated to have "the upper part of the head of a dirty white," while in mine there is a black line across the white; this however might lead one to suspect the bird to be a young one, although the rest of the plumage does not appear to differ from that of the adult bird, showing no signs of the "white spots, or spots of a lighter shade, scattered over the back and wings," as alluded to in the work above-mentioned.

Again, it is said to have "the first quill-feather of the wing nearly equal to the second and third, which are the longest," &c.—In my bird, the first quill is  $3\frac{1}{2}$  in. shorter than the second, which is a quarter of an inch shorter than the third; the third quill being consequently the longest, and the fourth nearly equal to the second.

This last character is perhaps a strong reason against supposing the two birds to be identical, and together with the different marking of the head and the ring on the neck, may go far to establish it as a

new species: but of this nothing positive can be said until some ornithologist on a visit to the hills may be fortunate enough to meet with the living bird, and have an opportunity of proving either the identity or distinctness of the species by observing the changes of plumage from youth to maturity—in the mean time, I have noted it down with a mark of doubt, as the Bearded Vulture of authors.

*Nemuch, 21st Feb. 1834.*

### X.—Proceedings of the Asiatic Society.

*Wednesday, the 5th November, 1834.*

Dr. J. TYTLER, Senior Member, present, in the chair.

The Report of the Committee of Papers upon the list of names, proposed at the last meeting as honorary members of the Society, was submitted, when the following were balloted for and duly elected. MEKHARA MENG, uncle to the king of Ava; Professor HEEREN, M. KLAPROTH, and Prof. ROSEN; Sir JOHN HERSCHELL, Prof. BUCKLAND and Col. SYKES.

Read, letters from the Secretaries of the Royal Society, the Royal Asiatic Society, and the Geological Society, acknowledging the receipt of the 17th and 18th vols. of the Researches.

Also, from Professor SEDGWICK, and from Mr. ATKIN, Secretary of the Society of Arts, expressing thanks for the second part of the 18th vol. As. Res.

Read a letter from Col. J. STUART, Deputy Secretary to Government, Military Department, intimating that the Honorable Court of Directors have, in a recent dispatch, informed the Government that the suggestion of the Society regarding a supply of tubes and apparatus for boring, will be attended to.

[We have since heard that they are on board the *Sir Edward Paget*.]

Read a letter from Captain R. HOME, proposing on the part of his brother, Col. HOME and himself, to deposit in the apartments of the Asiatic Society, the valuable collection of paintings, books, and casts, belonging to the gallery of the late R. HOME, Esq, of Lucknow, in compliance with the wish expressed by their father previous to his demise, that they should be preserved in some public institution in Calcutta, where they might be properly attended to, and at all times open to public inspection.

*Resolved*, that the thanks of the Society be returned to Col. and Capt. HOME for their most liberal offer, which they embrace with pleasure; and that suitable preparation be immediately made for their reception.

[The collection of paintings comprises the following valuable originals.]

Woman taken in adultery, by Dominichino, 6 ft. 2 in. by 4 ft.

Cleopatra, Guido, 4 ft. by 3 ft. 3 in.

Crowning of Mary de Medicis, Reubens, 5 ft. by 3 ft.

Infant Jesus, ditto, 4 ft. by 3 ft.

*Sir William Jones, as a boy, Sir Joshua Reynolds.*

Cupid asleep on a Cloud, Sir Joshua Reynolds.

Prodigal Son, Bassan, 5 ft. by 3 ft. 8 in.

Cathedral at Antwerp, Steinwicz the Elder, 3 ft. 9 in. by 2 ft. 10 in.

Triumphal Arch, (Titus') unknown, 5 ft. by 3 ft. 9 in.

Ghat at Benares, Daniel, 5 ft. by 3 ft. 4 in.

2 Views in Venice, Canaletti.

2 Views in Wales, Davies.

Head of an Old Man, on pannel, unknown.

And the following Portraits:—Warren Hastings, Lord Cornwallis, Lord Wellesley, Lord Minto, Sir G. H. Barlow, Sir E. Paget, Sir W. Jones, Dr. Fleming, Horace H. Wilson, Dr. Hare, the Nawab of Dacca, Col. Duff, Gen. Jones, and Dr. Laird.

They are now on their way down by water. The public are not generally aware that the Museum and Library of the Asiatic Society are at all times open to visitors, between the hours of 6 A. M. and 4 P. M. None but members of course have the power of taking books out of the rooms.]

*Library.*

The following donations to the library were announced :

LT. A. CONOLLY'S Overland Journey to India, —*presented by F. Macnaghten, Esq. on the part of the author.*

DR. BAIKIE'S Observations on the Neilgherry Hills, —*by W. H. Smout, Esq., the editor.*

M. EUGENE BURNOUF'S Observations sur la partie de la Grammaire comparative de M. F. BOPP, qui se rapporte à la langue Zende, —*by the author.*

REV. W. D. CONYBEARE'S Report on the Progress, Actual State, and Ulterior Prospects of Geological Science, —*by the author.*

CONSELLOR JOSEPH VON HAMMER'S German Translation of the Turkish Poet Fazli's *Gul o Bulbul*, with the original text in the Nashki character, —*by the translator.*

Annals of Literature of Vienna, Nos. 61, 62, 63, 64, —*by the same.*

C. T. BEKÉ'S Origines Bibliœ, or Researches in Primeval History, —*by the author.*

*Archæologia*, the 25th vol. of the Transactions of the Antiquarian Society, —*by the Society.*

Transactions of the Royal Society of Edinburgh, vol. xii. pt. 2nd, and Nos. 1 and 2, of its Proceedings, —*by the Society.*

Anniversary Address for 1834, by G. B. GREENOUGH, President, and Proceedings of the Geological Society of London, Nos. 32, 33, 34, and 35, with Index of vol. I. —*by the Society.*

Journal Asiatique, No. 76, —*by the As. Soc. of Paris.*

The Indian Journal of Medical Science, —*by the editors.*

Meteorological Register for August and September, —*by the Surveyor General.*

Ditto, kept at Cawnpur, to the end of September, 1834, —*by Col. Pollock.*

The following books were received from the London Booksellers:—

LARDNER'S Cabinet Cyclopaedia, Arithmetic, Manufacture in Metals, and Middle Ages, 3rd vol.

*Literary Communications.*

The Secretary reported receipt of a continuation of the late Mr. GEORGE TREBECK's manuscript journals, (Cashmir to Cabul, May—June, 1823,) presented by his brother Mr. CHARLES TREBECK, who had at length recovered it through Mr. FRASER of Delhi. It is believed that other portions of his and of MOORCROFT's papers still remain up the country. *Resolved*, that the present portion be despatched forthwith to Professor WILSON, who is now engaged in publishing the former part of MOORCROFT's Journals, on the part of the Society.

A letter was read from the Baron VON HAMMER, dated Vienna, 31st March, 1834, presenting a manuscript analysis and translation in part of a rare and valuable Arabic work entitled 'Mohit,' by *Kiatib Rûmî*.

"After my return from Italy, where I found at Naples, in the year 1825, in the library of the Museo Borbonico, *Kiatib Rûmî's Mohit*, which contains a treatise on navigation in general, and that of the Indian seas in particular, I redoubled my commissions at Constantinople for this exceedingly rare manuscript, and was last year so fortunate as to purchase a copy of it.

"I hasten to transmit some extracts to the Asiatic Society, which if they are thought interesting enough, I shall have great pleasure in continuing."

An account of the overland journeys of the same Arabic author, by M. VON HAMMER, appeared in the first part of the Bombay As. Soc. Transactions, in which an allusion is made to the present work. (See also *Orient. Mag.* I. 233.)

A letter was read from W. H. WATHEN, Esq. Secretary to the Bombay Government, transmitting by order of the Right Honorable the Governor in Council, a copy of an inscription found on the Arabian coast at a place called Hasan Ghorab, near Aden, together with a graphic description of the ancient fort, drawn up by Lieutenant WELLSTED of the Indian Navy.

[This paper will have an early place in the Journal.]

Read a letter from the Rev. J. STEVENSON, on the subject of the Inscriptions engraved on the excavated temple at *Karî* near *Pûnâ*, which he has succeeded in decyphering with the assistance of the alphabet of the Allahabad monument published in the Journal As. Soc.

[This paper is inserted in the present number.]

The continuation of Lieut. FOLEY's description of Ramree Island was received and read.

Extracts of a private letter to the Secretary, from Captain C. M. WADE, Political Agent at Ludiâna, were read, enclosing a Memoir in French, by M. COURT, an officer in the service of Mahârâjâ RANJÎT SINGH, detailing his operations on several other Topes in the neighbourhood of that originally opened by General VENTURA; one of them affording highly interesting results.

Captain WADE also forwarded a letter from General VENTURA himself, who, in continuation of his former important researches, has since collected upwards of five hundred ancient coins, which he has entrusted to M. ALLARD, for the Museum of Paris, politely offering their inspection and examination to the members of the Asiatic Society, as long as M. ALLARD may remain in the metropolis.

" Dans la mois de Janvier dernier me trouvant campé entre l'Hidasse et l'Indus, je me disposais à faire des nouvelles recherches et visiter moi-même plusieurs ruines que je savais exister dans ces contrées lorsqu'un coup de paralysie vint à se révéler dans mes dispositions : alors j'envoyais mes gens à la découverte et je fus assez heureux de les voir retourner avec une collection de belles médailles que je viens de remettre au cher M. WADE qui vous les fera parvenir, je le pense, par les soins de M. ALLARD qui se rend à Calcutta incessamment : mais, n'ayant pas été sur les lieux moi-même, je ne puis accompagner ces médailles que de quelques notes des endroits où elles ont été trouvées."

*Physical.*

Fossil shells, part of the foot of a tortoise, and various minerals, (including coal,) from Ramree, were received from Lieutenant FOLEY.

A note to Lieutenant ARCHBOLD respecting the shipment of the mummy from Mocha was communicated. The *Malak-ul Bahr* was to have brought it, but the crew refused to keep it on board after it had been shipped.

A letter was read from Captain CAUTLEY, dated Delhi, the 14th October, descriptive of the collection of fossil bones made by Serjeant DEAN, from the Jumna, and stating, that he was deterred from making further presentations to the Society's museum, on account of the expence of conveyance from so great a distance. In reference to this subject, it was moved by the Secretary, seconded by Dr. J. TYTLER, and *Resolved unanimously,*

" That Serjeant DEAN be remunerated for the expences incurred by him for the transmission of fossils from the Upper Provinces to Calcutta, and that the Society will be happy to be at the further expence of carriage of any other fossils with which Serjeant DEAN may have it in contemplation to favor the Museum, from the same deposit."

Captain CAUTLEY's letter gives the following additional particulars of the fossil bone deposit in the *Sewalik* hills : and of the subterranean town at *Behat*.

" This is a favorable opportunity of reporting progress on the fossil discoveries of the lower hills (*Sewalik*), which are going on even more flourishingly than I could have expected, considering that the only means of continuing the search during the rainy months were in carting fragments of the rock from the deposit to my house. The fossils are even now not only numerous, but rich in the remains of a great variety of species : Saurian and Chelonian, both *Emys* and *Trogon*, are most abundant : of the Saurian, the teeth of two varieties correspond very closely with the existing Alligator (or *magar* of the natives), and the *Gharial* (or *Gavial* of naturalists) : there appears to be a third variety of teeth of this order, as well as the jaw-bones of two of a smaller claw of lacertine animals, one specimen of which is exceedingly interesting, consisting of the lower half jaw, with one cheek-tooth, well fossilized. Of Mammalia, three families are very distinct, Solipeda, Ruminantia, and Rodentia, the former in one solitary specimen of an incisor of some animal of the horse species, the second of a variety of teeth of deer, the third of rats ; besides these, there are a great variety of teeth, which from want of experience and want of books of reference, I am unable to recognize. Some bones also, about which, for the reasons above mentioned, I can say nothing : two specimens of fishes' vertebrae, and some undoubted teeth of *Squalus*, or some voracious species,

will give some idea of the present state of my cabinet. Laying aside direct geological reasons, which may hereafter be best referred to, the great variety of remains already found in so short a period makes this discovery valuable. A further search on the line of mountains, of which the Sewálik may be considered the centre, will, I have no doubt, establish the fact of the existence of these remains on the whole line. Lieutenant DURAND, of the Engineers, on a late visit to Nahun, was fortunate enough to meet with the stratum of marle or clay conglomerate on the north face of the mountain upon which the town of Nahun stands; the remains therein discovered, in my opinion, identify it completely with the Sewálik stratum, the position of both being similar and in juxtaposition with the calcareous sandstone. The fossils in the Nahun deposit, which Lieutenant DURAND has introduced us to, consist of tortoise, saurian, mammalia, and fish, exactly of a similar description to those found at the Kalowála Pass, the enamel equally perfect, and the more solid masses of bone as highly impregnated with (hydrate of) iron. Lieutenant DURAND's discovery is of particular interest, from its having at once established the formation of the Nahun connecting link, as at this point the low line of mountains skirting the Dhera and Karda Dhúns, impinge upon the great Simálayan chain. Since the discovery of these fossils, I have visited the spot, and am satisfied of the identity of this formation with that of the Sewálik, and have every reason to imagine that an active search will not only shew that a similar deposit exists on the Pinjore line of lower mountains terminating at Rúpar; but that equal success may be expected on the left of the Ganges: as this is a mere notice of the progress of these interesting discoveries, it would be out of place to enter upon the matter geologically.—There is a tradition existing, of the remains of giants having been discovered in the neighbourhood of the Pinjore valley, near a village named Samrota, the said giants having been those destroyed by the redoubtable RAMCHANDRA. I have lately seen a tooth and a fragment of a tusk in the possession of Lieutenant W. E. BAKER of the Engineers, which were presented to him by the Nahun Rájá, as the remains of giants, and found near the above village: Lieutenant BAKER will take an early opportunity of sending you drawings of both these fossils, the first a very perfect tooth of an elephant, with the enamel of the flexures in the crown beautifully retained, the other the fragment of a small tusk, I imagine of an elephant also; both of these specimens are completely silicified: and from the appearance of the matrix, small fragments of which are visible in the interstices of the tooth, it would appear to be sandstone, or indurated sand: to those people who have time and leisure to visit Sumrota and the Pinjore valley, what a fine field is here opened out for interesting discoveries of the newer organic remains. I think that the circumstance of the existence of a deposit of this sort, either in or near the Pinjore valley, is mentioned by Dow in his History, from Ferishta; the bones having been found in digging a canal, or in the construction of some work, where excavation was necessary\*.

\* The passage in Dow's Ferishta is quoted in the appendix to Professor BUCHLAND'S note on the fossil bones from Ava. As it is short, we copy it, in hopes of its leading to farther inquiries for fossils in the Pinjore valley.

\*\* On the King's return to the capital, in the month of Rajeb, 762, (May, 1360,) he heard that in the vicinity of Perwar, was a hill, out of which issued a stream of water

"Some days hence I will despatch to the Museum some more relics from Behat. Circumstances have prevented a fair opportunity of continuing the search, but there are a few more interesting coins, one of them bearing a distinct inscription, some rings, and a small idol made of either sandstone or composition: a great quantity of small irregular lumps of iron and slag have been found, with some more arrowheads."

Extracts of a letter from Capt. EDWARD SMITH, Engineers, were read, explaining that he had been induced to postpone furnishing the list of the fossils from the Jumna, presented by him to the Society in December last, by having afterwards received further remains of the same kind in great number and variety, which he is now preparing to dispatch.

"You are I believe aware of the existence of fossils in the Jumna, in a greater abundance than was at first supposed; but I have, notwithstanding my own expectations to that effect, been surprised at the quantities that the last four or five months have produced, and the length of course of the river through which they are found. In the observations that have been made of the situations, only beds in which they have been lodged, there may be obtained some conclusions that the former less exact acquaintance with the place of deposit gave no evidence of. Some of these specimens are of such size that I shall have difficulty in finding an early conveyance for them, which however, I will look out for. I scarcely anticipated being able to add so largely to those already in your possession; there having this year been no works on the river in parts containing fossils. It was in descending the river, in March last, that searching on the banks I discovered those which are in preparation for you."

that emptied itself into the Setlej river, which the people called the Sursetti, and that beyond it was a smaller stream denominated Selma.

"It was stated, that if an eminence which intervened between these streams were cut through, the waters of the Sursetti, falling into the smaller stream, would flow on to Súnám, passing by Serhind and Mausurpur, and that the supply of water would be perennial.

"On this information, the King (FEROZ) proceeded in that direction; and causing fifty thousand labourers to be collected, he employed them in cutting through the mound or hill, so as to form a junction of the two streams. In this mound were found the bones of elephants and men. The bones of the human forearm measured 3 gez, or 5 feet 2 inches, in length. Some of the bones were petrified, others resembled bone."

We strongly recommend the canal thus cut by FEROZ SHAH, five centuries ago, to a careful elucidation by Captain CAUTLEY. If it still exist, it must afford one of the best situations for studying the direction and nature of the gravel deposits of the lower range, and of their fossil contents. It is seldom that a geologist can command the aid of fifty thousand men to open a section of the Himaláyan strata to his view.

The fossil deposits of the north-east extremity of the great range are also well deserving of farther examination. It was among the mutilated fragments of bone procured by Mr. COLERBROOKE in Kooch-behar, on the banks of the Brahmaputra river, that Mr. PENNYLAND discovered traces of the *Anthracotherium of CUVIER*. It is most probable that the localities of the lower range in its entire length will afford very numerous tertiary fossil deposits, when it comes to be explored.—Ep.

XI.—*Illustrations of the Botany and other branches of the Natural History of the Hindlayen Mountains and of the Flora of Kashmir; Part II. By J. FOLLEA ROYLE, Esq. F. L. S. and G. S. M. R. A. S. &c.*

Mr. ROYLE'S SECOND PART maintains its claim to the praise that the scientific journals of Europe had pronounced upon his first. The introduction continues his general observations on the geographical and geological structure of the great continent of India, drawing, for those portions, which he has not had an opportunity of visiting, his materials from SYKES, CALDER, HODGSON, GERARD, &c. and from HUMBOLDT for the systems of mountains in central Asia. The first plate also exhibits two geological sections of the Himálayan range, and a sketch of the rocks from Shergáti to Rogonáthpur; the former we shall hereafter transfer to our pages when the introductory remarks, which break off at the 12th page, are completed: the latter has been already given in Mr. EVEREST'S notes of a journey to Ghasipúr, (GLEANNINGS, iii. 129.)

The purely botanical portion of the work commences with the *Ranunculaceæ*, of which nearly a hundred species have been discovered in the Himálayas. Several of them are identical with those of other countries. The Himálayan genera, with one exception, are exactly those enumerated by LEDEBOUR as inhabitants of the Altai mountains: also, with exception of *Helleborus* and *Nigella*, which do not extend either eastward to the Altai or southward to the Himálaya, the same genera are enumerated by MEYER and BIBERSTEIN as indigenous to the ranges of Taurus and Caucasus.

Our author's observations on the application of the plants of this family in the *Materia Medica* of India are so valuable, that we need offer no apology for extracting them entire. We would willingly follow them up by his remarks on the other natural families *Dilleniaceæ*, *Magnoliaceæ*, *Anonaceæ*, *Menispermaceæ*, *Berberidæ*, &c. but neither our limits, nor justice to the author would permit so extensive a robbery. No one who would be acquainted either with the ornamental, the cultural, or the medical qualities of the Indian Flora, can dispense with the possession of Dr. ROYLE'S highly valuable labours—labours which he is now ushering to the world at great expense to himself and without the same extent of patronage with which the Honorable Company were wont in days of yore to encourage such meritorious works in their servants.

“ The *Ranunculaceæ* form a very natural family, not only with respect to structure and geographical distribution, but also in possessing the same sensible properties and modes of action on the human frame. This is owing to their containing in all parts an acrid principle, which KRAFF ascertained to be neither acid nor alkaline, but of so volatile a nature, that in most cases simple drying in the air, or infusion, or decoction in water, is sufficient to destroy it; that its activity is increased by acids, sugar, honey, wine, and spirits, and is only effectually destroyed by water and vegetable acids. (*Fée, Cours. d'Hist. Nat. Pharm.* vol. i. p. 373.) Two vegetable alkalies, *Delphia* and *Aconitia*, the latter little known, are produced by the plants of this family; if the acrid principle be always of the volatile nature that it is represented, the powerful effects attendant on the administration of the root of *Aconitum feros* even after it had been preserved ten years must be ascribed to the presence of some principle of a more permanent nature. According apparently to the proportion of the acrid principle to the rest of the vegetable substance, or perhaps owing to the peculiar nature of the acrid principle

in each species, it is found that they act either on the system generally, or in different degrees on particular organs. Thus several species of *Ranunculus* are used as rubefacients and vesicatories; while the roots of *Zanthorhiza*, *Coptis*, and *Hydrastis*, as tonics; and those of *Thalictrum majus* as a substitute for rhubarb. *Hellebore* has long been known as a powerful cathartic, and *Aconite* as a no less powerful narcotic and poison; while some from the destructibility of their noxious property by water have been used as food. The Mahomedan physicians in India having derived their knowledge of drugs chiefly from Arabian authors, who translated from the Greek, it is not surprising to find such articles as *Hellebore*, *Paeony*, *Lycotomum*, and *Stavesacre*, all of which as well as others might be grown in the Himalayas, prescribed in every part of India, though the druggists, calculating upon the ignorance of both practitioners and patients respecting the true drug, generally substitute some which they consider an equivalent. Yet it is interesting to observe, that independent observation has introduced into Indian practice several drugs from this family, to which the same properties are ascribed as in Europe. Thus *Ranunculus sceleratus* is used as a vesicatory. The roots of *Thalictrum foliosum* as a bitter in the cure of fevers—those of *Aconitum heterophyllum* as a tonic, and of *Aconitum ferox*, though a poison, as a narcotic in rheumatism. *Nigella sativa* is alone cultivated in India, as in most eastern countries, and continues in the present day, as in the most ancient times, to be used both as a condiment and a medicine.

The celebrated Indian poison called *Bish* or *Bikh*, being referred by all authorities to *Ranunculaceae*, requires to be noticed, though it would not be easy, even in the present state of confusion of Indian Materia Medica, to find an article of which it is more difficult to give a satisfactory account, and of which, at the same time, it is so necessary that we should have a clear idea. The subject to be entered into, with the detail which it requires, would claim a much greater space than can be allotted to it here: little more therefore can be done than to state the little that is known, and to urge observers, who may be favourably situated, to prosecute the inquiry.

Dr. BUCHANAN first acquainted the European world with the existence of four kinds of *Bikh*. 1. *Singya Bikh*. 2. *Bish* or *Bikh*, the poison. 3. *Bikkma*, a powerful bitter. 4. *Nirbisi*; also without deleterious properties. The first Dr. B. referred to a species of *Smilax*; the author has had two species of *Convallaria*, called *meetha-doodhya*, and *mohura-doodhya*, represented to him as being of a poisonous nature. The three other kinds of *Bikh* Dr. B. refers to the genus *Caltha*, but for what reason it is difficult to discover, as the flower of the species he describes are without the characteristics of the genus; and the plant, he allows, differs much in habit from *Caltha palustris*. It may be supposed, therefore, that he had only an opportunity of examining the flowers in a young state, and it is known that when he published his description, he was without his specimens. These are now in the East-Indian Herbarium, and have been all referred by Dr. WALLICH to the genus *Aconitum*. The specimens of *Caltha*? *Nirbisia* and *C. ? Codoa* of Dr. BUCHANAN, appear to be Dr. WALLICH's *Aconitum ferox*, while those of *C. ? Bikkma*, his *Aconitum palmatum*, all evidently in a young state, and without flowers or fructification. That the virulent poison, emphatically called *Bish*, i. e. the poison, is the root of *Aconitum ferox*, admits, I think, of no doubt. The root is brought down to the plains of India from the mountains where

this plant is indigenous; that it was produced by it was first learnt by Dr. WALLICH in Nepal; the fact was confirmed by Dr. GOVAN in Sirmore, and the information communicated to the author on the same mountains was, that *Bikh* is the name applied to *Aconitum ferox* and *Meetha tellia* to the root, which, though a violent poison, is occasionally used in medicine. It may further be stated, that the specimens of *Aconitum ferox* in the author's Herbarium, have the fusiform roots attached side by side, black and wrinkled externally, and of a brownish colour internally; they impress upon the tongue and fauces a peculiar burning sensation, and increase the flow of saliva, as is described to be the case with the *Bikh*. They moreover exactly resemble the specimens brought in the Indian bazars, of *Meetha tellia*, in the author's collection of *Materia Medica*.

Both Drs. BUCHANAN and WALLICH have mentioned the uncertainty and confusion existing in the names of the several articles of the Indian *Materia Medica*. This is no doubt true, and it therefore becomes more necessary to elucidate the subject, when such powerful drugs are sold and administered as remedies for disease. Considerable assistance will be derived in this labour, if, when consulting native works on the subject, we at the same time procure as many as possible of the drugs which are described. Without this no satisfactory progress can be made, as we have no means of ascertaining when the same drug is given in different parts of the country, under different names, nor when, which is sometimes the case, different articles are given under the same name.

Dr. BUCHANAN (*Brewst. Journal*, i. p. 250) gives *Bish*, *Bikh*, and *Kodoya bish* or *bikh*, as the synonymes: to these *Meetha* ought to be added, instead of being referred to *bikkma*. Professor H. WILSON (*Cal. Med. Trans.* vol. ii. p. 280) referring to this article, says, that *Bish*, *Bikh*, or *Vish*, means poison simply, and that it has several Sanscrit synonymes, as *Amritam*, *Vatsanabhu*, *Visham*, &c. Dr. CAREY, in his Bengalee Dictionary, refers *Bish* to *Aconitum ferox*, and quotes as synonymes with *Vatsanabhu*, *Mitha*, or *Mitha zuher* (sweet poison). Dr. W. HUNTER (*Cal. Med. Trans.* vol. ii. p. 416) has *Meetha zuhur*, *Meetha bikh*, and simply *Mitha* as synonymes. Dr. WALLICH (*Planta Asiat. Rar.* vol. i. p. 41) mentions that Dr. GOVAN found the root called *Meetha-doodya* and *Meetha telya*, and gives as synonymes, *Visha*, i. e. *Venenum*, et *Ati visha*, *summan venenum*; Hindee, *Vish* or *Bikh*; Newar, *Bikh* and *Bikma*. In the *Mukhzun-ool-Adwieh*, probably the best Persian work on *Materia Medica* in use in India, several kinds of *Bish* are enumerated; as—1. *Seengheea*, so called from its resemblance to the horn of a Deer. 2. *Buchnag*, like *judwar*. 4. *Teezuk*. 5. *Kuroon-ool-soombul*. 6. *Buhrasoorut*. 7. *Burhmunee*. 8. *Muhoodah*. 9. *Huldeh*. 10. *Kala koot*. 11. *Sutwa*. 12. *Tellia*. But as it is doubtful whether these are varieties or species, or whether more than those already mentioned, can be referred to the genus *Aconitum*, they are only enumerated as subjects for further inquiry. In the *Taleef-Shereef*, an Indian work on *Materia Medica*, lately translated by Mr. PLAYFAIR, *Singia* and *Bechnack* are given as two names of a most deadly poisonous root from Nepal, no doubt the Aconite.

In all the native works, the *Bikh* is represented as being a deadly poison, even in the smallest doses. The Hindoo works quoted by Dr. HUNTER describe it as being at first sweetish (hence the affix *meetha*, sweet), and then followed by a roughness on the tongue, or as it is expressed in one work, "seizing the throat."

Dr. BUCHANAN has informed us, that it is equally fatal when taken into the stomach, and when applied to wounds; hence used for poisoning arrows and killing wild animals. The futility of the Gorkhas attempting to poison the springs of water was shown in the last campaign, and Dr. GOVAN has proved the improbability of deleterious exhalations from this plant being the cause of the unpleasant sensations experienced at great elevations, inasmuch as it is only found much below where these are experienced. But as it is a root of such virulent powers, it has no doubt been frequently employed as a poison, and its sale was therefore prohibited by the native powers in India. Notwithstanding this, the Hindoo physicians, noted for the employment of powerful drugs, such as arsenic, nux vomica, and croton, do not hesitate to employ this also in medicine. In the *Taleef-Sherief* it is directed never to be given alone; but mixed with several other drugs, it is recommended in a variety of diseases, as cholera, intermittent fever, rheumatism, tooth-ache, and bites of snakes. It is also used as an external application in rheumatism in the north-western provinces. Mr. PÉREIRA's experiments have shown that this root, either in the form of powder, watery extract, or spirituous extract, is a most virulent poison: but of these forms the last is by far the most powerful. "The effects were tried by introducing this extract into the jugular vein, by placing it in the cavity of the peritoneum, by applying it to the cellular tissue of the back, and by introducing it into the stomach. In all these cases, except the last, the effects were very similar; namely, difficulty of breathing, weakness, and subsequently paralysis, which generally commenced in the posterior extremities, vertigoes, convulsions, dilatation of the pupil, and death, apparently from asphyxia." (*v. Wall. Pl. Asiat. Rar. loc. cit.*)

With respect to the *Bikhma*, or the second kind of *Bish*, the difficulties are greater, as the specimens of *Caltha ? Bikhma*, which Dr. BUCHANAN was informed produced the febrifuge root, belong to Dr. WALLICH's *Aconitum palmatum*, Cat. No. 4723; this may therefore produce a root possessed of the properties ascribed to the *Bikhma* by Dr. BUCHANAN's informants. Though we have no further information respecting it than its name, properties, and the short description of *Radia tuberosa* to guide us, it is interesting to endeavour if it can be traced in other parts of India, though names, especially provincial ones, we have seen vary in different districts, and the properties ascribed to a drug is rather an uncertain guide in the present state of the Indian Materia Medica; but it appears to be more than an accidental coincidence, that the author, in his inquiries, has met with a *tuberosus* root produced by a species of *Aconite*, which is extensively used in India as a tonic medicine. In the native works on Materia Medica, as well as in the common Persian and Hindoostanee and English Dictionaries, *Atees* is described as being the root of an Indian plant used in medicine. This the author learnt was the produce of the Himalayas: he therefore sent to one of the commercial entrepôts situated at the foot of the hills, and procured some of the root, making inquiries respecting the part of the mountains whence it was procured. The plant-collectors in their next excursions were directed to bring the plant, with the root attached to it, as the only evidence which would be admitted as satisfactory. The first specimens thus procured are represented in Plate 13, and the root *Atees* having been then ascertained to be the produce of a new species of *Aconite*, it was named *Aconitum atees* (*Journ. Asiat. Soc. vol. i. p. 459*), but which has since been ascertained to be the *Aconitum heterophyllum* of Dr. WALLICH. The roots obtained in different parts

of the country resemble one another, as well as those attached to the plant. They are about an inch in length, of an oblong oval-pointed form, light greyish colour externally, white in the inside, and of a pure bitter taste. That its substance is not so injurious as the *Bish*, I conclude from its being attacked by insects, while the other remains sound and untouched. The natives describe it as being of two kinds, one black, the other white, and both as bitter, astringent, pungent, and heating, aiding digestion, useful as a tonic and aphrodisiac. By inquiries in Nepal it might easily be ascertained whether this has any resemblance to the *Bikkma* of Dr. BUCHANAN.

Respecting the third kind of *Bish*, *Nirbisi*, *Nirbish*, or *Nirbikki*, the uncertainties are also considerable; as we have only the information that it is a tuberous root without deleterious properties; while Dr. B.'s specimens of *Caltha? Nirbisia* are not to be distinguished from those of his *Caltha? Codoa*, which have been shown to be those of *Aconitum ferox* in a young state. It is evident, therefore, that the people employed did not take the necessary precautions, and, perhaps, brought the leaves of the latter plant, because they thought it was like the true one, and it may therefore be supposed to be one of the *Ranunculaceæ*, particularly as the author, in the mountains of Sirmore and Gurhwal, found the name *Nirbisia* applied to *Delphinium pauciflorum*: and the roots brought down from these mountains with that name have the closest resemblance to the roots of some species of this genus, though he did not succeed in tracing it to the particular one; but that which is reckoned the best kind of *Nirbisi* in the Indian bazars is of a very different nature, and brought down from Bissehur and from Umritseer, the commercial capital of Lahore. This kind is fusiform, somewhat flattened and wrinkled, of a black colour externally, and in some respects resembling the *Bikk* itself; when cut, the substance is found to be compact, and of a brownish colour, with a slight degree of bitterness and acrimony.

The name *Nirbisi*, with its Persian and Arabic synonymes, *judwar* and *zudwar*, has been already applied by Mr. COLERBROOKE to the roots of *Curcuma Zedoaria*, because they agree pretty well with the round zedoary (*zedoaria rotunda*) of the shops; but that distinguished scholar, with a caution dictated by his extensive knowledge of the subject, observes, that if the drug be not the true zedoary, the synonymes must be transferred to some other plant. The term *Nirbisi*, as observed by Mr. COLERBROOKE, implies that the drug is used as an antidote to poison, being composed of the privative preposition *nir* and *bis*, poison; and in the *Mukhzun-ool Adwieh*, it is further explained, as repelling from and purifying the body from deadly poisons. It may therefore be considered as a medicine of considerable importance in Eastern countries, and that it is not only so at present, but has been reckoned such from very ancient records, will appear from the following quotations. The Arabic synonyme *Zudwar*, leads us at once to the accounts of the *Zedoaria* of old authors and the *Geiduar* of AVICENNA. Thus, MATHIOLUS (*Commentaries on Dioscorides*, lib. ii. c. 154), tells us, "Zedoaria (ut cap. clxxii. testis est Scrapio) convehitur e Sinarum regione ultra extremas Indiæ oras;" adding, after giving the medical properties, "et in antidotis additur. Ideoque dixit Avicenna nihil esse ea præstantius ad ebibitum Napellum." GARCÍAS AB ORTA, who was for so many years one of the physicians at Goa, writes: "Quod nos hic Zedoariam appellamus, Avicennæ, lib. ii. cap. 734, Geiduar dicitur; aliud no-

non ignoro, quia nascitur regionibus Sincensium provincie vicinis. Magna vero emittit *Gedwar*; nec facile invenias, nisi apud circumforaneos quosdam et struatores, quos Indi *foques*, Mauretani *Calandares* appellant, hominum genus per peregrinationibus et stipem amedicando vitam sustentat. Ab his enim et *foques* et magister *Geduar* emunt." "Utile est autem istud *Geduar* ad phlegmas sed praesertim adversus venena, et virulentorum animalium ictus morosusque." Clusius, at p. 378 of the same work, "Exoticorum libri decem," having obtained some specimens, "*Gedwar* veri nomine inscriptas," gives a figure, and compares them with the roots of *Anthora*, which was at one time thought to be the *Zedoary*; they resemble a good deal those of *atees*, as represented in p. 38. The Persian authors, after giving the synonymes, mention that there are five kinds of *Judwar*. The best, called *Khutai*, or Chinese, procured from the mountains of that country. The two next kinds are the produce of the mountains of Tibet, of Nepal, of Morung, and Rungpore; the fourth kind is from the hills of the Dukhun; and the fifth, called *Antulah*, is the produce of Andalouza, or Spain. A long account follows of the properties and uses of *Judwar*, of which it is needless to adduce more than that it is considered a powerful antidote to poison, particularly of the *bish*, more so, indeed, than the *tiryak farook*, the ingredients of which are given by Prosper Alpinus De Medicin. Egypt. lib. iv. c. 9. It is therefore probable, that the *Nirbisi* is the true *Zedoary* or *Geduar* of Avicenna, whatever may be the plant which produces it; that it is not likely to have been what is now so called, the produce of a species of *Curcuma*, is evident from the difficulty which GARCIAE AB ORTA had in procuring it even in India. Further, if the descriptions in the Persian works on *Materia Medica* be compared with those of the old Arabian authors, they will be found to refer to the same article, of which in India the name is *Nirbisi*. It may therefore be recommended as an interesting subject of inquiry for travellers in the Himalayas from Sikket to Cashmere, to ascertain the plant or plants which furnish the different kinds of *Nirbisi*, *Judwar*, *Zudwar*, or *Antulah*. *Cissampelos convolvulacea* is called *dahandibicee* in the N. W. provinces."

Since selecting the above extract for press, the THIRD PART of Dr. ROYLE'S Illustrations has reached India. It contains plates of fourteen new plants, two zoological; and one plate of the *fossil plants of the Burdwan coal formation*\*. Under the family *malvaceae*, we find a luminous and highly useful account of the cotton plant and its cultivation in various parts of the world, which we regret having no space to notice further at present. The author has also supplied a desideratum in botany by his monographical epitome of the *gossypia*, which he distinguishes into eight species.

Lieut. ARTHUR CONOLLY'S *Overland Journey to India*, and Lieut. A. BURNES'S *Voyage up the Indus and subsequent Mission to Kábul and Bokhárá*, have both appeared among the recent arrivals from England. As the *Gleanings in Science* have already given an epitome of the former journey, and the *Journal As. Soc.* of the latter, we need say no more than that, both works do credit to our enterprising travellers.

\* What has become of the valuable series of drawings of these fossils prepared from the specimens in the Society's museum by Dr. FALCONER three years ago?—

## XII.—Col. SYKES' Catalogue of Birds of the Incessorial Order in the Dukhun,

[Continued from page 423.]

Fam. *Merulida*, Vigors.—Genus *Oriolus*, Auct.

58. *Oriolus Galbula*, Linn. *Golden Oriole*, Lath. *Mango Bird* of Dukhun. Very abundant in Dukhun just before the rains. It is called *Panoseh* by the Maharrattas, from being the precursor of the monsoon. It is a quarrelsome bird. *Irides*, rich lake.
59. *Oriolus melanocephalus*, Linn. *Black-headed Oriole*, Lath. Rare. Seen by Colonel SYKES only in the immediate neighbourhood of the Ghauts. Found also in Africa.
60. *Oriolus KUNDOO*. Or. *corpore suprâ flavo-ciruti; uropygio, crisso, pognonis infernis rectricum ad apices, abdominisque lateribus nitidè flavis; alis olivaceo-brunneis; corpore subtus sordidè albo, brunneo striato; rostro nigro. Irides, rufo-brunneæ. Longitudo Or. Galbula.*  
Both sexes alike. Size of *golden Oriole*, and much resembling the female of that bird; but the bill is always black, and the *irides* reddish-brown instead of lake. — Genus *Turdus*, Auct.
61. *Turdus macrourus*, Gmel. *Long-tailed Thrush*, Lath. Rare. Found in the dense woods of the Ghauts.
62. *Turdus Sauraris*. *Gracula Sauraris*, Linn. *Pastor Sauraris*, Temm. *Little Indian Pie*, Edw., pl. 181.
63. *Turdus cyanotus*, Jardine and Selby, pl. 46  
This bird has the tongue of a *Pastor*. *Irides*, intense red brown. Stony fruit and *Citæde* found in the stomach. Has the naked spot behind the eyes, but the bird has not the air of a *Pastor*. Inhabits the Ghauts.  
Genus *Petrocincla*, Vigors.
64. *PETROCINCLA PANDOO*. *Petr. brunnescenti-cyanea; pteromatibus, remigibus rectricibusque fuscis. Irides, fuscæ. Statura minor quàm Turd. cyanei.*  
This bird differs from the *solitary Thrush* of Europe (*Turd. cyaneus*, Linn.) in its smaller size, slighter form, brighter cærulean tint, want of orange eye-lids, and white tips to the feathers. Found only in the denser woods of the Ghauts. Flight, low and rapid. It appears to correspond with var. A. of Dr. LATHAM'S *solitary Thrush*, vol. 5, p. 47.
65. *PETROCINCLA MAYL*. *Petr. suprâ griseo-brunnea, subtus rufescenti-alba, plumi brunneo marginata; crisso rufescenti, fusco-brunneo fasciata. Statura præcedentis.*  
This bird corresponds as closely as possible with what is stated to be the female of the *Turd. cyaneus*, and may by analogy be supposed to be the female of *Petrocincla Pandoo*; but it inhabits only the prickly milk-bushes (*Euphorbia tortilis* and *pentagona*) of the rocky plains of the Dukhun. Colonel SYKES never saw it in the Ghauts, nor in company with *Petr Pandoo*.
66. *Petrocincla cinclorhyncha*, Vigors, *Proceed. Zool. Soc. 1. p. 172.* Figured in GOULD'S Century of Himalayan Birds.  
Genus *Timalia*, Horsf.
67. *TIMALIA MALCOLMI*. *Tim. pallidè grisescenti-brunnea, uropygio pallidiori, remigibus rectricibusque mediis saturatioribus, his fusco obsolete fasciatis; subtus albescens, levis roseo tincta; frontis plumis subcyanis, in medio albo striatis. Irides, flavo-aureæ. Rostrum brunneum, mandibulâ inferiori ad basin flavescenti. Longitudo corporis 11½ unc., caudæ 5½.*  
*Kohuttee* of the Maharrattas. Congregate in flocks of ten or a dozen; fly low, slowly, and with difficulty; never cease chattering, and all at the same time. Food, grasshoppers and grain. Colonel SYKES has dedicated this species to Sir JOHN MALCOLM, G.C.B., who zealously aided his researches in India.
68. *TIMALIA SOMERVILLEI*. *Tim. rufescenti-brunnea; abdomine, crisso, dorso imo caudæque dilutè rufis, hic saturatiori obsolete fasciatis; remigibus brunneis; gutturis pectorisque plumis in medio subcyanis notatis. Rostrum pedesque flavi. Longitudo corporis 9½, caudæ 4½. Irides, pallidè flavæ.*  
A size less than *Tim. Malcolmii*, but shorter. *Irides*, bright yellow: same habits as the preceding, but found in the Ghauts only; the latter on the plains. Colonel SYKES has dedicated this bird to Dr. WILLIAM SOMERVILLE, F.R.S. in testimony of his respect.
69. *Timalia (Natarwa)*, Frankl. *Gogoye Thrush*, Lath. ?  
Habits of the preceding, but about half the size of *Tim. Malcolmii*. *Irides*, red brown, legs, yellow.

Genus *Ixos*, Temm.

70. *Ixos jocosus*. *Lanius jocosus*, Linn. *Jocose Shrike*, Lath.  
This is also the *Lanius Emerica* of SHAW. The male has a sweet note. Found only in the lofty woods of the Ghauts. *Irides*, fuscous. Lives on fruit; sexes alike.
71. *Ixos Cafer*. *Turdus Cafer*, Linn. *Cape Thrush*, Lath. *Le Courage*, Le Vaill. Inhabits gardens; destructive to fruit; without musical notes. Sexes alike.
72. *Ixos fulvicaus*. *Motacilla fulvicata*, Linn. *Sooty Warbler*, Lath. *Traquet noi des Philippines*, Buff.  
Sir J. ANSTRUTHER's variety. Lath., vol. 7, p. 112. Female, sooty-black, or brown-black.

Genus *Pomatorhinus*, Horsf.

73. POMATORHINUS HORSFIELDII. *Pom. olivaceo-brunneus; strigâ superciliarî, collo in fronte, pectore, abdominique medio albis. Irides, fusco-sanguineæ. Rostrum flavum. Pedes fusci. Longitudo corporis 9.7 unc., caudæ 3.7.*  
Minute insects (Dipterous) found in the stomach. Birds remarkably shy, and only met with in the dense woods of the Ghauts. The note of the male is *hoot, whoot, whoot*, uttered slowly; the female answers *hooc*. The tongue and habits of this bird are those of a *Thrush* or *Timalia*. I have dedicated this species to a gentleman to whom science is deeply indebted.

Fam. *Sylviadæ*, Leach.—Genus *Jora*, Horsf.

74. *Jora Tiphia*. *Motacilla Typhia*, Linn. Lath., vol. 7, p. 128, var. A. BROWN'S Illust. pl. 36.  
Dr. Horsfield's *Jora scapularis* appears to correspond with the female of *Jora Tiphia*. *Irides*, gray.

Genus *Sylvia*, Auct. *Warbler*.

75. *Sylvia montana*, Horsf. *Prinia montana*, Swains.  
Differs from the type of *Prinia* in its rounded tail. *Irides* fuscous.
76. *Sylvia sylvicola*, Lath. *Lesser White-throat*.  
Differs from the European bird only in the reddish tint of the white below.
77. SILVIA RAMA. *Sylv. pallidè brunnea, subtus albescens; caudâ obsolete fasciatâ. Longitudo corporis 4.7, caudæ 1.9.*  
Sexes alike. A size smaller than *Sylv. montana*, and might be mistaken for it; but Colonel SYKES has shot them male and female, in several places in Dukhun, full-grown birds.

Genus *Prinia*, Horsf.

78. PRINIA SOCIALIS. *Prin. capite dorsoque intensè cinereis; remigibus recfricibusque rufo-brunneis, his prope apices fusco-fuscatis; subtus rufescenti-alba, abdominis lateribus saturatioribus. Rostrum nigrum. Pedes flavi. Irides pallide aurantiacæ. Longitudo corporis 5.2, caudæ 2.2.*  
Sexes alike in size and plumage. This species constructs the same ingenious nest, and has the same habits, same note (*tooc tooc*), and feeds in the same manner, as the *Orthotomus Bennetti*.
79. PRINIA INORNATA. *Prin. suprâ pallidè cinereo-brunnea, strigâ superciliarî corporeque subtus albescentibus, abdominis lateribus crissoque rufescentibus; caudâ obsolete fasciatâ. Irides rufo-brunneæ. Rostrum brunneum; mandibullâ inferiori ad basin flavâ. Longitudo corporis 4.7 unc., caudæ 2.7.*  
Sexes do not differ in size or plumage. Habits of *Prin. socialis*. Both the above species are remarkable for a struggling flight, as if they experienced difficulty in making their way.

Genus *Orthotomus*, Horsf. *Tailor Bird*.

80. ORTHOTOMUS BENNETTII. *Orth. olivaceo-viridis; subtus albidus; capite suprâ ferrugineo; caudâ elongatâ obsolete fasciatâ. Irides flavæ. Longitudo corporis 6 unc., caudæ 2.7.*  
Two central tail-feathers elongated beyond the rest for one inch, and two-tenths of an inch wide only. Sexes alike. This bird is very remarkable for the ingenuity shown in constructing its nest, by sewing the leaves of trees together, with cotton thread and fibres. Colonel SYKES has seen nests in which the thread used was literally knotted at the end. This species very closely resembles Dr. HORSFIELD's *Orth. Scipium*, but on a comparison of the birds, they were found to have specific differences.
81. ORTHOTOMUS LINGOO. *Orth. olivaceo-brunneus, subtus sordidè albus. Longitudo corporis 5.6 unc., caudæ 2.1.*

This species differs from the type of *Orthotomus* in the short tail, but, has the characters of the genus sufficiently marked to be included in it. Sexes exactly alike in plumage. Principal food, black ants.

Genus *Budytes*, Cuv.

82. *Budytes citreola*. *Motacilla citreola*, Lath. This is the variety A. of *Mot. citreola* of Dr. LATHAM, vol. 6. p. 330.  
Length 6.7 inches : tail 2.8.

This bird so closely resembles the European species, that Colonel SYKES has not ventured to separate it. It has the habits of a *Motacilla*, but its long hind claw sufficiently distinguishes it, and M. CUVIER has facilitated research in forming a genus for such *Wagtails* as have this claw.

83. *BUDYTES MELANOCEPHALA*, *Bud. olivaceo-varidis* ; corpore subtus nitidè flavo ; capite, nuchâ, reetricibusque nigris, herum duabus lateralibus albo marginatis ; alis fuscis, plumis olivaceo-flavo notatis.

*Irides* intensè rufo-brunnæ. *Longitudo corporis* 6.8 unc., *caudæ* 3.

These are solitary birds, and are rarely found, excepting in the beds of rivers. In seven specimens four birds only were examined, and they happened to be males ; so that Colonel SYKES is uncertain with respect to the female.

84. *BUDYTES BERMA*. *Bud. olivaceo-iridis*, subtus flavus ; capite suprâ griseo ; strigâ superciliari albâ ; alis fuscis plumis flavescenti marginatis ; caudâ atrâ, reetricibus duabus lateralibus albis.

*Irides* flavo-brunnæ. *Statura* præcedentis.

This bird very closely resembles *Budytes flava* of Europe, but differs in the shade of the upper plumage, in the hind claw being two-tenths of an inch longer, and in the base of the lower mandible being whitish. This is a solitary bird in beds of rivers : female not known.

Genus *Motacilla*, Auct.

85. *Motacilla variegata*, Steph., vol. 13, p. 234. *Pied Wagtail*, Lath., vol. 6, p. 320, pl. 114. *Mot. picta*, Frankl.

86. *MOTACILLA DUKHUNENSIS*. *Mot. dorso scapularibusque pallescenti-griseis, caudæ reetricibus ad apicem nigrescentibus ; capite suprâ, nuchâ, gutture, pectore, reetricibusque mediis atris ; frontis fasciâ latâ, corpore subtus, plumarum marginibus, alarum remigibus primariis exceptis, reetricibusque duabus lateralibus albis ; remigibus fuscis.*

*Irides* intense rufo-brunnæ. *Statura* *Mot. albæ*.

Sexes do not differ in size or plumage ; but young birds have the black less pronounced. This is the most common and abundant *Wagtail* in the Dukhun, frequenting not only the beds of rivers, but the plains ; and Colonel SYKES has seen it in his own garden frequently. It very closely resembles the *Mot. alba*, of Europe, but differs in being of a light slate or cinereous instead of a blackish cinereous, and in the wing-coverts and secondaries being edged with broader white. It is almost identical with the *Mot. alba* of the Northern Expedition.

Genus *Megalurus*, Horsf.

87. *MEGALURUS ? RUFICEPS*. *Meg. olivaceo-brunneus, subtus albescens, pectore brunneo striato ; capite genisque brunnescentirufis, strigâ superciliari rufescente ; capitis dorsique plumarum rhachibus pallidioribus ; rostro pedibusque luteis.*  
*Longitudo corporis* 7.5 unc., *caudæ* 2.2.

Wings short : tail equal, narrow. Female unknown. Black ants only found in the stomach. This bird has the air of the *Anthus Richardi* figured in the *Planches coloriées*, 101. Frequents the plains only, like a *Lark*.

Genus *Anthus* Bechst. *Pipit*.

88. *ANTHUS AGILIS*, *Anth. olivaceo-brunneus ; subtus rufescenti-albescens, fusco-brunneo striatus ; remigibus flavo-olivaceo marginatis ; ungue postico subelongato, subcurvato.*

*Irides* fusco-sanguineæ. *Longitudo corporis* 6.8 unc., *caudæ* 2.5.

Found on open stony lands : female unknown. Closely resembles the *Titlark* of Europe. Its chief difference is in the hind toe.

Genus *Saxicola*, Bechst. *Wheatear*.

89. *Saxicola rubicola*, Temm. *Stone Chat*.  
*Irides* intense brown. These birds were met with only in low scattered bushes. Caterpillars, flies and ants found in the stomach.

90. *SAXICOLA BICOLOR*. *Sax. atra ; fasciâ alarum, uropygio, abdomine medio, crissore utrisque nigri. Irides* fuscæ. *Longitudo corporis* 5.8 unc., *caudæ* 2.4.

Female unknown. Three males were examined. Black ants, caterpillars and beetles were found in the stomach. Habits of the preceding.

91. *SAXICOLA RUBECULOIDES*. *Sax. cinerco-brunnea, subtus alba; gula thoraceque rufa; nectricibus mediis nigrescentibus, cæteris ad basin albis. Irides intense brunneæ. Longitudo corporis 4.7 unc., caudæ 2.*
92. *SAXICOLA ERYTHROPYGIA*. *Sax. fusco-brunnea; subtus rufo-brunnea, abdomine fusco vix striato; uropygio rufa; crasso rufo tincto. Statura Sax. bicoloris. Male unknown.*

Genus *Phanicura*, Jard. & Selb.

93. *Phanicura atrata*, Jard. & Selb. *Indian Redstart*, *Id.*

This bird is of the size of the *Redstart* of Europe, and has the same habits. It has a very peculiar manner of vibrating its tail when seated on a bough, as if it had an ague fit. A pair of these birds built their nest in an outhouse constantly frequented by Colonel SYKES's servants, and within reach of the hand. They had no alarms.

94. *Phanicura Suecica*. *Motacilla Suecica*, Linn.

Not differing from the European bird. *Irides* deep brown. Length 5.9 inches; tail 2.

Fam. *Pipridæ*, Vigors.

Genus *Parus*, Linn. *Titmouse*.

95. *Parus atriceps*, Horsf. *Mésange Cap-nègre*, Temm., Pl. Col. 287. f. 2.

96. *Parus xanthogenys*, Vigors, *Proceedings Zool. Soc.* 1. p. 23. Figured in GOULD'S 'Century of Himalayan Birds.'

*Irides* sienna brown. Tongue divided into four short *lacinis* at the tip. Wasps, bugs, grass seeds, and the fruit of the *Cactus Opuntia* were found in the stomachs of both species.

Tribus CONIROSTRES, Cuv.

Fam. *Fringillidæ*, Vigors.—Genus *Alauda*, Auct.

97. *Alauda Gulgula*, Frankl.

This is the common *Lark* of the Dukhun, with the habits and notes of the *Sky-lark* of Europe. When confined in a cage and shrouded from the light, it learns to imitate the notes of other birds, and even quadrupeds. The male is created. It is called *Chundoola* in Dukhun. *Irides* sepia brown. Length 6.7 inches; tail 2.3. Food, grasshoppers.

98. *ALAUDA DEVA*. *Al. rufescenti-brunnea brunneo intensiori notata; corpore subtus strigæ superciliari rufescenti-albis, pectore brunneo striato; capite cristato, brunneo striato; reetricibus brunneis rufo marginatis. Statura minor quam precedentis.*

99. *ALAUDA DUKHUNENSIS*. *Al. corpore suprâ griseo-brunneo, plumis in medio fusco-brunneo notatis; subtus albescens, pectore strigæ superciliari rufescentibus; reetricibus fusco-brunneis duabus lateralibus albo marginatis. Irides intense brunneæ. Longitudo corporis 6.3 unc., caudæ 2.*

Grass seeds only found in the stomach. Frequents stony plains.

Genus *Mirafra*, Horsf.

100. *Mirafra phanicura*, Frankl.

This bird is characterized by the lightness, shortness, abruptness, and sudden ascents and descents of its flight. *Irides*, yellow-brown. Granivorous.

Genus *Emberiza*, Auct. *Bunting*.

101. *Emberiza melanocephala*, Scop.

This native of Corfu is common to Western India. It appears in considerable flocks at the ripening of the bread grain *Jowaree* (*Andropogon Sorghum*) in December. *Irides*, intense brown. Length, 7.3 inches; tail, 3 inches. Granivorous. Allied to *Emb. luteola*, Mus. Carls. vol. iv., t. 93.

102. *Emberiza hortulana*, Linn. *Red-brown Bunting*.

This, although not absolutely identical, is so closely allied to the European bird, that Colonel SYKES cannot separate it. *Irides*, intense brown. Length, 7.1 inches; tail 3 inches. Grass seeds only found in the stomach. Bird, solitary.

103. *Emberiza cristata*, Vigors, *Proceed. Zool. Soc.* 1. p. 35.

Length 6½ inches; tail 2.7 inches. Rare in Dukhun, and found only on rocky and bushy mountains. Female of a uniform sooty brown. Grass seeds only found in the stomach. Native of China and Nepal as well as Dukhun.

104. *EMBERIZA SUBCRISTATA*. *Emb. suprâ intense brunnea, plumis brunneo pallidiori marginatis; subtus pallidè brunnea, fusco striata; alarum plumarum reetricumque lateralium marginibus, reetricibusque duabus mediis castaneis; capite subcristato. Irides intense brunneæ. Rostrum rufo-brunneum. Longitudo corporis 6.6 unc., caudæ 2.5.*

Sexes alike in size and plumage. Birds rare and solitary, and found only in the open spaces on high mountains. This bird is pronounced in Europe to be the

female of *Emb. cristata*; but setting aside the fact of both sexes of each bird being in the present collection, their localities are different, and they were never seen together by Colonel SYKES.

Genus *Linaria*, Bechst. Linnæ.

105. *Linaria Amandava*. *Fringilla Amandava*, Linn.

These beautiful little birds, so common in Goojrat, are rare in Dukhun.

Genus *Ploceus*, Cuv. *Weaver Bird*.

106. *Ploceus Philippensis*, Cuv. *Philippine Grosbeak*, Lath.

The *Weaver Bird* is very common in Dukhun, and there are few wells overhung by a tree where their nests are not seen pendent. They live in small communities, and are very noisy in their labours. They associate so readily with the common *Sparrow* that at the season of the falling of the grass seeds Colonel SYKES, in firing into a flock of *Sparrows* on the grass plats in his own grounds, killed as many *Weaver Birds* as *Sparrows*. Fruit of the *Ficus Indica* and grass seeds have been found in the stomach. *Irides*, intense brown.

107. *Ploceus flavicollis*. *Fringilla flavicollis*, Frankl.

This bird has so nearly the bill, tongue, *irides*, size and aspect of *Ploc. Philippensis*, that Colonel SYKES has considered it a *Ploceus*. Grass seeds and a few grains of rice found in the stomach. Very rare in Dukhun.

Genus *Fringilla*, Auct. *Finch*.

108. *Fringilla crucigera*, Temm., Pl. Col. 269. fig. 1. *Duree Finch*, Lath.

This minute bird has the strange habit of squatting on the high roads and almost allowing itself to be ridden over ere it rises. Smaller than a *Sparrow*. *Irides*, red brown. Coleopterous insects, maggots, and seeds of *Panicum spicatum* found in the stomachs of many specimens. This bird has the straight hind claw of a *Lark*, and should therefore neither be classed as a *Fringilla*, agreeably to M. Temminck, nor as a *Passer*, agreeably to Brisson. Its habits also separate it from both these genera. M. Temminck in his Plate has placed it on a twig, but it never perches.

GENUS *LONGCHURA*.

*Rostrum* forte, breve, latum, altitudine ad basin longitudinem æquans; *mandibulis* integris, superiori in frontem angulariter extendente, cumque eo circuli arcum formante.

*Alæ* mediocres, subacuminatæ; *remigibus*, 1mâ brevissimâ subpurâ, 2dâ 3tiâ 4tâque ferè æqualibus longissimis.

*Cauda* gradata, lanceolata; *rectricibus* mediis cæteras paulò longitudine superantibus.

*Pedes* mediocres, subgraciles.

The peculiar spear-head form of the tail, and the ridge of the upper mandible and the forehead, forming a segment of the same circle, together with the habits of the following species, afford sufficient characteristics to justify their separation from the genus *Fringilla* of M. Temminck. The *Gros-bee longicorne* of the Pl. Col. 96. (*Emb. quadricolor*, Lath.) belongs to the same group.

109. *Longchura nisoria*. *Fringilla nisoria*, Temm. *Gros-bee épervie*, Pl. Col. 500. Fig. 2.

Found only in the Ghauts. Grass seeds in the stomach. Length 5.4 inches: tail 1.9 to 2 inches. Sexes alike.

110. *LONGCHURA CREET*. *Lonch. pallid? cinnamomeo-brunnea*; *corpore subtilis uropygiogioe albis*; *remigibus rectricibusque intensè brunneis*.

*Fem. coloribus minus intensis*.

*Irides*, intensè rufo-brunnæ. *Longitudo corporis* 5.4 unc., *caudæ* 2.

Tail lanceolate; central feathers longer than the rest, and ending in a point. Sexes alike. These birds live in small families. Colonel SYKES has frequently found them in possession of the deserted nests of the *Ploceus Philippensis*; but their own nest is a hollow ball of grass. Ten white eggs, not much larger than peas, were found in a nest. The cry of the bird is *cheet, cheet, cheet*, uttered simultaneously by flocks in flight.

111. *Longchura leuconota*. *Fringilla leuconota*, Temm. *Gros-bee leuconote*, Pl. Col. 500.

Fig. 1.

Found only in the Ghauts. Length 4.8 inches, inclusive of tail 1.8 inch. Sexes alike. Grass seeds only found in the stomach.

Genus *Passer*, Auct.

112. *Passer domesticus*, Briss. *Fringilla domestica*, Linn.

On submitting the *Indian Sparrow*, male and female, to a rigid comparison with *Sparrows* shot in the Regent's Park, they were found to be absolutely identical.

Fam. *Sturnidæ*, Vigors.—Genus *Pastor*, Temm.

113. *Pastor tristis*, Temm. *Gracula tristis*, Lath.

- The *irides* are red brown, and remarkable for being studded on the external margin with regularly arranged yellowish-white specks. Sexes alike : omnivorous : quarrelsome, noisy. Length 11.9 inches, inclusive of tail of 3.5.
114. *PASTOR MAHRATTENSIS*. *Past. suprâ griseo-niger, remigibus caudâque saturatoribus ; capite genisque atris ; corpore subtilis subrufescenti-griseo ; crisso pallidiori, plumis albo marginatis. Rostrum pedesque flavi. Irides, pallidè griseæ. Longitudo corporis 9.6 unc. caudæ 2.9.*
- Sexes alike. Found only in the Ghauts. Stony fruit in the stomachs of three birds. Resembles *Past. tristis*, but is a size less, possesses no crest, and has gray *irides*.
115. *Pastor roseus*, Temm. *Turdus roseus*, Linn.  
*Irides*, intense red brown. Tongue bifid and fringed : not quite so much so as *Hypsipetes Ganessa*. These birds darken the air by their numbers at the period of the ripening of the bread grains, *Andropogon Sorghum*, and *Panicum spicatum*, in Dukhun, in December. Colonel SYKES has shot forty or fifty at a shot. They prove a calamity to the husbandman, as they are as destructive as locusts, and not much less numerous.
116. *Pastor Pagodarum*, Temm. *Turdus Pagodarum*, Gmel. *Gracula Pagodarum*, Shaw, vol. 7. p. 471. *Le Martin Brame*, Le Vail., Ois. d' Afr. pl. 95. tom. 2.  
*Irides*, greenish white. Length 8.5 inches, inclusive of tail of 2.5 to 3 inches. Sexes alike. These birds are great frequenters of the *Ficus Indica*, *Ficus religiosa*, and *Cactus Opuntia*, for their fruit. Insects also are found in the stomach. Birds lively and elegant in flight.

Fam. *Corvidæ*, Leach.—Genus *Corvus*, Auct.

117. *CORVUS CULMINATUS*. *Corv. suprâ splendenti-ater ; subtilis fuliginoso-ater ; rostri culmine elevato.*  
Longitudo corporis 14 unc., caudæ 7.
- Smaller than the European *Crow*. These birds are remarkable for their audacity. Bill with a considerable *culmen*.

118. *Corvus splendens*, Vieill. *Common Crow* of India.

This is no doubt Vieillot's *splendid Crow*, but in the thousands Colonel SYKES has met with he never saw the plumage ornamented with the pronounced green and blue in Vieillot's plate. Has the noisy, impudent, and troublesome habits of the English *Crow*. Length 18 inches, inclusive of tail of 6 inches. A wounded *Crow* was put into the cage with a *Vicerra Indica*, in the expectation that the latter would make a meal of it. The *Crow* however stood so vigorously on the defensive, that a treaty of peace ensued, and they lived amicably together for several weeks, the *Crow* partaking of the food of the *Civet* until it died from its wound.

Genus *Coracias*, Linn. *Roller*.

119. *Coracias Indica*, Linn. *Coracias Bengalensis*, Steph. *Blue Jay from the East Indies*, Edw. pl. 326.

Very common in Dukhun. Called *Tas*, from its note, by the Mahrattas. Sexes do not differ in size or plumage. *Irides* intense red brown. A grasshopper 2.5 inches long was found in the stomach of one bird. Length 13.3 inches, inclusive of tail of 4.7 inches.

Fam. *Bucerotidæ*, Leach.

*Hornbills* are by no means rare in Dukhun, but from accident Colonel Sykes had not a specimen to produce.

TriBUS SCANSORES, Auct.

Fam. *Psittacidæ*, Leach.—Genus *Palæornis*, Vigors.

120. *Palæornis torquatus*, Vigors.

Appear in considerable flocks in Dukhun, and are very destructive to the crops, particularly to the *Curthamus Persicus*. Fond also of the fruit of the *Melia Azadirachta*. The female differs from the male only in wanting the collar, and has in consequence been considered to belong to a different species. The Mahrattas call the bird *Ragoo* and *Keerub*. Length 17½ inches, inclusive of tail of 9½ inches.

121. *PALÆORNIS MELANORHYNCHUS*. *Pal. viridis, corpore subtilis, notâ circumoculari, dorsoque imo pallidioribus ; capite, collo in fronte nuchâque, columbino-canis ; rostro, torquæque collari latè nigris ; fronte, remigibus, rectricibusque mediis cyaneis, illo pallidiori ; rectricibus subtilis, apicibusque suprâ flavis.*

*Irides*, albæ, subnavo-marginatæ. Longitudo corporis 14.6 unc., caudæ 7.6.

Found only in the Ghauts. Sexes alike. This bird has the aspect of *Pal. columboides*, but differs in the black bill, broad black collar, pale green yellow beneath instead of dove colour, and in the want of the metallic green narrow collar and blueish rump.

Fam. *Picidæ*, Leach.—Genus *Bucco*, Linn. *Barbet*.

122. *Bucco Philippensis*, Gmel. *Burbu des Philippines*, Buff.

This well known bird is called *Tambut*, or the *Coppersmith*, by the Mahrattas. It sits on the loftiest and extreme twigs of trees, uttering the syllables *took took*,

took, deliberately, and nodding its head at each *took*, the sound and the motion originating the idea of a coppersmith at work hammering. *Irides*, lake colour. Length 6½ inches, inclusive of tail 1½ inch. Fruit and insects found in the stomach.

123. *Bucco casticeps*, Frankl.

Scarcely distinguishable from *Bucco corvinus* and *Bucco Javanicus*. Found only in the dense woods of the Ghauts. Its note is quite startling, and makes the hills echo. *Irides*, red deep brown. Length 8.7 inches, inclusive of tail of 2.7 inches: the bird is consequently smaller than Major FRANKLIN'S. Stony fruit only found in the stomach.

Genus *Picus*, Linn. Woodpecker.

124. *Picus Mahrattensis*, Lath. Mahratta Woodpecker, Id.

*Irides* rich lake. Length 7.4 inches, inclusive of tail of 2.4 inches. Although this is called the *Mahratta Woodpecker*, Colonel SYKES met with three birds only in Dukhuu during six years.

Fam. *Certhiidae*, Leach.—Genus *Upupa*, Linn. Hoopoe.

125. *Upupa minor*, Shaw. La Huppe d' Afrique, La Vaill.

*Irides*, almost black. Length 12 to 12½ inches, inclusive of tail from 4.3 to 4.5 inches. Feeds on the ground, and does not hop.

Fam. *Cuculidae*, Leach.—Genus *Leptosomus*, Vieill.

126. *Leptosomus Afer*. *Cuculus Afer*, Gmel. *Edolian Cuckoo*, Shaw. *Cuculus Edolius*, Cuv. *Cuc. surratus*, Shaw?

*Irides*, reddish deep brown. Length 13.4 inches, inclusive of tail of 6.6 inches. Rare in Dukhuu.

Genus *Eudynamys*, Vigors & Horsf.

127. *Eudynamys orientalis*. *Cuculus orientalis*, Linn. Female *Cuc. Mindanensis*.

Called *Koel* or *Koel* by the Mahrattas. A well known and noisy bird, with singularly loud notes, not at all like those of a *Cuckoo*, *Irides*, rich lake. Length 17 inches, inclusive of tail of 7 inches. These birds are frugivorous. In the stomachs of many the fruits of the *Bergera Kœnigi* and *Uvaria undulata* only were found. The difference in the plumage of the sexes is very remarkable. The female is the larger bird. The tongue of this bird is exactly that of the *Cuc. canorus*.

Genus *Cuculus*, Auct.

128. *Cuculus canorus*, Linn. Common Cuckoo, Lath.

*Irides*, yellow. Length 14.5 inches, inclusive of tail of 6.5 inches. Rare in Dukhuu.

129. *Cuculus fugax*, Horsf. *Bychan Cuckoo*, Lath.

*Irides*, bright yellow. Length 13.8 inches, inclusive of tail of 6 inches. Tongue as in 127. This bird has so much the aspect of a *Hawk* that Colonel SYKES passed it for one, until its note *koel*, *koel*, exactly resembling that of *Eudynamys orientalis*, recalled him to the tree on which it was seated, and he shot the bird.

Genus *Centropus*, Ill. *Coucal*.

130. *Centropus Philippensis*, Cuv. *Coucou des Philippines*, Buff. *Chestnut-winged Coucal*, Lath. *Mulabar Pheasant* of Europeans.

*Irides*, rich lake. Length 19½ inches, inclusive of tail of 11½ inches. This is a very useful bird, as Colonel SYKES found a snake eight inches long, centipedes, noxious insects, and lizards in the stomach. In the stomach and *œsophagus* of one bird a lizard thirteen inches long was found.

Tribus TENUIROSTRES, Cuv.

Fam. *Meliphagidae*, Vigors.—Genus *Chloropsis*, Jard. & Selb.

131. *Chloropsis aurifrons*, Jard. & Selb?

Fam. *Cinnyridae*, Vigors.—Genus *Cinnyris*, Cuv. *Sun-bird*.

132. *Cinnyris lepida*. *Certhia lepida*, Sparrm. *Nectarinia lepida*, Temm.

*Irides*, red brown. Length 4.8 inches, inclusive of tail of 1.5 inch. Female ashy brown above; light yellow below. Common in Dukhuu. Feed on small insects; also suck honey.

133. *Cinnyris currucaria*. *Certhia currucaria*, Linn. *Grimpereau gris des Philippines*, Pl. Enl. 576. f. 2.

This has been considered a young bird; but Colonel SYKES can venture to affirm from a long observation of its habits in his garden at Poona, that it is a species. *Irides*, bright lake. Length 4.9 inches, inclusive of tail of 1.5 inch. A spider, a *Cicada*, and minute Coleopterous insects were found in the stomach of many birds of this species. They also hover before flowers, and suck the honey while on the wing, like the *Cin. lepida*.

134. *CINNYRIS VIGORII*. *Cinn. collo supra, nucha, ptillis, scapularibusque intensè sanguineis, collo infra pectoreque coccineosanguineis; strigâ nutrinque mentali subrecti ad pectus extendente maculâque auriculari splendide violaceis; capite supra,*

*caudæ tectricibus, reetricibus mediis, lateraliumque, externo excepto, pinnis externis metallicè viridibus; alis, reetricibus lateralibus, dorso inferiori lateribus, fasciisque subpectorali fuscis; abdomine griseo; dorso imo sulphureo.*

*Irides, intense brunneæ. Longitudo corporis 5½ unc., caudæ 2.3.*

*Larvæ* of flies, a spider, ants, and minute insects found in the stomach. Inhabits the lofty trees of the dense woods of the Ghauts.—“ I will here beg leave to speak in the first person. I have dedicated this magnificent bird to a gentleman whose enlarged views of natural affinities in zoology have contributed essentially to enhance the value of the science, and to facilitate the labours of every zoologist. The dedication is also influenced by a desire to testify my sense of the many kind attentions of Mr. VIGORS.”—W. H. S.

135. *CINNYRIS MINIMA.* *Cinn. capite nuchæque olivaceo-viridibus; pectoris notis, dorso, scapularibus, uropygioque intense sanguineis, hoc violaceo splendenti; subtus pallide flavis; alis caudæque fusco-brunneis.*

*Pœm. olivascens-brunnea, uropygio rufo.*

*Irides, rufo-brunnæ. Longitudo corporis 3.3 unc., caudæ 1.2.* Met with only in the dense woods of the Ghauts. White ants and *larvæ* of flies were found in the stomach. One bird was seen sucking honey. Female of a uniform brown, with a patch of brick-red on the rump and upper tail-coverts, and the yellow below fainter than in the male. Colonel SYKES believes this to be the smallest of the Sun-birds.

136. *Cinnyris Mahrattensis.* *Certhia Mahrattensis*, Shaw. *Cinnyris orientalis*, Frankl. Dr. Latham does not mention the crimson joined to the yellow spot under the wing. These birds suck flowers while hovering on the wing; they eat minute insects also. Female not met with. Length 4.9 inches, inclusive of tail or 1.5 inch.

137. *CINNYRIS CONCOLOR.* *Cinn. viridi-olivacea, alis caudæque saturatioribus, corpore subtus pallidiori.*

*Irides, intense rufo-brunnæ. Longitudo corporis 4 unc., caudæ 1.*

Insects with long *antennæ* were found in the stomach. As four specimens obtained by Colonel SYKES were all females, and as they were met with in the same locality as *Cinn. Vigorsii*, *Cinn. concolor* may be the female of that splendid species; but the difference in the size, form, and aspect of the bird, independently of colour, is opposed to this: they were never seen together. The bird has the outline of *Cinn. Mahrattensis*. The specific appellation of *concolor* is given provisionally.

Colonel SYKES, in concluding his notice of the birds of the two first Orders, observed, that in the majority of instances his knowledge was derived from an observation of many specimens of the same species in the living state. For the most part also he had obtained both sexes, and was very rarely confined to a single specimen.

#### *Two new species of Indian Mouse.*

On June 26, 1832, Colonel SYKES presented two specimens of *mus* preserved in spirits, of which the following is the description printed in the Zool. Journal.

1. *MUS OLERACEUS.* The upper surface is thickly clothed with rather long smooth silky hairs of a bright pale chestnut colour; on the under surface and the inside of the limbs the quality of the hairs is the same, but their colour is nearly white with a yellowish tinge. This latter colour extends up the cheeks, round the mouth and the under surface of the muzzle, and over the upper surface of the feet; the hairs on the latter, on the muzzle, and on the long scaly tail, being very short. The ears are rather large, rounded above, and very nearly naked. The muzzle is rather short and obtuse, and the eyes are placed at an intermediate distance between its end and the base of the ears. The moustaches are numerous and long, some of them being black, and others, silvery or bright chestnut.

The extreme length of the tail, as compared with that of the body, and the comparative length of the hinder *farsus*, furnish characters sufficient to distinguish this *Indian field Mouse* from all its congeners.

2. *MUS PLATYTHRIX.* The head is rather flat and the muzzle slightly elongated and acute; the tail regularly ringed with scales, from between which only a few scattered hairs make their appearance. The fur of the upper surface is of a light grey at the base; but the longer hairs have a blackish shade, with an intermixture of testaceous brown, which is more obvious posteriorly and towards the lower part of the sides. The flattened spines, which are numerous, are white and transparent throughout the greater part of their length, with a dark margin and blackish acuminate tip, beneath which they exhibit, in certain lights, somewhat of a changeable gloss. The moustaches are few in number, black at the base and white at the tips, and reach beyond the ears, which are naked, rounded with a slight point, extremely open, membranaceous, and of a dusky black. The whole under surface, together with the inside of the limbs, the upper surface of the feet, and the claws, are of a yellowish or dirty white. The tail is of a uniform livid grey, but little darker above than beneath, and tapering to a very fine point.

Meteorological Register, kept at the Assay Office, Calcutta, for the Month of October, 1834.

Days of the Month.	Barometer reduced to 32° Fahr.				Thermometer in the Air.				Depression of Moist-bulb Thermometer.				Hair Hygrometer.		Rain. Inches.	Wind.			Weather.				
	At 4 A.M.	At 10 A.M.	At 4 P.M.	At 10 P.M.	Minimum at 4 A.M.	At 10 A.M.	Max. by Reg. Ther.		At 4 P.M.	At 10 P.M.	At 4 A.M.	At 10 A.M.	At 4 P.M.	At 10 P.M.		At 10 A.M.	At 4 P.M.	Morning.	Noon.	Evening.	Morning.	Noon.	Evening.
							At 4 P.M.	At 10 P.M.															
1	.684	.686	.680	.773	83.0	86.7	86.	84.4	83.3	1.9	5.0	4.5	3.1	91	.96	o.	nw.	o.	clear.	cumuli.	clear.		
2	.757	.690	.682	.787	81.1	86.7	89.	87.7	84.1	0.7	5.0	7.7	3.4	93	.97	o.	nw.	o.	do	do	do		
3	.815	.834	.738	.838	81.8	86.6	85.5	87.5	82.2	0.8	5.1	6.2	3.1	95	.98	o.	nw.	E.	do	fine.	do		
4	.821	.806	.800	.852	81.0	84.1	84.0	85.4	89.6	1.6	4.8	5.5	2.4	96	.96	ne.	n.	N.E.	haze.	cloudy.	drizzle.		
5	.791	.806	.750	.823	76.6	81.5	80.4	80.4	76.1	1.0	4.2	4.6	1.1	98	.97	ne.	n.	N.	rain.	hard rain.	high wind.		
6	.785	.820	.733	.805	76.1	81.5	81.4	80.4	75.9	0.7	3.7	3.1	1.0	98	.97	ne.	N.	N.E.	do	cloudy.	do		
7	.765	.828	.747	.805	76.1	81.4	81.4	84.6	77.2	0.6	3.2	4.4	0.5	98	.98	n.	N.	n.	dull.	ra. dull.	hazy.		
8	.773	.812	.719	.736	75.1	81.3	81.3	83.2	78.4	0.1	4.4	6.5	1.0	97	.99	o.	o.	o.	clear.	fine.	stratus.		
9	.688	.768	.668	.784	78.2	83.4	84.7	81.3	81.3	1.1	5.5	5.3	2.8	95	.95	o.	o.	o.	do	fine. cld.	stratus.		
10	.730	.730	.697	.780	78.3	84.0	86.7	83.2	81.7	1.7	5.2	6.3	2.8	95	.92	o.	o.	o.	hazy.	fine.	clear.		
11	.765	.800	.693	.763	82.2	85.2	86.3	86.1	82.2	2.2	5.0	6.7	3.0	95	.93	o.	o.	o.	clear.	do	bright.		
12	.690	.780	.678	.733	83.1	85.4	86.8	83.0	79.3	2.0	3.7	7.3	4.6	98	.94	o.	o.	o.	do	fine. ra.	cum. cirri.		
13	.721	.768	.686	.808	83.0	85.7	86.0	87.4	82.1	2.3	4.6	8.6	5.7	95	.87	o.	n.	a.	do	cum. strat.	rain.		
14	.765	.855	.781	.842	80.4	86.1	88.0	84.4	82.1	2.9	6.1	5.4	1.7	93	.94	o.	ne.	n. e.	dull	cont. ra.	hazy.		
15	.781	.856	.750	.785	78.0	81.5	80.0	82.4	78.3	1.1	3.3	3.6	0.6	99	.99	ne.	se.	E.	do	cum. strat.	rain.		
16	.711	.820	.702	.768	77.5	81.4	82.5	82.6	79.3	0.8	3.1	2.5	0.8	99	.98	e.	ne.	N. E.	st. rn.	much. rn.	hazy.		
17	.716	.800	.706	.778	77.4	81.7	83.7	82.2	77.4	0.0	2.4	2.9	0.6	99	.99	o.	ne.	E.	hardrain.	showery.	scud.		
18	.762	.826	.730	.798	77.2	81.1	86.7	82.5	79.8	1.2	2.7	3.6	1.2	97	.99	E.	e.	ne.	hazy.	do	hazy.		
19	.780	.830	.709	.800	79.1	82.5	86.6	82.8	79.7	1.3	2.3	2.4	1.9	99	.98	n.	e.	S.	cumuli.	do	clear.		
20	.759	.764	.659	.751	79.0	82.6	101.0	85.4	80.2	1.0	3.6	5.3	2.4	96	.94	n.	e.	o.	clear.	fine.	hardshower.		
21	.790	.794	.608	.734	79.1	81.9	104.0	84.8	82.2	1.4	3.2	5.2	2.7	97	.95	o.	w.	o.	cumuli.	clear.	cum. cirrus.		
22	.683	.788	.672	.740	80.0	83.2	101.	84.9	78.2	1.6	3.5	4.9	3.5	98	.96	n.	n.	n.	do	cum. strat.	storm.		
23	.721	.778	.686	.754	79.5	83.1	105.	86.2	78.7	1.0	3.2	5.6	7.3	93	.95	n.	nw.	n.	clear.	do	hd. squall.		
24	.732	.803	.744	.781	79.5	83.1	90.0	87.3	78.2	1.5	3.6	6.0	1.8	97	.95	n.	ne.	o.	cumuli.	showers.	haze.		
25	.738	.808	.714	.787	78.8	81.2	95.7	81.9	77.2	1.7	3.7	5.0	1.1	97	.96	o.	ne.	n.	st. rn.	rn. clear.	cl. rain.		
26	.815	.872	.822	.827	82.4	90.0	82.4	82.4	78.3	1.7	4.0	4.0	2.0	97	.96	ne.	o.	ne.	clear.	fine.	clear.		
27	.808	.860	.880	.910	78.2	82.4	80.0	81.7	76.5	2.1	4.6	4.4	1.1	97	.96	o.	ne.	ne.	do	rain.	do		
28	.797	.854	.878	.905	75.1	79.7	84.0	81.3	76.3	1.2	3.3	3.6	0.7	99	.99	ne.	ne.	n.	do	cloudy.	do		
29	.884	.950	.820	.868	76.6	81.2	91.2	82.9	77.5	1.0	3.8	6.4	1.7	98	.95	n.	s.	S.	do	cumuli.	do		
30	.802	.836	.800	.826	76.2	81.2	86.7	82.7	80.0	0.5	4.4	5.2	2.2	97	.96	ne.	s.	S.	do	hvy. squall.	storm.		
31	.803	.870	.788	.844	78.2	81.0	95.2	82.1	78.7	0.5	4.0	3.0	1.5	97	.98	S.	S.	S.	hazy.	cloudy.	rn. clear.		
Mean.	29.766	.836	.732	.800	78.9	82.9	90.6	83.9	78.6	1.3	4.0	5.0	2.3	96.6	95.5	13.05	calms.			unusually wet.			

The instruments are the same, and placed in the same situations as usual.

# JOURNAL

OF

## THE ASIATIC SOCIETY.

No. 35.—November, 1834.

I.—*Extracts from the MOHT, that is the Ocean, a Turkish work on Navigation in the Indian Seas. Translated by the BARON JOSEPH VON HAMMER, Prof. Orient. Lang. Vienna, Hon. Mem. As. Soc. &c.*

[Presented in Manuscript, and read at the Meeting of the 5th instant.]

SI'DI' AL CHELEBI, captain of the fleet of Sultán Suleimán, the legislator in the Red Sea, is already known in Europe and India, by the notice given of his journey overland from the Indian shores to Constantinople\*, and by the titles of his works recorded in the history of the Ottoman empire†. The two principal ones are, first, the description of his above-mentioned journey, which bears the title, *Mirror of Countries*; the second, his work on navigation in general, and particularly in the Indian seas, which forms the subject of this notice.

My attention to the high interest of this nautical work having been first roused thirty years ago, by the article mentioning it in HÁLÍ' CALFA'S Bibliographic Dictionary, I spared no kind of exertion to find a copy of it, whether in the libraries, or among the book-sellers of Constantinople: but all my researches were baffled for more than twenty years, until at length I lighted upon it in the library of the *Museo Borbonico* at Naples, in the year 1825; and after an investigation of seven years more, I was at last fortunate enough to buy at Constantinople, the manuscript serving for this notice. It is written in the fair *Neski* hand, bearing the stamp of Sultán Suleimán's age, and is stated to have been copied but four years after the composition of the original, which was finished at *Ahmedabad*, the capital of Gujerát, in the last

\* In the Transactions of the Bombay Literary Society; in the *Asiatic Journal*; and the *Journal Asiatique*; and printed separately.

† Tom. iv. p. 416.

‡ *Miret-ul-memálik*.

days of Moharrem of the year 962, (December, 1554,) while the present copy was finished in the town of *Amed* or *Diarbeker*, in the first days of *Rabi ul awal* of the year 966, (December, 1558.) The manuscript consists of 134 leaves or 238 pages, large octavo.

SÍAL ALÍ CAPUDÁN'S (Captain) work, according to the announcement in its preface, has been compiled out of no less than ten Arabic works on the Geography and Navigation of India, three ancient, and seven modern ones.

The ancient ones : 1. The work of LEIS BEN KAHLA'N ; 2, of MAHAMMAD BEN SHADÁN ; 3, of SAHL BEN ABA'N. The modern : 4, the work of JOLYÁR BEN AHMED BEN MA'JED, a native of *Ommás* ; then the five works of SULEIMA'N BEN AHMED, a native of the town of *Sheher*\*, viz. 5, the *Fewáid*† ; 6, the *Hawú*‡ ; 7, the *Tohfetelfohúlí* ; 8, the *Omdet*|| ; 9, the *Minkúj*¶ ; 10, the *Kiládet ul-shomús*\*\*.

The interest of its contents may be fairly estimated from the titles of its chapters and sections.

FIRST CHAPTER.—*Of the names of the skies and the stars, of the elements and what belongs to them* : 1, of the skies, stars, and elements ; 2, of the division of the circles of the skies ; 3, of the astronomical measures called *Essabet*††, (paces,) and of the cardinal points of the compass, (*Ahnán*)‡‡ ; 4, of the instruments serving to measure the distance of the stars ; 5, of the making of these instruments ; 6, of the calculation necessary to take the height of the stars.

SECOND CHAPTER.—*Of the Oss*§§ (the foundation) *of all astronomical calculations* : 1, of the solar and lunar years ; 2, of the foundation of the calculation of solar and lunar years ; 3, of the foundation of the Roman and Coptic solar year ; 4, of the mode of finding the lunar year ; 5, of the mode of finding the Roman year ; 6, of the mode of finding the Coptic year ; 7, of the mode of finding the Persian year.

THIRD CHAPTER.—*Of the divisions and subdivisions of the compass, rhumbs (Erwóm) |||| and points (Tarfút) ¶¶* ; 1, of the rhumbs lying between the cardinal points (*Ahnán*), 2, of the subdivisions of the rhumbs called *Tarfút* : 3, of the true circles of the compass.

FOURTH CHAPTER.—*Of the Indian Islands above and below the wind, and of Ameriou* : 1, of the islands situated above the wind, 2, of the absolute circles ; 3, of the circles situated below the wind ; 4, of the circles of the islands ; 5, of America.

\* بززر in the country of شحر (near Aden). † فوايد useful applications.

‡ حارويه the comprehending.

|| عمدة the column.

\*\* قلادة الشمس the collar of suns.

§ تحفة الفحول present for classic men.

¶ منهاج the true road.

†† اصابع

‡‡ احضان

§§ اس

|||| اروم

¶¶ ترفات

**FIFTH CHAPTER.**—*Of the calculations and the technical terms of navigation* : 1, of measurement in general, 2, of the fundamental measure ; 3, of the measurement of stars which rise and set together ; 4, of the names of the stars from which are taken the names of the rhumbs and points of the compass ; 5, of the circuit of the two highest stars in Ursa Minor (*Farkadain*) round the pole ; 6, of the lunar stations ; 7, requisites of the pilot ; 8, measures of the most celebrated stars.

**SIXTH CHAPTER.**—*Of the measures of the most celebrated continents* : 1, of the difference of polar measures ; 2, of the measurement by the north pole ; 3, of the measurement by the two highest stars in Ursa Minor ( $\beta, \gamma$ ) ; 4, of the measurement by the four stars of Ursa Major ( $\alpha, \beta, \gamma, \delta$ ).

**SEVENTH CHAPTER.**—*Of distances* : 1, of the original distances ; 2, of the different manners of calculation ; 3, of the difference of distance for two ships sailing on two different points of the compass ; 4, of the composition of charts and maps ; 5, of the distances of certain places situated in the direction up to within one *Esba* (astronomical inch) from the pole ; 6, of the distances of some places between them.

**EIGHTH CHAPTER.**—*Of the winds and monsoons* : 1, of the winds ; 2, of the monsoons and their time ; 3, of the monsoon called *headwind* and monsoon of the olives, (*Mausim wairūnī\**) ; 4, of the monsoon called by some *Damanī†* and its time ; 5, of the monsoon called the Eastern *Sabā‡*, *Estā§*, and *Rihī gabū||*.

**NINTH CHAPTER.**—*Notice of certain islands and voyages, and the signs of vicinity of land necessary to be known by pilots* : 1, of the islands of the Arabian continent ; 2, of the islands of the Persian continent ; 3, of the voyages along shore, and the signs of vicinity of land.

**TENTH CHAPTER.**—*Of accidents and dangers to be warded off by reason and experience, and of hurricanes (Tufūn)* : 1, of accidents and dangers to be warded off by reason and experience ; 2, of the hurricanes.

The most interesting of these ten chapters are the *fourth*, on the continents and islands, above and below the wind ; the *eighth*, on the monsoons ; and the *ninth*, on the Indian voyages, wherein the direction and steering of thirty voyages, with all the intermediate points, which are to be touched on, or taken care of, are given in detail. As a specimen of the practical interest of this curious and useful book follows the translation of the eighth chapter, on the *monsoons*, as being one of the shortest, and not least interesting.

#### CHAPTER VIII.—OF THE WINDS AND MONSOONS.

##### Section 1. *Of the Winds.*

The cause of the wind is the motion of the air ; don't you see that agitating a fan you do produce wind ? It is also produced by cold, as may be

ريح قبل || ازيب § صبا † دمانی † موسم زيتوني \*

shown from numerous proofs. If you sail under a cloudy sky, with a strong wind, and a cloud approaches the ship from one side, so that the cold of the cloud is sensible, the first wind ceases, and with its ceasing, the cold ceases also; further, winds blowing from the land set in at night, and those blowing during the day come from the sea, and cease when night approaches; the cause of which is, that at night the earth grows cool, and the sea remains warm, the contrary of which is the case during day-time, because, by the reverberation of the rays of the sun, mountains and deserts are heated during the day. Another proof is, that the coldness of sandy deserts is stronger than that of a mountainous country, and ground watered by rain is colder than ground which is not drenched by rain. Another proof is, that a cloud, particularly when in motion, produces wind, arising from the cold which is hoarded up in the cloud. The principal winds are four, according to the Arabs, the Northern, Southern, Eastern, and Western; those between them are called *sidewinds* (Nokeba); but the pilots call them by names taken from the rising and setting of certain stars, and assign them certain limits, within which they begin or attain their greatest strength, and cease. These winds, limited by space and time, are called *Mausim* (Monsoon); viz. *mausim*.

The following Arabic verses give the names of the four cardinal winds:

*Saba* (the East) blows from the rising of the sun. From the *Polar Star* comes the North wind, called *Shemeul*; and from *Canopus*, the South wind, called *Janub*; opposite to the East blows the West wind, *Dobur*.

*Section 2. Of the different sorts of monsoons, and the time they blow in.*

Be it known, that the ancient masters of navigation have fixed the time of the *monsoon*, that is to say, the time of voyages at sea, according to the year of *Yuzdajird*, and that the pilots of recent time follow their steps; but as there is in every true solar, that is to say *Jaldian*, year, near the fourth of a degree more, every four years, a day is intercalated, so that this day is deficient in the *Yuzdajirdian* year. The late master SULEIMA'N BEN AHMAD wrote his book *Om'at* (the column) in the year of the Hijra 917 (1511), and fixed then the time of the monsoons according to that year, since which, up to that of this translation, 961 (1753), more than forty years have elapsed, so that the time fixed by him for the monsoon, falls now short by ten days. For example, the monsoon which set then in on the 190th day of the *Yuzdajirdian* year, sets in now on the 130th, and that which was fixed then on the 160th, falls now on the 170th. The rest must be calculated in the same way, in order to avoid error and confusion; but even the intercalation of a day every fourth or fifth year is not free of error; it is, therefore, the most expedient to calculate according to the zodiacal year\*, that is to say, the *Jaldian* year, which requires no intercalary days. The monsoon of each country is limited by its fixed time. Remark further, that wherever the word *fi* (about) is added, it is to be understood, that the monsoon sets in about the time stated; for example, if it is said *about* the tenth of the year, means that it does not exactly set in on

\* سنة بروج the year of the constellations.

*Nauráz* (the new-year's day), but within the first ten days of the year; but if *about* is not added, it means exactly the day mentioned; for example, it sets in on the tenth day of the year, means that it sets regularly in on the tenth. At the time when the ancient Arabic pilots wrote their works, the radical Jalálian year was not yet established, neither were the Roman months known in these countries, and they calculated, therefore, according to the *Yazdajirdian* year; but the calculation of the *Jalálian* year is much easier. Be it known, that at the time when the above-said book (the *Column of Sulaimán Ben Ahmad*) was translated, the *Nauráz Sultáni*, that is to say, the *Jalálian* new-year's day, fell on the 135th day of the *Yazdajirdian* year, that is to say, on the 16th of *Mordád*\*.

The monsoons are of two sorts, the western ones, called by the seamen *Rihí Kewer*, the second, the eastern ones called *Rihí Azib*†, and *Sabá*§. The eastern monsoons sub-divide again in two classes; during the first, the Indian seas are shut; nevertheless, they are called *Mausim*|| (season).

*Section 3. The first sub-division of the first sort called Ráeer-rih\**; (*headwind*), or the monsoon of the olives, (*Mausimí zaitáni*.)

The monsoon of *Aden*, *Gujerat*, and *Concona*, from the 130th day of the *Yazdajirdian* year, which is the 360th of the *Jalálian*, that is, five days before the next new-year's day (16th March). The point from which it arises is *Aden*; sometimes it ceases within the 170th of the *Yazdajirdian* year, which is the 35th *Jal.* (24th April). From *Aden* ships set out within the 150th or 160th day of the *Yazdajirdian* year, which answer to the 15th or 25th *Jal.* (4-14th April), they arrive on the 180th of the *Yazdajirdian*, or 45th of the *Jalálian* year (4th May), at *Sheher*; proceed from thence to *Gujurat* and *Concona*, but not onwards to *Manibar*†† (*Malabar*), where there is much rain and danger.

2. The monsoon of *Sheher*, *Gujerat*, *Malubar* and *Concan*. The highest monsoon of *Gujerat* sets in within the 150th of the *Yazdajirdian*, or 16th of the *Jalálian* year (7th April). The highest monsoon of *Concan* sets in within the 140th *Yazdajirdian* or 5th *Jalálian* (25th March). The monsoon of *Malabar* within the 130th *Yazdajirdian* or 360th *Jalálian* (16th March), five days before the beginning of next year‡‡.

3. The monsoon of *Dhofár*, *Gujerat*, and *Malabar*, sets in within the 100th *Yazdajirdian* = 330th *Jalálian* (14th February): when the navigation is open to all India, for *Dhofár* is the place from whence the *Rihí Kewer* (the western monsoon) sets forth, which blows within the 70th day of the *Yazd.* year, equal to the 300th of the *Jalálian* (15th Jan.)

\* The *Yazdajirdian* *Nauráz* falling in the year 1553, on the 28th October, th, *Jalálian*, on the 135th day, answered to the 12th of March, 1554; this is, however, not the true equinox, which in the year 1554 fell on the 11th, on which day the longitude of the sun was = 0.

† *مستقبل* †† *راس الريح* \* *موسم* || *صبا* § *ريح اذيب* ‡ *ريح كوس* †

‡‡ Here the calculation does not answer, as the number of the one or the other must be changed if the difference of 135 should be made out: this is also the case with the two following ones.

4. The monsoon of the shore of *Gujerat* occurs within the 160th day of the Yazdajirdian, equal to 25th of the Jalálian (14th April).

5. The monsoon of the coast of *Meshkassa\**, *Hairjaj†*, *Sheher*, and *Aden* sets, in within (about) the 170th day of the Yazdajirdian year, equal to 35th of the Jalálian (24th April).

The monsoons below the wind, that is of the parts of India situated below the wind, are the following :

6. The monsoon of *Gujerat*, to sail for *Malacca*, *Shomotora*, *Tanassari*, *Bengal*, and all the tracts situated below the wind, sets in about the 130th day of the Yazdajirdian year, equal to 360th of the Jalálian‡, and lasts till the 170th Yazdajirdian, equal to 25th Jalálian (24th April); the highest monsoon sets in about the 150th day of the Yazdajirdian year, answering to the 15th of the Jalálian.

7. The monsoon of *Concona* to sail for *Malacca*, *Shomotora§*, *Tanassari*, *Martaban* and *Fáikú||*, and all the tracts situated below the wind, sets in within the 140th day of the Yazdajirdian year, or on the fifth day before the Jalálian new-year's day (16th March), and lasts till to the 180th day of the Yazdajirdian year, equal to the 45th of the Jalálian year (4th May); the highest monsoon sets in about the 160th or 150th day of the Yazdajirdian year, answering to the 25th or 15th of the Jalálian (4th—14th April).

8. The monsoon of *Malabar*, to sail for *Malacca*, *Shomotora*, *Tanassari*, *Martaban*, and *Bengal*, and all the ports situated below the wind, sets in about the 160th day of the Yazdajirdian year, answering to the 25th of the Jalálian (14th April).

9. The monsoon of *Dibi¶*, for *Malacca*, *Shomotora*, *Tanassari*, *Martaban*, and *Bengal*, and all the ports situated below the wind, sets in within the 160th day of the Yazdajirdian year, equal to 25th of the Jalálian (14th April).

10. The monsoon of *Sheher*, for sailing to *Malacca*, *Shomotora*, *Tanassari*, *Martaban*, and *Bengal*, and all the ports situated below the wind, sets in within the 110th day of the Yazdajirdian year\*\*, which answers to the 340th of the Jalálian; but from *Sheher* to *Fartak*, you meet the western wind *Kaws*, which sets in about the 130th Yazd. or 360th Jalálian, five days before the new-year's day, and six days if there be an intercalary one (16th March).

11. The monsoon of *Fartak* for the above said ports sets in on the same day.

12. The monsoon of *Dhofír* for *Malacca*, *Shomotora*, *Tanassari*, *Martaban*, and *Bengal*, and all the ports situated below the wind, sets in about the 10th day of the Yazdajirdian, equal to 340th Jalálian (24th Feb.)

13. The monsoon of *Muscat*, for *Malacca*, *Shomotora*, to the continent of *Siam*, *Bengal*, and all the ports below the wind, sets in about the 130th day of the Yazdajirdian year, equal to 360th of the Jalálian (16th March).

14. The monsoon of *Zelaa* and *Berberi*, for *Sheher* and *Meshkara††*, the highest (strongest) sets in about the 120th Yazd. equal to 85th Jal. (13 June).

15. The monsoon of *Aden*, for *Sheher* and *Meshkara*, at the same time.

\* Muscat? † البحر ايق ‡ Here is the same error of calculation above observed.

§ Sumatra. || Pegu. ¶ The Maldives. \*\* There is also a want of agreement in this date. †† Larkhara?

16. The monsoon of *Aden*, for *Hormúz*, sets in about the 190th day Yazdajirdian, equal to 55th, or the 200th equal to 65th Jalálian, (15th or 24th May) : later, it is not good.

*Section 4. The second sub-division of the first sort of monsoon, which is the end of Kaws, called by some Tirmah, and by some Damáni.*

17. The monsoon of *Mecca*, or rather of its port *Jedda*, to *Malabar*, *Concona*, *Gujerat*, and *Hormúz*, sets in about the 280th day of the Yazdajirdian year, answering to the 145th of the Jalálian (12th August).

18. The monsoon of *Sevakín\**, to *Malabar*, *Concona*, *Gujerat*, sets in about the 280th day of the Yazdajirdian year, equal to 145th of the Jalálian.

19. The monsoon of *Silá* and *Berberi* to *Malabar*, *Concan*, *Gujerat*, *Hormúz*, sets in about the 290th day of the Yazdajirdian year, equal to 150th of the Jalálian (17th August).

20. The monsoon of *Aden* to *Malabar*, *Concona*, *Gujerat*, sets in about the same time, or five days later ; that is to say, on the 155th or 160th day of the Jalálian year (22nd—27th August).

21. The monsoon of *Sheher* to *Malabar*, *Concona*, *Gujerat*, sets in on the 300th day of the Yazdajirdian year, answering to the 165th of the Jalálian year (2nd September).

22. The monsoon of *Meshkara* for sailing to *Malabar*, *Concona*, *Gujerat*, springs up on the 300th day of the Yazdajirdian year, which answers to the 165th of the Jalálian, according to the rule above-mentioned.

23. The monsoon of *Dhofár* for *Malabar*, *Concona*, *Gujerat*, *Hormúz*, sets in on the 300th day of the Yazdajirdian year, answering to the 165th of the Jalálian (2nd September).

24. The monsoon of *Fartak* and *Aden*, for sailing to *Hormúz*, sets in about the 290th day of the Yazdajirdian year, answering to the 155th of the Jalálian (22nd August).

25. The monsoon of *Kaulahát* and *Muscat* to *Gujerat* and *Concona*, sets in on the 300th day of the Yazdajirdian year, which is the 165th of the Jalálian ; from this time up to the 180th or 190th Yazd. or 45th,—55th, day of the Jal. year (4th—14th May), the navigation is open to all India. The monsoon below the wind, which blow at this time from the Arabian continent and the coasts, and the other countries below the wind, are :

26. The monsoon for sailing from *Aden* to *Malacca*, *Shomotora*, *Tanassari*, *Martaban*, *Bengal*, and all the ports situated below the wind, sets in about the 280th day of the Yazdajirdian, that is, the 145th of the Jalálian year (12th August).

27. The monsoon of *Sheher* and *Meshkara*, to the above said ports, sets in about the 290th day of the Yazdajirdian year, which is the 155th of the Jalálian (22nd August).

28. The monsoon of *Gujerat*, for sailing to *Shomotora*, *Tanassari*, *Bengal*, and all the ports situated below the wind, sets in on the 300th day of the Yazdajirdian, equal to 166th of the Jalálian year (2nd September).

29. The monsoon of *Concona*, to sail from it to the above ports, is setting in on the 305th day of the Yazdajirdian year, which is the 170th of the Jalálian (6th September).

\* Opposite to *Jedda*.

30. The monsoon for sailing from *Malabar to Malacca, Shomora, Tanasari*, and all the ports below the wind, sets in about the 320th day of the Yazdajirdian year, equal to 185th of the Jalálian year (21st Sept.).

31. The monsoon for sailing from *Dibi to Malacca, Shomora, Tanasari, Martaban, Bengal*, sets in about the 320th day of the Yazdajirdian year, answering to the 185th of the Jalálian (21st Sept.)

32. The monsoon of the continent of *Alinat* (? *Barronat*) for sailing from it to *Siam*, is setting in on the 325th day of the Yazdajirdian, that is on the 190th of the Jalálian year (26th Sept.)

33. The monsoon of the coasts for sailing to *Hormúz*, sets in about the 300th day of the Yazdajirdian, that is to say, the 185th of the Jalálian year (21st Sept.?)

34. The monsoon from the coasts and *Maukadash* (in Africa) to *Jaweddih* (the Maldives) sets in about the 320th day of the Yazdajirdian, that is to say, the 185th of the Jalálian year (21st Sept.)

35. The monsoon for sailing from the coasts to the Arabian continent, to *Dhofir, Meshkaun, Hairja, Sheher, Aden*, sets in on the 325th day of the Yazdajirdian year, that is, on the 190th Jal. (26th Sept.)

*Section 5. The second class of monsoons, that is the eastern ones called Asib or Sabá\*.*

36. The monsoon for sailing from *Gujerat* to all the Arabian islands, springs up about the 340th day of the Yazdajirdian year, answering to the 205th Jal. (11th Oct.) and lasts till to the 340th or 350th, that is, till to the 5th or 15th day of the Jalálian year (5th March); but to *Kaulhat, Muscat*, and *Hormúz*, it may be used till the 60th day of the Yazdajirdian year, or the 25th of the Jalálian (14th April); later it is not good.

The finest monsoon for sailing from India to the Arabian continent sets in about the 100th and 110th day of the Yazdajirdian year, which is the 330th or 340th of the Jalálian (13th—23rd February).

37. The monsoon from *Concona* to the Arabian continent sets in about the 350th day of the Yazdajirdian year, and lasts till the 140th of the next; that is to say, from the 205th till to the 5th of the next Jalálian year, (11th Oct.—25th March :) later it is not good; that for *Hormúz* lasts till to the 150th of the Yazdajirdian, that is to say, the 15th of the Jalálian year.

38. The monsoon from *Hormúz* to the Arabian continent sets in about the 340th day of the Yazdajirdian year, lasting to the 100th of the next; that is to say, from the 205th to the 330th of the Jalálian year (11th Oct.—13th Feb.). This is for the coasting voyage; but if the high sea is kept, it serves from about the 100th day of the Yazdajirdian year, to the 30th of the next; that is to say, from the 330th to the 365th Jal. (18th Feb.—2nd March).

39. The monsoon from *Gujerat* to the coasts, blows from about the 340th day of the Yazdajirdian year to the 90th of the next year; that is, from the 205th to the 320th of the Jalálian (11th Oct.—3rd Feb.)

40. The monsoon from *Bengal to Aden and Mecca*, that is to say, to the ports of *Jedda* and *Hormúz*, sets in about the 50th day of the Yazda-

Jirdian year, and lasts till to the 80th; that is, from the 280th to the 310th of the Jalálian year (25th Dec.—25th Jan.);\* but for sailing to the continent of *Alíqat* (? *Barronat*) and the island of Ceylon, it sets in, about the 190th day of the Yazdajirdian, equal to 330th Jalálian (13th Feb.)

41. The monsoon for sailing from *Malacca* to *Jedda*, *Aden*, *Hormás*, blows from about the 50th day of the Yazd. year, to about the 100th; that is to say, from about the 280th day till to the 330th Jal. (25th Dec.—13th Feb.)

42. The monsoon from *Tanassari* and *Martaban*, to *Jedda*, *Aden*, and *Hormás*, blows like that for Bengal and Malacca.

43. The monsoon from *Shomotora* to *Jedda*, *Aden*, *Hormás*, blows from about the 30th day of the Yazdajirdian year, till to the 90th; that is to say, from the 260th to the 320th of the Jalálian year (5th Dec.—3rd Feb.)

44. The monsoon for sailing from *Shomotora* to *Bengal*, blows from about 100th to 150th day of the Yazdajirdian year; that is to say, from the 330th till to the 15th of the next Jalálian year (13th Feb.—4th April),

45. The monsoon of *Tanassari* is the same with that of Bengal.

46. The monsoon of *Jazreddib* to *Aden* and the whole Arabian continent, blows from the 10th to about the 120th day of the Yazd. year; that is, from the 240th till about the 350th day of the Jalálian year (5th Nov.—5th Mar.)

47. The monsoon of *Diúl Sind*, for sailing from thence to the Arabian continent, blows from the 10th of the Yazdajirdian year to about the 120th; that is, from the 240th to about the 350th of the Jalálian (ditto).

48. The monsoon of *Mélandi* to *Jazruí Kamr*, (island of the moon\*,) blows from about the 80th to the 100th of the Yazdajirdian year; that is, from the 310th to the 330th of the Jalálian (24th Jan.—13th Feb.)

49. The monsoon of *Kíuí* for sailing to *Sofalat*, blows from the 18th to the 60th of the Yazdajirdian, that is, from the 240th to the 290th of the Jalálian year (15th Nov.—4th Jan.)

50. The monsoon from *Sofala* to *Kíuí*, blows from about the 160th to the 190th of the Yazdajirdian year; that is to say, from the 25th to the 55th Jal. (14th April—14th May.) The finest lasts till about the 170th Yazd. 35th Jal. (24th April.)

The dates of these monsoons are given according to the dates of the year in which this book was written in, and are ten days later than those given by the master *Sáleimán Ben Ahmad*, the author of the *Omdat* (column). If the calculation is made in the Yazdajirdian years, it is necessary to take into account the intercalary years; but in the calculation of Jalálian years, the same order may be always followed up.

The truth of these statements, and the error of the calculation (as it is impossible to guess anywhere else, but on the spot, which of the two numbers may be the right or false one), are only to be elucidated in India itself, and are referred therefore by the translator to the learned members of the Asiatic Societies of Calcutta, Bombay, and Madras.

[We have added to the above the English dates for the present year, making the Jaláli year begin on the 21st March, with the vernal equinox.—Ed.]

\* Madagascar.

† On the coast of Africa.

II.—*Account of some Inscriptions in the Abyssinian character, found at Hassan Ghoráb, near Aden, on the Arabian coast. By Lieutenant WELLSTED, Indian Navy, attached to the Survey department.*

[In an Extract from Lieutenant WELLSTED'S Journal, communicated by the Right Honorable the Governor in Council at Bombay to the Asiatic Society, and read at the Meeting of the 5th November.]

“ On the morning of the 6th of May, 1834, we anchored in the Honorable Company's Surveying Ship *Palinurus* on the Arabian coast, in a short and narrow channel, formed on the one hand by a low rocky islet, and on the other, by a lofty black-looking bluff, to which our pilot applied the designation of Hassan Ghoráb. Some ruins having been perceived on the summit of the latter, a party shortly after our arrival proceeded to the shore for the purpose of examining them. To avoid the swell which rolled along the opposite side of the island, and produced a considerable surf against the seaward face of the cliff, as it rose up perpendicularly from the sea, we pulled into a small bay on the N. E. side, where the water was much smoother. Landing on a sandy belt, which extended from the margin of the sea to the base of the hill, we found ourselves amidst the ruins of numerous houses, walls, and towers. The houses are small, of a square form; and have mostly four rooms, on a single floor; the walls appear to have been carried along the face of the hill in parallel lines, at different heights;—several towers also occur at scattered distances. The hill on this side, for one-third of its height, ascends with a moderate acclivity, and along the slope, the ruins are thickly scattered; there are, however, no remains of public buildings or edifices, nor are there any traces of arches or columns. The whole have been constructed from fragments detached from the rock, and from the several patches which remain, it is very certain that the greater number must have been covered over with cement; both this and the mortar, from the action of the weather, have almost entirely disappeared. The cement appears from the traces yet left on the beach, to have been obtained, as it is at present in many parts of the Arabian coast, by the calcination of coral. A further examination during an extension of our walk round the side of the hill, enabled us to discover that Hassan Ghoráb was about 500 feet in height, that it was composed of a dark greyish-coloured compact limestone, and that it had been formerly insulated, though it was now connected to the main by a low sandy isthmus, which had been blown up there by the violence of the S. W. winds, and was evidently of recent formation. The action of the sea might indeed be traced in the cavities and hollows exhibited by a ridge of rocks now at some distance from the water, but which it was evident at no very distant

period must have been covered by it. During this time we had been looking in vain for some path by which we might ascend to the summit, but it appeared inaccessible on every side, and we had almost given up our search, when one of the party suggested, that two towers, which were standing by themselves, might possibly have commanded the approach and entrance to one; scrambling accordingly over the ruins formed by the falling of the upper part of these, we at length discovered some faint traces of a track, which in order to facilitate the ascent had been cut along the face of the hill in a zig-zag direction. But beyond and above that the steep front of the cliff had been cut down so as to form a sort of terrace, and even here the path at the widest part would not admit more than two abreast; there being a steep precipice above and below us, we did not find it a very pleasant road; on a rock to the right, about one-third the ascent from the top, we discovered the inscriptions, which I have subjoined. The characters were two and a half inches in length, and it will be seen, are executed with much care, order, and regularity. In order to avoid the possibility of omission or error, three separate copies were taken by different individuals, which have all been subsequently examined and compared. Continuing our route from hence to the top of the hill, houses nearly as numerous as below, walls, and other defensive edifices, were perceived at various distances, scattered over its surface, and on the verge of the precipice a square tower of massive masonry had been erected; it has probably served both as a watch-tower and light-house. Some of the stones are of very large dimensions, the windows and doors are plain, and no arches are to be seen; about one hundred yards from the tower the tanks are situated, they have been excavated with much labor out of the solid rock and are cemented inside.

Having now surveyed every part of the hill, we could not but come to the conclusion that it had been formed both by nature and art as a place of extraordinary strength: while the former had left it inaccessible at but one point, the latter had so completely fortified it at that quarter, that it would be impossible for courage or address, however consummate, to scale it. But what, independent of this advantage, must have given it to foreigners its principal value, would have been its insular position, which, when we consider the lawless and barbarous character that the inhabitants of this coast have borne from the earliest period, must to them, both as a retreat essential to their public safety, and also as a magazine, have rendered it invaluable.

The circumstances of its possessing two harbours affording anchorage in either monsoon, on a coast remarkably destitute of any (as yet discovered) so well sheltered, would appear to indicate a commercial

character to the town. But it is to the future that we must look for the elucidation of this point, as well as to the other matters connected with it.

The origin and purport of the inscriptions which have been found by various travellers inscribed on the faces of several mountains and hills in Arabia, have engaged the attention and excited the inquiries of the learned during the greater part of the last, and the early part of the present, century, and many copies have been transmitted to Europe for their investigation. Many of these I have in my possession, or have referred to; but this differs in the nature of its characters from them all.

I forbear, therefore, until this shall be deciphered, from making any other suggestions or remarks, than those which I have submitted relating to the local features of the spot on which they were found. I cannot however neglect to draw attention to the curious and striking coincidence between the distance of the port of Hassan Ghorab, as deduced from our survey, and that specified by Arrian, as the distance of the port of cave Canum or Kane, from the port called Arabia Felix, which modern geographers with much confidence place at the present harbour of Aden.

The natives possessed no information respecting the ruins, excepting that they had always heard their erection ascribed to the "foreigners."

The dimensions of the Tanks alluded to as cut out of the rock, were as follows:

	Length.	Breadth.	Depth.
No. 1, Square,	32 ft. 8 in.	29 ft. 5 in.	14 ft. 0 in.
No. 2, Long-oval,	42 do. 7 do.	17 do. 2 do.	12 do. 11 do.
No. 3, Semi-elliptical,	70 do. 5 do.	12 do. 0 do.	variable.
No. 4, Oblong,	30 do. 6 do.	9 do. 6 do.	9 do. 1 do.

[We have omitted in the plate the specimens of ancient and modern Ethiopic from the inscriptions at Axum, because they may be found in BRUCE, Lord VALENTIA, or in any catalogue of ancient alphabets. Lieut. WELLSTED remarks that the inscription found at Hassan Ghorab, on close examination, resembles both ancient and modern Ethiopic. The Ethiopians ruled Yemen, a part of Arabia, previous to the appearance of Muhammed.—ED.]

### III.—Further Information on the Topes of Mánikyála, being the translation of an Extract from a Manuscript Memoir on Ancient Taxila, by Mons. A. COURT, Engineer Officer in the Army of Mahárája RANJIT SINGH.

[We have to thank Captain WADE for procuring us the favor of the following extract for insertion in the Journal. It continues our history of the opening of these monuments from the period to which it was brought up by Dr. GERARD'S notice of Dr. MARTIN'S operations, at page 332. We regret that M. COURT had

not seen what had already appeared on the subject, as it would necessarily have altered his views of the antiquity of the monument, if not of its origin. We hope to obtain a copy of the inscriptions, which will probably be in the same dialect of the Pehlevi as occurs on the cylinders.—ED.]

*Manikyála* is the name of a small village situated on the route leading from Attok to Láhor. It is built on the ruins of a very ancient town of unknown origin. The geographical position of these ruins, and particularly the abundance of coins found among them, afford the presumption that this city must have been the capital of all the country between the Indus and the Hydaspes, a country which the ancients knew by the name of *Taxila*, and of which frequent mention is made in the history of ALEXANDER.

There is at *Manikyála* a vast and massive cupola of great antiquity. It is visible at a considerable distance, having a height of about 80 feet, with 310 or 320 of circumference. It is solidly built of quarried stones with lime cement. The outer layer is of sandstone. In the interior, the masonry is of freestone ( *pierre de taille* ), mixed with sandstone ( *grès* ) and granite; but principally, with a shelly limestone ( *pierre de concretion* ), which by its porosity resembles stalactite. Age and exposure have so worn away the northern face of the edifice, that it is now easy to ascend to the summit, which could not have been done formerly, because there were no regular steps constructed on the exterior. Its architecture is simple, and offers nothing worthy of much remark. Round the circumference, near the base, is seen, in bas-relief, a range of small columns, the capitals of which appear to have been ornamented with ram's heads ( *têtes de beliers* ). These ornaments are now scarcely perceptible on account of the wearing away of the sandstone by time. I have remarked similar ornaments at a tank situated between *Bimber* and *Serai-saidábád*, on the road to Cashmír, and I remember observing the same kind of thing on the columns of the towns at Persepolis.

This monument is in my opinion nothing more than a tomb of some ancient king of the country, or it may be the work of some conqueror from Persia or Bactria, who may have raised it in memory of some battle fought on the spot, intended to cover the remains of the warriors who fell in the combat. This last conjecture appears the more probable, seeing that similar cupolas are equally remarked in the district of *Rável Pindi*, in the country of the *Hazáris*, which joins the former, at *Pesháwar*, in the *Khaiber hills*, at *Jelálábád*, at *Loqmán*, at *Kábul*, and even, they say, at *Bámbian*:—all of them places situated on the road leading from Persia, or Bactriana, into Hindustán. I have moreover remarked, that the greater part of these cupolas are situated in

passes difficult to get through, or at least in places well adapted for a hostile encounter. One thing is certain at any rate, namely, that they are all sepulchral tumuli; for having myself opened several of these cupolas, I have found in most of them, little urns of bronze, or other metal, or of baked clay, containing funeral ashes, or the debris of human bones; also jewels, and coins for the most part of Græco-Scythic, or Græco-Indian types.

The Muhammedans of the neighbourhood pretend to say, that the tope contained the remains of all the Musulmans who perished in the battle which took place in this place between the Afgháns and the army of Rájá MÁN; but besides, that the religion of Muhammed opposes the erection of monuments to the dead, (?) the antiquity of the building and of the medals it contained prove to be far prior to the time of the Muhammedan incursions.

The Hindus of the country resort to the spot to offer up the first cuttings of the hair of their male children—a custom which is said to have prevailed anciently in Greece.

Scattered over the site of the ruins of Mánikyála are seen the remains of fifteen other cupolas, smaller than the principal one just described. These I have lately been engaged in digging up, and they have furnished some very interesting discoveries. The excavation of a tope situated about a cannon shot distant from the present village of Mánikyála to the N. N. E. is particularly calculated to throw light upon these curious monuments of antiquity, since a part of the medals extracted from it bear genuine Latin characters, while others are of the Græco-Scythic or Græco-Indian type. Moreover, the stone which served as a covering to the niche which contained them, is sculptured all over with inscriptions in an unknown character, and altogether different from that of the coins?

This cupola is laid down as No. 2, in my map of the place. It was in a thorough state of dilapidation, so as hardly to be observed; and it was only after having carefully examined the contour of the foundation that I decided upon penetrating it. Its height might be 60 or 70 feet. I began by piercing it from above in the centre with a hole of 20 feet diameter. The materials extracted were chiefly a coarse concrete, extremely porous. The nature of the stone reminded me forcibly of the pyramids of Egypt, which are constructed of a limestone full of shell impressions, (nummulitic limestone.)

In my first operations, I found, at the depth of three feet, a squared stone, on which were deposited four copper coins. Below this point, the work became extremely difficult, from the enormous size of the blocks of stone, which could hardly be removed through the upper

opening. At ten feet lower down, or at ten from the level of the ground, we met with a cell in the form of a rectangular parallelogram, built in a solid manner, with well dressed stones, firmly united with mortar. The four sides of the cell corresponded with the four cardinal points, and it was covered with a single massive stone. Having turned this over, I perceived that it was covered with inscriptions.

In the centre of the hollow cell stood a copper urn, encircling which were placed symmetrically eight medals of the same metal, which were completely corroded with verdigris. The urn itself was carefully enveloped in a wrapper of white linen, tightly adhering to its surface, and which fell into shreds when I opened the urn\*. The copper urn enclosed a smaller one of silver: the space between them being filled with a paste of the colour of raw umber (*terre d'ombre*), in which the verdigris had begun to form. This pasty matter was light, without smell, and still wet. On breaking it, I discovered a thread of cotton gathered up into a knot (*ramassé en au seul point*), and which was reduced to dust on handling it. When I attempted to remove the silver urn from within the outer cylinder, its bottom remained attached to the brown sediment, and I remarked that the silver was become quite brittle from age, crumbling into bits between the fingers. Within the silver urn was found one much smaller of gold, immersed in the same brown paste, in which were also contained *seven silver medals*, with *Latin characters*. The gold vessel enclosed four small coins of gold of the Græco-Scythic or Græco-Indian type;—also two precious stones and four pearls in a decayed state; the holes perforated in them prove them to have been the pendants of earrings.

From the position in which these several urns were found, an allusion was possibly intended to the ages of the world. The four gold coins were of far inferior fabrication to those of silver. The latter are worn as if they had been a long time in circulation. Whether they are Greek or Roman, I cannot venture to affirm. I would only remark, that if the Greeks before the reign of PHILIP used the Latin alphabet, it might be probable that there were Greek coins, and that they were brought into the country by the army of ALEXANDER. If, on the contrary, they are Roman, they may be of the epochs when the kings of India sent embassies to the Roman emperors *Augustus* or *Justinian*. Or, it is possible that they are brought into the country through the ordinary channel of commerce by the Red Sea†.

\* The exterior of the copper cylinder of M. VENTURA'S *tope* has the marks of a cloth wrapper well defined on the corroded surface.—ED.

† While correcting the press of this passage we are put in possession of Mr. COURT'S drawings of the coins, which we will make the subject of a postscript.—ED.

The inscription on the stone is in a character that resembles the writing of the Rájputs of the Hímálaya mountains in the present day. It has also a resemblance to the Ethiopian; and it is well known, that there existed from time immemorial a communication between Egypt and India. I am surprised that my friend General VENTURA did not find an inscription on the stone in the principal deposit of the large tope. On my way to *Peshdwar*, I lately visited the scene of his operations, and searched carefully among the ruins for any such, but without success. This cupola was penetrated by him from above. When the cap was removed, a square shaft was found of 21 feet deep and 12 feet side, well constructed of squared stones. On the floor of this chamber there were two massive stones, between which was deposited a small box (see page 315). The floor itself was formed of two enormous stones, which were broken to pieces with some trouble before the digging could be continued below. The difficulties were much increased from this point by the frequent occurrence of large blocks of stone locked into the body of the masonry without mortar, which it was necessary to extract by the upper vent. At 27 feet below the first stage, a second was met with, of a less perfect nature, wherein a second discovery was made:—below this, again, before reaching the ground, the most interesting discovery occurred. Hence the miners worked a conduit underground, on the side towards the village of *Mánikyála*, which facilitated greatly the extraction of materials. This adit is now nearly closed up with rubbish, and can only be entered on all fours.

As the relics found in this cupola have been addressed by my friend to the Asiatic Society of Calcutta, I refrain from any observations on them. I will only remark, that the emblem on the gold medals of *Mánikyála*, as well as on those of my topes, may be observed in *Beraia* with some slight difference, on the sculptures at *Bistaun*, near *Kermansháh*; I think also, the same symbol exists at *Persepolis*. I can with confidence assert that the monogram  exists on the bas-relief of the gate of the ancient castle of *Shastar* in *Susiana*.

I have observed that most of the cupolas of *Mánikyála* are situated on the ridges of sandstone rock which cross up from the surface of the country.

The neighbourhood is generally strewed with ruins, and traces of a square building can generally be perceived, in the immediate vicinity, of similar construction to that of a Persian caravanserai. If these monuments are the remains of temples, there can be no doubt, that *Mánikyála* must have been the principal seat of the religion of the country. The ruins of the town itself are of very considerable extent:—every where, on digging, massive walls of solid stone

and lime are met with—and a great number of wells; but almost all now filled up: these latter are all built of cut stone. All the neighbouring heights are garnished with tombs; and it is known that the ancient Persians, the Scythians, and even the Hindus selected eminences to erect their tombs on, especially those of their chiefs. They are all adjusted to face the cardinal points of the compass.

The whole country overlooked by Mánikyála must have been once a vast plateau, which in the course of ages, and by the continued action of the annual rains, has undergone a complete change. It is now cut every where into deep ravines, which render it very difficult to traverse. The country is sprinkled with wretched hovels; but the natural aspect of the plains is singularly bare and barren. The immediate vicinity of the hills is, however, varied with the meagre foliage of a thorny shrub.

This district (canton) is now called *Patwár*. That it was formerly very populous, is proved by the quantity of ruins of old houses. According to the inhabitants, the whole space that now separates Mánikyála from the ruins of Tammiak, which is about 16 kros of the country distant, was so thickly covered with houses, that the two towns might be considered as one. They add, that mulberries and other fruit trees flourished there exceedingly. The devastation now witnessed can only be laid to the account of its being the thoroughfare of all the conquerors who in turns sallied forth to ravage India.

It appears that the aborigines of the country were Hindus, to whom were joined the *Pandavas*, worshippers of the sun, and the *Chandrabansís*, worshippers of the moon. Subsequently, a mixture took place with the Persians, the Scythians, and even with the Greeks, for the *Ghekhers*, so frequently talked of in the country, are nothing more than the descendants of the Greek colony that ALEXANDER left on the banks of the Indus, or perhaps the Greeks of the kingdom of Bactria, of which this district for a long time formed a part. What I here advance is upon good foundation, for the people themselves insist, that the *Ghekhers* are descended from the *Khéianis*, ancient Persians, or from the *Rúmís*; and it is well known that all Oriental nations apply this last term to Greece: hence we may conclude that *Ghekker* is but a corruption of the word *Greek*. Moreover, the numerous medals discovered with Greek legends tend strongly to confirm this idea.

The country appears to have been conquered by the Persians long before the time of ALEXANDER. This is proved by the Persian medals found; further, an ancient tradition of Persia alludes to an invasion that our chronologists refer to the fourteenth century before Christ. It is also known, that under DARIUS, the son of HYSTASPES, this country and all up to the banks of the Indus, formed one of the twenty satrapies of the vast Persian empire.

ALEXANDER traversed it in 326 B.C. At the death of this conqueror, it was annexed to Bactriana, raised into a separate kingdom, by the Greeks, who revolted from his successors. It then fell into the hands of the Scythians, who destroyed this latter kingdom.

Splendid collections of coins might be made in this country. They are found principally at *Mánikyála*, *Djún*, *Pind-dádan Khán*; at *Nillí Daulla*, *Ráwal Pindí*, and in the districts of the *Hazáris* and *Hazárow*. They were formerly worked up into *lotas* and cooking vessels, and ornaments. It was only in 1829, the period when my researches commenced, that the inhabitants began to appreciate their value. The copper coins are most numerous; the fear of being supposed to have dug up a treasure leads the inhabitants to melt up those of silver and gold, which makes their preservation comparatively rare.

The immense store of coins constantly dug up proves that this country was formerly in a flourishing state; and that in consequence of the frequent invasions of India, its riches were constantly hidden by burial, and so preserved. By far the greater portion of the coins are Græco-Scythian, or Græco-Indian; others again are altogether Indian; the latter are the most ancient: they are in a Devanágari character now unknown to the natives\*. There are found also Græco-Persian coins, and sometimes pure Persian ones. These last represent the fire altar, with two guards to preserve it. I find that their costume has a striking resemblance to that of the present inhabitants of *Paswár*, who allow their hair to fall behind the head in large tufts of curls, and wear frequently the ample plaited pantaloons represented on the two warriors of the coins.

*Mánikyála* is at 40 *kurors* E.S.E. of the fortress of *Attok*, and at 34 N. W. of the city of *Jilim*.

The ruins of the town of *Ranma*, attributed to *Sita-Rám*, are at 13 *kurors* S. S. W. of *Mánikyála*. Those of *Parvala*, ascribed to the era of the *Pandavas*, are at 12 *kurors* to the north. The traces of the town of *Dungéli* are at 14 *kurors* on the east. This last place flourished under the *Ghekkers*, whose sovereigns fixed their residence there. *Makkhyala*, near *Rotds*: *Benda* and *Tamial* near *Ravel-Pindí* are also places formerly occupied by the *Ghekkers*.

#### IV.—Note on the Coins discovered by M. COURT. By JAS. PRINSEP, &c.

Since the above paper went to press, I have received through M. MEYREY, the drawings made by M. COURT, of the several coins; and

\* I know not to which species of coin the above passage alludes: hitherto the number discovered in those parts with the Delhi character on them has been very small. The *Samagri deva* and the *Canouj* coins are numerous, but they are evidently much more recent than the Bactrian and Indo-Scythic.—J. P.

of the inscription alluded to in his remarks. The original drawings being destined for Paris, I have, with permission, had fac similes lithographed of the whole, as they are of the highest importance towards the elucidation of the history of the ancient monuments at Mäulkyäla.

Plate XXXIV. figs. 1, 2, 3, and 4, are the four coins found on the top of the large stone which served as a cover to the niche, containing the principal deposit. These coins are already well known to us, the first being the common copper coin of Kadphises (in this instance written KAAICYC): the other three being of KANHPKI. The reverses on the latter coins are however different from those described in my paper on the subject (page 449): the running or dancing figure of fig. 2, has occurred but rarely, among the coins heretofore collected, in comparison with the more common device of *Mithra* or *Nanaia*; and where it does, the name is less distinct. The reverse of figs. 3 and 4, is evidently the same personage as is represented on Gen. VENTURA's gold coin, standing in lieu of being seated; and my conjecture, that this figure had four arms, is now substantially confirmed.

The name is distinctly composed of the four letters OKPO, which I imagine may be the corresponding word in Zend for the Sanskrit *Arka*, a common appellation of *SURYA*, or the sun. The Hindu image of this deity is in fact represented with four arms, and is often accompanied with a moon rising behind the shoulders, just as was depicted on the Ventura gold coin\*. We can have little doubt, therefore, that in this device we behold the substitution of the Hindu form of the solar divinity for the Persian effigy of *Mithra*.

Plate XXXIII. Fig. 5, is stated by M. COURT to be a precise copy of the inscription found on the lower surface of the large slab of stone. This is doubtless the most valuable and important of his discoveries; for it will inform us of the precise nature and object of the monument in question. Although my progress in decyphering the character in which it is written, of which I hope shortly to render an account, does not yet enable me to transcribe the whole, still I see very distinctly in the second line the word *Malikdo*, king, in the very same characters that occur on the reverse of so many of the Bactrian coins. This so far throws light upon the subject, that it connects the monument with royalty, and prepares us to lean more favourably to the hypothesis advanced by all those who have been engaged in opening the topeæ, and supported by all the traditions of the country, that they are the sepulchral monuments of kings. I shall have to recur to this question presently in speaking of the liquid contents of the metal cylinders.

\* See Plate LXXXIX. of Moore's Pantheon.

The same plate XXXIII. represents (reduced one-third) the position of the three cylinders, or urns, of gold, silver, and copper, as they stood in the niche of the under stone, surrounded by eight coins of copper, arranged in the directions of the cardinal points. The coins are mostly corroded, but they can all be recognized as belonging to ΚΑΔΡΗΣΗΣ and ΚΑΝΕΡΚΟΣ. Fig. 12, the one differing from the ordinary coins of this group, and bearing on the obverse the head of a king, with Greek legend, and on the reverse a standing figure of Hercules with his club, surrounded by a Pehlevi inscription, I know from other samples in my possession to belong to a monarch sometimes designated ΕΟΞ, while on others of his coins he is distinctly entitled ΚΑΔΦΙC. I have no hesitation therefore in ascribing this variety also to a monarch of the same family.

The contents of the several cylinders of M. COURT's tope were beyond all comparison the richest and most curious hitherto met with. The large tope gave M. VENTURA only two gold coins; that opened by M. MARTIN HONIGBERGER, presented only one gold medal of ΚΑΔΡΗΣΗΣ. Here, on the contrary, we have no less than four native gold coins, in excellent preservation, in the gold urn; and seven silver coins in the silver envelope: with this further peculiarity in the latter, that they are all of foreign origin.

The four gold coins are of a device familiar to us; they bear the legible inscription, in corrupt Greek, ΠΑΟ ΝΑΝΟ ΠΑΟ ΚΑΝΗΡΚΙ ΚΟΠΑΝΟ which I have described in my former notice. The figures on the reverse of the three first are of the Hindu cast, having four arms, with the epigraphie ΟΚΡΟ (the sun); they agree with that of the copper coins described in the preceding page. The last, figure 18, bears the title ΑΘΡΟ, a supposed ethithet of the sun; for an explanation of which see page 453\*.

The silver coins are entitled to a minute and individual examination; for, from the first glance, they are seen to belong to the medallic history of Rome, of which the most ample and elaborate catalogues and designs are at hand to facilitate their exact determination.

Fig. 19—is a silver *denarius* of MARK ANTONY, struck while he was a member of the celebrated triumvirate, charged with the eastern

\* In a pamphlet just received from Paris, entitled "*Observations sur la partie de la Grammaire Comparative de M. F. Bopp, qui se rapporte à la langue Zende, par M. Eugène Burnouf*," page 7, I find the very two words alluded to in p. 453, fortuitously occurring to rectify my conjectures as to their import—*âthra* is translated *au feu*, and is evidently an inflected case of our word *âthra*, which is thus proved to signify simply 'feu,' fire, (*âthra, le feu, âthra, P.*):—while a little further, we find the words "si l'on trouve une fois dans le Vendidad-Sade, *matâthra* pour *mitra*, c'est une faute du manuscrit, que l'accord des autres copies suffit pour faire apercevoir."—May not the same remark apply to the ignorance of the die engravers in writing MAΘΡΟ for MIΘΡΟ?

portion of the empire. It agrees with the description of a coin in VAILLANT, vol. ii. p. 9.

*Obverse.* M. ANTONIVS. III. VIR. R. P. C. (*Triumvir Reipublicæ Constituendæ*). *Device*, a radiated head of the sun, supposed to be the same as the Egyptian Osiris.

*Reverse.* The head of ANTONY, behind which the *lituus*, or crook, denoting him to hold the priestly office of Augur.

*Fig. 20.*—A silver *denarius*, recognized to belong to JULIUS CÆSAR, from the features, the inscription, and the peculiar device on the reverse. It corresponds with one described by VAILLANT, ii. 1.

*Obverse.* The head of CÆSAR, behind which a star. Medals of this kind were struck by AGRIPPA, ANTONY and others, in honor of CÆSAR, after his death; the star alludes to his divine apotheosis: the letters CÆSAR... remain distinct.

*Reverse.* The group entitled in Latin, *Orbis, Securis, Manus junctæ, Caduceus, et Fasces*, supposed to designate the extended empire, the religion, concord, peace, and justice of the emperor.

*Fig. 21.*—This I imagine to be a coin of AUGUSTUS CÆSAR, although it does not precisely agree with any published medal of that Emperor.

*Obverse...* VFVS. III. VIR. Two juvenile heads, probably of CAIUS and LUCIUS. The circumscribing legend may be either of MESCINIUS RUFUS, a magistrate, (VAILL. ii. p. 23,) or of PLOTIUS RUFUS, mint master, (VAILL. ii. 4.) the only two recorded names permitting a termination in VFVS. and at the same time being Triumvirs.

*Reverse.* A female figure holding probably a spear in the left hand. The few letters legible seem to form part of the usual inscription on the coins of AUGUSTUS, CAESAR DIVI F. (*Augustus Caesar divi Julii filius*).

*Fig. 22.*—The helmeted figure on this coin, and the unintelligible inscription on the reverse, lead me to ascribe it to the age of the Emperor CONSTANTINE, although I can find none in BANDURIUS nor VAILLANT, with which it exactly agrees.

*Obverse.* A head facing the left, with a handsome helmet.

*Reverse.* Two combatants, one clad as a Roman, the other as a German? a fallen warrior between the two. Beneath, the letters QIERMM.

The remaining three silver coins are in too imperfect a state to be identified: the first, fig. 23, bears the final letters of the word CAESARIS. The last, figure 25, has a female head with a mural crown, which may belong to a Greek city.

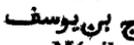
How or why these coins came to be selected for burial with the local coins of the Indo-scythic monarch, it is impossible now to conjecture; and it is certainly a most curious fact, that while in the neighbouring monument, the foreign coins consisted solely of those of the Sassanid dynasty of Persia, these should be entirely wanting here, and should be replaced by coins of Rome, many of which must have been regarded as antiques at the time, if I have been right in attributing the fourth of the list to CONSTANTINE. Such an assumption indeed removes all difficulties regarding the date, and brings about a near

accordance with the reign of SHAPUR II. of Persia, in the middle of the fourth century, the date already assigned to the principal tope from the presence of that sovereign's coins. We may therefore now look upon the epoch of the Hindu or Indo-scythian Rao KANERKI, as established from these two concurring evidences, and it may serve as a fixed point whence to trace backwards the line of strange names of other equally unknown and obscure monarchs, whose names are now daily coming to light through the medium of these coins, until they fall in with the well-known kings of the Bactrian provinces.

I once more stop the press for the purpose of noticing a very important paragraph in the second volume of *Marsden's Numismata Orientalia*, this moment received from England, materially affecting the antiquity of the *Mánikyála* monument.

It will be remembered, that the Sassanian coins deposited there were all of that species distinguished by an ornament of two wings upon the head-dress, and that I assigned them on the authority of KER PORTER, and for other reasons which appeared conclusive, to SHAPUR II. A. D. 310-380. There was also on some of them a curious cypher, (vide Plate XXI.) of  which seemed to defy scrutiny.

It seems that Mr. MARSDEN, on the authority of Sir WILLIAM OUSELEY, backed by the BARON DE SACY, attributes all this class of coins to *Khosrá-parviz*, A. D. 589, the Zend word *Hoslui* (for *Khosrú*) being stated to exist on many of them. They have also a cypher somewhat resembling the above.

A multitude of these coins have also been discovered bearing Arabic names, *Omar*, *Sald*, *Harír*, &c. in addition to their usual inscription, and the fact had been explained by Mr. FRÆHN of the Petersburg Academy\*, by extracts from history, proving that the early Muhammedan conquerors of Persia retained the national coinage until 75-76, A. H., when the Khalifs AB-DUL MALEK, and HAJJAJ substituted their Cufic coin. MAKRIZI, in particular, makes the following decisive assertion: "OMAR caused dirhems to be struck with the same impressions as were in use under the KHOSROES, and of the same form, with the addition only of certain Arabic sentences, upon some, and upon others the name of the Khalif." The curious cypher above alluded to, is accordingly set down by the BARON DE SACY as *Arabic*, and he reads it, . The form in the original is a little different from our *Mánikyála* type, the termination of the first cypher having an opposite curvature . In this form it might possibly be read *Hajáj*, although, as Mr. MARSDEN remarks, it is difficult to discover *bin Yúsuf* in the context:—but if the flourish upon the *Mánikyála* coin

\* This circumstance was pointed out to me by Captain JENKINS, as noticed on the cover of the last Journal.

is supposed to be identical with this, the interpretation is at once overturned; for it is no longer possible to construe even the first cypher into *Hajdj*, in accordance with the BARON DE SACY'S reading.

Be this as it may, the undoubted Arabic names and sentences upon so many of the winged-cap Sassanian coins, tend strongly to unsettle the date I had assumed, on the authority of these coins alone, for the Mánikyála tope, and to bring their construction down into the seventh century. But here again an additional difficulty arises with regard to the Roman coins just discovered by M. COURT. Is it likely that in a distant and semi-barbarous country coins of seven hundred years' old, should have been preserved and selected for burial in a shrine or tomb then erected?

The more we endeavour to examine the subject, the more difficulties and perplexities seem to arise around us; but it is only by bringing every circumstance forward that we can hope to arrive at last at any satisfactory conclusion. The two coins published in Plate XXI. will doubtless be considered of great interest by the illustrators of the Sassanian dynasty in Europe—they may destroy a favorite theory of them, as their evidence of the Arabic names tends to shake our notions here; but we shall both be the gainers in the end, and eventually the service of an obscure history will be materially promoted by the collision of discoveries.

V.—*Note on the Brown Liquid, contained in the Cylinders from Mánikyála. By the same.*

The important discovery made known by M. COURT, in the memoir just read, of another metallic vessel or urn filled with brown liquid evidently analogous to that found by General VENTURA, in the great tope of Mánikyála, reminds me that I have not communicated to the Society, the results of my examination of this curious liquid. I will now proceed to supply this omission, referring to page 314 of the present volume, and to Plate XXII., for the particulars of its preservation, and of the vessels containing it. It now appears certain that the liquid was originally deposited in these receptacles, for had it permeated from the superincumbent structure, it would have filled the stone recess as well as the urn, whereas M. COURT particularly describes the former as empty and dry.

When the Mánikyála relics reached Calcutta, the liquid in the outer copper vessel was nearly dried up, and the sediment had the form of a dark-brown pulverulent crust, adhering to the inner surface of the vessels. It was washed out with distilled water, and preserved in glass stoppered bottles, in which, after several months, the greater part fell to the bottom, but the liquid remained still of a deep brown, and passed the filter of the same colour.

The liquor of the inner, or brass cylinder, having the consistence of wet mud, was bottled off separately.

1. In the innermost or gold cylinder, which rested in an oblique position in the brass case, a deposit of the brown matter had in the course of ages consolidated in the lowermost corner, differing from that formed by the rapid drying, in being very hard and of a shining vitreous or resinous lustre on fracture. It enclosed fragments of the glass (or *ambre brisé*, of M. VENTURA) (fig 22, a, b, c, d,) and when detached from the larger pieces of them, possessed the following properties :

Specific gravity, 1.92.

100 parts heated in a test tube gave off moisture, and a minute portion of empyreumatic oil, .....	20.0
The residue, heated red, lost of carbonaceous matter,.....	4.0
It then fused under the blow-pipe into a parti-colored slag, which pounded and divested in nitric acid, yielded of phosphate of lime (?) tainted slightly by oxide of copper,.....	12.0
The silicious or glassy residue, unexamined, weighed, ..	64.6
	100.0

2. The brown paste itself was next submitted to examination.

It was not soluble either in alcohol or ether ; and after once being precipitated by acids, evaporation to dryness, &c. it was no longer soluble in water.

Nitric acid boiled upon it took a light-yellow colour, causing a slight effervescence and a brown scum to rise to the surface of the liquid ; the greater part remained untouched and unchanged in colour. Sulphuric acid had no greater effect. The acid solution shewed the presence of copper in abundance.

When the brown liquid was gradually heated in a tube, to drive off its water, a slip of litmus and one of turmeric paper being introduced into the neck of the tube, there was not the slightest indication either of free acid or of alkali.

Acetite of lead threw down a heavy precipitate of a brownish-white colour, leaving the liquid clear.

The brown precipitate obtained by evaporation, when heated on platina foil, took fire for a moment, and then burnt like a coal, leaving an earthy residue, coloured by oxide of copper. When the decomposition was conducted in a test tube, reddened litmus paper being introduced, empyreumatic oil was given off with strong fumes of ammonia.

It being evident that the brown substance was chiefly composed of vegetable, with perhaps a little animal matter, carbonized and blackened by age, and mixed with earths and metallic oxides, a hasty approximate analysis was attempted in the following manner, to ascertain whether any trace of animal matter or bone was discoverable.

10 grains of the dried substance were introduced into a glass tube, to which a shape was then given by the blow-pipe, like the letter N ; nitric acid was introduced in the second bend, to arrest the ammonia, which might be driven over on the destructive distillation of the substance operated on. After gradually heating the closed end of the tube red hot, that portion was broken off, the charcoal weighed, incinerated, and the ash digested in nitric acid. From the resulting solution, ammonia threw down a copious white precipitate, redissolving the oxide of copper, which was thus carried through the filter. The precipitate heated, and weighed, was redissolved, and reproduced by ammonia ; while sulphuric acid

threw it down in a heavier form as sulphate of lime. It was therefore set down as phosphate of lime.

Without entering into details, the results of the analysis were as follows :

Empyreumatic oil, passed off through acid, . . . . .	22.0
Ammonia and water, . . . . .	19.0
Carbon, burnt off, . . . . .	18.0
Silicious insoluble portion of ash, . . . . .	9.0
Phosphate of lime, . . . . .	16.0
Oxide of copper, and what remained in the ammonia, . . . . .	22.0

100.0

3. A separate examination of a few of the numerous yellow transparent fragments, which filled the inner cylinder, was then undertaken, principally with a view to determine whether they were of a crystalline nature, or simply glass; their behaviour under ignition having already convinced me that they were not "ambre brisé," as supposed by M. VENTURA.

The specific gravity of the fragments at 77°.5 was found to be 2.40, in itself a conclusive argument as to their vitreous nature; but to render the matter still more certain, a large clear fragment was ground and polished with parallel faces, so as to admit of its being introduced in the axis of a polarizing instrument. The result was that in no position whatever could it be made to depolarize the polarized ray of light, a certain proof of its non-crystalline structure.

When the topaz-coloured fragments were boiled in nitric or sulphuric acid, their colour entirely disappeared, and the liquid being tested, was found to contain both oxides of copper and iron; the brown colouring matter seemed to be the same in nature as the brown liquid described and analyzed above, but it had penetrated the glass to a certain depth, and was not removable by boiling in plain water.

Heated before the blow-pipe, the glass underwent fusion imperfectly, and became opaque from superficial efflorescence.

Finely pounded and fused with carbonate of potash for some time in a platina crucible, then dissolved out with muriatic acid, a considerable portion of silicious matter remained undissolved in a flocculent precipitate, which was separated and weighed.

The solution tested for lead and lime shewed but faint traces of the latter, so that the artificial glass was composed principally of silicated alkali. It was not thought necessary to pursue the analysis farther.

From the preceding rough analysis it is clear that the fragments are of a vitreous nature, and it seems probable that pieces of glass were fraudulently introduced into the cylinder, in lieu of some precious stones, which the pious founder may have intended to deposit with the other contents of the monument.

It remains to offer a few remarks upon the nature of these curious monuments, of which two opposite theories seem to have been broached. The opinion of the inhabitants of the country, as reported by all our observers, is, that they are the tombs of ancient kings:—that of Professor

WILSON, Mr. HOBSON, and other orientalisks, that they are *Déhgopes* or *Bauddha* mausolea, containing relics of, or offerings to BUDDHA or SHÁKTA.

These two theories however may, I think, be reconciled in a very simple manner.

Are not *déhgopes*, or *chaityas*, in many instances at least, shrines built over the remains of persons of the Bauddha faith, and consecrated to their saint? If so, we have but to suppose the rulers of the Panjáb, at the period of the erection of the topes before us, to have been of this religion, and the desired amalgamation of opinions is effected. My friend M. CSOMA de KÖRÖS, in reply to my interrogation on the subject, expressly treats them as mausolea of the dead, and thus describes the objects contained in the modern *déhgopes* of Tibet :

“The ashes of the burnt bones of the deceased person being mixed with clay, and with some other things, (sometimes with powdered jewels or other precious things,) worked into a sort of dough, being put into moulds, are formed into little images, called མཚོན་མཚོན་, *tsha, tsha*, and then deposited in small pyramidal buildings, or shrines, (S. *Chaitya*, Tib. *mchhod-rten*, མཚོན་རྟེན་ vulg. *Chorten*,) without any great ceremony, and without any thing precious in addition.”

Such being the custom with the remains of ordinary persons at the present day, we can easily conceive that the quality of the caskets intended to contain the ashes of princes or priests in the flourishing era of their faith, would be of a superior description, and that coins and other precious substances would in some instances be added. In the *Mánikyála* cylinder, the pounded gritty substance contained in the brown paste was evidently such as M. CSOMA describes : the larger fragments of glass were, as before surmised, substitutes for precious stones, and the brown paste itself is to all appearance compounded of various vegetable matters now decomposed and carbonized, mixed up with a portion of the ashes of the deceased, as evinced from the presence of ammonia and phosphate of lime.

There is much similarity between these mounds, sometimes of masonry and sometimes of rough stones and earth, and the remains described by Mr. J. BABINGTON, under the name of *Pandor Kulis*, in the third volume of the Bombay Transactions. Those erections are also of two kinds : one a mere enclosure of stones, surmounted by a circular stone of an umbrella-shape, and thence called a *Topi Kul* ; the other, formed of a pit below the surface, in which a large jar is placed : the mouth of the pit being covered over with a large circular stone, the earth and grass of which give it the appearance of a tumulus or barrow : this species is denominated *Kodey Kul*, and it always contains human bones in a more

or less perfect state, besides urns, arms, implements, and beads of various shapes, colours, and materials\*. Mr. WILSON attributes these monuments to a very ancient Hindu practice of collecting and burying the ashes and bones of their dead, in places where no sacred stream was at hand, into which they might be committed. He quotes in support of this hypothesis, the following passage from Mr. H. T. COLEBROOKE'S *Essay on the Funeral Ceremonies of the Hindus*, in the seventh volume of the *Asiatic Researches*.

"Using a branch of *Sami*, and another of *Palasa*, instead of tongs, the son or the nearest relation first draws out from the ashes the bones of the head, and afterwards the other bones successively, sprinkles them with perfumed liquids, and with clarified butter, made of cow's milk, and puts them into a casket made of the leaves of the *Palasa*. This he places in a new earthen vessel, covers it with a lid, and ties it up with thread. Choosing some clear spot, where encroachments of the river are not to be apprehended, he digs a *very deep hole*, and spreads the *Cusa* grass at the bottom of it, and over the grass a piece of yellow cloth. He places thereon *the earthen vessel* containing the bones of the deceased, covers it with a lump of mud, moss, and thorns, and plants a tree in the excavation, or raises a mound of masonry."

This is precisely the *Kodey Kul*; and the same authority helps us to an explanation of the *Topi Kul*, in which no bones are found.

"To cover the spot where the funeral pile stood, a tree should be planted or a mound of masonry be raised."

"The one," says Mr. WILSON, "commemorates the cremation, and is consequently nothing more than a pile of stones: the other inurns the ashes of the dead, and consequently contains the frail and crumbling reliques of mortality."

The curious circumstance noticed by M. COURT of the eight coins symmetrically arranged around the central casket, calls to mind that part of the ceremony described in the passage immediately preceding the foregoing extract from Mr. COLEBROOKE'S *Essay*.

"The son or nearest relation repairs to the cemetery, carrying eight vessels filled with various flowers, roots, and similar things. He walks round the enclosure containing the funeral pile, with his right side towards it, successively depositing at the four gates or entrances of it, beginning with the north gate, two vessels containing each eight different things, with this prayer, "May the adorable and eternal gods, who are present in the cemetery, accept from us this eight-fold unperishable oblation: may they convey the deceased to pleasing and eternal abodes, and grant to us life, health, and perfect ease. This eight-fold oblation is offered to SIVA and other deities: salutation to them†."

Although the foregoing extracts refer to the ceremonial of the orthodox Hindus, they may probably represent the general features also of a Buddha funeral; for the Buddhists agree with them in burning their dead; and in afterwards consigning the ashes and bones to some

\* *Oriental Magazine*, vol. i. page 25.

† *As. Res.* vii. 255.

urable mausoleum. Dr. HAMILTON informs us that the remains of priests in Ava, after cremation, are preserved in monuments\*, and Mr. DUNOAN describes a marble urn dug up among the Buddhist ruins at Sarnáth, near Benares, which contain "a few human bones, together with some decayed pearls, gold leaves, and other jewels of no value," just of the same nature as those discovered in the Panjáb. There was also a similar precaution of enclosing the more precious urn in one of coarser material, (in this case of stone,) in order more effectually to insure its preservation. That the bones at Sarnáth, belonged to a votary of Buddha was confirmed by a small image of Buddha discovered close by, and by the purport of the inscription accompanying it†.

From consideration of these circumstances, therefore, in conjunction with the decided opinion of all those who have recently been engaged in the examination of the Panjáb and Kabul topes, the hypothesis of their being the consecrated tombs of a race of princes, or of persons of distinction, rather than mere shrines erected as objects of worship, or for the deposit of some holy relic, seems both natural and probable; or rather the two objects, of a memorial to the dead, and honor to the deity, seem to have been combined in the meritorious erection of these curious monuments.

I cannot omit noticing in this place, one of those singular coincidences which often serve to throw light upon one's studies. While our enterprising friends have been engaged in opening the ancient topes of Upper India, the antiquaries of England have been at work at some ancient Roman tumuli or barrows in Essex. Without intending to draw any conclusions from the facts elicited in the course of their labours, it is impossible to read the pages of the *Archæologia* (1834, vol. xxv.) without being struck with the similarity of customs prevailing in such distant localities, pointing as they do towards a confirmation of the many other proofs of the identity of origin of the Roman and the Hindu systems.

The sepulchral tumuli of Essex contained, like those of the Panjáb, various bronze urns, enclosing fragments of burned bones, glass, coins, and even the brown liquid itself! The liquid is described as being in some cases "of a light yellow, in others of a dark-brown," of which colour was also an incrustation about the exterior of the vessels. Professor FARADAY, who examined the liquids, supposes that the water was

\* *Trans. Roy. As. Soc.* vol. ii. p. 46.

† The square chamber without door or other opening discovered in digging the ruins at *Buddha Gays*, and supposed by Dr. HAMILTON to be a tomb, resembles the square ornamented chamber penetrated by Dr. GERARD near Kábul, where he found the image of Buddha, described at page 455 of the present volume.

not originally placed in the urns ; but that it came over by a species of distillation into the empty space of the vases, on the alternate heating and cooling of the air contained in them. The researches of M. M. VENTURA and COURT may give reasons for thinking the contrary.

"The deposit on the side of the large vase was a dry flea-brown powder, containing a few white specks. It was combustible with a very feeble flame, burning like ill-made tinder or charred matter. It left a little pale light ash, containing carbonated alkali, carbonate of lime, and a little insoluble earth. This substance gave no trace of ammonia by heat. It is probably the result left upon the decay of organic matter, but of what nature, or in what situation that may have been, I cannot say.

"The liquor was a dilute solution of the same kind of matter, (4.2 grains to a fluid ounce :) this when dried and heated, did yield a little ammonia ; it blackened, but did not burn visibly."

"A third bottle was found to contain a fatty substance like stearic acid, melting under 212°, burning with a bright flame, and leaving little ash. It was dark-brown on the exterior, and yellowish and semi-transparent in the middle : the brown coloring matter was separated by dissolving the fat in alcohol—it was supposed to be the residue of albuminous or gelatinous matter, but it yielded no trace of ammonia."

Mr. GAGE, the author of the description, imagines the liquid to have been lustral water, poured in at the time of depositing the bones and funeral ashes. The pieces of fused glass adhering to the burnt bones, and the liquid, recalled to him VIRGIL's description of the funeral pile of MISÆNUS.

— Congesta cremantur

Thurea done, dapes, fuso crateres olivo.  
Postquam collapsi cineres et flamma quievit,  
Reliquias vino et bibulam lavère favillam :  
Ossaque lecta cado textit Chorineus abeno.

The dark-brown incruusted powder of the outside of the urn was in the same manner referred to a decayed wreath of yew, or other dark vegetable, depicted in the lines.

———— Cui frondibus atris

Intexunt latera et ferales ante cupressos  
Constituunt. *Æneid*, vi. 215.

The offerings at funeral sacrifices among the Romans consisted of milk, wine, blood, and such other *munera* as were supposed to be grateful to the deceased :—money was usually added to defray the charges of Charon's ferry.

The reader may compare this description with the extracts from COLERIDGE ; before given, and draw his own conclusions.

As the opinions of all those who have visited the countries where these monuments lie, are particularly deserving of attention, I cannot

resist the temptation of extracting a paragraph concerning them from the Manuscript Journal of Mr. TREBECK, the companion of Mr. MOORCROFT, now in my hands for transmission to Europe. These travellers, it will be seen, visited the spot where Mr. MASSON has lately been so actively engaged. They procured some of the coins now so common to us, and they had received from native tradition the same account of the contents of the topes which has now been confirmed by direct examination.

“On the evening when we were encamped at Súltánpur, Mr. MOORCROFT, in the course of some inquiries learnt that there were in the neighbourhood a number of what the people called Búrjs or towers, which according to their accounts of them were exactly of the same form as that seen by us in the Khurbur country. In consequence of our stay at Bálá Bágh, we had sufficient leisure to return in search of them, and in the forenoon of the 8th, taking along with us a person in the service of Súltán Mahmud Khan, we set off towards the place where they were said to be. Our road lay between Súltánpur and the Súrkháh, and taking a guide from that village, we were conducted to the bank of the latter rivulet which we were obliged to ford. The water was so deep and rapid that a man on foot could not have got across it, and its color was quite red, from the quantity of red earth washed along by it. Having passed it, and ridden over some fields, belonging to a small Garhí, or walled hamlet, and over a piece of clayey land, much cut and broken by water-courses, we reached a narrow gravelly slope, joining at a few hundred yards, to the left, the base of the mountains bounding this side of the valley. Here we found a Búrj, but were a good deal disappointed by its appearance. It differed considerably from those we had before met with, and though certainly antique, was built much less substantially: its exterior being for the most part of small irregularly-sized slate, connected without mortar. A good deal of one side of it had fallen down, and there were others before us; we did not stay long to examine it. We counted several whilst proceeding, the number of them amounting, as well as I can recollect, to 11, and seeing one more to the westward, and better than the rest, we advanced towards it. It was situated on a stony eminence at the base of the hills near where the main river of Kábul issues from behind them, and nearly on a line with the garden of Chahar Bagh.

“We ascended to it, and found it to be of about the same size as the one near Lalla Bagh, but as just observed of a different form. It was in a more perfect state than any of the rest in the same vicinity, but varied little from them either in style or figure. It was built upon a square structure, which was ornamented by pilasters with simple basements; but with rather curious capitals. Were it a tomb, one might suppose the centre of the latter coarsely to represent a skull supported by two bones, placed side by side, and upright, or rather a bolster or half cylinder with its lower part divided into two. On each side of this were two large pointed leaves, and the whole supported two slabs, of which the lower was smaller than the upper one. The most curious circumstance in this ornamental work was, that though it had considerable effect, it was constructed of small pieces of thin slate, cleverly disposed, and had more the appearance of the substitute of an able architect, who was pressed for time, and had a scarcity of

material, than the work of one who had abundance of the latter, plenty of leisure, and a number of workmen at command. A flight of steps had formerly led up the southern side of this platform, but nothing remained of them except a projecting heap of ruins. On the centre of the platform was the principal building, called by the country people the *Búrj*, the sides of which had been erected on a perpendicular to half its present height. This lower portion of it was headed by a cornice, and was greater in diameter than the upper part of the structure, its top forming a sort of shelf round the base of the latter. Its centre was marked by a semicircular moulding, and the space between the moulding and the cornice was ornamented by a band of superficial niches, like false windows, in miniature, arched to a point at the top, and only separated by the imitation of a pillar formed as before noticed of slate. The upper part of the tower was a little curved inwards, or conical above, but a great deal of its top had fallen off. The effect given to its exterior by a disposition of material was rather curious. From a distance it seemed checked a good deal like a chess-board—an appearance occasioned by moderately larged-sized pieces of *quartz*, or stone of a whitish color, being imbedded in rows at regular distances in the thin brown slate before spoken of. I had just time, though hurried, to take an outline of its formation on a piece of drawing-paper.

“The use of these erections next became a matter of speculation, and Mr. MOONCKOFF, having heard that coins were frequently picked up in various places near them, instructed a man the day after our return to proceed to the neighbourhood of them, and try if some ancient pieces of money were not to be found. The inhabitants of the *Ummur Khail*, a small village near them, said, that they learnt from tradition that there had formerly been a large city in this part of the valley, and pointed to some excavations across the *Kábul* river, which they told us had been a part of it. Of the coins they stated that several had been found of *copper*, but as they were of no value to them, they had been taken to some of the nearest *bunneahs* or shop-keepers, and exchanged for common pice. This information gave a clue to the person in search of them, and he succeeded at two or three visits to some *Hindus* of *Chahar Bagh*, *Súltánpur*, &c. in procuring several. He was also sent back to *Jelálabád*, but brought with him from thence only two pieces of *Russian* money, which were useless. The former were however very valuable and curious, and had on each side of them for the most part impressions of human figures; but from the frequency with which they were combined with representations of the elephant and the bull, it may be conjectured that they were struck at the command of a monarch of the *Hindu*, or *Buddhist* persuasion. The variety was considerable, and there were certainly two or three kinds which might have been *Grecian*, particularly one that had upon one side of it a bust, with the right arm and hand raised before the face with an authoritative air. Of this coin there were eight or ten, they were of about the same size as *English* farthings, and the figure spoken of was executed with a correctness and freedom of the style foreign to *Asia*, at least in the latter ages. The rust upon them, and the decayed state of the surfaces of two or three, as well as the situation in which they were found proved, that they were not modern. There were several more of the same size, merely with inscriptions in letters not unlike *Sanscrit*; and some other inscriptions, on the larger pieces of money, were so legible that a person, acquainted with oriental letters and antiquities, might discover much from them. With regard to the *Búrjs*, or buildings previously mentioned, Mr.

MOONCROFT'S opinion is probably correct. He conjectures that they are the tombs of some persons of great rank, among the ancient inhabitants or aborigines of the country; and as the religion of the Hindus seems to have been prevalent here in the earliest ages, that they have been erected, as records of the sacrifices of Sattis. But the question cannot be satisfactorily set at rest till one of them is opened. It is odd, that they should have escaped destruction, situated as they are in the full front of Musulman bigotry, and avarice; and, notwithstanding what some individuals assert, their present decayed state seems to be occasioned by age, rather than any attempt to discover whether they contain any thing valuable. A few people say that one of them was opened, and that a small hollow place was covered near its base, in which there were some ashes as of the human body."

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VI.—*Journal of a Tour through Georgia, Persia, and Mesopotamia.* By  
Capt. R. MIGNAN, *Bombay European Regt., F. L. S. and M. R. A. S.*

[Continued from p. 463.]

On the 24th we started early in the morning for Tabriz. The weather continued so very cold, that whatever was moistened by the breath, immediately became ice. Our mustachios were distended into an icicle. During the early part of our march we had some slight deserts, and afterwards entered a pass surrounded by wild and barren mountains. From an elevated spot we observed the river Augi flowing through a deep valley below, which we shortly after crossed upon a stone bridge of three arches. We found the water of this stream extremely brackish; indeed, the soil of this region is so salt, that all the streams partake of that quality. At the side of our road we observed immense masses of rock, the surface of which appeared to have been worn by the action of water. Indeed, the whole tract wore the appearance of having been recently abandoned by the ocean, and formed one irregular broken waste which might be compared to the waves of the sea, changed into earth, at the heat of the agitation. The latter part of our journey was unusually rugged, and although I have seen much mountainous scenery, I can remember none that exceeded in difficulty the passes of Karadagh.

Nothing can be imagined less like the environs of a capital city than the aspect of the country on every side of Tabriz. For several miles, the traveller passes over a plain which exhibits little but sterility and abandonment. The gardens which at first resemble black spots on the desert, are all that direct the attention to the celebrated capital of Azerbiján. It looks like some older city, long deserted by man. The appearance of its mud walls, arising out of, and surrounded by ruins; the prison-like houses which seldom exceed one story, without a decent looking win-

dow to enliven them; the inelegantly shaped domes, without a single Turkish minaret to relieve them; all exhibit a most monotonous effect, and combine in a general *coup d'œil* to impress the traveller with a very mean opinion of Persian architecture.

Tabriz, or as it is generally called by foreigners, Tauris, is the Gan-zaka of antiquity. It is situated in the province of Azerbiján, which in former times was called Atropatia, from ATROPATES the satrap, who, after the death of ALEXANDER, assumed the title of sovereign of the country, and transmitted it to his posterity, who retained the government for several centuries. It is asserted by some, that in the fourth century of our era, a treaty was concluded between NARSUS king of Persia, and the Emperor GALERIUS; by which contract TIRIDATES became its governor, and enlarged the city in emulation of the magnificence of Ecbatana. Yet we find that subsequent to this, it suffered various revolutions; for when HERACLIUS entered its gates, there were only three hundred houses standing. On the accession of the Sefi race however, Tabriz regained its old importance. Sir JOHN CHARDIN mentions, that in his time the city contained half a million of souls. "J'ai fait beaucoup de diligence pour apprendre a combien se monte le nombre des habitans de Tauris; je ne pouvais pourtant pas le savoir au juste: mais je pense qu'on peut dire sûrement qu'il va à 550 mille personnes." (*Chardin, Voyage de Paris à Ispahan, p. 184.*) But the earthquake of 1727, so greatly diminished its population, that only seventy thousand remained, and after the succeeding shock in 1787, there were only forty thousand inhabitants. If CHARDIN be correct, how dreadfully scourged this province must have been in the short space of forty-one years. Such were the awful changes of power and population, during the last century.

Tabriz is surrounded with a wall, and protected by a deep ditch which embraces a circumference of three miles and a half. The suburbs which have been built from ruins dug on the spot, occupy the ground which once composed the old city. To the north and east they extend for several miles, and so great is the mass of ruin about the plain in this direction, that I am convinced, the most violent shocks were experienced at some distance from the new city. Two hundred and fifty mosques are mentioned by CHARDIN, out of which the remains of three only are to be traced. The finest of these is, that of Ali Koja, erected by him six hundred years ago. It is still nearly one hundred feet in height, and commands a fine view of the surrounding country. Some time ago, a woman was thrown from its summit, for having murdered her husband. About two miles to the south-west of the city, the ruins of Sultan KAZAN's sepulchre are to be seen. The remains of decayed

buildings are here most enormous. The appearance of the sepulchre is that of an elevated mound composed of the usual *debris*—bricks, lime, stones, and tiles. It is encircled by several arches, and other vestiges of departed grandeur.

The court of **ABBÁS MIRZÁ**, Prince Royal of Persia, is held at **Tabriz**. Of the fifty-five sons\* of **FATTEH ALÍ SHÁH**, he is the only one who ever made an attempt to raise a regular army, which continued in an efficient state, until the conclusion of the peace with Russia. At present, the Government cannot see the utility of entertaining men who are not absolutely required, and have in consequence disbanded nearly the whole army, retaining only a few Russian deserters. The serviceable part of the establishment however, consists of three British officers, (Capt. **SHEE**, and Lieutenants **BURGESS** and **CHRISTIAN**,) and eight sergeants, all of whom are under the immediate command of Major **ISAAC HART**, of His Majesty's 65th regiment of foot, an officer of the highest military talent, and determined bravery, who deserves far greater praise than I am capable of bestowing. Notwithstanding the insuperable difficulties this indefatigable officer has encountered, he has single-handed, organized, and held together all the prince's troops, and for the last sixteen years, the name of **HART** has been the admiration of every soldier in the Russian army on the frontier. The artillery have always been the most efficient part of **ABBÁS MIRZÁ**'s army, and the infantry scattered throughout the districts. The amount of the general disciplined force under the command of Major **HART**, which might be collected, is about 10,000. Previous to the late war fifteen battalions, each 1000 strong, were regularly clothed and fed by His Royal Highness, together with nearly 10,000 irregulars, or *Túffangchís*: these are foot soldiers, armed with matchlocks, who were only nominally ready at a call, being dispersed among their own villages. As these men received little or no pay, it cannot create surprise, their never evincing great readiness for field service, or much firmness in action; especially when their wives and children were left during their absence totally unprovided with even the common necessaries of life.

The introduction of English discipline in Persia, would long since have been superseded by Russian, had it not been for the unceasing exertions of Major **HART**; and when we remember the avaricious habits, and the horrid depravity, into which **ABBÁS MIRZÁ** has lately

\* The family of His Majesty of Persia consists at present of fifty-five sons, and one hundred and twenty-five daughters. Many of his sons have fifteen and twenty children, and some of these are of an age to possess wives and husbands: so that, when the number of the king's issue is reckoned at a thousand, it will not appear incredible.

fallen, it becomes a wonder how he continues to retain any forces at all: and it may be added as a fact, that the Russian Government would give the Major any sum of money to quit the country. Count PASKEWITCH is so jealous of our intimacy with Persia, and so anxious to dislodge us therefrom, that he actually tendered officers to drill the troops entirely at the expense of his own employers; and had it not been for Major HART's local power and influence, the Persians would have accepted of their services. When this officer quits Persia, the whole army must swarm with Russians, whose ambassador will not fail to gain an effectual ascendancy\*. Is this to be wondered at? the Prince Royal has intreated the Indian Governments to grant him officers upon their former terms; to this they would not listen, so that he must eventually accept the services of Russia. When that day arrives our influence in Persia ceases, *perhaps* for ever †.

ABBÁS MIRZÁ has been formally proclaimed heir-apparent to the crown: this has been acknowledged by the two great powers of Europe, but it is a matter of much doubt and uncertainty, whether or not any other member of the reigning family, will ever be established upon the throne. The Kajurs, or royal tribe of Persia, are detested by all classes of people, and when the present Sháh dies, it is not improbable that an attempt will be made to exterminate the whole family. According to

\* Since the writer quitted Persia, he has heard with unfeigned sorrow that Major HART is no more. He may be permitted to embrace this opportunity of indulging his feelings by a brief record of his lamented friend. The name of ISAAC HART will not be read even by a common acquaintance without awakening sentiments of the deepest regret, for the loss of so much worth. With good talents he combined an invincible perseverance, a masculine understanding, and an energy of spirit. These endowments were accompanied by qualities of greater value—a purity of principle, a generosity of spirit, and an affectionate temperament of heart, which secured him the respect and regard of every individual of his acquaintance. He was on the eve of revisiting his native country, when unhappily his health broke down. He died at Tabriz, on the 11th day of June, 1830.

† It may not be inapplicable here to remark, that much of the success of the Russians in their intercourse with Persia, where their power is gaining the ascendancy over ours, is owing chiefly to the attention they pay to the acquirement of the Persian language; for which purpose there are both at Moscow and St. Petersburg institutions, where the young men who are destined for missions are early prepared for that service; and it is much to be regretted that no such institution in our own country places it within our power to cope with our neighbours in our relations with Muhammedan countries. The slightest reflection will convince even a common observer, that the negotiations of a *chargé d'affaires* at a Muhammedan court, who communicates personally with the supreme head, is infinitely superior to those of him who is obliged to employ an interpreter, who invariably turns your negotiations to his own account, or that of his highest bidder.

OLIVIER, this tribe is of Turkish origin. They took refuge in Persia, under the reign of SHÁH ABBÁS I., whence they received the name of Kajurs, or fugitives.

During my stay at Tabríz, I was presented to ABBÁS MIRZÁ by his physician, Mr. CORMICK, of the Madras Medical Service. We were received in the hall of audience, which on entering we found so dark after the brightness of the sun to which our eyes had been exposed on the way, that we were unable to distinguish at first the objects within. The room was long and narrow, the floor covered with a carpet, which felt extremely rough when trodden, and which was so thickly embroidered, that the primary material was completely hidden. Upon this carpet, at the corner of the room farthest from the entrance, and in the centre of the border which had no cushions, Prince ABBÁS MIRZÁ reclined. The style of his dress was not different from that worn by all Persians of the higher order. He had on a pelisse of scarlet cloth, lined and bordered with black sable. From his waist projected through the sable the handle of his dagger, mounted with brilliants; and on his right side lay a Damascus sabre, the blade of which seemed to be of a value little inferior to that of its scabbard, which was of gold, enamelled, and ornamented with diamonds, and other precious stones.

In appearance ABBÁS MIRZÁ was about forty-five years of age; his countenance was handsome, though his features were not well-shaped. His eyes were fine, large, and of a deep black; his nose was lofty, and his look imposing, mixed, however, with an expression of ferocity. His jet eye-brows, and long bushy beard, formed so great a contrast with the paleness of his face, that I could scarcely persuade myself paint had not been used. His hands were also delicate, and on one of his fingers he wore a splendid diamond, which he often presented to view by bringing the hand into contact with his beard. He was excessively affable and *polité*; his manners were highly polished, and his expressions of civility wore that tinge of hyperbole, for which the natives of these countries are so remarkable. Sir ROBERT KER PORTER's likeness of him gave me no idea of his expression of face; but I am told he is much altered since he fell into such habits of debauchery. His conversation turned principally upon the emigration of our countrymen to New South Wales, and of its climate and productions. He was highly amused at our description of the Kangaroo, and would not be persuaded that they were fit for *kabobs*—but, added he, "I would not hesitate in tasting of them, provided you set me the example; I then should see by your countenance, whether they were good." During the visit, Dr. CORMICK turned every thing I said into an extravagant compliment to the prince, and then demanded of me if it was not what

I intended to express. Dissent was of course impossible, so I allowed him his own way. After remaining in the audience room for about half an hour, we made two low bows, and retired under the escort of the *Kaim makám*, or prime minister, who accompanied us to the outer court, where we met our horses and returned home.

Not long ago, the Governor of Bombay, Sir JOHN MALCOLM, sent Prince ABBÁS MIRZÁ a very handsome London-built stanhope, which he sported about the suburbs of the city, and issued a proclamation that his ministers should forthwith provide themselves with similar equipages. The nature of the country is so good, that carriages might drive over it with nearly as much safety as upon a turnpike road. Persia is well adapted for carriages, and with very little trouble good roads might be made, except through the defiles from one plain to another, where the ruggedness of the mountain passes present serious difficulties. This was the case when wheeled-carriages were in use; for DARIUS after the battle of Issus, kept to his car as long as he was in the plain; but was obliged to alight from it, and mount his horse when he came to the mountains. It would have been well, if His Royal Highness had followed this prudent example upon his late hunting pic-nic; for on his attempting to ascend the mountains in his stanhope, the vehicle overturned, and was smashed to pieces, and the Prince had his head nearly broken. I was told that His Highness had chosen the fittest spot for such an achievement. Since this accident, he has quite forgotten to see his orders enforced either in building carriages, or constructing roads. Some of the *attachés* to our embassy have *droskies*, which are drawn through the narrow streets of the town by men; after which, their ladies are seated in them, and drive over the surrounding plain.

The Prince Royal is exceedingly fond of hunting and hawking—he generally goes into Karadágh; which is, in fact, his “hunting place.” Antelopes, partridges, and bustards are found there in great numbers. Such is the wonderful speed of the first-named animal, that no instance has yet occurred of their being fairly run down, except by relays of horsemen and dogs, after the manner described by XENOPHON of hunting the wild ass. He says, that the horsemen had no other means of catching them, than by dividing themselves into relays, and succeeding one another in the chase: *καὶ οἱ μὲν ὄνοι, ἐπεὶ τις διώκοι, προδραμοντες ἀνείστηκσαν (πολὸν γὰρ τοῦ ἵππου θάπτον ἔτρεχον) καὶ πάλιν ἐπεὶ πλῆσιάζοι ὁ ἵππος, ταυτὸν ἐπόλου· καὶ οὐκ ἦν λαβεῖν, εἰ μὴ διασταυρῆσαι οἱ ἵπποις θηρῶν διαδεχομενοὶ τοῖς ἵπποις.* (ANABASIS, lib. i. c. 5.) The antelope is equally common to Persia, as to Arabia, India, and Africa. It is the *θορκας*, mentioned by XENOPHON, among the wild animals which the Ten Thousand hunted on their march through Syria. The bustards are the *ἀρίδες*, for they

possess the same qualities which he describes; making short flights, and tiring very soon. (ANABASIS, lib. i. c. 5.) The natives call this bird the *young antelope*. They likewise designate the ostrich by the name of a beast, calling it the *camel bird*. This appellation is apposite, for when the camel is seen on the desert from a distance, it is almost impossible to discriminate the one from the other.

I was often amused in my rambles round Tabriz, at meeting the Muhammedan ladies, who promenaded the streets, enveloped in their *chaders*. If no native was within hail, (as the sailors would say,) they invariably tossed off their veils, and in a sprightly manner expressed a desire to become better acquainted. The same forward air and manner was also displayed by the women, who often appeared at the latticed windows overlooking the road, and who manifested by their coquetry, and a peculiar laugh of the eye, the expression of delight at the attention they excited. As their faces were highly *rouged*, and their head-dresses gaily adorned, it forcibly called to my recollection, the history of JEZEBEL, how she *painted her face*, and *tired her head*, and *looked out at the window*\*. They have also a busy trifling with their veils, under the pretence of adjusting their hair; during which time they do not fail to make the best use of their large gazelle-like eyes. In speaking of the women, I shall briefly remark that they have intrigue to their fingers' ends—*à la Française*. The higher classes are extremely profligate; and when engaged in an *amour*, quit their home, wrapt in their impenetrable *chader* of one of their female slaves. There is no country on earth where the women have greater opportunities of gratifying their wicked propensities than Persia. Major HART assured me that when the Russians were in possession of Tabriz, most of the Persian nobles fled to the adjacent towns, and left their wives and their slaves in possession of their houses—and of their liberty. These women flocked at nightfall in such numbers to the citadel, where most of the Russian officers were quartered, that the sentries were compelled to repel them with the butt ends of their firelocks, or they would have been completely overpowered by the violent passions of these females. On their admission to the officers, who thought that fear had driven them for protection, they confirmed by expressive looks, and attractive gestures, that the object of their visit was by no means equivocal. I could illustrate this with many facts, but the present one will, I think, be sufficient to show that the Persians have some cause for *padlocking*

\* "And when JEHU was come to Jezreel, JEZEBEL heard of it; and she painted her face, and tired her head, and looked out at the window."—2 Kings, xi. chap. 30th verse.

their women. Indeed, the feelings which they have towards them is well expressed in the word "Zaifah," which we should translate into frailty, or weakness. Shakspeare's celebrated apothegm in Hamlet, "Frailty, thy name is woman," is highly characteristic of the Persian ladies.

Before finally quitting Tabríz, I may observe, that during the time of my stay, the weather was in general temperate. The thermometer in the shade ranged from 41° to 51°. The air was kept so constantly loaded with moisture by the melting of the snow, that LESLIE'S hygrometer never sunk below 50° in the shade; but when exposed to the sun, it sometimes rose to 95°. The sky was for the most part clear, and the air both keen and bracing.

We quitted Tabríz on the 31st of March, at the hour when the once-worshipped god of the Persians was lifting his glorious forehead over the heights of the city, and from every mosque the Mussulmans' loud voice called on all true-believers to rise to their orisons. Our first stage was made to the village of KHOSRU-SHA'H, distant about four farsangs, or sixteen miles, and seated in the fertile and lovely valley of Uz-Kon. On our route we passed the village of Sardery, which presents itself from an eminence, and occupies the base of a hill, upon the summit of which are the ruins of a fort. From this spot I took some geographical bearings. The city we had left, and the over-hanging mountains were on our right, while the peninsula of Sháhí was on the left. The bed of the salt stream which we crossed previous to our arrival at Tabríz pursued its tranquil course through the plain, from the gorge of the mountains, whence it escapes, to the head of the lake Ourumia, where it discharges itself, and is lost altogether. The disposition of the surrounding plain would lead to the idea, that the lake once extended over it, and such is the delusive effect of the mirage, which plays over its saline surface, that it is very difficult to believe what one sees is vapour and not water. This optical deception has been noticed from the remotest times. It is alluded to by the prophet Isaiah, when he says, "And the parched ground shall become a pool." (Chap. xxxv. v. 2.) And again, "I will make the wilderness a pool of water." (Chap. xli. v. 18.) QUINTUS CURTIUS, in describing ALEXANDER'S march through the Sogdian desert, says, that "the plains wore the appearance of a vast and deep sea," (QUIN. CUR. lib. vii. chap. 5,) which is a true and perfect description of the mirage of the Persian and Arabian deserts. Bishop LOWTH has rendered what we read "parched ground," in our Bibles, into "glowing sand," (Isaiah, xxxvth chap. 7th verse,) which is highly expressive of this illusive appearance.—(LOWTH'S Isaiah, chap. ix. page 88.)

In winding round the same range of mountains which surround Tabriz, and which are a ramification of the Sahand branch, we observed innumerable villages, embosomed amongst trees, while the snow-capt heights of the Sahand mountains rose above the valley, and gave the whole a most picturesque effect. From this village to Dehkargám, a distance of full twenty miles, the country is a level plain, over which we saw flocks of the bustard, and several large foxes; but owing to their extreme shyness, we could not approach either sufficiently near to obtain a shot at them. Shortly before we caught the first view of the town, we could observe Lake Ourumia spreading its unruffled waters through a succession of rugged promontories, of which, a towering snow-peaked range, which fringes the horizon, forms the most magnificent feature. Dehkargám is encircled by a mud wall, and surrounded with extensive gardens and orchards. Trees were now assuming their dress, their foliage shot forth in great luxuriance, and wore a charming colouring to the landscape. This town was the headquarters of the Russian cavalry at the time Field Marshal ПАСКЕВИЧ was carousing in the capital of the province. The whole district is wonderfully productive, and a beautiful foraging country.

April the 2nd.—We proceeded to Khaniah over a tract of mountain glen of about sixteen miles, destitute of the smallest symptom of habitation or culture. The very rills disappear, and the water oozes out of the rocks in springs, which no frost can congeal. Now and then a little noteless bird darted across the road, and appeared to eye us from a distance, as he balanced himself on the point of a reed. Cattle, nearly as wild-looking as deer, snuffed the wind as we neared them, and gambolled on the firm footing which they well knew among the marshes. We distinctly heard the hawk's cry as he skimmed along the rugged cliffs, and the yellow-winged earth-bee boomed round us, and with a bold hum spun away to the marshy shore of Sháhi.

The hamlet of Khaniah lies upon the margin of the lake, and were it a little more elevated, would command a grand view of it. The face of the mountains which gird its western shore, wear all the appearance of a volcanic region. The rugged aspect of the Kurdistán chain, the deeply furrowed ravines on either side, the romantic forms of the jagged rocks, all prove that the surrounding country has been the scene of some convulsion of nature. A little before we entered the hamlet, we saw several chalybeate springs bubbling from the earth, and a few yards further on, some curious petrifications are situated. These consist of several pieces of water contained within the circle of a mile, whose sluggish shallows stagnate and petrify by a slow and regular process, producing that stone which in the country is called Tabriz

marble. The water appears as if it were frozen, and when the stagnation is complete, a man may walk over it. The tendency of this water to become stone is so great, that where it exudes from the ground, the petrification assumes a globular shape, like the bubbles of a spring suddenly arrested in their play by a magic wand, and thus converted into marble. The stone is nearly transparent, very brittle, and often streaked with veins of various colours. Its general appearance is that of alabaster, and it is capable of receiving a fine polish. It is devoid of fissure, and may be cut into immense slabs. Rushes grow abundantly in the ground around, and the neighbourhood is both saline and marshy. This remarkable natural curiosity bears north 20 west, and is about two miles from the lake.

There are few objects more calculated to arrest the attention of the traveller than this lake, which is considered the Spauto and Marcianus of STRABO and PROLEMY, and is now called Deriáh Sháhí, the Sea of Sháhí, or the Lake of Ourumia, from a town of that name situated on its western bank. This town is the site of the ancient Thebarma. The very same extraordinary circumstance is remarked here as on the shore of the Dead Sea. There is no visible outlet to the lake, notwithstanding fourteen rivers are daily flowing into it. No increase in the height of the water is perceptible: on the contrary, signs of diminution are very apparent; so that the evaporation is greater than the body of water sent into it. There is a very close resemblance between the Lakes Asphaltés and Ourumia. No living creature is found in either; for as soon as the rivers carry down any of their fish, they instantly die and become putrid. Their waters are the same, intensely cold, and to the taste appearing like a mixture of lime, nitre, and magnesia. The indefatigable and lamented African traveller BROWNE, found by an experiment that this noble sheet of water contained one-third more salt than the sea. IBN HAUKEl also remarks, that its waters are so exceedingly salt, no fish can exist in them; and he likewise adds, that its length is about five days' journey. The extreme length of the two seas are the same, seventy miles; but Ourumia is thrice the breadth of Asphaltés, being about thirty miles. It contains five islands and a peninsula, which are nearly untenanted, except by venomous snakes and other reptiles. Dr. THOMAS SHAW, in his Travels into the Holy Land, calculates that the river Jordan daily sends into the Dead Sea six millions and ninety thousand tons of water. "So great a quantity of water," he continues, "being received without any visible increase in the limits of the Dead Sea, hath made some conjecture, that it must be absorbed by the burning sands: others, that there are some subterraneous cavities to receive it. Provided the sea should be seventy-two

miles long, and eighteen broad, and six thousand nine hundred and fourteen tons of vapour being allowed to every square mile, there will be drawn up every day above eight millions, nine hundred, and sixty thousand tons. As the heat of the sun is of more activity here than in the Mediterranean Sea, exciting thereby a greater proportion of vapour; so the Jordan may, in some measure, make up this excess by swelling more at one time than another; though, without doubt, there are other rivers, particularly from the mountains of Moab, that must continually discharge themselves into the Dead Sea\*." Although none of the rivers flowing into the sea of Sháhí, are so large as the Jordan, yet collectively they cannot fail to make up an immense mass of water. It is perfectly impossible to form an estimate of the proportion of the supply to the evaporation, because all Persian rivers overflow their banks in spring, and at the end of autumn are mere rivulets.

Just as the sun was on the eve of setting, I proceeded on foot to the shore of the lake. An awful silence hung over it, but the sound of its waters slowly rolling before the wind, which blew at the time, were even more appalling than the desolation of its shores. In this solitude I felt something approaching to pleasure from the sight of a hawk, which passed over the unnavigated waters. This incident arrested the course of those feelings, which divine indignation forces upon a traveller who visits the Dead Sea, though the assertion that no birds can fly over that sea, on account of the pestiferous vapour inhaled from its surface, has received a marked contradiction by our latest travellers. I have already remarked that no fish exist within the waters of Lake Ourumia, having made particular inquiries at the village, whose inhabitants have often spread nets in vain; nor did I observe on the shore any shells whatever, or find, in truth, a solitary tree of any species. On the whole, the vast wilderness, and dreadful sterility of the same, is sufficient to impress a beholder with feelings of awe and dread. I remained about half an hour on the shore, and filled a bottle with the water. The shades of evening were approaching, the glorious lamp of night was watching, as it were, a close of day, to illuminate benighted worlds; and my village guide represented the danger of remaining longer, since a surprise might be apprehended from some of the wandering tribes, who are ever on the watch for prey. In consequence of this we returned to the village. We continued our march from hence, going south, over a barren tract of dark mountains, totally devoid of vegetation. The soil was argillaceous, and now and then the road lay over deep strata of rock, among which talc was predominant. Previously

\* Vide *Travels into Syria, and the Holy Land*, by Dr. THOS. SHAW, F. R. S.

to leaving the flat waste surrounding Deriáh Sháhí, we gazed upon the marsh which renders Sháhí a peninsula. Far off, to the west, we saw the cloud-diadem that crowns the chain of mountains which divided the old Assyrian and Median empires, and other mountain ranges, all accustomed "to parley with the setting sun." Shortly afterwards we were hid from the lake altogether, but obtained a more expanded view as we descended from the mountains towards Ajub-shír. From hence, the lake itself appeared as in the bottom of a bowl; we could now observe all its islands, which lying in a cluster, had the appearance of a little glimmering archipelago. From this point of "various view," the wide prospect of the windings of the river that issues from the adjacent mountains was suddenly descried. Ajub-shír is a small village, situated upon one of the fourteen rivers that flow into the lake, and which takes its birth from among the Sahand mountains. It is, as well as several other villages on the plain, the property of Jáfer Kúli Khán, the opulent chief of Marágha. This man is one of the greatest land proprietors in Persia, and the bitterest scourge in Azerbiján. Although the condition of the peasant is miserable in this province, he is in general industrious, and infinitely superior in intelligence to the ryots of British India. It is impossible to conceive the life of misery, which the peasant passes under the wild caprice, and perpetual irritation of Persian tyranny—the exposure of his dearest interests to brutal passion, or malignant power; his constant fear, that the fruits of a life of labour will be sacrificed to the avarice of some insolent slave, raised into sudden authority by his superior villainy, and sent forth to live by plunder and rapine. God forbid, that the day of oppression may not have an end; that man, however defiled with the dust of slavery, may not wring the scourge from the hand of the tyrant, and clear away the stain!

We reposed at Ajub-shír a great part of the day, as all the beauty tended towards the west, each hour deepening the prospect into the mellower splendor. To keep the eye from reposing on the lake, was indeed impossible; its still waters soothed one's soul, without holding it away from the mounts and cliffs, that forming of themselves a perfect picture, are all united with the mountainous region of the west. Towards sun-set we proceeded onward, and met the shepherds driving their flocks towards the village. The husbandmen were returning home from the toils of day, and from every house the smoke ascended in an undeviating upright direction.

"Et jam summa villarum culmina fumant,  
Majoresque cadunt altis de montibus umbræ."

We soon descried the rich town and fertile district of Bináb, which is distinguished by its extensive orchards, and its hamlets environed by trees and cultivation. From hence not only the great expanse of the lake is seen, but the full extremity of the plain to the northward. We stopt the night within the cottage of a tobacconist, and renovated our strength by smoking a choice collection of chibouques. After this we were served with two boiled fowls, lying in a small ocean of the milk of goats thickened with the whitest of rice. "Here's a dish fit for the cousin of the sun," exclaimed our host, rubbing his hands, and smacking his lips with expectation. "Bismillah," he added, as a signal for us to commence operations, and his fingers were in the dish in a moment, and in another, the tenderly boiled fowl was dissected limb by limb. "By the mouth of Muhammed, this dish is a savoury meal!" To this I perfectly agreed, for the pilau was capital; and to do the Persians justice, it must be said, they excel in this dish; in truth, Persia is the only country where it is cooked to perfection. While we were discussing the fowls, I perceived several damsels looking at us through the crevices of the harem door; and if I may judge from a few hasty glances, I should say, that my host had a good taste in women. In presenting me a kaleún, I was surprised to see him produce a bottle of wine from a curtained recess, which appeared well filled with jars; and after taking a few copious draughts, I could easily observe that he was getting fuddled, so I knocked the ashes from the top of his pipe, which he finished with as much satisfaction as if he had only begun it. He then stretched himself out on the floor, and fell asleep.

Bináb is encircled by vineyards to a considerable extent, which yield a grape celebrated throughout Persia for the good wine it produces. No one was abroad, although it was early day when we departed for Meándáb, distant twenty-five miles, over a wearisome country. After toiling over a succession of hills that separated the plains, and looking upon the country below, the eye wandered unreposed over a boundless brown expanse. The hamlets which were spread over the plain, appeared like spots upon the surface of the ocean. As we journeyed on, we saw the cultivators on the ground: their agricultural implements were of the simplest description. The plough, for instance, was formed of two wooden beams, one of which was placed athwartways, to yoke the buffaloes or oxen together, and at the extreme end, a shapeless wedge of iron was affixed to turn up the earth: thus  About noon we reached the banks of the river Jakantúr, and found a rude kind of raft constructed of beams placed across inflated sheep-skins, which was to convey us to the opposite shore. This raft closely resembled the *kellek* of Assyria, a description of which

is given in my work on Chaldæa, published in 1829, by Colburn. The stream appeared about thirty yards wide; its waters were rapid, and occasioned great difficulty, and no short time in getting the mules over. On embarking, the ferrymen pushed off the raft, and rowed it with sufficient ease, till they got into mid channel; when we were carried with the greatest rapidity along with the stream to a considerable distance. During the whole time the boatmen were shouting, "God preserve us," and one of them, who was very alert, managed to bring us to a shoal near the bank, when he leaped into the river, and contrived to stay our course, to admit of our casting the horses and mules adrift, and so lightened the boat, as to disembark us on the bank. They then re-crossed the stream, after towing the raft to a certain height, up the southern bank, and far beyond the point of embarkation on the opposite shore. Two miles below this ferry, the stream is generally fordable, as the waters have become shallow by expansion; and I was told, that in the depth of winter, it freezes so hard, as to admit large káfilahs to cross its surface, though from the apparent rapidity of its course, I should be inclined to doubt this information.

The Jakantu flows into the sea of Sháhí, and is a branch of the Kizil Uzán\*, the banks of which river became the scene, a few years ago, of the mysterious murder of the celebrated traveller BROWNE; and although His Britannic Majesty's Ambassador, Sir GORE OUSELEY, was in the country, and in fact, very close to the neighbourhood of this sad catastrophe at the time it occurred, yet (strange to relate) no resolute and determined measures were taken for the apprehension of the perpetrators. I have not the least hesitation in saying, that his Majesty of Persia was accessary to this murder; indeed, it was the current opinion in the country at the time: but unfortunately, our character was not then in very high estimation at court. Mr. BROWNE's ultimate object was to investigate that magnificent country, Khorasan. The present Sháh appears determined that no traveller shall have his *real* protection, if their journey is in that direction. Although Mr. FRASER has presented us with a very valuable account of some parts of it, yet his sufferings were great, his obstacles almost insurmountable, and his treatment infamous. For this our travellers have to thank

\* This river is the Amardus of Ptolemy, and is supposed to have been the Gozen of Scripture. Its present appellation is descriptive of the yellow hue of its waters. Its course is both tortuous and rapid, and being augmented by several streams from the neighbourhood of the village of Banna, which is seated in the north-eastern branch of the Kurdistán mountains, it sweeps along through an Alpine country, till it enters Ghilán; where rushing onwards through a beautifully wooded country, discharges itself into the Caspian Sea, a little to the eastward of Resht.

their protector and friend FATEH ALI SHA'H. His Majesty dislikes to hear of any British travellers penetrating into Khorasán, and he seldom fails to use his best endeavours to make them adorn a tale, in stead of telling one.

His Majesty is the most accomplished liar in the kingdom, (in Persia, lying is considered one of the "*most fashionable accomplishments.*") Whoever doubts the authenticity of this assertion, had better close my pages, and consult those travellers of the last, as well as the present, century; he then can judge for himself. For gain, a Persian will commit the most heinous crime under heaven, and falsehoods flow spontaneously from his lips, even when no apparent motives exist. In speaking of the Persian character, it will be found to be the natural result of the circumstances in which he is placed. A Persian is more apt to defend himself by cunning than courage, and is so dependent on the help of others, that he knows not when to trust to himself: he calls on "Khúda," when he ought to exert himself, and sheds tears when he should show spirit. He makes splendid professions when he knows his sincerity will not be tried, and is at once mean and ostentatious. In a word, his character is made up of selfishness, avarice, treachery, deceit, and cruelty. Lord HEYTESBURY once asked me to tell him their *real* character. My reply was this, "They surround you like the flies with the sunshine, to disappear when you are under a cloud. It is impossible to avoid their buzzing; but God help the man that does not know how to appreciate the value of their lip-deep friendship."

(To be continued.)

## VII.—Proceedings of the Asiatic Society.

Wednesday Evening, the 3d December, 1834.

W. H. MACNAGHTEN, Esq. Vice-President, in the chair.

Sir JOHN PETER GRANT, Kt., and WILLIAM GRANT, Esq. proposed at the last Meeting, were balloted for, and duly elected Members of the Society.

Read a letter from HENRY ASHTON, Esq. President of the Athenæum at Liverpool, acknowledging the receipt of the 2nd part of the 18th volume of the Asiatic Researches.

### Library.

The Secretary apprized the Meeting of the arrival of the paintings, &c. presented to the Museum at the last Meeting, by Captain R. HOME; he also laid the minutes of the Committee of Papers, regarding the necessary preparations requisite for their reception, which were confirmed.

The extensive library also presented by Captain HOME, consisting of 300 volumes, principally of valuable works on architecture and painting, were laid out for inspection on the table.

Read a letter from Professor H. H. WILSON, enclosing statements of account with the Society's booksellers, MURRAY and Co., and PARBURY and Co. by which it appeared that a trifling balance remained in the hands of the latter. Professor WILSON enclosed a letter from Mr. J. MURRAY, regarding the publication of MOORCROFT'S Journal, about which no definitive arrangement had as yet been concluded.

Read a letter (in Latin) from the Hungarian Society, at Pest, stating the objects of its recent institution, and desiring an interchange of publications. The first volume of the Transactions of this new Society, in the Hungarian language, with the statutes in Latin, and various miscellaneous pamphlets, were presented.

The following books were also presented.

Lea's Contributions to Geology,—*by the author.*

The Indian Journal of Medical Science, No. 12,—*by the Editors.*

Illustrations of the Botany and Natural History of the Himálayan mountains, &c. Part 3. By F. J. ROYLE, Esq. F. L. S. and G. S. M. R. A. S.

Meteorological Register for October, 1834—*by the Surveyor General.*

*Museum and antiquities.*

Read a letter from W. H. MACNAGHTEN, Esq. presenting various weapons, consisting of a bow and arrows and two swords, richly mounted in silver and gold, used among the Coorgs.

The sword, without a scabbard, is slung in a curious belt, fitting to the middle of the back. A short knife is also worn in front with a silver chain, and paraphernalia for the matchlock. The weapons were accompanied with five native drawings, shewing the mode of exercise adopted by the Coorg troops.

Read a letter from Captain JAMES LOW, M. A. S. C., dated Province Wellesley, 16th October, announcing that he had forwarded under charge of Major SUTHERLAND, the facsimile of an inscription on a stone slab in his possession, which was discovered by him near the ruins of an old Buddhist temple in Province Wellesley.

The inscription is stated to be in some ancient form of the *Bali*, or *Pali*, character. It is not yet arrived.

The Secretary exhibited to the members present some selected specimens from the rich collection of Gen. VENTURA'S coins brought down by the Chevalier ALLARD; to which allusion was made at the last meeting.

On a cursory examination of these coins, the following classification was readily made on account of their very excellent state of preservation. They comprise many names altogether new, and many very valuable and curious medals of pure Bactrian workmanship, along with a number of the Indo-Scythic coins, and several of the peculiar gold ones, of *Rao Nano Rao*, &c. with the inscriptions clear and distinct.

*Catalogue of General Ventura's Bactrian Coins.*

Of DEMETRIOS, one beautiful small silver coin.

Of EUCRATIDES, one large and one small ditto; and three copper.

Of AGATHOCLES, one fine silver didrachma.

Of PHILOXENOS, one large silver, one square and one round copper.

Of APOLLODOTOS, 11 small circular, and one ditto square silver coins, quite perfect; and eight copper square coins, one round ditto.

Of MENANDER, two small silver, and one copper square.

Of ANTIMACHOS, one small silver coin.

Of NĒNOS, three small silver coins.

Of AZILISOS, one silver drachma, and two copper pieces.

Of ERMAIOS, nine copper coins.

Of MAYOS, two very singular copper medals.

Of NICEPHOROS ANTILAKIDOS, seven small square coins.

Of AVSIOS, one square ditto.

Of AZOS, one large and 11 small silver coins ; also 66 fine copper coins of the same prince, with seven distinct devices, none having the Sovereign's head, but generally exhibiting the figures of animals.

Of EOS ? (the name only well defined on a few), 22 copper coins.

Of KADAPHES CHORANOS, six small copper pieces.

Of UNAD PHERROS, 23 copper coins.

Of KADPHISES, large copper 18, small ditto 68 coins.

Of KANERKOS, the Raja and Mithra form, copper, .. .. 45

Ditto, a elephant, .. .. 34

Ditto, the sitting figure, leg up, .. .. 32

Ditto, the running figure, .. .. 4

Gold coins of the *Rao Nano Rao* group, .. .. 10

of the *Kanouj* group, .. .. 3

One silver coin of the Behut type.

Besides Arsacian, Sassanian, Cufic, and modern Persian coins, and a number of decayed and illegible coins.

#### *Physical.*

Read a letter from Lieut. W. E. BAKER, Engineers, forwarding a drawing of the fossil elephant's tooth presented to him by the Nahun Raja, in whose country it was found, as mentioned in Captain CAUTLEY's note read at the last meeting.

[This will be published in our next number.]

On the subject of fossil discoveries, the following report of further progress from Captain CAUTLEY, dated 22d November, was read with much interest :—

“ I am glad to say that Dr. FALCONER's idea of the fossil remains of the larger class of animals, existing in the lower range of mountains, has at length been most satisfactorily realised!! Lieut. BAKER in a late visit to a pass near the Jumna, opposite the village of Rayawalla on the *west* bank of the river, found a fragment of what appeared to me the leg bone of an elephant, but the specimen was small and much worn by weather. I crossed the river some days afterwards, and in company with Lieuts. BAKER and DUKAND, took a careful examination of the ravine and slip near which the fragment had been found. We brought away with us a number of fossil bones, two of which were beautifully perfect ; one of a leg bone of an elephant, and the other of some large animal, perhaps a camel. I write, however, in perfect ignorance of any classification, having no books of reference, and having been disappointed in my endeavours to obtain CUVIER's *Ousemens fossiles*. These fossils are found in the upper sandstone strata, in the stratum apparently superior to all the others, inclined at the angle which is usual in these hills, viz. from 20 to 35° to the horizon. Since my return to this place, I hear from Lt. BAKER, that a party of work people sent by him to the Ambwalla and Tetrahindi passes, opposite Rayawalla, has returned, laden with similar fossils.

I must also tell you that in the same pass, viz. the Ambwalla, in which the first large fossil was found, Lieut. BAKER discovered some thin strata of blue clay or marle full of fresh water shells, amongst which I recognise a variety of *Helix*, *Planorbis*, and an univalve; the shells are in texture and appearance similar to those found in the kankars of the plains, but very fragile and much broken. There appear to be two strata, each of about 12 inches thick, separated by the sandstone rock. The upper stratum has a superincumbent mass of sandstone of from 60 to 80 feet thick, the inclination may be about 35° to the horizon. In these interesting discoveries now going on, we have already got possession (I imagine) of *three* distinct fossil deposits, and in all probability three as distinct *eras*.

The 1st or lowest being that with the lignite; consisting of a clay conglomerate or coarse marle, full of remains highly impregnated with hydrate of iron, the leading ones being Saurian and Chelonian, but abounding in bones and teeth of Mammalia, fishes teeth and vertebra, and some few shells; but the latter very imperfect and much broken, probably fresh water from their thinness.

2nd.—The blue marle or clay filled with the fresh water shells above-mentioned.

3rd.—The upper or grand deposit of the remains of the larger Mammalia now found by Lieut. BAKER, their remains being perfectly fossilized, and existing in abundance in the superior strata of sandstone; the general inclination of all these strata varying from 20 to 35° to the horizon.

“ Nov. 25th. The parties detached to Sumrota near the Pinjore Valley, and another spot near Nahun, have brought back a great number of fossils, remains of the larger mammalia. We await your answer to decide on measures for providing the Society with specimens, unless there be objection to *separating* a collection, which will undoubtedly be of the most extensive description; for by keeping them together, there will be a greater chance of a final classification. Ignorant as I am in fossil osteology, I cannot even propose the animals to which our enormous bones belong: the teeth alone prove some of them to be *elephants*'. My friend Lt. BAKER has sent you a drawing of the tooth given to him by the Nahun Rájá. —I have now a similar one brought from Sumrota—and what is rather provoking, a splendid specimen of a head, or as the Chaprassi terms it a '*Deo ka Sir*,' which was found, was carried off by a hill man of the party, who absconded, and bore off the head in triumph to the Nahun Rájá. This head has been applied for; but as it is called a *Deo ka Sir*, the Rájá may perhaps not be inclined to give it up.—There is no doubt of our finding many more, as the fossils are in abundance: all those as yet found are *Westward of the Jumna*.—I have one party in the Sewálík line, eastward of that river, on the search, and when the jungle gets burned a month hence, will have other parties in all directions.

“ I have just received a letter from Lieut. BAKER, mentioning *three* other places where these huge fossil bones have been found; in fact, proving that from the Jumna to the Pinjore Valley, these mountains abound in them.—I hope ere long to report on the Sewálíks, or the line between the Jumna and Ganges.”

Lieut. J. S. NEWBOLD transmitted a Memoir on the Naning territory in the Malay Peninsula, drawn up from memoranda made during a six months residence in its jungles, in 1832. The author proposes also to favor the Society with his notes made on various occasions of visits to the independent chiefs of the interior of Malacca, till lately feudatory to the decayed Malay empire of Menanggobowe in Sumatra.

Read a letter from Sergeant DEAN, stating that he had despatched for the Society, a further assortment of the Jumna fossil bones, and promising a series of specimens of the Volcanic minerals from the neighbourhood of Samur lake.

Specimens of the land shells of Chili were presented by M. DURAND.

Two bottles of water from the hot springs in the Mahadeo hills, and a fragment of stalactite (at first supposed to have been fossil wood) from the cave of the same name, were received from Dr. G. G. SPILSBURY.

### VIII.—Miscellaneous.

#### 1.—Influence of Colour on the Absorption and Exhalation of Odorous Principles.

The *Philosophical Transactions*, for 1833, contains an account of Dr. STARK'S very curious experiments on this novel subject. He had observed that when wearing a dark coloured dress he always brought away from the dissecting room an intolerable smell, which was never remarked to the same extent in light-coloured clothes. This circumstance led him to examine the subject much after the simple and successful plan of Doctor WELLS'S experiments on dew and radiation: and indeed the results follow precisely in the same order, and shew an analogy between light, heat, and odour, in their reception and discharge by coloured substances, which may hereafter furnish an argument for the materiality of the two former.

Equal weights of black, blue, green, red, yellow, and white wool, cotton, and silk were severally and collectively exposed to an atmosphere of *asafoetida*, or of camphor, and were invariably found to the sense impregnated with odour in the order set down: as however no perceptible gain of weight was acquired, it was desirable to devise some means of confirming the evidence of smell

For this purpose, a vessel of tin was prepared, in the upper part of which the several substances were freely suspended, while camphor was gently heated and volatilized from an iron plate below. Pieces of card of the same weight and size, and painted of the colours mentioned, were also employed, and the results were very uniform; thus, the gain of weight in several experiments was as follows, on an original weight of 10 grains.

	Exp. 1.	Exp. 2.	Exp. 3.	Exp. 4.	Exp. 5.
Black gained	0. 3 gr.	1. 2 gr.	—gr.	1. 0 gr.	0. 9 gr.
Dark blue	—	1. 2	—	—	0. 8
Red	0. 2	1. 0	1. 0	0. 9	—
Green	0. 25	1. 0	—	—	—
Brown	—	—	0. 9	0. 7	0. 4
Yellow	—	—	0. 5	0. 5	0. 3
White	0. 1	0. 7	0. 02	0. 4	0. 1

In all these experiments the black attracted most, the blue next; then followed the red and green; and after these the yellow and white. Dr. STARK next directed his attention to the comparative attraction of animal and vegetable substances, the results of which may be thus summed up:

	Exp. 1.	Exp. 2.	Exp. 3.	Exp. 4.
Silk gained	3,5 gr.	1,4 gr.	0,2 gr.	1,9 gr.
Wool	2,4	0,5	0,1	1,5
Cotton	2,2	0,4	0,05	1,0
Card	—	—	—	0,4

Every one must have remarked, that silk dresses imbibe a powerful odour, from which cotton ones are comparatively free:—woollen cloth appears to be intermediate. The intensity of the smell however must evidently depend on the celerity with which odours are *given out*, not imbibed: to this third point therefore the author gave his last attention, and it was satisfactory to find that the *radiation*, if it may be so termed, of odours obeyed exactly the same law as its absorption. Thus, the sets of cards, after having been exposed as above to the vapour of camphor and weighed, were left in an open apartment for 24 hours; the losses sustained were in the following ratio.

	Exp. 1.		Experiment 2.	
Black lost	1,0			
Dark-blue	1,0	0,9	0,03	0,87
Dark-brown	0,9	0,8	0,1	0,70
Orange red	0,8	0,6	0,2	0,40
Yellow	—	0,5	0,1	0,40
White	0,5..	0,4	0,3	0,10

The practical conclusions to be derived from this valuable train of observations are numerous. The use of airing clothes and linen:—the advantages of wearing light-coloured and especially white dresses in all countries where contagion is rife;—the danger of close assemblies of sombre costumes; such as courts of justice, funerals, &c.:—the advantages of white-washing walls; are all too palpable to need comment. Dr. STARK gives instances of the baneful effect of black dress in absorbing the hurtful emanations of fever patients in a public hospital: and he cites the sessions of Oxford in 1577, where the smell of the jail imbibed from the numerous prisoners caused the death of the judges and several of the black-robed counsellors. At the Old Bailey, in 1750, four judges, three or four counsel, the under sheriff, several of the jury, in all forty persons were attacked and died of jail fever, imbibed in a similar way. May it not be from an experience of the unfitness of dark dresses for hot climates that they are so seldom seen among the natives, and may not their healthiness and freedom from plague be attributable in part to this cause, as well as to the cleanliness wisely prescribed by their lawgivers? Certainly it would be highly agreeable to the temperament of Europeans in this country were some wholesome regulation promulgated, dispensing with sable habiliments under all circumstances. The offensive odour they exhale, as well as imbibe—the impossibility of washing them—their imparting a stain to other clothes, and to the body, when in a state of moisture, render them disagreeable alike to the spectator and to the wearer. The disciples of Hygeia in this country have long since lain aside their European livery, and there seems no reason why the other twain of the “three black sisters, law, physic, and divinity,” should not extend the same indulgence to their votaries of the cloth and of the gown, whose occupations peculiarly expose them to the pernicious influences of bad air and crowded assemblies.

## 2.—Chinese Method of making Gongs and Cymbals.

[Extracted from the Chinese Encyclopedia called *Tian-kong-kai-wo*, by STANISLAS JULIEN. *Annales de Chimie*, Nov. 1833.]

“Copper, for musical instruments, must be alloyed with pure mountain tin, perfectly devoid of lead. The proportion for gongs\* (*lo*) is eight lbs. of copper and two

\* The French word is *tam-tam*, but in India we understand by that expression a native drum.—ED.

lbs. of tin. For small bells and cymbals, the two metals must be purer than for gongs.

The gong must not be cast of the necessary form, and afterwards forged under the hammer: but first a thick disc must be cast, then cut round and forged. If large, the instrument must be laid on the ground, and four or five workmen employed to hammer it. By degrees it spreads and rises on the edges, when it begins to give out sounds like those of a musical cord from the points struck by the cold hammers.

In the centre of the plate a boss or knob is left, on which the blow is to be given:—two sorts of sound are recognised, the male and female, depending on the form and projection of the boss.

On doubling the blows of the hammer, the instrument gives out a grave tone.\*

To this unsatisfactory extract M. DARCEY has appended a note, of which the following is the purport.

The analysis of seven *tam-tams* and 22 Chinese cymbals confirmed the composition stated of 80 copper + 20 tin\*: it contains no bismuth. This compound metal is well known to be as brittle as glass, and far from submitting to the hammer after being cast it would hardly bear the blow of a striker. Moreover it is more brittle when heated, and may then be pulverised. This alloy is also dense, the fracture a fine grain like bell-metal, whereas the gongs and cymbals are of less specific gravity, a fibrous structure, and a colour similar to that of an alloy of 90 C. + 10 T, or gun metal: they may be hammered out and bent with ease.

It is evident, therefore, that there must be some secret in the fabrication of these instruments, and this M. DARCEY supposes to be the mode of tempering. In fact he finds that the alloy in question raised to a cherry-red heat, and then plunged into cold water, assumes all the properties of the *tam-tam* and cymbal metal:—This skilful chemist has constructed more than 60 pair of cymbals thus, and always found the simple expedient successful. The Chinese account is entirely silent as to any such treatment of the alloy.

After tempering, however, the alloy is still much too brittle to be worked under the hammer:—the Chinese workmen must therefore have deceived the author of the article; and the translator is also at fault in supposing that it is more easily forged hot.

The method followed in China is thus conjectured by M. DARCEY: An exact model of the instrument required in lead or pewter is first made†, over which a mould of sand or clay is made. The alloy is fused, cast into an ingot, remelted and cast into the mould‡.

The cast is then dressed (*ébarbée*) and tempered like steel. The tone may be regulated by the higher or lower temper given, or by gentle blows over the surface to shape and finish it. France now rivals China in the excellence of her cymbals and *tam-tams*.

\* This is also the composition of the Japanese mirrors. See Journal As. Soc. vol. i. p. 243.—ED.

† This is a very common practice in India.—ED.

‡ Probably the Indian mode of attaching the mould to the top of the crucible is followed, as by this means it is warmed and receives the metal freely.—ED.

IX.—*Catalogue of Birds (systematically arranged) of the Rasorial, Grallatorial, and Natatorial Orders, observed in the Dukhun by Lieut.-Colonel W. H. SYKES, Bombay Army, F. L. S., F. Z. S., &c. &c.*

[Continued from p. 543.]

ORDER III. RASORES, M.

Fam. Columbidae, Leach.—Genus *Ptilinopus*, Swains.

138. *PTILINOPUS ELPHINSTONII*. *Ptil. supra fusco-brunneus; corpore infra, capite, colloque cinereis; cervice nigro, plumis ad apices guttâ albâ notatis interscapulis rubineis; collo pectoreque smaragdino, uropygio cinereo, nitentibus; remigum 2dâ, 3dâ, 4tâ et 5tâ pogonitis externis excavatis.*

*Irides* ochraceo-flavæ. Longitudo corporis 10.3 unc., caudæ 5.5.

This very fine bird, forming a link between the Pigeons proper and *Vinago*, has quite the figure and air of *Ptilinopus porphyreus*, figured in Stephens, vol. 14. (*Columba porphyrea*, REINW., TEMM., Pl. Col. 106); but is much larger: it is a rare bird in Dukhun, and met with only in the dense woods of the Ghauts. Not gregarious. Stony fruit found in the stomach. Sexes alike. Flight very rapid. The lateral skin of the toes is very much developed.

Genus *Columba*, Auct. Pigeon.

139. *COLUMBA MEENA*. *Col. capite, collo, interscapulis, gastræque saturatè vinaceis, ventre dilutiore; crisso, caudæque tegminibus inferioribus apiceque albis; tergo uropygioque arduisacis; tegminibus caudæ superioribus ad apices vinaceis; scapularibus alarumque tegminibus nigris, castaneo latè marginatis; remigibus caudæque fusco-brunneis, illis castaneo marginatis; tegminibus alarum inferioribus cinereis; collo utriusque nigro maculato, plumis cærulescenti-albido ad apices marginatis.*

Fœm. *Crisso dilutè vinaceo; tegminibus caudæ inferioribus pallidè cinereis; rectricibus 4 intermediis albo haud terminatis.*

*Irides* aurantiacæ. *Rostrum* pedesque flavescentes. Longitudo corporis 8 unc., caudæ 5.2.

*Brown and Chestnut Dove. Hhulgah* of the Mahrattas.

This species might be mistaken for the European *Col. Turtur*, but on comparison, is found to differ in the whole head, neck, shoulders, breast, and belly, being richer vinaceous; in the back and rump being ash, and vent and under tail-coverts in the female light cinereous; in the four upper tail-feathers in the female being red brown without white tips; in the upper tail-coverts being tipped with faint chestnut; in the forehead and chin not being dull white; in orange *irides* instead of yellow; and finally in its greater size. Gregarious. Found only in the woods of the Ghauts. Webs of 2nd and 3rd quills narrowed as in the *Ptilinopus*.

140. *Columba tigrina*, Temm., Fig. Pl. 43. *Surat Turtle*.

M. TEMMINCK's figure does not sufficiently develop the dove-coloured or ochrey tips to the feathers of the back and wing-coverts, and the tips of the centre feathers of the tail are coloured reddish instead of being white. A remarkable feature in this bird is unnoticed in the description of it, namely, the elongated and subulated tail; unlike the last or most other species of *Dove*, instead of widening towards the tip, it is widest at the base when closed, and gradually narrows to the extremity; in fact, each feather is subulate. *Irides* lake colour or pinkish red. Sexes exactly alike. Found on the skirts of the woods in the Ghauts. Length, inclusive of tail, 12 inches: tail, 5 inches.

141. *Columba humilis*, Temm., Pl. Col. 258 et 259. *Columbe terrestre*.

M. TEMMINCK says that this bird "vit habituellement à terre," but from long observation, Colonel SYKES can testify that this supposed habit is no more characteristic of this species than of any other *Dove* in his possession. Gregarious. Not an inhabitant of the woods, but affecting mango-tree groves in the neighbourhood of cultivation. Length, inclusive of tail, 9.4 inches; tail 3.4. Tail, as in the last species, narrower at the extremity than at the base when closed.

142. *Columba risoria*, Linn. *La Tourterelle à collier du Sénégal*, Buff. Ois. 2, 560 and 553. pl. 26. Pl. Enl. 161 & 244. Le Vail., Ois. d'Afr. 6. pl. 268.

Length, inclusive of tail, 13.5 inches: tail 5 inches. Gregarious, and common in the open country. Sexes alike. In spite of the proverbial gentleness of the *Dove*, Colonel SYKES has seen these birds fighting with the most inveterate hostility; seizing each other by the bill, and rolling upon the ground together. Outer webs of 2nd, 3rd, and 4th quillfeathers hollowed.

143. *Columba Cambayensis*, Lath. Ind. Orn. 2. sp. 56. Temm., Fig. pl. 45.

Colonel SYKES's bird is identical with the species figured in M. TEMMINCK's plate, but it does not correspond with the description of the *Col. Cambayensis* of SHAW, vol. ii. p. 79. This species is distinguished from all other *Doves* with which

Colonel SYKES has met, by the square red spots on the black patches on the side of the neck. Sexes alike. Frequents gardens and stable-yards. Length, inclusive of tail, 11.8 inches : tail 5.5 inches.

144. *Columba (Enas, Linn. Stock Pigeon, Parva of the Mahrattas.*

The most common bird in the Dukhun, congregating in flocks of scores, and a constant inhabitant of every old dilapidated building. Colonel SYKES saw the same species on board ship on the voyage to England, brought from China. *Irides*, orange. Sexes alike. Length, inclusive of tail, 14.3 inches : tail 4.3 inches.

The Dukhun bird differs from the European species in the bill being black instead of pale red, in the utter want of white or black in the quills, the want of white in the tail-feathers, and in the legs being brown instead of black. As these differences are permanent, they might justify a specific name being applied to the *Dukhun Pigeon*.

Fam. *Phasianida*, Vigors.—Genus *Meleagris*, Linn. Turkey.

145. *Meleagris Gallopavo*, Linn.

The Turkey is met with only in the domestic state : it is reared in great numbers by the Portuguese.

Genus *Pavo*, Auct.

146. *Pavo cristatus*, Linn. *Pea-fowl, Mohr of the Mahrattas.*

The wild *Pea-fowl* is abundant in the dense woods of the Ghauts : it is readily domesticated, and many Hindoo temples in the Dukhun have considerable flocks of them. On a comparison with the bird as domesticated in Europe, the latter is found, both male and female, to be absolutely identical with the wild bird of India. *Irides*, intense red brown.

Genus *Gallus*, Briss.

147. *Gallus giganteus*, Temm., Gall, Ind. 633.

Known by the name of the *Kulm Cock* by Europeans in India. Met with only as a domestic bird ; and Colonel SYKES has reason to believe that it is not a native of India, but has been introduced by the Mus-sulmans from Sumatra or Java. The *iris* of the real game bird should be whitish, or straw-yellow. Colonel Sykes landed two cocks and a hen in England in June, 1831 : they bore the winter well. The hen laid freely, and has reared two broods of chickens. The cock has not the shrill clear pipe of the domestic bird, and his scale of notes appears more limited. A cock in the possession of Colonel SYKES stood 26 inches high to the crown of the head, but they attain a greater height. Length from the tip of the bill to the insertion of the tail 23 inches. Hen, one third smaller than the male. SHAW very justly describes the habit of the cock, of resting, when tired, on the first joint of the leg.

148. *Gallus Sonneratii*, Temm. Gall. Ind. 659. *Jungle Cock. Rahn Komrah of the Mahrattas.*

Very abundant in the woods of the western Ghauts, where there are either two species or two very strongly marked varieties. In the valleys at 2000 feet above the sea, *Sonnerat's* species is found, slender, standing high on the legs, and with the yellow cartilaginous spots on the feathers even in the female. In the belts of wood on the sides of the mountains, at 4000 feet above the sea, there is a short-legged variety ; the male has a great deal of red in his plumage, which *Sonnerat's* has not ; the female is of a reddish brown colour, and is without cartilaginous spots at all : in fact, the female of this variety is the *Gall. Stanleyii* of Mr. GAY's 'Illustrations.' Eggs exactly like those of the domestic fowl in form and colour, but less in size. The wild hen would appear to sit on a much smaller number of eggs than the domestic, as Colonel SYKES shot a hen upon her nest in which were only three eggs, and the process of incubation had evidently commenced some days. In the craw and stomach of many birds nothing whatever was found, excepting the seeds of a stone-like hardness called *Job's tears* (*Coix barbata*.) *Irides*, brownish deep orange. The crow or call of this species is like that of the *Bantam Cock*.

149. *Gallus domesticus*, Ray. *Phasianus Gallus cristatus*, Linn.

The *domestic fowl* is so abundant in the Dukhun, that in parts of the country not much frequented by Europeans, Colonel SYKES has bought from eight to twelve full-grown fowls for two shillings. Many of the hens, particularly of the villages in the Ghauts, are not to be distinguished from the wild bird ; excepting only in the want of the cartilaginous spot on the wing-coverts.

150. *Gallus Morio*, Temm., Gall. Ind. 660. Briss., Orn. 1. 174.

This supposed species very frequently occurs accidentally in the Dukhun. Although unsightly, the black fowl is very sweet eating.

151. *Gallus crispus*, Temm., Gall. Ind. 661. Briss. Orn. 1. 173. pl. 17.

Occurs abundantly like the last variety.

Genus *Numida*, Linn. *Pintado*.152. *Numida Meleagris*, Linn. *Guinea Fowl*.

Met with only in the domestic state, and bred almost exclusively by European gentlemen. Thrives as well as in its native country.

Fam. *Tetraonidae*, Lesch.—Genus *Coturnix*, Cuv.

153. *Coturnix dactylosonans*, Temm., Gall. Ind. 740. *Tetrao Coturnix*, Linn., Syst. Nat. 1. 278, 20. *Lohak* of the *Mahrattas*. *Large Grey Quail*.

Rare in the Dukhun, and found only in pairs in tufts of grass near water-courses and ponds. Resembles the *Quail* of Europe in size and plumage: the *irides* are dusky red or reddish brown, like those of the European bird, which by mistake are described in SHAW as yellow. Female a little larger than male: one female measured 8 inches, inclusive of tail of 2 inches, but this was a large bird. Period of incubation in the monsoon.

154. *Coturnix textilis*, Steph., 11. 365. *Perdix textilis*, Temm., Pl. 35. *Perdix Coromandelicæ*, Lath., Ind. Orn. 2. 654. 38. *Black speckled-breasted Quail*.

*Irides*, dusky red. Length 6.1 inches, inclusive of tail of 1.5 inch. In pairs in the monsoon; gregarious the rest of the year. Very abundant in *Jowarce* fields, (*Andropogon Sorghum*.)

155. *COTURNIX ARGOONDAN*. *Cot. suprà rufescenti-brunnea, fasciis angustis dilutè ferrugineis notata; infrà soridè alba, fasciis equidistantibus nigris; fronte mentoq; ferrugineis; strigà superciliari rufescenti-albidà.*

Fam. *Fasciis magis obscuris.*

*Irides* fusco-rubre. *Rostrum* nigrum. *Longitudo corporis* 5 unc., *caudæ* 1.5. Always gregarious; frequenting only rocky places, or amidst low bushes. The covey rises with a startling whirl. Flight very short. Pugnacious, and used by the natives for combat.

156. *COTURNIX PENTAI*. *Cot. suprà saturatè brunnea; infrà rufescenti-albidà nigro fasciata; ventre crissoque albidò-ferrugineis; interscapullio scapularibusque nigro maculatis, plumarum rhachibus dilutè flavis; remigibus brunneis pallidè ferrugineo maculatis; strigà superciliari soridè albà; mento rufescente.*

Fam. *Infrà rufescens, haud fasciata; plumarum rhachibus albis.*

*Irides* ochraceo-brunneæ. *Rostrum* rufescenti-brunneum. *Pedes* flavescentes.

*Longitudo corporis* 5.3 unc., *caudæ* 1.7.

Has the habits and somewhat the appearance of the last species, but is found only on the most elevated table-lands and slopes of the mountains, amidst reeds and grass. Colonel SYKES's specimens were shot at 4000 feet above the sea.

157. *COTURNIX ERYTHORHYNCHA*. *Cot. suprà saturatè brunnea, infrà dilutè castanea, nigro (preter ventrem medium) undequaque guttata maculataque, scapularium maculis maximis, pectoris guttis minimis; scapularium tegminunq; alarum superiorum albo fasciatarum rhachibus albis, crucem efformantibus; remigum pognonis externis rufescenti faciatas maculatisque; fronte nigro; strigà frontali utrinque suprà oculum productà gulq;que albis.*

Fam. *Fronte, strigà inde ad utrumque latus ductà, gulq;que dilutè castaneis.*

*Irides* obscurè flavo-ochraceæ. *Rostrum* rubrum. *Longitudo corporis* 5 unc., *caudæ* 1.5.

Colonel SYKES has found this very handsome bird only in the valley of Karleh, where it frequents the same ground as the *black Partridge* (*Perdix picta*). Gregarious and abundant. In closing his notices of the *Quails*, Colonel SYKES mentioned that grass seeds constitute their principal food.

Genus *Perdix*, Biss. *Partridge*.

158. *Perdix picta*, Jard. & Selby, Pl. 150.

This is called the *black partridge* in Dukhun, by Europeans. It affects uncultivated tracts in the country, covered with tufts of rank grass and low bushes, where it is abundant. Colonel SYKES has never met with it in gardens. The call of the male is a kind of broken crow. Sexes exactly alike. *Irides*, reddish dark-brown. Length, inclusive of tail, 10 inches: tail 2.5 inches. Does not roost on trees.

Genus *Francolinus*, Steph. *Francolin*.

159. *Francolinus Ponticerianus*, Steph. 11. 321. *Perdix Ponticeriana*, Lath., Ind. Orn. 2. 649. 18. Temm., Pl. Col. 213. *Ferruginous and Grey Francolin*. *Teetur* of the *Mahrattas*.

Called a partridge in the Dukhun, where it is one of the most common birds, frequenting gardens and cultivated lands. *Irides* intense red brown. Length, inclusive of tail, 14 inches: tail 3.6 inches. Not met with in the Ghauts, unless in well cultivated valleys, and not at all on the mountains. Roosts on trees; and Colonel SYKES has on more than one occasion shot them on trees during the daytime; but this is a rare occurrence.

[To be continued.]

*Meteorological Register, kept at the Assay Office, Calcutta, for the Month of November, 1834.*

Day of the Month.	Barometer reduced to 32° Fahr.				Thermometer in the Air.				Depression of Moist-bulb Thermometer.				Hair Hygrometer.		Rain.	Wind.			Weather.				
	At 4 A.M.	At 10 A.M.	At 4 P.M.	At 10 P.M.	Minimum at 4 A.M.	At 10 A.M.	Max. by Reg. Ther.	At 4 P.M.	At 10 P.M.	At 5 1/2 A.M.	At 10 A.M.	At 4 P.M.	At 10 P.M.	At 10 A.M.		At 4 P.M.	Inches.	Morning.	Noon.	Evening.	Morning.	Noon.	Evening.
																		o.	n.	o.	rain.	clear.	bright.
1	.966	.934	.950	.926	77.2	80.0	104.	82.0	77.4	3.4	7.8	11.3	4.4	88	78					rain.	clear.	bright.	
2	.916	.900	.908	.962	75.6	79.5	104.	82.4	77.2	2.8	8.1	12.8	4.2	85	75					clear.	do	do	
3	.966	.997	.936	.988	74.7	80.5	102.	81.9	77.2	1.6	9.3	9.7	2.6	84	83					do	do	do	
4	.945	.996	.890	.953	74.5	79.4	103.	81.7	78.5	1.5	7.0	9.9	3.4	89	84					do	do	do	
5	.912	.964	.886	.935	73.5	79.4	88.7	81.1	75.6	1.2	6.1	7.4	2.7	93	89					do	do	cloudy.	
6	.936	.970	.870	.906	73.2	77.5	76.9	77.4	72.0	0.5	4.6	4.5	1.3	90	98					do	do	showers.	
7	.873	.950	.880	.930	71.	76.4	98.	79.4	75.	0.4	4.9	6.4	2.0	96	93					rain.	clear.	cloudy.	
8	.910	.962	.914	.968	72.2	76.1	99.	80.7	74.1	1.7	5.6	9.0	1.4	92	84					clear.	hazy.	clear.	
9	.949	.911	.929	.983	70.3	77.1	102.	80.3	74.6	1.2	9.1	11.6	4.0	83	78					do	do	do	
10	.924	.966	.916	.973	71.5	78.9	101.	80.1	74.3	2.5	8.3	10.4	3.2	85	80					do	do	bright.	
11	.935	.984	.934	.980	70.	75.9	101.	78.7	74.	1.0	8.7	11.9	3.6	85	88					do	do	do	
12	.936	.950	.940	.986	70.4	75.9	103.	79.5	73.0	2.1	7.9	10.8	3.4	88	80					do	do	bright.	
13	.958	.939	.976	.989	68.6	76.3	102.	78.7	73.9	2.0	9.8	10.3	1.6	82	85					do	do	clear.	
14	.974	.950	.981	.921	69.4	76.7	101.	78.7	73.5	1.7	8.5	10.2	2.0	86	83					do	do	bright.	
15	.908	.948	.944	.930	70.	76.5	102.	78.6	75.0	1.9	6.7	10.3	2.5	91	82					do	do	fog.	
16	.909	.978	.932	.907	70.8	76.0	93.	78.4	71.3	1.7	5.9	9.1	1.1	92	85					do	do	cumuli.	
17	.964	.970	.973	.932	70.1	76.0	99.8	79.3	73.2	2.1	5.9	9.6	1.8	92	84					do	do	cumuli.	
18	.912	.962	.974	.968	70.8	76.4	99.	79.2	75.0	2.0	6.9	8.9	2.7	91	85					do	do	cumuli.	
19	.915	.940	.980	.918	69.2	76.8	101.	78.5	72.7	2.0	8.1	9.9	2.7	96	82					do	do	do	
20	.944	.966	.956	.969	69.7	75.5	92.5	78.6	72.2	2.3	6.7	8.9	1.6	91	85					do	do	do	
21	.944	.964	.966	.961	69.	75.9	100.	78.9	73.2	2.4	6.0	10.2	2.2	93	82					do	do	do	
22	.946	.954	.962	.930	70.	76.5	100.	77.5	73.2	2.3	0.0	10.8	2.0	83	71					do	do	do	
23	.962	.968	.960	.921	70.6	74.8	94.	78.1	71.5	2.5	2.3	10.4	3.7	90	81					do	do	do	
24	.936	.922	.920	.901	70.6	75.3	97.8	78.7	70.1	2.8	7.5	11.1	2.0	89	79					do	do	cloudy.	
25	.922	.978	.998	.967	68.7	74.8	94.	77.6	73.2	1.7	8.5	10.0	4.3	86	84					do	do	do	
26	.972	.929	.914	.961	67.8	74.3	98.4	78.4	73.	2.8	6.4	11.1	7.0	83	80					do	do	do	
27	.932	.914	.900	.959	68.2	74.1	101.	78.4	71.9	3.1	4.8	7.7	10.9	89	89					do	do	do	
28	.954	.938	.938	.911	69.8	74.9	95.	77.5	71.	4.1	7.0	11.1	6.0	89	89					do	do	do	
29	.964	.970	.963	.946	65.7	74.6	92.	77.0	70.4	4.3	6.5	11.0	6.4	88	78					do	do	do	
Mean.	.963	.921	.931	.931	71.2	79.2	98.1	79.4	74.1	2.2	7.5	10.1	3.7	88.7	82.1								

Light N. airs. Fine and seasonable.

The instruments and localities as usual. The Barometer has been compared with Captain HENNING'S Marine Barometer from England (which had been adjusted with the Royal Society's Standard Instrument), and found just 0.010 inch lower than the Roy. Soc. Bar. The maximum thermometer is found to be exact to the sun's rays at this season. On the 5th and 6th there was a severe storm in the Bay, by which the Sophia was damaged.

# JOURNAL

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## THE ASIATIC SOCIETY.

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I.—*Some Account of the Territory and Inhabitants of Naning, in the Malayan Peninsula. By Lieut. J. T. NEWBOLD, 23rd Regiment, Madras Native Infantry.*

*Topography.*—Naning is an inland territory; its mean length north and south, about forty miles, by an average of ten in breadth, giving 400 square miles. The boundary to the northward was never clearly defined till the 9th of January, 1833, when Mr. WESTERHOUT, the Superintendent of Naning, came up to Sunjie Seepoot, a village near the frontier, to meet the Rumbowe chiefs, with a view of determining the respective boundaries of the two territories.

An agreement was here drawn up, and signed by the Raja MUDA, the Panghulu of Rumbowe, Maharaja LILAH, and the eight Sukes, and by Mr. WESTERHOUT and two witnesses on the part of Government.

The boundary line agreed on, commences at Qualla Sunjie Gernee, thence to Bukit Bertram, thence to Bukit Jelatang to Bukit Puttoos, thence to Jeerat Gunjie, Lubo Talan, Duson Feringie, Duson Kapar, and Ooloo Songa, to Bukit Puttoos\*. By this arrangement a spot fertile in tin, and a small access of territory, have been gained to Government.

\* The boundaries of Naning with Johole and Malacca have been fixed, since the writing of this memoir—with the former, the line extends from Bukit Puttoos to Bukit Battang Malacca, and terminates at Mount Ophir. The Malacca line commences at Mount Ophir, and thence taking a south-westerly direction, passes through Rambotan Gading, Battle Bakawat, Bukit Lansat, Bukit Badorie, Bukit Panchoor, Pankalan Sumpit, Qualla Sunglepattye, Campong Kodia Pacho, Pondo Sassum, Pondo Panjang, Pondo Battu, Bukit Kaya Arang, Bukit Pembagian, Ramoun Chino Kechil, and Tebbing Tingih. From Tebbing Tingih to Qualla Londono, the Rumbowe river is the boundary between Naning and Rumbowe to Qualla Surgie Gernee.

This line with part of Johole, and Mount Ophair forms the eastern and northern boundary ; to the southward, Naning is bounded by the Malacca and Assahan territory ; on the west by Malacca, and the left branch of the Lingie or Rumbowe river.

The face of the country presents an undulating extent, interspersed with high knolls thickly clothed with jungles ; the hollows, or rather flats between these undulations, where the water lodges in the rainy season, average 70 or 80 yards in width, and either form a swamp or paddy-ground, according to the industry or otherwise of the natives in the vicinity.

The soil on the high grounds is red and gravelly generally ; on the flats, soft and whitish. Pipe-clay is found in some parts, as also a rich black soil.

Naning has only three streams, scarcely to be called rivers—Sungie Rumbowe, Sungie Malacca, and Sungie Londoo ; of these, the Rumbowe stream is much the largest. It enters Naning from Rumbowe near Qualla Maraboo, whence it makes its exit into the Malacca territory, a little below the place where it receives the waters of Sungie Londoo. It is here nearly 16 yards broad, and passable for troops in dry weather. In the rains it is not fordable.

Trees thrown across here and there constitute the only bridges : boats come up, but their supply is precarious.

This and the Lingie river unite below Sempong, a tongue of land belonging to Rumbowe, which is formed by the division of the two streams, about six miles below the north-western extremity of Naning, and nearly midway between it and the sea, where it empties itself, dividing the Malacca and Salengore territories about 24 miles to the northward of Malacca. Up to Sempong its mean breadth is 180 fathoms : soundings at the mouth (high-water and spring-tides) seven and eight fathoms. The tide barely reaches to the Naning territory.

Sungie Londoo is a small stream taking its rise at Bukit Kayu Arang, or the Ebony Hills in the Malacca territory. It enters Naning near Cahow, taking an almost northerly course, and emptying itself into the Rumbowe river below Si Maraboo.

Sungie Malacca is formed of two branches, taking their rise, the one in the hills of Rumbowe, the other near Battang Malacca, in Naning ; they unite near Sabang, taking a westerly direction, and quitting Naning near Sungiepattye, fall into the sea at Malacca, having an embouchure of about 16 yards wide. In the wet season it is navigable for provision and baggage boats to Ching in Malacca, and thence by Malayan canoes (sampana) to Sabang in Naning.

Throughout Naning it is fordable in dry weather, but not in the rains; it is crossed at short distances by the usual Malay rude foot-bridges.

Its bed is generally sand and gravel; the banks grassy and sandy; in some parts steep. Besides these streams, there are many small rivulets not worthy of notice.

The native roads are merely foot-paths, cut and cleared constantly by the Malays as they pass along with their Parangs, which a Malay is seldom or never without.

There are vestiges of a road here cut by Colonel FARQUHAR, from Malacca to Sahang in Naning, which it enters near Malacca Sinda; but from neglect it is little better than the native foot-paths.

The Malay roads run over the bunds of the paddy-fields, which frequently break down, leaving a deep puddle, over which they throw a bamboo or two as a bridge; their streams and rivulets boast of nothing better than a couple of trees felled carelessly across their course, with sometimes a slight bamboo as a hand-rail.

These paths if little travelled on by the Malays are liable to serious obstruction, particularly in a military point of view, from the numerous forest trees blown down by the wind, or falling through the decay of age.

I have seen in a remote part of this country, the path as effectually barricaded by this accidental obstruction, as if a body of Malays had been at work to cut off our communications.

A military road of communication between Taboo (the wretched capital of ABDUL SYED, situated nearly on the frontier of Naning), was opened during the operations in 1832, following in parts the old Malay foot-path. It enters Naning at Sungiepattys, passes through Alor Gajah (now FORT SISMORE, our chief military post), over the shoulder of the hill of Bukit sa Booseh to Taboo, where it terminates about three and a half miles from "Kubur Feringie," (the ancient tomb of a Portuguese in the jungle,) on the Rumbowe frontier, to which territory a path through a dense forest leads.

The Taboo road was constructed on excellent principles, for the service for which it was intended; a thick and lofty forest has been cleared to the extent of from 70 to 100 paces on either side, precluding the possibility of trees falling or being felled across. The low underwood in the intermediate space was burnt so as to afford the lurking Malay no shelter. Brushwood and branches of trees, secured on either side, by strong piles, and layers of gravel thrown over the whole, enable the guns and provision carts to pass with ease the numerous Sawahs and marshes.

From the Naning road, at its entrance into the Naning territory at Sungiepatte, branches another nearly due west, leading to Sungie Baru, a cultivated district, distant about nine miles. This has been constructed since the cessation of hostilities. Another road to Sabang, (one of the most populous places in Naning, and a military post, about four miles from Alor Gajah,) branches off in an easterly direction. From Sabang there is a bullock road to Taboong, the most easterly of the Naning outposts, eight miles distant from Sabang; also a bandy road to Taboo, which joins the road from Alor Gajah, shortly after entering the Taboo lines. From Sabang are also roads to the outpost of Qualla Eena and Pellowe, three or four miles distance from thence.

Water is plentiful, and may easily be got, two or three feet below the surface, on the slope of the rising grounds. It is often of an acidulous mineral taste, but is not accounted unhealthy by Europeans.

There is a hot sulphureous mineral spring near Sabang, the water of which is esteemed by the Malays as very beneficial in cutaneous diseases. I have rarely passed without seeing some diseased native having his contaminated person in the steaming liquid. There is also a hot-spring in the jungle near Taboo: the natives say that the temperature of this is much greater than that of the Sabang spring. I have not been able to discover that a volcano has ever existed in Naning, nor are there any volcanic remains visible.

A small portion of gold is, I understand, to be found in Naning, and tin in considerable quantities; but it wants a more industrious and energetic population to turn these advantages to account. Mr. WASSERHOFF, Superintendent of Naning, has established a tin mine at Londis, about two and a quarter miles from Taboo; of the produce of which and the ore I possess very favorable specimens. The charcoal used by the Malays for roasting and smelting the ore is that of the Compas and Kamounia wood. The following is a translation of the simple Malay mining process, given me by a Malay miner:—"Excavate the ground to the depth of a man; if there be ore, you will find it like small dark stones; then make a channel to drain off the water. This done, construct a furnace, like the one used in burning lime, with a fannel beneath, to allow the fused metal to escape: heap it with the ore and Compas or Kamounin charcoal, set fire to and blow it, and the metal is produced." Straits tin is now selling at 13½ dollars to 14½, and Banca from 15 to 15½, per picul. The natives' mines are very superficial, seldom more than from six to twelve feet deep, and as many in length and width. The process will be more fully described hereafter.

*Produce and Trade.*—The chief produce of Naning is rice, timber, and fruits; of the former, the produce averages 70 gantams to one

sown. There is one crop a year. The inhabitants carry on a trade with Malacca, in timber for house-building, and in fruit; the rice is generally used in home consumption.

Gambier, rataas, 21 varieties of Kaladi, jaggery, dammer, together with a small quantity of pepper, pán and betel, marabow, compass, ebony, and kamounin wood, with wood-oil, and a little inferior coffee are likewise found; pepper and gambier were much more cultivated than at present, the diminution is to be ascribed to the present low prices these two articles bear in the market.

Pepper to pay well ought to fetch seven dollars per picul, the price now varies between five and six. Gambier sells at 3 and 3½ dollars; it has been stated that Naning produces annually three hundred piculs of tin, sixteen thousand gantams of paddy, and a quantity of coir-ropes.

Sago, Nibang, Ranjow, Areca, and Jack trees are plentiful.

I possess lists of ten different varieties of cocoanut trees, of which the "Klapa Logie," a sweet cocoanut, is most esteemed.

Also thirty-nine varieties of plantain, of which the "Pisang Berangan" and "Pisang Raja" are the best; the odoriferous Dorian is accounted by Malays the first fruit in the world. There are two or three varieties of it in Naning, of which the "Dorian Tambago," and the "Kapatah Gajah," or the "Elephant's Head," are held the greatest delicacies. The Mangis or Mangosteen grows in Naning, an excellent fruit, of which I do not hear that there is more than one variety; Pine-apple, Rambotan, (two varieties) the Duku, the Fampony, the Sangoeh, (three varieties,) the Dalimah, and about fifty others, of which I have lists, as well as most of the jungle trees, with the native mode of cultivation, which for the sake of brevity are omitted.

There are forty-five species of trees in the jungle, of which the fruit is edible, and of which the Naningites availed themselves during the late disturbances. There are fourteen varieties of oranges and lemons, and sixteen varieties of yam, and twenty three of culinary vegetables.

Naning produces most of the animals to be met with on the Malay Peninsula; amongst the principal of which are the elephant, rhinoceros, and tapir, (rare) a variety of tigers, tiger cats, leopards, monkeys, bears, alligators, and guianas, and an endless variety of birds—the Argus pheasant, the peacock pheasant, rhinoceros-horn-bill, humming birds, and a large vampyre bat called the Kaluwang. Snipes are common; but the hare and common partridge are not to be met with. There are a great variety of snakes, and one or two of deer; two varieties exceedingly minute, termed by the Malays the "Plandok" and Napa, the flesh of which is dried and eaten.

The Malays in Naning do not cultivate more rice than is absolutely necessary for their private wants, and the portion annually given up to the Panghulu; this is generally cut in February and March. The principal grain districts are Sabang and Malikie. The Panghulu depended on these places in a good measure for his supplies. Fire-arms and gun-powder are scarce.

Carriage is got with difficulty and expense in Naning. Coolies are the best means of transporting baggage.

The Malays are despicable as an enemy in open ground, or at close quarters, (except the rare Amok,) seldom or never trusting their persons from the protection of a breast-work or trees; when they retreat, they plant Rangows (a sort of wooden caltrop) in their rear. During a war which lasted two months, behind breast-works, between the chief of Rumbowe and a confederacy of minor chiefs against him, after a large expenditure of powder and a disastrous list of bursten Lilahe, the bills of mortality actually amounted to two casualties. In short, their plan is one of incessantly harassing the line of communication, stockading and retreating: the best, in fact, they could adopt in a country covered with forest, and where every tree is a strong-hold, and every road a defile.

Taboo is the only decidedly unhealthy post to Europeans; of the officers who remained there, any length of time, one alone escaped fever.

It is situated, not low, but surrounded by lofty hills, covered with jungle, which, perhaps by impeding the free circulation of air, may contribute to its character for unhealthiness; which it also bears from the natives themselves.

The climate of the interior is not favorable to the long occupation of the country by Indian troops; at all events they would require frequent reliefs. Fever and an obstinate ulcer attacking the legs, are their principal enemies; a slight scratch without attention being difficult to heal.

The ulcer attacks the Malays also; they call it *توكق* *tokah*; they also have a species of leprosy called *كست* *kusta*, and a disease, like cholera, called *انگين طاعون* *angin tuawan*, or the "Wind of Pestilence;" both of these last are deemed incurable in Naning, and the unfortunate sufferer is generally deserted by his friends in his greatest need, or driven into the jungle to perish, as an outcast. Katumbohan *كدمبره* or small-pox, is prevalent. I have not heard that inoculation or vaccination, is known to the natives; at all events, it is not practised; they use refrigerating medicines.

*Population and Revenue.*—The census of 1829, gives the population of Nanning at 3,456 souls, of whom 1,800 are capable of bearing arms, and 911 houses. The revenue is derived from its produce, and has been estimated before the war at 3,000 dollars per annum;—this is probably above the average.

The Panghulu levied an annual tribute, formerly, from every house of five gantams of rice, and two fowls, and two coconuts\*.

The principal villages are those of Sabang, Taboo, Chirara Pootih, Malikie, Battang, Malacca, Sungie Seepoot, and Brissoo Sabang, with the small campongs around, contain 148 houses; they present similar features to other Malay villages; the houses are situated near the edges of paddy fields, and invisible at a distance from the number of coconut and other fruit trees, by which, as well as a Paggah fence, they are usually surrounded; they are straggling, and one village runs into another, in a manner from which it is impossible for a mere observer to know where the one ends, and the other commences.

Taboo, the chief village and former place of residence of the panghulu of Nanning, lies about seven miles from our principal post, Alor Gajah, through an undulating country of jungly hills and uncultivated rice-grounds.

About two and a half miles from camp (Alor Gajah), crowning a small eminence, seventy yards to the left of the road, stood the stockade of Bukit Sabooseh, taken by Captain POULTON's detachment on the 25th May, 1832. This position commanded the Taboo road.

Below this hill, on the Taboo side, lies the village of Malikie, to which the expedition in 1831 penetrated. Farther on, about a mile, in a commanding position on the road, which gradually ascends to it, stood the stockade of Bukit Perling; thence towards Taboo, the descent of the hill is very steep, and as usual, terminates at the foot, in an uncultivated swampy rice-ground.

Perling was decidedly the strongest military position taken up by the enemy, and in some measure deserved the name "The Key of Taboo," bestowed on it, by the Panghulu.

From this up to the Taboo lines, the country on the left bears traces of a better cultivation, and a once numerous population.

The Taboo lines consist of a long mud wall, about eight feet high, and three or four thick, rivetted by stakes and branches of trees laid parallel to each other; this wall runs across the rice-grounds in the front, on the edges of the raised ground, on which grows a thick coconut tope, forming the rear, and containing a burial-ground, with several deserted houses; the lines are 840 feet long. There is a station

\* He also possessed the privileges of Hu Dandin, Pengutan, and Kepala Ayer.

like projection in the centre, the idea of which does the Malayan "Vauban" credit.

The left of the lines terminates in an epaulment, flanked by a steep hill, whilst the right terminates with the tope in a deep swampy rice-ground. The rice-ground in front is traversed by a small rivalet, and flanked by jungle, in which were three small stockades; and on the left by steep wooded hills, on the bottom of which, near the edge of the rice-ground, runs the Alor Gajah road.

In front of the left of the lines rises Bukit Penialangan, or execution hill, (so called from the ex-panghulu's selecting this as his "place de grève,") commanding the lines from right to left: some distance in rear of the burial ground is a mosque, and the building where the *تابو* Taboh or great drum, whence the place derives its name, was placed. The Taboh itself has been displaced, and now lies broken on the ground. The sacred baths of the ex-Panghulu, little sheds, are near this. Here the superstitious Malays were wont to seek a remedy for their maladies from the holy-water into which the sacred foot of the Panghulu had been dipped.

The house of the Panghulu was situated in the midst of an almost insulated cocoanut tope, and surrounded by a high stockade of bamboo, with an imperfect mud breast-work. It has been pulled down by order of Government, partly, I understand, to do away with any superstitious idea entertained by the natives of the Panghulu's future return to it, from the circumstance of its remaining standing.

The village of Taboo itself is a small collection of Malay houses, not amounting to 30, surrounded as usual by topes of fruit trees, and shut in by lofty hills, mostly covered with forest; it is considered unhealthy, as stated before; there are many idle superstitious connected with its environs.

The Rumbowé frontier at Kubur Feringie, through Chirara Pootih, the last Naning village, is distant hence about three and a half miles. Taboo is about twenty-two miles north by west of Malacca.

*Religion.*—The inhabitants of Naning are Muhammedans of the Sufi sect, and were converted in the thirteenth century in the time of MUHAMMED SHAH, the first king of Malacca, prior to which time, it is supposed, that they were of the faith of Buddha; the distinction of Shiah or Rafzi, and Sunni, so common in India and Persia, are unknown to the generality of them, owing perhaps to their Arab teachers. Many being descendants of Arabs, their attention to the rite of Islam is more constant and regular than is to be met with among the Muhammedans of India, from whom also they differ considerably in their rites and ceremonies; though not in their belief in the great principles on which the

religion of Muhammed has its basis. Their criminal laws, though founded in the precepts of the Koran, are by no means so exclusively so as those by which the Indian followers of the prophet guide their conduct.

The *Haj* or pilgrimage to Mecca is here more common. The *Kurban* قربان and *Zakat* زکوٰۃ, sacrificing and giving religious alms, are more general. They circumcise both males and females; the women come out unveiled in public. They Moslems in India are generally Hanifites. The Naningites prefer the doctrines of Imám Sufi.

They devour locusts. Their rites of burial and marriage differ; they esteem the flesh of a buffalo as the greatest luxury; they have no "Urses." They hold three days of the week as lucky to commence any undertaking, viz. Monday, Thursday, and Friday.

In short, the Malay resembles more the Arab in the simple mode of his worship than the Mussalman of Hindustán, tainted and contaminated by the admixture of many Hindu observances and ceremonies.

They have no *Maulavis* nor *Ulimas* like the Mussalmans of India; they observe the five stated daily periods of prayer, as also the postures *Ruku* ركوع, and *Sijdeh* سجده *Itedal* اعتدال, and *Kiam* قيام.

There are four officiating priests attached to each mosque, besides the *Koli* or *Kazi* قاضي who presides over a number of mosques, viz. the *Imam* امام, the *Khatib* خطيب, the *Bilal* \* بلال or *Muessin*, and the *Panghulu Momkim* or *Mukim*.

The immediate religious care of the inhabitants of the *Mukim* (or parish) to which the mosque belongs devolves upon the *Imám*, *Khatib* and *Bilal*.

There are two *Kázis* in Nanning, "SELAHO and SULONG JUMAN," (to both of these priests I am indebted for much of the information collected here on the religious usages obtaining in Nanning;) the former resides at Campong Tengha, near Malikie, the latter at Malacca Pinda. The *Kazi* is guardian to all orphans, who have no near male relations; he is arbitrator in all knotty religious points, which the four inferiors may not be able to decide; he confirms marriages. In the month of Ramzan, or the Malayan *Puasa* فواس, the Naningites present their *Kazis* with the *Fitrát* فطره, in the shape of small donations of rice, generally, one *gantam* from each individual. The *Kazi* receives at the death of any person one "Suku," and at sacrifices, the head of the victim.

The functions of the Imám are principally merged in the performance of the sacred rites of the Muhammedan religion, viz., those under

\* Bilal was the name of the first Muessin in the time of the prophet, and is used by the Malays instead of the term Muessin.

the head of the *Imamet*, the *Mandi*, and *Kafan*, or washing and shrouding of the dead, the *Salat Janasat*, or prayer pronounced over the corpse, previous to interment. The fee of the *Imám* is commonly one "*Sukz*," and the clothes of the deceased. The *Imáms* of Malacca do not perform the duties of washing and shrouding the dead; the office is there executed by the *Bilal*, and in India by the Naib of the Kazi.

The *Khatib*, as in India and Arabia, recites the *Khatbah*, an oration or sermon, in praise of God, the prophet, and his viceregents, on Friday, in the mosque, from the three steps of the *Mimbar*, a species of rostrum; and he performs the *Nikah* or marriage ceremony, for which he receives three *Peraks* (nearly equivalent to six annas), four cubits of white cloth, and a *Tikar*, a sort of mat.

The duties of the *Bilal* are sacrificial; the calling to public prayer, the reciting of the *Talkeen*, the service for the dead, after the corpse has been lowered into the grave. He receives as his fee for this a *Tikar* and one *Perak*. When a goat or buffalo is sacrificed, he receives two fingers breadth of flesh from the victim's neck.

The *Panghulu Momkim* or *Mukim* is an inferior servant of the mosque, which it is his duty to keep clean, and in good order; to remove the bodies of the dead, to assist at burials, to go round the various Campongs and give notice of the performance of public prayer, and to report absentees to the *Imám*. He beats the *Taboh* or great drum of the mosque to assemble all devout Mussalmans to prayer.

The *Talkeen* is sometimes read by this functionary.

The *Imám*, *Khatibs*, *Bilals*, and *Panghulu Momkims* are elected to their several offices, after an examination into their fitness and capabilities, by the *Kazis* and elders; besides the fees already mentioned, they each receive annually from every individual attending the mosque, a present of one gantam of paddy.

There are 16 mosques to the *Momkims* or *Mukims* (parishes) in Naning, viz. these of *Taboo*, *Bukit Tootoo\**, *Pago*, *Taboong Pulu*, *Sonno*, *Brissoo*, *Sunjie*, *Seepoot Londoo*, *Ayer Parlas*, *Tanjong Reemo*, *Padang*, *Sabang*, *Kamooning*, *Pillowe*, *Malacca Pinda*, *Battang Malacca*, and *Malikie*.

Each of these mosques are under the immediate controul of an *Imam* and a *Khatib*; and under them *Bilal*, and *Panghulu Mukim*. The whole of the establishments are superintended by the *Kazis* or *Kalis*, of whom, as previously stated, there are two in Naning.

The mosques are repaired at the public expence, and are generally situated detached from any house or small insular knolla, in the midst

\* This mosque has since been removed to *Kalamia*.

of Sawahs. They are conical shaped buildings of wood raised on wooden pillars, with ornaments of the same material, like the wings of birds at the eight corners of the two roofs, that cover the building like the "flies" of a tent, to which in shape they bear some resemblance; the inner part consists of one spacious room, kept extremely clean, with a wooden *Minbar* or pulpit at one end.

The *Taboh* or drum is generally placed in a small building erected for the purpose close to the mosque. It is a long hollow cone of wood, over the wide aperture of which is stretched the strong hide of a buffalo. Before the time appointed for meeting at public prayers, it is beat by the *Panghulu Momkim*, to give the inhabitants of the surrounding Campongs notice.

There are no minarets to the mosques in Naning. The only one that I have seen in the peninsula is that of the Malayan mosque at Malacca: on the top of this is a gong, which is struck instead of the drum. The graves that are found near the mosques in Naning, are generally those of rich or religious men; poor men being generally buried at a distance.

At the mosques of Bukit Tootoo, near Alor Gajah, are the tombs of the late Raja MUDA of Rumbowe, Rajah ASSIL, who was driven from his dominion by Rajah ALI, and that of ANJA the predecessor of the ex-Panghulu of Naning.

A *Mukim* must consist of 44 houses, the *Khatbah* cannot be read in the mosque until the number be complete.

There are many tombs of men famed for piety interspersed throughout the country, in whose name the people of Naning make vows for the prosperous termination of any object, and go to their tombs to make oblations, &c. They call such tombs *Kramets* كرامت. There is no particular day as in India, in which they conjugate to perform the *عرس* "Urs\*" or pilgrimage.

The most sacred tombs or *Keramet* كرامت in Naning are those at Kala Kantee, Pace Dalam, and Bukit Paion, near Tabo; also those of Khateeb Batani at Londoo, of Dattu Dalon at Sabang, and those at Lubi Koppong and Kalama.

Those mentioned before at Bukit Tootoo of the expelled Rajah MUDA of Rumbowe; and ANJA, the predecessor of the ex-Panghulu of Naning, will, when hallowed by time, become "Kramet," which literally signifies "revered," "venerable," a "miracle;" but it is a term given generally by Malays to the burial places of the early Arabians, who first preached the doctrines of Muhammed on the Malay peninsula.

\* At Malacca there is an annual *عرس* Urs to the tomb of Wali Ismail, or Pulo Besar.

The *Bidda* ٻڌڻ or midwife always attends on the occasions of births; her hire is about a dollar for the forty days, during which it is customary for her to remain.

The new arrival being washed, &c. the father puts his mouth to its ear, and pronounces the *Azda*, or "*Allah Akbar*." On the seventh day, the ceremony of *Bar Chukur* بر جو کر or shaving the head is performed, together with the *Fatehek* فاتحہ, and *Maulood* مولود, a form of prayer used at births.

On the fortieth day, the woman performs the customary ablutions and prayers, and is pronounced clean.

The ceremony of *Berassa Gngi* براسہ گنگی, or filing the teeth, takes place among women before the day fixed for the *Antar Islanjid* انٽر ايسلنجيد, i. e. the day on which it is customary for the bridegroom to send the money for the marriage expences.

It is performed by a woman with a species of fine stone, brought generally from Achin, sometimes a fine steel file is substituted: the patient reclines on her back, during the operation; it lasts about an hour, and has been described to me, as producing a peculiarly harsh and unpleasant sensation, similar to that caused by the action of strong mineral acids. The teeth are generally filed down about quarter of their height. After the operation, the gums not unfrequently remain in a swollen and painful state for two or three days. The *Berassa Gngi* is performed on males at an uncertain period, but generally in early age, and is, as Mr. MARSDEN observes, generally the occasion of some family festival; as, also, is the ceremony of boring the females' ear.

The Malays imagine the process of filing down the teeth as indispensable to personal beauty; together with the subsequent operation of blackening them. This is done by the repeated application of a black liquid termed *Grang*, obtained by burning cocoonut-shells on iron plates.

Marriages are not contracted at so early an age as among the Moslems of India, but, as there, the parties chiefly interested have least to do in selecting their future partners for life.

The alliance is first agreed on by the friends of both parties, generally the matrons.

After this, a few friends of the bridegroom elect, wait upon the bride's father, and present him with a ring and a small donation of clothes; the marriage expences, which are paid by the man's friends, are then agreed on. The *Mahr* مهر or marriage portion of the wife is also paid by the man, and ought to be always a *zahil* of gold, or silver or some other less precious metal, according to his means\*. It is usually fixed at the time of performing the *Nikah* نڪاح, which is done by the

\* It is however generally thirty *Scapie*—a sum nearly equivalent to 20 rupees.

*Khatib*, before two witnesses on each part, and a *Wakel* or agent on part of the bride, who is not present, but remains at home. Then the *Wakel* and two witnesses go to ask her consent as a matter of form; the ceremony is then performed agreeably to the Mohammedan law.

The husband can then, if his wife have attained the age of puberty, carry her to his own house; if not, she remains in her father's house until the desirable event take place.

When the parties are wealthy, a buffalo is killed, and the friends of both parties feasted. The two inferior kinds of marriage common in Java, and self-prostitution, are rare in Naning, though instances have been known of husbands prostituting their own wives and children when pressed by debt or poverty.

Women about to be married cut off the hair (this ceremony is called "*Andam*") in front of the forehead. This is done, as well as the application of the "*Inei*" or "*Henna*" to the palms, and nails of the hands and feet, three days before the marriage ceremony.

Of the ceremonials after death the following may be noticed:

If the dying person has possession of his faculties, he recites or has recited to him the *توحيد* *Touhid*, a form of confession of the Unity of the Deity.

After death, the *Imám* performs *مندی* *Mandi* and *كفن* *Kufan*, or the washing and shrouding of the corpse; for this latter purpose, a long wrapper of cotton cloth, the deceased's *baju*, vest, and turban, and two *hiffafeks* are used; the grave is invariably dug the depth of a man's ear.

The Mussalmans of India make a distinction in digging it: for a man, the depth of the navel; for a woman, up to the breast.

The corpse is then placed on a bier formed of two planks, the exact length of the grave, to which it is carried, followed by the nearest relatives; females sometimes attend in Naning, but never at Malacca.

The *صلاة جنازة* *Selat Jenazah* is then read by the *Imám*, standing; the corpse is lowered down into the grave, with the two planks that composed the bier.

It is not deposited on the direct bottom of the grave, but in a side receptacle about two feet high, the two planks are then forced down edgeways, so as to shut out firmly this receptacle from the rest of the cavity, which is then filled up by earth thrown through some grass leaves and branches, in order that it may fall more lightly, till the upper edge of the plank is concealed, when earth is thrown in, and the grave filled up in the usual manner; a little water is then sprinkled, and the *Bilal* or *Pangulu Momkin* recites the *تسبيح* *Tasbeeh* at the grave, in a sitting posture, with his face turned toward the *Kiblah*, in the direction of which also the head of the corpse is inclined.

On the third, the seventh, the fourteenth, the fortieth, and last-

17, on the hundredth day, *Fatiha*, oblations of spices, also wood and flowers, are made to the manes of the dead.

Their burial places are raised banks of earth, with two small wooden pillars or upright stones at each end of an oblong carved wooden frame, the largest denotes the head; they plant the *Selasia* generally near burial-grounds, and sometimes the *Champaka* and *Camboja*.

They like other Muhammedans believe in the examination of the corpse by the Angels "*Munkir* and *Nakir*," who enter upon their inquisitorial functions, after the funeral attendants have retired seven paces from the grave, on their returns to their several homes.

*Religious fasts, festivals.*—Their religious observance of the first 10 days of the months Mohurram, the 28th of Safr, the 19th of Rabi al awal, the first 12 days of Rabi al akhir, the 10th of Shábán, the 30 days fast of Ramzán, and the first of Shavál; and lastly, the 10th to the 15th of Za-al Haj, resembles that of the Arabs more than the customs which obtain among the Muhammedans of India.

The sacrifice of the buffalo is, I believe, peculiar to Malayan Muhammedans. The buffalo selected for the *Kurban* must be without blemish or disease, its fore and hind leg bones must not be broken after death, nor the spine: neither are the horns to be used for common purposes, such as the handles of *Kris*, &c.

The animal, to be sacrificed, is thrown down in a convenient place near the mosque of the *Mukim*, by his hind and fore legs being bound together; his head is also secured and turned in the direction of the *Kibleh*, and water then poured over it; the *Bilal* advances with the sacrificial knife, (in Naning the knife, called *Gulo Rumbowe*, is generally used for this purpose,) and turning himself towards the *Kibleh*, recites the "*Bismilláhi helálan taieeban Allahu Akbar*,"

بِسْمِ اللّٰهِ حَلَالٌ طَيِّبٌ اللّٰهُ اَكْبَرُ four times successively, and then divides the wind-pipe and large blood-vessel of the neck of the animal. It is flayed after death, and divided into two equal parts. One-half is distributed among the inhabitants of the *Mukim*, of the other half two *chuppahs* (a little more than 2-lbs.) is allotted to the *Panghulu*, the head to the *Kali*, two *chuppahs* to the *Imám*, two to the *Khateeb*, two to the *Bilal* and *Panghulu Momkin* or *Mukim*.

The first-half is generally cooked and eaten on the spot.

On religious occasions, buffaloes are always sacrificed on one of these three days—Friday, Monday, or Thursday.

They are also sacrificed at weddings, births, circumcisions, &c. of wealthy people at the "*Chukur Anak*," or the ceremony of shaving the head of children, and finally on going to war.

\* Those for females are generally flat and niched at the summit; they are called *Nissan*, probably from the Persian *Nishan* نشان.

On these occasions, the buffalo need not be without blood, &c. and is killed according to the usual Muhammedian custom of the *Zabihah*.

In Arabia the camel is esteemed as the most acceptable sacrifice that can be offered; not only from the high repute, in which the flesh of this animal is held, among the inhabitants, but on account of its general usefulness. The Malays, in like manner, having no camels, select the buffalo, the flesh of which is esteemed, as before remarked, as the greatest delicacy imaginable; and every person who has travelled over the Sawahs of a Malayan country, can bear witness to the utility of the despicable looking buffalo.

*Thermometrical Register kept in the open air at Alor Gajah, in the centre of the Nanning district, by B. G. MAURICE, Asst. Surg. 23rd Regt. Mad. Lt. Inf.*

(Abridged from the original, by J. P.)

*Note.*—From August 1 to 4 and 13 to 22, and after the 16th of January, the observations were made at Malacca. All the rest were kept at Alor Gajah.

August, 1832.					September, 1832.				
Day of Month.	6 A.M.	2 P.M.	8 P.M.	Weather.	Day of Month.	6 A.M.	2 P.M.	8 P.M.	Weather.
1	79°	..	78°	thunder.	1	74	103	79	fine.
2	81	99°	84.5	close.	2	74.5	88.7	76	rainy.
3	80	92	80	threatening.	3	73.5	91	77	fine.
4	..	99.7	..	very close.	4	73	88	75.5	fog.
5	..	105.7	76	lightning.	5	74	86	80	rainy.
6	73	92	76	fine.	6	72	94.5	77	fine.
7	72	108	72.7	ditto.	7	75	91	77	ditto.
8	76	105	77	ditto.	8	74	100	80	ditto.
9	75.7	99	76	ditto.	9	76	99.5	78.7	ditto.
10	72	104.5	78	ditto.	10	73	88	78	light clouds.
11	73	87	76	storm.	11	71	95	79	shower.
12	72.5	95.7	..	cloudy.	12	73.5	96	76	heavy rain.
13	..	108	82	showers.	13	73.5	93	76	ditto.
14	82	104	80.7	fine.	14	74	97	77	fine.
15	81	104.7	82	ditto.	15	73	100.5	79	fog. rain.
16	81	91	82	lightning.	16	75	85	77	heavy rain.
17	77.5	92.7	80	heavy rain.	17	73	95.5	77	fine.
18	75.5	88	80	fine.	18	73	96	..	cloudy.
19	74	89	..	ditto.	19	74	95	78.5	showery.
20	76.5	89.5	..	ditto.	20	73	91	..	contd. rain.
21	76	84	..	heavy rain.	21	72.5	81	76	thk. fog.
22	74	90	..	fine.	22	72	92	77	cloudy.
23	..	95	..	ditto.	23	71	99	76	heavy shower.
24	72	90	78	heavy rain.	24	71.5	99	77	fog. rain.
25	74	91	76.5	cloudy.	25	74.7	95	78	fine.
26	74	86	78	showery.	26	73	91.7	75	showery.
27	70	96	73	foggy.	27	75	100	77.5	heavy rain.
28	70.5	102.5	76	fine.	28	77	90.7	77	shower.
29	71	89	75	thunder.	29	74	92	77	thk. fog.
30	72	..	76	fine.	30	73	89	..	shower.
31	74	104.5	76	rain.					

October.				December.					
1	74	91	77	contd. rain.	1	..	95.5	..	showers.
2	75	95.5	78	ditto.	2	75	78	78	heavy rain.
3	..	95	77.7	fine.	3	75	96	80	fine.
4	73.5	89	79	ditto.	4	75	85	77	ditto.
5	75	92	78.5	showery.	5	74	105	80.2	ditto.
6	74.7	86	75	v. heavy rain.	6	74	99	77	fog. fine.
7	71.7	91	76	ditto.	7	72	99	80	fine.
8	73	85	74	showery.	8	73.5	82	76	heavy rain.
9	73	92	76	very bet.	9	75.5	86.5	75	ditto.
10	74	97	76.5	fine.	10	71	100	76	heavy showers.
11	73	92.5	77	fog. rain.	11	74	88	76	cloudy.
12	74	..	76.7	ditto.	12	..	92	77	showers.
13	73.5	93	78.5	fine.	13	74	108	..	ditto.
14	74.5	91	76	showery.	14	72	87	77	ditto.
15	73	85.5	75	show. rain.	15	73	101	77	squall.
16	73.7	107	..	rainy night.	16	..	103	77	heavy rain.
17	74	90.7	78	fine rain.	17	74.5	95	77.7	showers.
18	73	..	..	ditto.	18	74	92	76	cloudy.
19	..	101	70.7	ditto.	19	73	97	76.7	heavy rain.
20	72.5	104	77	ditto.	20	74	92	76	light rain.
21	73.7	97.7	76.5	fine.	21	73	103	78	fine.
22	74.5	96.5	77.5	cloudy.	22	75	108.5	82	dit o.
23	74.5	95.5	78	heavy rain.	23	75	98	78	light rain.
24	75	89	78	close.	24	74	93	78	contd. rain.
25	74	86	76	heavy rain.	25	73.5	91.7	..	ditto.
26	73	91	..	ditto.	26	72	101.5	78.5	cloudy.
27	74	87	79	cloudy.	27	76.5	93.5	73.7	heavy rain.
28	73	81	74	ditto rain.	28	72	115	80	fine.
29	74	76.5	73	contd. rain.	29	76	101.5	77.5	ditto.
30	72.5	90.7	76	light ditto.	30	74	94.5	75	ditto.
31	74	82	74	showers.	31	..	94	76	ditto.
November.				January, 1833.					
1	70	83	75.5	fog. shower.	1	..	..	74.5	heavy showers.
2	73.7	92.5	76.5	showers.	2	71	81.5	73	heavy rain.
3	74	90	..	fog. rain.	3	71	83	72	ditto.
4	73	93.5	76	showers.	4	70	96	76.5	fine.
5	73	81.5	75	cloudy.	5	73	93.5	75	much rain.
6	74.5	100	79	ditto.	6	..	94	77	fine.
7	75	91	77.5	fog. shower.	7	70	92	76	ditto.
8	72.5	83	77	heavy rain.	8	74	85	75	showery.
9	74	78.5	74.5	ditto.	9	72	98.5	76	ditto.
10	74	82.5	76	fog. rain.	10	71.5	103	77	ditto.
11	71.5	104.7	76	heavy rain.	11	70	90	76	heavy rain.
12	73	79	74	ditto.	12	73.5	100.5	76.5	ditto.
13	73	..	77.7	ditto.	13	..	83	77	fine.
14	74	86.7	75	ditto.	14	76	95.7	..	light shower.
15	72.5	82	75	fine.	15	72.5	98	77	fine.
16	71.5	93	77.7	ditto.	16	71.5	94	78.5	ditto.
17	73.7	109	77	ditto.	17	..	..	..	heavy shower.
18	74.7	85	78.7	ditto.	18	..	..	..	fine rain.
19	73.5	116.7	77	showers.	19	..	93	77	ditto.
20	72.7	87.7	77	fog. fine.	20	..	..	..	ditto.
21	..	78.7	74	heavy rain.	21	74.5	..	..	ditto.
22	74	109	77.5	ditto.	22	75	111	77	ditto.
23	72.7	116	80	fine.	23	75	93	77	showery.
24	..	94.5	76	heavy rain.	24	75	112	77	ditto.
25	76.7	86.7	76	ditto.	25	71	84	78	showers.
26	75	76.5	..	ditto.	26	75	93	77	ditto.
27	72	..	76.5	ditto.	27	75	83	75	heavy rain.
28	74	121.7	76.7	ditto.	28	72	80.7	78	ditto.
29	..	86	75	ditto.	29	75.5	91	76	ditto.
30	73	86.5	77.7	fog. fine.	30	73	63.7	78	showers.
					31	74	93	78	fine.

II.—Notice of an Ancient Mahal or Palace near Jaunpúr, in which some Hindu Coins were lately dug up. By V. TREGGAR, Esq.

The following particulars have been collected from different sources. Much is from the History of Jaunpur by Moulvee KHYR-UD-DÍN MUHAMMED, an anonymous translation of which was lent me by a friend. Part is from information afforded by the most intelligent natives I could meet with, and part is from personal observation.

Raja JYCHAND or JYCHANDRA was ruler of the country from Bazar to Kanouj, and reigned about the Samvat year 1400. His favorite residence was near the city of Jamunpur. As a clue to the true period of his reign, it may be useful to mention, that PURMALIK was in his time raja of Kalinjer and RAE PITHOURA (also called PRITHVÍ PAT) was king of Hastinapur; also that the son of the former (named BRAMHA) was married to BELWA', daughter of the latter. JYCHAND's reign was undisturbed by the Mussalmans, but his son LAKHUN was not so fortunate. Not only was his country taken from him, but he himself was sent to Delhi; where, some say, he was forcibly converted to Muhammedanism. In commemoration of their victory, the Mussalmans changed the name of his residence to Zafferábád.

SHAH FEROS II. is by the Muhammedans considered as the founder of Jaunpur. The following is KHYR-UD-DÍN's account. In the year of the Hijri 772, SULTAN FEROS was encamped near Zafferábád. Riding out for amusement, he was particularly pleased with a certain spot, on the banks of the Goomty, and determined to build a city upon it. A dream, in which his grandfather, SHAH JOUNAN, appeared and requested the new city might be called after him, stimulated him to immediate exertion. A fort was erected on the site of a Hindu temple, which was destroyed for the double purpose of supplying materials, and making room for its successor. In this account I place little or no belief. I am inclined to think the Hindu statement much more correct. They say that *Jamunpúr* was a very ancient and large city, but had fallen into decay till the time of JYCHANDRA, who ornamented it, and the adjacent country, with many large and beautiful temples. My reasons for placing more confidence in the latter than the former relation are first, the *fact* of its having been the residence of JYCHANDRA; secondly, from the magnitude and number of the temples, which formerly existed; and thirdly, from the very circumstance of its having been chosen as the seat of the Soubeh.

That JYCHANDRA did reside here, is hardly to be doubted. Tradition, handed down from father to son, still points out the spot where his mahal stood. The ruins of the fort built by him are still known

as JYCHANDRA'S kote, and two buildings (remaining of 12) are still shown as the places where he and his son LAKHUN held their darbars. The Utala dewal, and one at Chachakpur, are mentioned in the History of Jaunpur as having been built by him in 1416 Samvat.

The following temples are said to have been destroyed by FEROS SHAH and his successors :

The temple of Kerarbár, of whose materials and on whose site the fort was built ;

The Utala Dèwal ;

The Dèwal of BIJICHAND, (VIJAYA CHANDRA) a former Raja, And the temple at Chachakpur.

Numerous other Hindu buildings were thrown down in Zafferábád as well as Jamunpur. The Kerarbár dèwal was destroyed without opposition ; but the attempt on the Utala dèwal was resisted, and the Emperor with his attendants forced to retreat. On the arrival of assistance from the camp, a severe conflict ensued, which ended in favor of the Hindús. The Emperor was forced not only to desist for the present, but to promise to refrain in future from such offensive acts. Under the government of IBRAHÍM SHAH, the Moslem population seems to have outnumbered the Hindús. In that spirit of bigotry which invariably accompanies the Muhammedan power, the Hindús were greatly oppressed. They were forbidden to worship idols, or to sound the sankh, and at length, besides being taxed, were prohibited residing within a certain distance of the city. The splendid houses which they had built were given to the favorites of the court, and the attempts of FEROS SHAH were renewed. The Utala dèwal was destroyed, and the present Utala Masjid erected in its place. The other two temples, viz. that of Chachakpur, and that of BIJICHAND shared the same fate. In the erection of the mosques, the builders were ordered to turn inwards any figures which might be carved on the stones. As this injunction was strictly obeyed, I have no doubt many inscriptions have been by this means preserved.

The stones from the tank of BIJICHAND were used for the building of the mosque of Jumai-ushark, and those of the temple on the bank, for the mosque of *Khális Mukhlis*. The great extent of the present buildings, composed wholly of the remains of Hindu temples, are proofs of the magnitude of the latter.

Vanity or ignorance might lead the Mussalman historian to ascribe the foundation of so large and celebrated a city, to a prince of his own caste. That its conquerors improved it, or at least renovated it, I doubt not ; but the foundations were laid (most probably) ages before it fell into their hands.

It may be said, that *Jamunpur*, by which almost all the Hindus call it, and which every pandit affirms to be its real name, is merely a corruption of *Jaunpur*. I beg to say, that the latter is so of the former. The Mussalmans endeavoured to give the new buildings names as similar as possible to the old ones. Thus the mosque built on the site of the *Utala dèwal*, is called the *Utala Masjid*, from a custom of the former princes, who used to place in its court their travelling equipage and baggage. The *Bijl Mandul*, built by Rájá BUCHHAND, was called the *Bidi Manzil*, when converted to a Mussalman residence. The change, therefore, from *Jamunpur* to *Jaunpur* was not only easy and probable, but perfectly natural and consonant with the custom of its new possessors; more particularly as the date of its pretended foundation is shewn by that name. According to the *Abjad*, the powers of the letters forming *Shahar Jaunpur*, are 770.

Little doubt will, I hope, remain as to the city of Jamunpūr having been very extensive previous to the Mussalman conquest. The fact of the populace having resisted successfully the Emperor FEROD and his troops is alone of great weight.

This allowed, it is not improbable that the prince of so large a country should have chosen the spot for his residence. No other Hindu names are preserved to whom could be attributed the building of the mahal, &c. The particulars gathered from my Hindu informants are, I think, more entitled to credit from their having been related to me, diverted of the fabulous and wonderful, with which ignorance and superstition delight to envelope the occurrences of past ages.

I have been unable to discover the former name of Zafferábád. One man informed me, he had once heard it, but could only recollect it sounded like Sompur or Samatpur.

The present town is situated along the western bank of the river Goomty, nearly four miles from Jaunpur. JYCHANDRA'S mahal is a mile and half to the eastward, on the concave bank, on an angle in the river. The bank is very steep and high, but the ruins reach in some slopes to the water's edge. There were very probably gháts from the top. The whole building extended over about six bigas, which is now cultivated. The old fort is to the south of Zafferábád, and contains 11 bigas of land, but may stand on twice that quantity. It is now merely a mound of earth, about 50 feet in height, with the remains of the bastions still visible. All the stones and bricks have been removed to form the various buildings, by which it is bounded on two sides, as well as to supply the fort, bridge, and masjids.

The gold coins in my possession were found in the ruins by the cultivator of the " mahal." He brought them to the bazar for sale, but

the goldsmiths refused to purchase them, saying, they were useless, as on account of their bearing the figures of RA'M and SĪTA, no one dared cut or work them up. To this circumstance they owe their preservation. They were taken from the villager by two zemindars, in whose possession they remained six years.

They are not exactly similar, though the difference is but slight. The symbols above the right-hand of the female figure are different. The male figures do not agree, but this may be owing to one being more rubbed than the other.

That which is most plain has at the back of his head a bow knot, with the ends long and waving. The armour on his legs is easily distinguished, as also the long robe. In both there appears to have been an inscription on both sides, and some letters within the bow. The standard, evidently some bird, is difficult to distinguish. The right hand appears to hold an arrow, the point of which is near the feet.

Any further information I may collect, I shall be proud and happy to communicate.

[The gold coins alluded to above are of the ordinary Kanouj type, of which several are depicted in the 17th volume of the Researches, and several more are to be found in MARSDEN'S *Numismata Orientalia*. The letters are, however, more distinct than usual, and seem to make the words *Sri Vikrama*. Drawings of them will be given hereafter, but we have thought preferable to publish the particulars at once. We hope Mr. TREGGAR will favour us with a copy of the inscription he states to have found in an ancient character, on an image in a temple near Jaunpur, dated 515 years back. The form of the Nāgarī characters at different eras, well established by dates, is a desideratum.--ED.]

### III.—*Price of Grain at Allygurh, near Delhi, from the year 1804 to 1832 inclusive. By EDWARD STIRLING, Esq. C. S.*

In the course of my official duties, having occasion to ascertain the price of grain for some years subsequent to the conquest of this district, I thought it might be desirable to obtain the price of wheat and grain from the period of our first possession of the country to the end of last year. This I have effected, and the accompanying statement contains the result for each month during the last 28 years. In the last column on the right hand will be found stated the average of the year, and at the foot of the table, the average of each month for the whole period.

The prices of grain herein-mentioned have been abstracted chiefly from the Kotwalī records of the town of Coel, and an average for the whole month has been made from the daily prices of these two kinds of grain.

It seems necessary to state the weight of the seer specified. It consists of ninety sicca weight of the old Furukhabad rupee, weighing

about 173 grains, or equal to  $86\frac{1}{2}$  sicca weight of present standard weight of 180 grains troy, so that one seer equals about two pounds and a quarter, troy weight.

In the present scarcity throughout the Upper Provinces, and southern parts of India, this table will not be, perhaps, uninteresting, to those who are desirous to make comparisons of the prices of grain in other parts of the country, and I hope may elicit information of a similar kind, and thereby embody a fund of knowledge that may be found hereafter useful to Government and individuals.

*Abstract of a Table of the Prices of Wheat and Gram in the Market of Allygurh, from the year 1804 to 1832. A. D. expressed in seers and chitacks, sold for one rupee.*

YEAR.	WHEAT.	GRAM.	YEAR.	WHEAT.	GRAM.
	seers. chts.	seers. chts.		seers. chts.	seers. chts.
1804, ....	19 12	23 8	1819, ..	19 12	20 4
1805, ....	25 10	27 8	1820, ..	19 8	20 6
1806, ....	35 2	50 8	1821, ..	29 4	29 0
1807, ....	35 0	56 2	1822, ..	33 4	35 4
1808, ....	28 8	35 0	1823, ..	29 8	43 4
1809, ....	23 0 $\frac{1}{2}$	29 12	1824, ..	34 4	44 6
1810, ....	33 0	38 12	1825, ..	29 8	33 6
1811, ....	51 8	67 12	1826, ..	20 6	19 8
1812, ....	35 8	49 8	1827, ..	33 2	30 12
1813, ....	23 8	23 12	1828, ..	35 4	43 8
1814, ....	35 0	38 8	1829, ..	39 0	49 4
1815, ....	47 14	49 8	1830, ..	40 2	49 4
1816, ....	41 14	34 14	1831, ..	35 4	42 10
1817, ....	29 12	31 5	1832, ..	37 8	53 0
1818, ....	20 6	20 12	Avg. 29 yrs.	31 12	37 10

*Average Variation of Price from month to month, the first nine months, for 28 years; the last three, for 29 years.*

MONTHS.	WHEAT.	GRAM.	MONTHS.	WHEAT.	GRAM.
	seers. chts.	seers. chts.		seers. chts.	seers. chts.
January, ....	30 11	36 2	July, .....	31 5	37 6
February, ..	31 6	37 4	August, ...	32 6	38 2
March, .....	36 12	41 0	September, ..	32 0	35 6
April, .....	34 10	42 12	October, ...	29 14	35 4
May, .....	32 14	39 8	November, ..	29 8	36 0
June, .....	32 0	33 0	December, ..	29 12	34 12

[The statement above alluded to, was so voluminous, containing the prices of wheat and grain for every month of each year, that it was impossible to set it up for the pages of the Journal; and it has, therefore, been neglected until now, when it occurred that the average prices of each year, and the average variation of price during the twelve months, might in themselves form an useful table for record.—Ed.]

The refiners are in total ignorance of the rationale of this process, and I regret that I can only conjecture it, being unacquainted with the matters most commonly combined with the gold of Bhote, or forming its matrices.

*Note to the above paper. By J. P.*

The process described by Dr. CAMPBELL is precisely that employed throughout India, and no where more frequently than in Calcutta. I took occasion myself to notice it in the Oriental Magazine for June 1827, for the purpose of pointing out a material error in many manuscript copies, as well as in the English translation, of ABUL FAZL's description of the same operation. As the passage alluded is short, and the work containing it, now out of print, I venture to subjoin the passage:

"In GLADWIN'S translation of the Ayeen Akbery, there is an account of the native process for refining gold, in which it is mentioned, that a composition of 'equal parts of saltpetre and brick-dust' is spread between the plates of gold, which are then heated red hot, &c.

"As it is well known to chemists, that the ignition of such a mixture would only disengage nitric acid, the very acid which is actually used in the European method of refining in the humid way, this passage is calculated to mislead even the scientific reader. The mixture really used by the native refiners is composed of equal parts of common salt (muriate of soda) and brick-dust, just in the same way as is practised in Europe, in what is termed the dry method of refining. The rationale of the process is, that muriatic acid has the power of dissolving silver and copper at a red heat, and the muriates, being volatile, quit the surface of the gold plate as soon as they are formed, giving place to a fresh action from further acid, until the gold is rendered perfectly pure. The muriate of silver is not decomposed, unless some free alkali be present. Now, the nitric acid will quit all its bases at a red heat, and is itself incapable of acting upon silver at that temperature, although it will assist in oxydating copper and other metals: saltpetre is indeed frequently used in purifying silver. There is then evidently some mistake, and if so, is it attributable to the translation? or to the original work, which is so accurate and particular in most of its details? For the purpose of deciding this question, several old manuscript copies of the Ayeen Akbery were examined. In one the expression was simply *shoreh*, which agreed with the translation. In another it was *shoreh i khist khám*, the saltpetre of half-burnt bricks:—at last, in an older manuscript, the true original reading was discovered, which proved to be *nimak shoreh*, coarse bitter common salt, such as is given to cattle. The ignorance of copyists had imagined perhaps that the word *nimak* was redundant, mistaking *shoreh* for a substantive, as though it were written "salt of saltpetre," and *nimak* was therefore henceforward omitted. The ease with which the sense of passages in manuscripts may become varied is further evinced by the second example, where the original plain sentence of 'half of coarse salt, and half brick-dust,' has suffered two metamorphoses, and appears as merely 'the nitre of half-burned bricks!'

"Perhaps in this place, a brief account of the whole process will not be devoid of interest.

"The gold to be refined, is beaten out into very thin leaves of 12 inches square, each weighing about 100 grains. From 100 to 200 of these leaves are piled one on another, being first dipped in a mixture of oil and water, and then smeared over with a composition of three parts of fine old brick-dust, and one part of common salt.

"A fire of cow-dung is made on the ground, upon which the pile of gold leaves is placed, and it is farther sprinkled with some more of the composition. Around the whole, a dome of cow-dung is raised, (see Pl. XXXV, fig. 5,) to which fire is applied, and the operator fans it with precaution, that the fire may not become too fierce, and melt the gold. The firing is repeated three times; after which the plates are separated and thoroughly washed. If the purification is to be carried further, another charge of the composition is interstratified with the leaves, and three more fires applied. Sometimes even the whole process is repeated three times. Bullion of 22 carats pure, is refined to 23 carats, by the first three heats. After six fires, it becomes 23 carats, 2½ grains pure. The expense of the process is very trifling, and every part of the residue is saleable to the under refiners, who extract the silver and copper.

"The heat employed, measured by a pyrometric alloy cupel, was below the melting point of silver."

In publishing Dr. CAMPBELL's account, I have with permission omitted his reasoning on the rationale of the Nepal process, to make way for a brief notice of some recent observations by the celebrated French chemist BOUSSINGAULT\*, whose experiments have led to a more accurate knowledge of the subject than was before to be met with even in the best works. This chemist had an opportunity of witnessing the art, now so completely exploded and obsolete among Europeans, in the mint of New Granada: "Certes c'était," he writes, "une circonstance des plus piquantes, que de me trouver au milieu de cette métallurgie du 16ème siècle, non-seulement d'observer ces fourneaux compliqués qui rappelaient la philosophie hermétique, mais encore de me rencontrer, scientifiquement parlant, avec des hommes de cette époque. On croyait voir des chimistes qui venaient de se réveiller après avoir dormi pendant trois siècles."

Instead of beating the gold into fine leaves, as in India, the practice at Santa Fé is to granulate it, and dispose the grains in porous earthen vessels, in alternate layers with a cement made of two parts of brick and one part of sea salt. The layers of cement are an inch thick; each pot holds 10 or 15 lbs. of gold; and the cementation continues from 24 to 36 hours at a cherry-red heat.

To decompose or reduce the silver, which is retained as a chloride in the brick-dust, the cement is triturated with mercury and one-teenth of fresh common salt, in a humid state. The muriate of mercury is washed off and an amalgam of silver and mercury left behind, which yields a very pure silver, (known in the Calcutta market as *plata fina*.)

\* In the *Annales de Chimie et de Physique*, vol. LIV. 1833, page 253.

In the process of cementation, it was evident that the silver was converted into a chloride by the action of *dry* clay and *dry* salt. BOUSSINGAULT commenced his inquiries with precisely the same materials, operating on fine gold dust, containing 26 per cent. of silver, and substituting only well baked Cornwall crucibles for the fragile porous ware of the country:—he was surprised however to find that no action whatever now took place, although he maintained his fire for 72 hours! and to the exultation of the natives he was forced to allow the superiority of their old and despised methods.

To ascertain whether air was necessary to ensure success, one slip of silver, weighing 24.6 grs., was cemented in a well-closed crucible, covered with charcoal powder; while another of the same size was merely encased in cement, without a crucible, so as to favor the access of air. After seven hours, the former had lost only 0.3 gr., while the latter was reduced in weight to 9.5 grs. The presence of air was thus proved to be indispensable: it remained to examine in what way it acted. Salt by itself may be fused and sublimed in an open silver crucible, without acting upon it in any degree—the volatilization is materially accelerated by a current of hot air, but without any danger of affecting the metal.

Two slips of silver were again prepared, weighing 6.5: one was cemented with a mixture of pure silex and salt; the other with pure alumina and salt. After four hours, under a muffle at a cherry-red heat, the latter had entirely disappeared; the cement was slightly agglutinated, crystalline, and no longer saline to the taste. The other slip still weighed 4 grs.; its surface was remarkably crystallized, and covered with a green glass, which adhered strongly. The cement was also completely vitrified, to which circumstance doubtless the bad success of the cementation was attributable.

It is known that pure silex has no action whatever on salt when both are dry, but the moment aqueous vapour is introduced, a powerful re-action commences, muriatic acid is disengaged, and silicate of soda remains. In the above experiments then water must have got to the cement even through the heated muffle of the furnace, and it occurred that the success of the Santa Fé cementation might be mainly attributable to the quantity of wet vapours necessarily formed in the combustion of a wood-fire.

To prove whether it was the water contained in the atmosphere, or that supplied by the fuel, that favored the process, BOUSSINGAULT placed a slip of silver, coated with the cement, in a porcelain tube, heated red, through which he then passed a current of dry air:—the silver remained untouched.

The vapour of water being thus proved to be the principal agent, it seemed evident that the muriatic acid gas must be decomposed at a red heat by silver, although it is generally maintained that this metal exercises no action whatever on the acid even at high temperatures.

To ascertain this point, a slip of silver, rolled in a spiral, was placed in a porcelain tube passing through the furnace. A current of muriatic acid gas was admitted from one end, passing first through muriate of lime to dry it; at the other, a curved tube and chamber was fixed, to collect the gas that might be disengaged. At first some hydrogen was given off, but the disengagement soon ceased, and the muriatic acid gas continued to pass without decomposition. On examination, the surface of the silver was found coated with a varnish of chloride, which had prevented the further action of the acid gas. To remedy this evil, the slip was enveloped in alumina:—the action now went on better, though still slowly, and the chloride had penetrated but a little way into the coat of alumina. In the next experiment, salt was added to the clay, bringing it in fact to the composition of the cementation mixture; and now the decomposition proceeded with rapidity, the salt favoring in a singular manner the spreading of the chloride of silver through the porous substance of the alumina; probably owing to a combination between the two chlorides.

I have dwelt at some length on the above series of experiments, because they afford a beautiful application of scientific inquiry to a rude and practical process which has been handed down and imitated from generation to generation, without the least knowledge of the real action of the materials upon one another; and so apparently simple, that chemists had hitherto neglected to examine it. Yet in this rude result of the experience of ages, what a host of chemical operations are combined, and how necessary is every step of the process:—the brick-dust for instance answers a double object, first, to decompose the salt, and thus cause the disengagement of the acid gas;—and secondly, to absorb with the aid of the excess of the salt, remaining undecomposed, the chloride of silver as it is formed, and thus both to keep the surface of the gold free for fresh action, and to prevent the loss of the silver by evaporation, for the chloride is of itself very volatile.—The porous nature of the pounded brick allows the passage and access of the vapours, and thus gives it a preference over unburnt clay for the object in view. Again the wood fuel, or in this country, the cow-dung cake, giving abundance of aqueous fumes, is indispensable to the process, while the small intensity of its combustion affords a regulated heat so as not to endanger the melting of the gold, and its open texture promotes the circulation of the moisture, through the pile

within.—Nothing more effectual could have been contrived with the same degree of simplicity.

The humid process of refining has however of late years been brought to such perfection, that it must finally drive the dry process off the field even in India, on account of its vastly superior economy. I have not space here to enter into any particulars of the new method of refining silver and gold by sulphuric acid, but I may remark that according to a recent publication on the subject by GAY LUSSAC, the refiners of Paris not only charge nothing for refining gold of low qualities, but actually pay a bonus to be allowed the job, returning to the proprietor all the silver contained in it, and paying themselves out of the copper alloy!

V.—*Notice of some Fossil Impressions occurring in the Transition Limestone of Kamaon. By Dr. J. McCLELLAND.*

The three accompanying figures, Pl. XXXV. figs. 1, 2, 3, are a representation of appearances observed in a schistose rock, which is composed of argillaceous clay and hornblende. They are interesting for two reasons; first, because they assist to determine the period at which the rock was formed which, but for the presence of these appearances, and a few indistinct traces of orthocera, would be referred to the primitive era; and secondly, because they appear to constitute a new species of fossil remains. I have only found them in the valley of the Ponar river, a small stream which rises in the mountains between Lohughat and Almorah. The bed of this stream is about 1500 feet above the sea, and is chiefly composed of the rock in which these remains are found. Lofty mountains ascend to the height of some two or three thousand feet on each side of the river: some of these are composed of primitive and others of transition rocks, and the latter are superimposed on the rock in which these fossils occur. During a hasty survey of the bed of this river, I found the impressions only in the smooth surface of water-worn masses, and from the great size and globular shape of the latter, I was unable to detach any of the fossils with the hammer, and am therefore deprived of the pleasure I should otherwise have had of transmitting a few specimens to the Society. The accompanying drawing was, however, sketched on the spot, and conveys a pretty accurate idea of the appearance of these fossils as they exist in the rock. They never occur straight, being always bent and distorted, and a great number are usually aggregated together in the same stone. The rings are detached and equidistant from each other, and are always about fourteen or fifteen in number,





except in such specimens as fig. 1 : these are probably only the remains of fragments, as they never consist of any fixed number of rings. We may refer these fossils perhaps to the Linnæan genus *Dentalium*, and the species may in that case be named *D. annulata*.

March, 1834.

The valley of the Ponar river, where the peculiar appearances represented in my notice of March are found, is so hot and unhealthy, that it is quite deserted at this season, and the path leading to it is so difficult that for eight or ten miles it must be travelled on foot ; a performance which an European could not accomplish with safety except in the cold weather.

This will account for my not being able to send you at present the specimens you require ; and whether I be permitted to remain in this neighbourhood long enough to be enabled to procure the specimens is somewhat uncertain.

These considerations induced me to make an effort to procure some of the fossils without delay ; and on receipt of yours of the 27th ultimo, I despatched a few natives to the spot, provided with such implements as I could procure for breaking rocks, and placed them under the direction of a person who was with me at the time I first observed the fossils.

The men have now returned unsuccessful in their attempts to break the rocks, containing the specimens for which they were sent.

Under these circumstances, it may be the most prudent way, before introducing a new, real, or supposed species, to inquire if the figures in question be really organic remains, or mere delineations formed by a peculiar arrangement of the distinct concretions of the rocks in which they are found. The consideration of this point is suggested partly by the remarks contained in your letter, and partly by a fragment of transition limestone, which has been brought to me containing ring-shaped delineations on its surface, which, if not quite similar to those represented in my former notice, are at least nearly allied to them. The accompanying drawing (fig. 4) is a faithful representation of the appearance on the limestone ; the stone from which it was taken is much at your service : it was brought from the spot in which the other specimens are found. They occur in great quantity, and pass progressively into those represented in my first notice, and both appear to be but the two extremes of the same thing\*. They occur only in rocks of

\* Since the above was written I have met with an extremely interesting paper on Belemnites in the Phil. Transactions, 1754, by Mr. BRADSHAW, to which a plate is attached, containing various figures. No. 16 bears a strong resemblance

the same age, whether these be slate or limestone. On the other hand, we know that mere delineations on the surface of particular rocks, differ with the constitution of the rock in which they occur, are uncertain as to size, and are without any fixed regularity in the proportion of the different parts to each other; proving them to be either the result of mechanical increment or of chemical attraction. Respecting organic fossils, KRONSTEDT says, "They are distinguished by an organic structure more or less imperfect, of which as long as they bear any marks we are to reckon them as fossils of a foreign\* species." With respect to your remarks on the rings, I can only account for the part of the lower and upper portions being both visible, by supposing the bodies to which they belonged to have been soft enough to yield to lateral pressure, and to have been thus converted into superficial substances. Others again, as fig. 1, may have been exposed to compression, which acted longitudinally, so as to destroy their length, but preserve the lateral dimensions.

It is unnecessary to remark that this explanation would not apply to any univalve shell with a regular spire; and that of univalve shells without regular spires, *Dentalium* is the only genus to which these appearances can be referred. The generic character of *Dentalium* is "shell awl-shaped, open at both ends." The rings are sufficiently characteristic to distinguish the species; but until we can procure good specimens, it is premature to be positive as to the place these fossils should occupy. I know the danger of touching fossil drawings without the specimens before one's eyes, and what shakes my confidence in the drawing attached to the former notice now is, that though it was accurately sketched from the specimens, yet it was finished from recollection only.

With respect to the drawing here attached, it is calculated to mislead as to the true nature of the fossils; were the figures complete, they would be found to be awl-shaped, the ends nearly equal in size, to fig. 3, except that the Ponar fossil appears to have been perforated in the centre, while Mr. B.'s figure is merely grooved by external striæ, but in this respect, Mr. B. remarks, there is great variety—may not the Ponar fossil be a *Bellemeite*, so worn and changed by the lapse of ages, as only to present the marks of former cells: the outer crusts being destroyed, and the traces of septæ and siphunde only remaining—but taking the aggregated form of the rings, and assuming them to have been a shell; it certainly would have agreed with the modern genus *Dentalium*; but if by that we imply also the nature of the animal which formerly occupied it, we then go too far in attempting to define so imperfect a trace of the organisation of a former world. In a chronological arrangement this fossil must take its place amongst the remains of the earliest created beings.

\* "Foreign species," as here used, means foreign substance.

and apparently open; there is also an appearance something like a detached spire, but this I take to be nothing but the fore-shortening of the rings, such as is represented in fig. 1, but less perfect. I may add, that I have not seen the trace of a spire or a whorl in all these appearances. Orthocera are long, straight, tapering shells, characters not one of which answer to these remains. One of the figures in the accompanying drawing resembles a fragment of an orthoceratite, but were it more complete, it would be awl-shaped. Now as to the mineral composition of the fossil in transition slate, I found the rings to be composed of a fine siliceous sandstone. In the limestone they are incorporated with, and similarly constituted, as the rock itself, so that they would elude the character of fossils, were it not for their more perfect existence in the transition slate. Having pointed out these appearances to your notice, as well as the locality in which they occur, their nature may be further inquired into by others, should the term of my residence in this quarter deprive me of the opportunity.

May, 1384.

[Being rather sceptical as to the appearance of the under-surface of the rings represented in Dr. McCLELLAND's first notice, we mentioned our doubts to him, and were favored with the further explanation, dated in May, which by some accident was mislaid; and we were forced to repeat our request for a duplicate. The great distance will account for the delay which has unfortunately occurred in its appearance. We are not yet satisfied, however, that the impressions are truly of a fossil nature, and we doubt whether any geologist would venture from such indistinct traces to pronounce an opinion of the genus of the fossil.—Ed.]

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VI.—*Further notice of Influence of the Moon on Atmospheric Phenomena.* By the Rev. R. EVEREST, M. G. S. &c.

In my last paper, I urged the probability of the dew-points varying with the declination of the moon, and from that was naturally led to the conclusion that the rain-falls would vary in a similar manner. Having, therefore, obtained the Nautical Almanack for the year 1823, and having by me the register of rain-fall for the two months of August and September in that year, I made out a table for comparison, placing the rain-fall in one column, and the declination of the moon in an adjoining one beside it, and her semi-diameter in the next to that; on the other side, the days of the month in succession, and on the other side of them again, the declination of the sun. If we recollect that the latitude of Calcutta is about  $22^{\circ} 23' N.$ , we may see by this table that a greater proportion of rain falls when the declination of the moon (either north or south) is near about the same as the latitude of the place, and that the proportion lessens as

she advances towards the Equator. To make this more clear, let us take the average of rain-fall on the days when the moon's declination is great, and compare them with those when it is less, and we shall find the following results.

*In August, 1823.*

The average rain-fall for each day, when the declination of the moon (either south or north) was greater than  $18^{\circ}$  was ..... 0.826 inches.  
 When the declination of the moon was between  $18^{\circ}$  and  $9^{\circ}$  it was 0.330  
 When the declination of the moon was between  $9^{\circ}$  and  $0^{\circ}$  it was 0.174

*In September.*

When the declination of the moon was above  $18^{\circ}$  it was ..... 0.656  
 When between  $18^{\circ}$  and  $9^{\circ}$ , ..... 0.151  
 When between  $9^{\circ}$  and  $0^{\circ}$ , ..... 0.297

An exception to the former observation will be noticed here, since in September, the average, when the moon is between  $9^{\circ}$  and  $0^{\circ}$ , exceeds that when she is between  $18^{\circ}$  and  $9^{\circ}$ . This I take to be owing to the course of the sun, whose declination is between  $9^{\circ}$  and  $0^{\circ}$  in the month of September, and at that time of year, the days when the declination of the moon is within those limits are also the days of conjunction and opposition. As the divisions I have adopted for illustration are merely arbitrary, any others may be substituted for them. Thus, if we take the average (for the two months) of the days of maximum declination of the moon, of one day before, and two days after that, we get an average of 1.17 inches for each day. In this case, there is an excess, probably owing to the locality of Calcutta, a place which having a great extent of ocean to the south, is more exposed to the influx of currents from the ocean, when the moon gets to the north of it. But on this I hope to be able to speak farther hereafter. In the period included in the table there are six days, on each of which the rain-fall was greater than two inches. I here subjoin them, with the corresponding declination of the moon.

1823.	Inches of		Decl. of Moon.
	Rain.		
August 2nd, .....	2.14	$26^{\circ} 2'$	N.
Ditto 16th, .....	3.32	26 12	S.
Ditto 17th, .....	2.56	25 9	S.
Ditto 18th, .....	3.00	22 59	
September 25th, .....	2.68	25 0	N.
Ditto 26th, .....	4.60	25 59	

I have also been able to obtain the registers for the last two months of the year 1824, and for the first three months of the year 1825. In this period a few items of rain are registered, which are as follow :

1824. Inches of Rain. Decl. of Moon.			1825. Rain-fall. Moon's Decl.		
November 22nd,	0.92	24° 1' S.	February 10th, ..	0.68	22° 6' S.
Ditto 23rd, ...	2.20	23 5	Ditto 17th, ...	0.68	9 35
Ditto 24th, ...	0.01	20 59	Ditto 22nd, ...	0.02	13 20 N.
December 3rd, ..	0.78	17 29 N.	March 1st, ....	0.40	19 15
Ditto 4th, .....	1.46	20 44	Ditto 2nd, .....	0.06	15 8
Ditto 5th, .....	0.40	23 0	Ditto 8th, ... ..	0.04	17 51 S.
Ditto 31st, ... ..	0.08	19 35	Ditto 10th, ... ..	0.08	23 4
			Ditto 16th, ... ..	0.02	10 36
			Ditto 19th, ... ..	0.02	3 14 N.
			Ditto 20th, ... ..	0.10	7 50
			Ditto 21st, .....	0.90	12 19
			Ditto 22nd, ....	0.60	26 1

TABLE—Shewing the quantity of Rain in Inches and Decimals that fell in the months of August and September, 1823, with the Declination of the Moon, to the nearest minute, at noon, on the corresponding days, also her Semidiameter ditto, and Sun's Declination ditto.

August.					September.					
D. of M.	Sun's Declin.	Rain.	Moon's Declin.	Moon's Semid.	D. of M.	Sun's Declin.	Rain.	Moon's Declin.	Moon's Semid.	
1	18 11	..	24 14 N.	16 5	1	18 30	....	22 18	16 23	Calcutta. 0
2	17 56	2.14	26 2	16 18	2	18 8	....	18 3	16 26	Lat. N. ... 22.28
3	17 41	1.28	26 7	16 28	3	7 46	....	12 40	16 25	Average daily rain-
4	17 25	0.60	24 21	16 35	4	7 24	....	6 36	16 20	fall on each day
5	17 9	0.01	20 50	16 38	5	7 2	....	0 17 N.	16 12	when the Moon's
6	16 53	..	15 56	16 36	6	6 39	0.05	5 55 S.	16 1	Dec. is greater than
7	16 36	..	10 6	16 29	7	6 17	0.02	11 41	15 47	18° or about 4° 30
8	16 19	..	3 49	16 48	8	5 55	0.10	16 43	15 34	on each side the
9	16 2	0.01	2 28 S.	16 45	9	5 32	..	20 48	15 20	zenith of Calcutta.
10	15 45	0.06	8 28	15 49	10	5 9	0.16	23 47	15 9	In August, 0.826
11	15 27	1.18	13 52	15 34	11	4 46	0.44	25 35	14 59	In ditto, when
12	15 10	0.32	18 29	15 20	12	4 24	0.68	26 7	14 52	Moon's Dec. is
13	14 52	0.20	22 8	15 7	13	4 1	0.28	25 27	14 47	between 18°
14	14 33	..	24 41	14 58	14	3 38	0.40	23 38	14 46	and 9°.... 0.330
15	14 15	0.52	26 3	14 51	15	3 15	..	20 47	14 46	In ditto, be-
16	13 56	3.32	26 12	14 46	16	2 51	..	17 3	14 50	tween 9°
17	13 37	2.56	25 9	14 44	17	2 28	0.38	12 36	14 55	and 0°.... 0.174
18	13 18	3.00	22 59	14 44	18	2 5	..	7 35	15 2	Average daily
19	12 59	0.14	19 49	14 46	19	1 42	1.20	2 11 S.	15 10	rain-fall in
20	12 39	0.10	15 49	14 50	20	1 18	0.22	3 23 N.	15 18	Sept. when
21	12 19	0.46	11 9	14 54	21	0 55	0.60	8 55	15 27	the Moon's
22	11 59	0.62	6 0	15 0	22	0 32	0.28	14 9	15 35	Dec. is above
23	11 39	0.18	0 33 S.	15 7	23	0 8	0.30	18 47	15 43	18°..... 0.656
24	11 19	..	5 0 N.	15 15	24	0 14 S	0.28	22 31	15 50	Between 18°
25	10 58	0.17	10 25	15 23	25	0 37	2.68	23 0	15 57	and 9°... 0.151
26	10 37	0.40	15 30	15 33	26	1 1	4.60	25 59	16 2	Between 9°
27	10 17	0.06	19 55	15 41	27	1 24	0.42	25 20	16 6	and 0°.... 0.297
28	9 55	0.03	23 23	15 51	28	1 48	0.12	23 4	16 10	
29	9 34	0.30	25 34	16 1	29	2 11	0.13	19 20	16 12	
30	9 13	0.02	26 12	16 10	30	2 35	0.28	14 28	16 12	
31	8 51	0.01	25 6	16 17						
		17.69					13.62			

It may be observed that (with one exception) the items of rain, which fell with a low declination of the moon, in the two last months, may be attributed to the effect of the conjunction and opposition of the sun. Should this predominance of rain about the maximum declination of the moon be found to obtain generally, it will account for the third day before the new moon, and the 11th and 12th after, being maxima—a circumstance which I noticed in my former paper, but was unable to explain. The rainy-season lasts more or less from the 21st June to the 21st September? Now the day of new moon nearest the 21st June is nearly or actually the same with that of maximum north declination. But as the sun leaves the northern tropic, the days of maximum declination gradually separate from those of conjunction and opposition, till by the time he is at the equator, they have reached the quarters.

In adding up, therefore, the sums of rain which fell in successive lunar revolutions, the chances were, that the third day before, and 11th and 12th after, new moon, would be the maxima, as they were (upon the whole) nearest to those of maximum declination of the moon. I hope shortly to obtain a sight of the Nautical Almanacks for some other years, and to have the honour of laying the results (whatever they may be) of a comparison of them, with the registers, before the Society. It only remains for me to explain, why I preferred comparing the amounts of rain-fall, and the fluctuations of the dew-points with the changes of the moon, to comparing the heights of the barometer with the same, and as this latter plan has been suggested to me from a highly esteemed quarter, I lose no time in replying. I first beg to refer him to DANIELL's Meteorological Essays, (1829), page 136, and to assure him, that I agree with the observations there made, viz. "That the total weight of the perpendicular column would not be affected so much as that of its horizontal sections; and the amount of the lunar influence should be sought in the variations of the differences of density between some high elevation and the level of the sea," &c.

For example, supposing a case where the aerial fluid was at rest (the pressure being equal every where). Now, if any inequality were to be caused (either by the presence of a luminary above the horizon or otherwise) a current would instantly be set in motion to restore the equilibrium, and any inequality, beyond what was necessary to overcome the inertia of the air, would instantly be counteracted by an increased velocity of current. But in estimating the rain-fall and dew-points together, we get the sum of the effect produced—the accumulated results of successive tides or currents. If we reflect what a small difference of level is sufficient to set water in motion, we cannot

but suppose that a very small inequality of pressure would be sufficient in the case of air. Such an inequality is no doubt caused by the action of the moon. Mr. HOWARD found, on an average of 10 years at London, that the barometer stood 0.10 (I quote from recollection) lower at change and full, than when the moon was in the quarters. No such inequality could be found in this climate, though a difference to a small amount may be detected. If the Editor will refer to the Table No. 3, annexed to my last paper, he will see that I did attempt such comparisons as he speaks of, with the barometer; but left them off, owing to the results being less satisfactory than those derived from the rain-fall and dew-points. I must acknowledge that it is by the indications of the barometer alone, that we can ever hope to include the atmospheric changes within the precise limits of a mathematical formula; but if we are precluded from this, we are not therefore debarred from adopting a more indirect and humble line of investigation, which, though it can claim no praise for ingenuity of research, may yet present us with some results of general usefulness. If we can obtain one additional presage of an approaching storm—if we can indicate with some probability the year of drought and famine, our time has not been misemployed, nor our labors wholly fruitless.

I perceive that the effect of the moon's declination is felt in the rain-falls in England, though but slightly, as was to be expected.

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VII.—*Correction of a mistake regarding some of the Roman coins found in the Tøpe at Manikyala opened by M. COURT. By Lieut. ALEXANDER CUNNINGHAM, Engineers.*

[We hasten to insert the following extract from a letter just received, as the corrections pointed out appear to be in every case judicious,—in the case of *Larisculus* conclusive. We compliment our young friend upon the success with which he has commenced his numismatic studies, and shall always be happy to profit by his criticisms.—ED.]

I take the liberty of addressing you on the subject of the coins found in the second tope at Manikyala by Mons. COURT, as I conceive you have made a great mistake in the age of one of the Roman coins, and it is from this very coin that you fix the date of the erection of the tope.—The coin I mean is No. 22. You remark that the *helmeted figure* on this coin and the *unintelligible inscription* on the reverse lead you to ascribe it to the age of the Emperor CONSTANTINE; now these very observations of yours, setting aside the appearance of the coin, convince me that it is of the time of the Commonwealth; and I take it to be one of the Gens Herennia, of which there are 15 varieties: it may however be one of the Gens Quinctia, of which there

are 12 varieties—but as I have no books for reference I shall be much obliged if you will look over the coins of the families, and settle the point. The style of the coin is exactly the same as those of the times of the consuls, and very different from those of the age of CONSTANTINE. The obverse is either a head of Roma or of Libertas, and the ornaments upon the helmet are peculiar to the early Roman coins. The reverse is a common device upon the coins of families, and represents two soldiers fighting, with one fallen between them, while victory is hovering over their heads. You say of the two combatants that one is clad as a Roman, and query whether the other as a German: if the coin is of the age of CONSTANTINE, by what means has the German got there? My opinion is that the coin is one of Quintus Herennius, with perhaps the cognomen Marcomannus, or some other name obtained from the earlier enemies of Rome. At any rate the age of the coin can be decided by this—If it is a coin of the families, it must be pretty *thick*—if of the age of CONSTANTINE, *thin*.

The remaining three silver coins, you say, are in too imperfect a state to be identified: I agree with you that Figs. 24 and 25 are too much worn to be identified—though they both appear to me to be of the times of the consuls—No. 25 has the appearance of a Parthian coin. No. 23 you say 'bears the final letters of the word CAESARIS'—but I think I can show that you are wrong. What you call the final letters of the word *Cæsar* are the commencing letters of the man's name who struck the coin. The word is LARISCOLUS, which was the cognomen of Publius Accoleius. This coin is the only known specimen of the *Gens Accoleia*, and the whole inscription should be P. ACCOLEIUS LARISCOLUS—The reverse is a play upon his cognomen of Lariscolus or the Larch Tree; and although the coin is much worn, yet the three sisters of Phaëton may still be seen just commencing their metamorphoses into Larch trees.—The story is related by Ovid\*.

Of these seven coins found in the second tope at Manikyála, not one can be proved to be of a later date than the birth of Christ. What is the inference? That the tope must have been constructed about the commencement of the Christian era; and the coins may have belonged to the soldiers of the army which ANTONY led into Parthia, and it is known from history that they lost most of their baggage on that expedition. If, as you say, the tope is of the age of CONSTANTINE,\* why were there no coins deposited in it of a later date than the birth of Christ, when it is well known that Roman coins of the second and

\* See Edinburgh Encyclopedia, Art. *Namismatology*; the plate contains a facsimile of this very coin.—Ed.

third centuries after Christ are often found in the Punjab and in India itself, as may be seen by referring to the pages of your Journal\*.

At page 311, Vol. II. of the Journal, you describe a coin, shown in Plate VIII. Fig. 1 of coins, as of ALEXANDER the Great, 'having a fine juvenile portrait of the conqueror before he assumed the horn of Ammon; and, on the reverse, Apollo seated on the peculiar oracular seat,' &c. If this is a coin of ALEXANDER the Great, what is the meaning of the following note at page 32, vol. ii.? This coin of DEMETRIUS is recognized to be *Seleucidan* from the figure of *Apollo sitting upon a peculiar altar*, described by PINKERTON as a 'hampër inverted!' Now the *reverses* of these two coins are *alike*, consequently if one is *known* to be *Seleucidan* from its *reverse*, the other must also be *Seleucidan*;—add to this, the coins of ALEXANDER the Great have no *numerals* upon them, and very few, if any, have *titles*. In my opinion it is a coin of ALEXANDER 1st, or BALA of Syria, who bore the very title of *Euergetes* which is upon this coin †.

At page 406, vol. ii.—on a coin of APOLLODOTUS you remark that 'the introduction of the conjunction KAI you do not remember to have seen on any other Greek coin.' Out of only 30 Greek coins in my possession there is one conjunction KAI upon it—but I believe it is not common upon Greek coins.

I should like to see Fig. 13, Plate II. of Roman coins, as it seems a very curious one. I have many remarks to make upon Mons. MASSON'S collection of coins, but I must defer them until I know whether those I have already made are acceptable or not. I hope you will pardon the liberty I take not only in addressing you, but in differing from you in opinion.

\* The existence of the *Rao Nano Rao* coins in M. COURT'S tope prove it to belong to nearly the same epoch as the neighbouring monument opened by Gen. VENTURA, in which Sassanian coins of the seventh century (according to SACY and FACHIN, were discovered. Although therefore, taken alone, the Roman coins would raise the antiquity of the tope to a period somewhat posterior to the time of ANTONY'S expedition, still in combination with the other facts, they cannot set aside the more modern date of deposit: and the inference is stronger than ever, of their having been antiques at the time, and of the party buried there having been an antiquary in his day.—Ed.

† The title of ALEXANDER I. was *Philopator* and not *Theopator*; however there is every probability of the coin belonging to him. It was ascribed to ALEXANDER the Great, principally from the handsome youthful features of the monarch.—Ed.

VIII.—Description of the Fossil Elephant's Tooth from Sumrotee, near Náhun. By Lieut. W. E. BAKER, Engineers.

[In a letter to the Editor.]

In fulfilment of the promise made to Capt. CAUTLEY, I have the pleasure to enclose a sketch, (Plate XXXVI.) drawn to half size, of the fossil tooth presented to me by the Náhun Rája, and stated by him to have been found at a place called Sumrotee, about 30 coss in a westerly direction from Náhun. Concerning the exact situation of this place there is still considerable doubt, but as Lieut. DURAND has sent out persons in quest of it, we hope soon to determine its locality, and to be enabled to prosecute our researches whenever opportunity may offer. We could get no certain account of the formation in which this fossil was found imbedded, but the substance of which, small portions were found adhering to the specimen, appears to be a ferruginous sand.

I have not the means of comparing this with other fossil elephant's teeth; but I beg to call your attention to two points, which *may be* of importance, and which the imperfection of the drawing might prevent your remarking.

First, the great prominence of the molar ridges, particularly at one end, viz. the left of the drawing.

Secondly, the part that were the "crusta petrosa" has been broken away, the bone below it appears perfectly continuous, and not divided into separate plates. I may add, that the great general convexity of the grinding surface seems to show that this tooth belonged to the upper jaw, and that the fractured appearance of one of the ends proves that it once extended further in that direction. The colour of the "crusta petrosa" is a dull black. The bony parts where they are discovered, as well as the prominent ridges of enamel, are of a lighter tint, and the surfaces of the latter are highly polished.

Dádupur, November 16th, 1834.

[We should make the same remark on inspection of the present drawing, as on first receiving the fossil tooth from Jabalpur\*, that there is nothing to distinguish it (the animal that bore it) from the existing species of elephant, to the drawings of which in CUVIER'S *Ossemens Fossiles*, (which are not engraved in a style suited to very accurate comparison,) it bears a stronger resemblance, than to those of the fossil elephant's tooth. We are happy to perceive that the Asiatic Society is now in a fair way of possessing a splendid museum of the fossil riches of this newly discovered or re-discovered tract of country, through the exertions of Captain CAUTLEY, Lieut. BAKER, and Colonel COLVIN, all three engineer officers on the spot, and all equally zealous and disinterested in promoting the objects of science.—Ed.]

\* Journal Asiatic Society, Vol. II. page 585.

**IX.—Catalogue of Birds (systematically arranged) of the Ressorial, Grallatorial, and Natatorial Orders, observed in the Dukhun, by Lieut.-Colonel W. H. SYKES, Bombay Army, F. L. S., F. Z. S., &c. &c.**

[Continued from p. 598.]

160. **FRANCOLINUS SPADICEUS.** *Franc. castaneus* suprâ fusco tinctus, plumarum marginibus dilutioribus; capite, collo, ventre, crisso, tegminibusque cauda inferioribus fusco-brunneis; vertice nigrescenti-brunneo; plumarum ventris crissisque rhachibus elongatis, acutis.

*Fœm.* Suprâ nigro castaneoque varius; pectoris abdominisque plumis castaneis ad apices lunulâ latâ nigrâ notatis.

*Pallus.* Fusco-ferrugineus, vittis tribus dorsalibus latis, intermediâ saturatè rufobrunneâ, lateralibus favescenti-albidis.

*Irides* rufobrunneæ. *Rostrum pedesque* rufescenti-cornei. *Longitudo corporis* 9.7 unc., *caudæ* 5.

*Perdix spadicea*, Lath., Ind. Orn. 2. 644. 4. Temm., Gall. Ind. 719. *Tetræo spadiceus*, Gmel., Syst. Nat. 1. 759. 29. *Le Perdix rouge de Madagascar*, Sonn., Voy. Ind. 2. 169. *Francolin spadice*, Temm., Pig. et Gall. 3. 315. *Koku-tree* of the Mahrattas.

The male only of this bird, which is very common in the thick brushwood of the Ghauts, appears to have been known to the writers quoted. Colonel SYKES has had both sexes alive in his possession for some time, and has no doubt they might be successfully introduced into Europe. They are excellent eating. Rarely take to wing or perch. Male has a harsh call of three syllables, *Kot-kut-ree*, whence the Mahratta name; female in confinement uttered little notes like the twittering of a chicken. A male in Col. SYKES's collection has three large spurs on one leg, and two on the other.

Genus *Pterocles*, Temm. *Ganga*.

161. *Pterocles exustus*, Temm., Pl. Col. 354 & 360. *Rock Pigeon* of Europeans in the Dukhun.

A very common bird in the Dukhun; gregarious; frequenting open stony plains only. Characterized by the height at which it flies, the rapidity of its flight, and its peculiar and piercing note announcing its approach ere it can be well seen. It feeds on a quadrangular hard small seed, which Colonel SYKES has found in the stomach of only one other bird.

*Irides* reddish brown. Sexes of the same size. The male has two of the tail-feathers linear and elongated, which is not the case with the female. Male, inclusive of tail, 14.2 inches: tail 5 inches.

162. *Pterocles quadricinctus*, Temm., Gall. 3. 252. *Painted Rock Pigeon* of the Dukhun.

Rare, and met with only in pairs, on open ground, at the foot of hills. *Irides*, reddish brown. Sexes of the same size. Length, inclusive of tail, 13½ inches: tail 3 inches.

Genus *Hemipodius*.

163. *Hemipodius pugnax*, Temm., Pl. Col. 60. fig. 2.

Common in the Dukhun, and called the *Bustard Quail* by Europeans. Its reputed pugnacious qualities are not known. Solitary, or in pairs, and mostly found in *Chilice* fields (*Capsicum annuum*). *Irides*, light yellow. Length, inclusive of tail, 7.5 inches: tail 1.5 inch. Habits, tongue, and internal organization of *Coturnix testis*. M. TEMMINCK describes the female as differing in plumage from the male; but in Colonel SYKES's specimens the sexes are exactly alike.

164. **HEMIPODIUS TAIGOOR.** *Hem. suprâ castaneus, plumis stramineis marginatis, nigroque undulatis fasciatis; tegminibus alarum stramineis nigro fasciatis; remigibus fuscis; mento gulâque albis; pectore nigro alboque fasciato; ventre crissoque dilutè ferrugineis.*

*Irides*, pallidè flavæ. *Rostrum* nigrescens. *Longitudo corporis* 4.8 unc., *caudæ* 1.7.

Closely resembles the female of *Hem. pugnax*, as described by M. TEMMINCK, but the bill is longer and more slender, and Colonel SYKES has specimens of both sexes. Sexes alike.

165. *Hemipodius Dessumier*, Temm., Pl. Col. Called the *Button Quail* by Europeans. Colonel SYKES never met with this bird otherwise than solitary; frequents thick grass or pulse fields, and sits so close as to expose itself to be trod upon. Flight

so abrupt and short, that ere the gun is well up to the shoulder, the bird is down again. Irides, straw-yellow. Length, inclusive of tail, 5.7 inches: tall 1.4 inches. Fam. *Syrthiidae*, Vigora.—Genus *Otis*, Linn. *Bustard*.

166. *Otis nigriceps*, Gold's Cent. Himal. Birds.

This noble bird is so common in the Dukhun, that one gentleman has shot nearly a thousand. Gregarious. Egg, a perfect oval, brown olive, with obscure blotches of darker brown olive. Length 3.4 inches, diameter 2.7 inches. One only found in a hole in the earth on the open plain, and that considerably advanced in the process of incubation. Irides, deep brown. Length, male, inclusive of tail, 56½ inches: tail 13½ inches. Female 4½ inches, inclusive of tail of 10½ inches. Male supplied with the remarkable gular pouch common to the *Otis tarda*.

167. *OTIS FULVA*. *Ot. supra cacotico-brunnea, plumis fulvo marginatis variegatisque; tegminibus alarum, collo, pectoreque fulvis, punctis lineisve brunneis parce notatis; ventre, uropygio, femoribus, tegminibusque caudæ inferioribus fulco-albis: tegminibus alarum inferioribus lateribusque cacotico-nigris; caudæ fulcè fasciis quatuor cacotico-brunneis notatæ; mento gulæque albis; vertice brunneo, strigæ medii longitudinali albâ.*

Irides rufescenti-lutescentes, radiis a pupillâ pallidè lutescentibus. Pedes flavescens. Longitudo corporis ♂, 15.6 unc., caudæ 3.4: corporis ♀, 17.4, caudæ 3.4.

The wings are of unequal length in the sexes; and the quills are singularly acuminated.

Col. SYKES gives the following detailed description of the *Otis fulva*: Forehead, crown, back, scapulars, and first three quills rich chocolate brown; feathers of the back and scapulars triangular at the point, edged with fulvous, and barred in the centre and near the base with a broad bar of fulvous, mottled with chocolate. Round the eyes, a streak down the centre of the crown, whole neck, breast, wing-coverts, and tail buff or fulvous; the back neck closely speckled with minute dots of brown. On the wing-coverts a few scattered lines and specks of brown. Tail with four distant fuscous bars, the intermediate spaces beautifully barred with flexuose lines of fuscous. The fourth and following quills and secondaries marked like the tail. Two irregular fuscous streaks down the fore neck. Breast fulvous, with a few faint lines and spots of brown. Belly, vent, under tail-coverts, and thighs yellowish white. Under wing-coverts and sides of the body fine chocolate brown. Occasionally a feather is tipped with white on the wing-coverts. Upper mandible fuscous, lower yellowish. Chin and throat white, extending up towards the ears. Sexes exactly alike in plumage. The down at the base of all the feathers pink. Primary quills singularly acuminated, particularly in the male, terminating in a point as fine as that of a needle; less so in the female, and the wings of the latter are from one to two inches longer than those of the female. This difference is constant.

Col. SYKES stated that his description was written from eight specimens lying before him, and that he had transmitted three similar to the India House.

Some of Col. SYKES's sporting friends in India having expressed a belief that the *Otis fulva* was the female of the black *Floriken* of the Dukhun, (a comparatively rare bird, the *Otis fulva* being common,) he was induced to pay particular attention to the organs of sex, and never found the *testes* and *ova* otherwise than fully developed. If therefore it be referrible as an immature bird to a known species, (*Otis Bengalensis*, *Otis aurita*, or *Otis Indica*.) it appears in the Dukhun in hundreds, with all the indications of puberty, at a time when the supposed parents are rarely, if at all, to be met with. Col. SYKES's birds are identical with a specimen laid before the Society by Major FRANKLIN on the 9th of August, 1831, under the name of *Otis Indica*; Major FRANKLIN, at the same time, expressing doubts of it being the white-chinned *Bustard* of Dr. LATHAM. The description of the *Otis Indica* has only two features common to the *Otis fulva*, "chin white," and "under parts dusky yellowish cream colour;" as they differ in all other particulars, the birds cannot be identical; and a reference to a figure of the *Otis Indica*, which is only to be met with in J. H. MILLER, confirms the impression. Col. SYKES believes with Major FRANKLIN that the present species has been usually mistaken for the female of *Otis aurita*.—A correspondent in the Magazine of Natural History, No. 16, for November, 1830, under the signature of "A Subscriber," page 517, confirms Col. SYKES's opinion, stating that the *Churf* or *ochrous Floriken* (*small Bustard* of India) is not the *Otis Indica* (*white-chinned Bustard*), nor the *Otis Bengalensis*, nor the black *Floriken* (*Otis aurita*) or *Leek* of Hindostan.

Col. SYKES stated the food of the *Otis nigriceps* and the *Otis fulva* to be almost exclusively grasshoppers; and he pointed out the absence of a gizzard (the stomach being simple), combined with the remarkable shortness of the intestinal canal, scarcely exceeding the length of the body, as distinguishing these birds from all others that had come under his observation.

## ORDER IV. GRALLATORES, III.

Fam. *Gruidæ*, Vigors.—Genus *Grus*, Pallas. *Crane*.

168. *Grus Antigone*, Steph., 11. 531. *Grus orientalis Indica*, Brisson, Orn. 5. 578. 7. Kullum of the Mahrattas.

Appear in flocks of hundreds in Dukhun during the cold season.

Fam. *Ardeidæ*, Leach.—Genus *Ardea*, Anct.Section A. *Tarsi long.*

169. *Ardea Egretta*, Gmel., 1. 699. *Ardea Torva*, Buch. Franklin, Zool. Proceedings. *La Grand Egrette*, Buff., Ois. 7. 377. Pl. Enl. 925. *Large white Heron with yellow bill.*

Length, inclusive of tail, 35 to 36 inches: tail 5.8 inches. Length of the European bird 42 inches. *Irides* bright yellow. Solitary.

170. *Ardea Garzetta*, Linn., 1. 937. *L'Aigrette*, Buff., Ois. 7. 372. Pl. Enl. 901. *Little Egret Heron.*

Length, inclusive of tail, 24 to 25 inches: tail 4 inches. Length of the European bird 24 inches. *Irides* light yellow.

Gregarious. Toes, as in the European bird, yellowish green or apple green, exhibiting a curious contrast to the greenish black of the legs.

171. ARDEA ASHA. *Arde. supra ardosiacæ, dorso brunnescente; mento, gula lined longitudinali jugulari, corpore sabtüs, tegminibusque caudæ inferioribus albidissimis; tegminibus alarum tertiaris albo unguetè marginatis.*

*Irides* dilutè flavæ. *Rostrum* corneum. *Tarsi* virescenti nigri. *Longitudo corporis* 20½ unc., *caudæ* 3½.*Slate-coloured Heron.*A very rare bird in Dukhun. Has a good deal the aspect of *Arde. Novæ Hollandiæ*, and several points of resemblance to *Arde. gularis*, *Arde. jugularis*, and the young of *Arde. cærulea*: but differs from all.

172. *Ardea cinerea*, Lath., Ind. Orn. 2. 691. 54. *L. Heron huppé*, Buff., Ois. 7. 342. Pl. Enl. 787.

*Irides* bright-light yellow. Length, inclusive of tail, 38 inches: tail 6 inches.

Identical with European specimens. Solitary.

173. *Ardea nigrirostris*, Gray, Zool. Misc. 20. Fig. Ind. Zool. Part 12th. *Large white Heron with black bill.*

Differing only in having a black bill from *Arde. Egretta*; otherwise identical in size, form, colour, and internal organization; nevertheless, as Col. SYKES has adult birds preserving the black bill, he considers Mr. GRAY'S specific distinction valid. *Irides* bright yellow.Section B. *Tarsi short.*

174. *Ardea Malaccensis*, Gmel., 1. 643. *Crabier blanc et brun de Malacca*, Buff., Ois. 7. 394. Pl. Enl. 911. *Buglah* of the Mahrattas.

*Irides* light bright yellow. Length, inclusive of tail, 19 inches: tail 3 to 3½ inches. One male-bird measured 21 inches. White capillary worms found on the mesentery.

175. *Ardea Caboga*, Penn., Hindoos. 2. 158. *Gibraltar Heron*, Lath., var. A. *Small pure white Heron. Batty bird* of Europeans in Dukhun.

Attend oxen while grazing, and pick insects from them. Gregarious. Length, inclusive of tail, 19½ to 21 inches: tail 3½ inches. *Irides* bright yellow. A shade of yellow ochre on the forehead in some individuals.

176. ARDEA GRAYII. *Arde. alba; dorso atro-rubente; capite, collo, pectore, scapularibusque sordidè flavescenti-albidis; occipitis plumis 3—5 longis, linearibus, albidissimis.*

*Irides* nitidè flavæ. *Rostrum* ad apicem nigrum, ad basin flavescens. *Tarsi* fuscescenti-carnei. *Longitudo* (caudâ inclusâ) 18½—19½ unc., *caudæ* 3.*Marone-backed Heron.*The deep chestnut or marone feathers of the back are decomposed, and extend nearly to the end of the tail. The immature bird bears a very close resemblance to the *Arde. Malaccensis*.

177. *Ardea Javanica*, Horsf., Linn. Trans. 13. 190. *Indian green Heron* of Dr. LATHAM, No. 74.

Col. SYKES'S specimens are identical with those from Java, and on comparing them with the descriptions of *Arde. virescens*, Ill., and the plate of BUFFON, (Pl. Enl. 908, *Crabier de Cayenne*,) they differ in wanting the red stripes down the throat and neck, and in the tail being dark metallic green instead of black, and in smaller size. Dr. HORSFIELD'S trivial name is therefore valid. *Irides* bright light yellow, surrounded by a very narrow red ring. Length, inclusive of tail, 16½ inches: tail 2½. Sexes alike in size and plumage. Solitary on the woody banks of small streams.

178. *Ardea cinnamomea*, Gmel., 1. 643. *Entire chestnut Heron*. Identical with

- specimens in the British Museum and India House. Length, inclusive of tail,  $16\frac{1}{2}$  inches: tail  $2\frac{1}{2}$  inches. *Irides* bright yellow.  
Rare in Dukhun. Mostly solitary; never gregarious. Remarkably wary.  
Genus *Botaurus*, Brisson. *Bittern*.
179. *Botaurus stellaris*, Brisson, Orn. 5. 444. *Ardea stellaris*, Linn., 1. 239. 21. *Le Butor*, Buff., Ois. 7. 411. Pl. Enl. 789. *Common Bittern*.  
Identical with the European bird.  
Rare in Dukhun.  
Genus *Nycticorax*, Steph.
180. *Nycticorax Europæus*, Steph., 11. 609. *Ardea Nycticorax*, Linn., 1. 235. 9. *Le Bihoreau*, Buff., Ois. 7. 435. Pl. Enl. 758. *Night Heron*.  
*Irides* broad, crimson. Length, inclusive of tail, 24 inches: tail 4.2 inches.  
Length of the European bird about 22 inches. *Irides* and legs of the same colour as those of the Asiatic bird.  
Genus *Phanicopterus*, Linn. *Flamingo*.
181. *Phanicopterus ruber*, Linn., 1. 230. *Le Flammanf*, Buff. Ois. 8. 475. Pl. Enl. 63. *Red Flamingo*. *Rajah* Huns of the Hindoos.  
*Irides* light yellow. Length, inclusive of tail,  $43\frac{1}{2}$  inches: tail 6 inches.  
In the *duodenum* of a female were found two thick, remarkably white worms composed of *annuli*; one 7 inches long, the other  $4\frac{1}{2}$  inches; and filling up the intestinal canal, so that liquid food only could have passed; nevertheless the bird appeared quite healthy.  
Genus *Platalea*, Linn. *Spoonbill*.
182. *Platalea leucorodia*, Linn., 1. 231. 1. *La Spatule*, Buff., Ois. 7. 448. Pl. Enl. 405. *Crested white Spoonbill*.  
*Irides* crimson. Length, inclusive of tail,  $35\frac{1}{2}$  inches: tail  $5\frac{1}{2}$  inches.  
Although a little larger in size, it is otherwise absolutely identical with the European bird, even to the colour of the *irides* and legs.
183. *Platalea junior*. The feathers with black shafts.  
Mr. STEPHENS describes these birds as rarely occurring inland. Col. S.'s specimens were obtained 100 miles from the sea, and at an elevation of 2000 feet.  
Genus *Ciconia*, Ray. *Stork*.
184. *Ciconia leucocephala*. *Ardea leucocephala*, Gmel., 1. 642. Lath., Ind. Orn. 2. 699. 78. *Le Heron Violet*, Buff., Ois. 7. 370. *Heron de la côte de Coromandel*, Buff., Pl. Enl. 906. *Violet Heron*. *Kandehsur* or *Korowu* of the Mahrattas.  
It is singular that this well-marked bird should have been classed as a *Heron* for a long period, and remain as such at the present moment in Shaw. Length, inclusive of tail, 33 to  $34\frac{1}{2}$  inches: tail 8 inches.  
Mostly seen on open stony plains, or in ploughed fields. Food chiefly grasshoppers. Monogamous. *Irides* scarlet, margined with a narrow circle of black and an exterior circle of yellowish.
185. *Ciconia Argala*, Steph., vol. 11. p. 622. *Araca dubia*, Gmel., 1. 624. *Ardea Argala*, Lath.  
Is met with in Dukhun; but Col. SYKES has not a specimen. Called the *Adjutant* by Europeans, from its stiff soldier-like strut.  
Genus *Anastomus*, Ill. *Courly*.
186. *Anastomus Typus*, Temm. *An. Coromandelianus*, Steph., 11. 632. *Ardea Coromandelica* (l'adulte) et *Ponticeriana* (le jeune), Temm. *Le bec ouvert des Indes*, Soan. Voy. 2. pl. in p. 219. Buff., Ois. 7. 409. Pl. Enl. 932. *Cinereous Muscle-catcher*.  
*Irides* bright yellow. Length, inclusive of tail, 32 to 33 inches: tail  $6\frac{1}{2}$  to  $6\frac{1}{4}$  inches.  
BURRON's figure is excellent. Lives on the animals of a new and large species of *Unio*. The stomach of this bird is not less remarkable than its bill: the last exhibiting a beautiful adaptation of means to their end; the form of the mandibles enabling the bird to hold and open the bivalve shell of the *Unio*. Solitary.  
The proportional length of the intestinal canal exceeds that of any other bird in the order *Grallatores*, in one specimen being five times the length of the body, neck and bill inclusive.  
Genus *Tantalus*, Linn.
187. *Tantalus leucocephalus*, Lath., Ind. Orn. 2. 706. *Le Tantale de Ceylan*, Cuv., Règne Anim. 1. 481. *White-headed Ibis*.  
*Irides* yellow. Length, inclusive of tail,  $40\frac{1}{2}$  to 43 inches: tail  $6\frac{1}{2}$  inches.  
A large diaphanous spot on each side of the base of the upper mandible before the eyes does not appear to have been noticed in the description of the bird.  
The generic characters, if this bird be made the type, require modification. The stomachs of three birds were distended with fibrous vegetable matters in a commi-

unted state. A fourth had the same vegetable matters and the half of a corn nine inches long.

Genus *Ibis*, Le Cép. *Ibis*.

188. *Ibis religiosa*, Cuv., Règne Anim. 1. 483. *Sacred Ibis*. *L'Ibis sacré*, Cuv., Recherches sur les Ossements Fossiles, 1. 161. *Tantalus Ethiopius*. *Ibis Maecet*, Cuv., Attn. Mus. 11. 125. *White Ibis with purple black secondary quill decomposed feathers*, Ind. Orn. 2. 706.

Col. SYKES carefully compared the descriptions and measurements of the larger *Mummy Ibis* of CUVIER; and is induced to believe the present bird is the same. Col. SYKES puts into juxtaposition the measurements of CUVIER's *Mummy Ibis* from Thebes and one of his own birds:

	<i>Mummy Ibis.</i>	<i>Dukhan Ibis.</i>
	Inches.	Inches.
Length of beak and head together.....	8.27.....	8.15
Head.....	1.85.....	1.90
Tibia.....	5.90.....	5.80
Tarsus.....	4.01.....	3.80
Middle toe.....	3.81.....	3.50
Ulna.....	6.01.....	5.95
Hand.....	4.92.....	4.90

The individual of which the measurements are given has the two first quills tipped with violet, their shafts of the same colour, and four of the secondary quills are also violet, and with their webs decomposed, according with CUVIER's description. The violet colour is not so deep as in the *Ethiopian Ibis*; but as in all Col. SYKES's specimens (nine in number) the violet feathers are in progress of development, the colour would no doubt subsequently be darker. CUVIER mentions that the *Mummy Ibis* varied a little in size. Col. S. has birds larger and smaller than that of which the measurements are given.

Appear in Dukhan in the cold weather only. Gregarious.

Irides narrow, lake colour. Food water-crickets, crabs, beetles, shrimps. Length, inclusive of tail, 30 to 35½ inches: tail 5.3 to 5.7. Bill and head to occiput 7.8 to 9.6 inches. Bill to the gape 6.4 to 7.8 inches.

189. *Ibis ignea*, *Tantalus igneus*, Lath., Ind. Orn., 2. 708. 12. *Ibis falcinellus*. Temm., Man. d'Orn., 2nd Edit. 2. 569.

Col. SYKES's birds, male and female, are identical with two European specimens, in the British Museum labelled *Ibis ignea*, and viewed as the immature birds of *Ibis falcinellus*. Col. SYKES however has seen so many of both in India, appearing in different flocks at the same period of the year, and not having, as M. TEMMINCK describes the birds before they are three years old, "partie inferieure du cou, poitrine, ventre, et cuisses d'un noir cendré; haut du dos et scapulaires d'un cendré brun," but of a rich fuscous brown, with brilliant metallic reflections; differing also in the proportions of the internal organization; and Dr. LATHAM moreover describes even the youngest birds of *Ibis falcinellus* as characterized by reddish brown. HERODOTUS speaks of the smaller *Ibis* as entirely black, a description inapplicable to the *Ibis falcinellus*, but applicable to the present species, which at a short distance appears entirely black. Col. SYKES is therefore induced to adopt the opinion of those writers who considered the bird distinct from *Ibis falcinellus*. Its measurements correspond with those of the smaller species of *Mummy Ibis* given by CUVIER; and it agrees in plumage (intense blackish brown with metallic reflections, without any mention of chestnut or marone, the livery of the *Ibis ignea*), with the descriptions of the ancients; it is therefore very probable, as M. TEMMINCK suggests, that it is the sacred species worshipped and embalmed by the Egyptians.

Length (male), inclusive of tail, 25½ inches: tail 4½ inches. Female 23½ inches: tail 4 inches.

Black beetles, larvae of water insects, and numerous univalve shells found in the stomachs of these birds.

190. *Ibis papillosa*, Temm., Pl. Col. 304. *Black screaming Ibis*. *Indian variety of Bald Ibis*, Lath., 9. 156.

Soar high in the air in circles, uttering melancholy screams. Monogamous. Found in the stomach of several birds aquatic insects, multitudes of black beetles, *Jowaree* seeds, *Gryllotalpa*, and vegetable matters. Col. SYKES's birds are much less brilliant in plumage than the specimen described and figured by M. TEMMINCK.

Irides pale red. Length, inclusive of tail, 25 to 28½ inches: tail 7½ inches.

191. *Ibis falcinellus*, Temm., Man. d'Orn. 2nd Edit. 2. 599. *Tantalus falcinellus*, Linn., 1. 241. Gmel., 1. 648. *Le Courbis verd*, Buff., Ois. 6. 39. *Courbis d'Italie*, Buff., Pl. Enl. 819. *Marone Ibis*.

- Sexes do not differ in plumage; but the female is somewhat smaller than the male.
- Length, inclusive of tail, 26 to 26½ inches: tail 4½ inches. Multitudes of black beetles and grasshoppers, and univalve freshwater shells, found in the stomach. An immature bird in possession of the Zoological Society, unlike the supposed immature bird (*Ibis ignea*), is characterized by the marene livery of the *Ibis falcinellus*.
- Fam. *Scolopacidae*, Vigors.—Genus *Totanus*, Bechst. *Sandpiper*.
192. *Totanus ochropus*, Temm., Man. d'Orn. 420. *Tringa ochropus*, Linn., 1. 250. *Green Sandpiper*.
- Absolutely identical in plumage with a specimen from Hudson's Bay in the British Museum, and with English specimens.
- Irides fuscous brown. Length, inclusive of tail, 9½ to 10 inches: tail 2½ inches. For the most part solitary. The stomach approximates to a gizzard. Sexes alike. Cry, *Cheet, Cheet, Cheet*.
193. *Totanus Glareola*, Temm., Man. d'Orn. 2nd Edit. 2. 654. *Tringa Glareola*, Linn., 1. 250. *Wood Sandpiper*.
- Differs from one specimen of *Tringa Glareola* in the British Museum in a defined white line over the eyes to the bill, more white on the throat and less brown speckled on the breast, and slightly longer bill; but is identical in plumage with another specimen.
- Irides fuscous brown. Length, inclusive of tail, 9 to 9½ inches: tail 2.2 inches. Sexes alike. In April as delicate eating as the common *Snipe*. Cry, *Chit, Chit, Chit*; but the alarm cry is like the grating of a rusty hinge.
194. *Totanus hypoleucos*, Temm., Man. d'Orn. 424. *Tringa hypoleucos*, Linn., 1. 250. *Common Sandpiper*. *Tringa Guinetta*, Brit. Mus. *La petit Alouette de Mer*, Buff., Pl. Enl. 650.
- Irides fuscous brown. Length, inclusive of tail, 8½ to 9 inches: tail 2.4 inches. Cry, a sharp whistle like *Wheet, Wheel, Wheet*. Jerk the tail in a curious manner. Sexes alike. Generally solitary.
- Genus *Limosa*, Briss. *Godwit*.
195. *Limosa Glottoides*. *Totanus Glottoides*, Gould's Century of Himalayan Birds. Col. SYKES agrees with Mr. GOULD in the propriety of separating this bird from the *Totanus Glottis* (*Scolopax Glottis*), or *Green-shanks* of Europe.
- Irides fuscous red brown. Length, inclusive of tail, 14 to 14½ inches: tail 3 inches.
- Sexes do not differ in plumage or size. Cry in flight, a sharp, shrill *Queek, Queek*. Very wary birds. Commonly seen alone; rarely three or four together. Minute fish, larvæ of water insects, and univalve shells found in the stomach.
196. *LIMOSA HORSFIELDII*. *Lim. supra brunnea, plumarum rhachibus lineisque transversis angulatis nigris; mento, corpore infra, uropygibus, dorsi dimidio, caudâ, marginibusque plumarum superiorum albis; remigibus fuscis rhachibus albis; caudâ lineis plurimis angulatis angustis nigris notatâ.*
- Irides intense (rufo-brunnæ. Rostrum pedesque (hi gracillimi) nigri. Longitudo corporis 8—8½ unc., caudâ 2½.
- This is a miniature likeness of the preceding, but quite distinct, although similar in habits, manners, flight, and cry; but with a permanent difference in size and some markings. It is comparatively a rare bird. Col. SYKES had at first considered it a young bird of *Tot. Glottoides*, until an observation of some years convinced him of his mistake. So wary as to be rarely within reach of the gun. Female with the spots and markings fainter than in the male. Bill 1.9 inch long.
- Genus *Gallinago*, Ray. *Snipe*.
179. *Gallinago mediâ*, Ray. *Scolopax Gallinago*, Linn., 1. 244. *Becassine*, Buff. Ois. 7. 483. Pl. Enl. 883.
- Appears only from November until March in Dukhun. Same as the European bird, with trifling exceptions, resulting probably from age. Irides intense brown. Size of common *Snipe*. Found in the stomach, vegetable matter, minute univalve shells, earth-worms, larvæ of water insects, and fine gravel. Sexes alike.
198. *Gallinago minima*, Ray, Syn. 105. A. *Scolopax Gallinula*, Linn., 1. 244. 8. *Becassine sourde*, Temm., Man. d'Orn. 440. *Jack Snipe*.
- Appears and disappears with the preceding species. Identical with the European bird and precisely similar in its habits. Irides intense brown. Length, inclusive of tail, 8.2 inches: tail 2.3 inches. Food the same as that of the common *Snipe*. Sexes alike.
- Genus *Rhynchea*, Cuv.
199. *Rhynchea picta*, Gray, Proc. Zool. Soc. *Rhynch. Capensis*, Steph., 12. 65. *Scolopax Capensis*, Linn., 1. 246.

Col. SYKES has specimens in such states of plumage as to correspond with the above species, shot on the same ground. Migratory. *Irides* red brown. Length, inclusive of tail, 10 inches: tail  $1\frac{1}{2}$  inches. Sexes alike. Feed like Snipes.

Genus *Pelidna*, Cuv. *Dunlin*.

200. *Pelidna Temminckii*, Steph., 12. 103. *Tringa Temminckii*, Leisl. Temm., Man. d'Orn. 401. *Small Dunlin*.

Identical with the European bird. *Irides* dark brown. Length, inclusive of tail, 6 to  $6\frac{1}{2}$  inches: tail 2 inches. Feed like Snipes. Gregarious. Excellent eating. Fam. *Rallida*, Leach.—Genus *Parra*, Linn. *Jacana*.

201. *Parra Sinensis*, Gmel., 1, 709. *Yellow back-necked Jacana*. Fig. in GOULD'S Century of Birds.

The immature bird is the *Parra Luzoniensis*. Dive remarkably well despite their long toes. *Irides* fuscous brown. Length, inclusive of tail, 18 to 19 inches: tail 9 to 10 inches. Found in the stomach of many birds vegetable matter, two species of univalve shells, bugs (*Cimex annulatus*), and fine gravel. Gregarious, and common on the rivers in Dukhan.

Genus *Gallinula*, Ray. *Gallinule*.

202. *Gallinula Javanica*, Horsf., Linn. Trans. 13. 196. *Poule Sultane de la Chine*, ou *Poule Soultane brune*, Pl. Enl. 896. *Pan Kouree* of the Maharrattas.

This is the Variety B of the 'Index Ornithologicus.' Dr. HORSFIELD has judiciously separated it from the *Gall. phœnicurâ*. Col. SYKES's specimens differ from Dr. HORSFIELD'S only in being a little larger. *Irides* fuscous red. Length, inclusive of tail,  $11\frac{1}{2}$  to  $12\frac{1}{2}$  inches: tail  $2\frac{1}{2}$  to 3 inches. Larvæ of water insects found in the stomach. Legs very long.

Genus *Rallus*, Auct. *Rail*.

203. RALLUS AKOOL. *Rail, capore supra lateribusque olivaceo-fusco-brunneis; alis caudâque fuscis; gutture, pectore, ventre, uropygioque cinereo-brunneis; tegminibus alarum caudaque inferioribus saturatè brunneis; mento albo. Rostrum virescenti-nigrum. Pedes carneo-brunnei. Longitudo corporis 8—9 unc., caudæ 2½.*

The only spot of white on the bird is at the chin. Wings and tail short. This bird appears quite distinct from any described species of *Rallus* or *Gallinula*. The nearest approach to it is the *Rail, niger* of Gmelin from the Cape of Good Hope. Sexes alike. Frequents sedgy and marshy places amidst low bushes. Shuns observation.

Genus *Porphyrio*, Briss.

204. *Porphyrio smaragnotus*, Temm., Man. d'Orn. 2nd Edit. 2. 700. *Fulica Porphyrio*, Linn., 1. 258. *Le Taleve de Madagascar*, Buff., Pl. Enl. 810.

These very beautiful birds are found on most of the very large tanks or ponds, the surface of which is a good deal covered with the broad leaves of the *Lotus*, on which the birds walk. Vegetable matters only found in the stomach of several birds, particularly parts of the green capsules of *Trapa bispinosa*. Sexes alike. *Irides* blood red. Length, inclusive of tail, 18 inches: tail  $3\frac{1}{2}$  inches. Stomach a true gizzard.

Genus *Fulica*, Auct. *Coot*.

205. *Fulica atra*, Linn., 1. 267. *Le Foulque*, Buff., Ois. 8. 211. Pl. Enl. 197.

Differs only from Javanese specimens in being larger, and a shade lighter below. Much larger than the common *Coot* of Europe, but with the same coloured *irides* (crimson), and does not otherwise differ. Length, inclusive of tail, 18 to 19 inches: tail 2 inches. It has the habits of *Podiceps*, and with the gizzards, long *cæca*, and general internal organization of a *Duck*, seems to belong to the order *Natatores*. Water weeds and coarse sand found in the stomach.

Fam. *Charadriadae*, Leach.—Genus *Cursorius*, Lath. *Cursor*.

206. *Cursorius Asiaticus*, Lath., Ind. Orn. 2. 751. 2. *Cour-vite de Corromandel*, Buff., Ois. 8. 129. Pl. Enl. 892.

*Irides* dark brown. Length, inclusive of tail, 10 inches: tail  $2\frac{1}{2}$  inches. Sexes alike. Numerous in Dukhan; but only on the open stony and grass plains. This bird has the shortness of intestine of the *Bustard* (equal to the length of the body), with a stomach nearly similar; feeding in the same manner on insects and their larvæ and with the same cursorial habits, and should therefore be placed near the *Struthionidae*, after *Otis* and *Tetrao*.

Genus *Vanellus*, Briss. *Lapwing*.

207. *Vanellus Goensis*, Steph., 11. 514. *Tringa Goensis*, Lath., Ind. Orn. 2. 727. 7. *Para Goensis*, Gmel., 1. 706. *Vanneau armé de Goa*, Buff., Pl. Enl. 807.

*Irides* fuscous crimson. Length, inclusive of tail, 14 inches: tail 5 inches. Affect open plains and beds of rivers. Gregarious. Water insects, shells, and corn found in the stomach. A watchful and noisy bird at night: uttering cries of *Did he doo it, Did he doo it*. Sexes alike.

208. *Vanellus bilobus*. *Charadrius bilobus*, Gmel. 1. 691. *Le Pluvier de la côte de Malabar*, Buff., Pl. Enl. 980.

The bird has a black bill, yellowish at the base; and not a yellow bill, as described in the 'Index Ornithologicus.' There are one or two other minor discrepancies; but no doubt it is the species figured by BUFFON. Although it wants the hind toe, and is therefore, agreeably to generic characters, a *Charadrius*, its habits, figure, food, and almost its cry, are those of the preceding species. COL. SYKES has therefore classed it as a *Vanellus*. Irides yellowish. Length inclusive of tail, 11½ to 12 inches: tail 3½ inches. Gregarious. Found only on the open stony and grass plains. Like the *Van. Goensis*, a restless noisy bird at night, crying *Deewit, Deewit*. Sexes alike.

Genus *Charadrius*, Auct. *Plover*.

209. *Charadrius pluvialis*, Linn., 1. 254. 7. *Le Pluvier doré*, Buff., Ois. 8. 81. Pl. Enl. 904. *Golden Plover*.

Identical with Javanese specimens. Smaller than one North American specimen and two English specimens in the British Museum; but absolutely identical with other British specimens. A rare bird in Dukhun, and appearing only in the cold weather. Irides almost black. Length, inclusive of tail, 10 inches: tail 2.6 inches. Gregarious. In the stomach were found beetles, land insects, and coarse sand.

210. *Charadrius Philippensis*, Lath., Ind. Orn. 2. 745. 11. *Petit Pluvier à collier de Luçon*, Sonn., Voy. Ind. 84. pl. 46.

This little bird has the habits of *Totanus*; frequents the shores of fresh water only; and in fring into a flock of *Sandpipers* it is frequently killed in company with them. Irides fuscous crimson. Length, inclusive of tail, 7½ inches; tail 2.3 inches. Gregarious. Sexes alike. SONNERAT, in his description, omits to mention that the margins of the eyelids are bright yellow; instead of which he calls the irides yellow.

Genus *Himantopus*, Ray. *Longshanks*.

211. *Himantopus melanopterus*, Horsf., Linn. Trans. 13. 194. *Charadrius Himantopus*, Linn., 1. 255. *L'Echasse*, Buff., Ois. 8. 114. Pl. Enl. 878.

There are slight discrepancies in the plumage between the birds of Java, India, and Europe; and in case of these being permanent, and not the result of non-age, specific differences might be established. Irides narrow, lake or crimson colour. Length, inclusive of tail, 16 inches; tail 3½ inches; to the end of the toes 2½ inches. Gregarious. Vegetable matters, larvae of water insects, and minute univalve shells found in the stomach. These birds are strangely polluted with visceral worms of the tape and capillary kinds.

Genus *Edicnemus*, Cuv. *Thick-knee*.

212. *Edicnemus crepitans*, Temm., Man. 322. *Otis Edicnemus*, Lath., Ind. Orn. 2. 661. 11. *Charadrius Edicnemus*, Linn., 1. 255. *Le grand Pluvier*, Buff., Pl. Enl. 919. *Great-headed Thick-knee*.

There is no visible difference between the Dukhun and British species. Eyes of very great size. Irides very broad, of a greenish yellow. Length, inclusive of tail, 17 to 18 inches; tail 4½ inches. Gregarious. Frequents bushy wilds as well as grass plains. Not met with in woods. Land insects and seeds found in the stomach. Sexes do not differ in size or plumage. This bird rests on the first joint of the leg like the *Gallus giganteus*.

#### ORDER V. NATATORES, III.

Fam. *Anatidæ*, Leach.—Genus *Plectropterus*, Leach.

213. *Plectropterus melanotos*, Steph., 12. 8. *Anas melanotos*, Gmel. 1. 503. *L'Oie bronzée de Coromandel*, Buff., Pl. Enl. 937. *Black and white Plectropterus*. *Nukta* of the Mahrattas.

The very large vertical compressed process on the upper mandible; the white lower part of the back; cinereous rump; and rudimentary black mane down the back neck are not noticed in descriptions of this species. This noble and splendid bird is not common in the Dukhun. Female considerably less in size than the male, and with the metallic reflections much less brilliant; destitute also of the comb or crest on the upper mandible. Seen in pairs. Horny process on the bend of the wing obtuse. Length, inclusive of tail, 30 to 34 inches; tail 5½ to 6 inches. Seeds of water-grasses, and the remarkable quadrangular hard seeds met with in the stomach of the *Pterocles exustus* found also in the stomach of the *Plectropterus*. Digestive muscle of the remarkable thickness of 1.2 inch.

Genus *Anser*, Brisson.

214. *Anser Cirra*. *Anas Cirra*, Gray, Indian Zool. Illust. No. 4. fig. 6. *Cirra Teal*, Lath. *Cotton Teal* of Europeans in Dukhun, from the quantity of white in the plumage.

Irides bright crimson.

This handsome bird is one of the smallest of the *Anatidæ*. Length, inclusive of

tail, 12½ to 14 inches; tail 3 to 3½ inches. Sexes exactly alike. Monogamous. Vegetable matter and gravel found in the stomach. These birds, when wounded, dive, and on returning to the surface show only the bill above water, keeping the body below at pleasure.

Genus *Tadorna*, Leach.

215. *Tadorna rutila*, Steph., 12. 71. *Anas Casarca*, Linn., App. 3. 224. *Shieldrake*. *Brahmumy Duck* of Europeans in Dukhun.

Irides yellowish brown. Length, inclusive of tail, male 28 inches, female 25 to 26 inches; tail 5½ inches. For the most part of the year these birds are in pairs, but on the Nerbudda river in Guzerat, Colonel SYKES has seen them congregated in hundreds in April. Found in the stomachs of many birds, grass seeds and vegetable matters only. The female is destitute of the black ring round the neck ornamenting the male. The intestinal canal twice the proportional length of that of the *Plectropterus*.

Genus *Anas*, Auct.

216. *Anas strepera*, Linn., 1. 200. *Chipeau*, Buff., Pl. Enl. 958. *Chestnut lesser wing-covert Duck*.

Males identical with specimens in the British Museum from Kent. No females for comparison. Length, inclusive of tail, male 24 to 25 inches, female 22 inches; tail 4 inches. Numerous in Dukhun. Gregarious. A tape-worm was found protruding through the coat of the intestines in one bird, without affecting its health or flesh.

Genus *Rhynchaspis*, Leach, MSS.

217. *Rhynchaspis virescens*, Leach, MSS. *Anas clypeata*, Linn., 1. 200. *Souhet*, Buff., Ois. 9. 191. Pl. Enl. 971. 972. *Black-headed shoveler*.

Identical with British specimens of the common *Shoveler*; but differing from the description of that bird in Shaw. Irides yellowish brown. Length, inclusive of tail, 20 to 21 inches; tail 4 inches. Grass seeds, vegetable matters, pulse-like seeds, and gravel found in the stomach. Gregarious. The intestinal canal is more than seven times as long as the body, neck and bill included; and in this particular is not approached within nearly two-sevenths by any other bird of the order *Natatores*.

Genus *Mareca*, Steph. *Wigeon*.

218. *Mareca pacilorhyncha*, Steph., 12. 134. *Anas pacilorhyncha*, Gmel., 1. 635. *Spotted-billed Duck*, Lath.

Irides red fuscous brown. Length, inclusive of tail, 22 to 25 inches; tail 4 to 4½ inches. Sexes alike in plumage. Grass seeds, vegetable matters, and small stones found in the gizzard. Colonel SYKES's birds identical with a specimen in the British Museum, from the Himalayan mountains. The spot at the end of the bill invariably yellow, but in books it is stated to be white. The diaphragmic muscle thicker than the diameter of the cavity of the gizzard. Colonel SYKES does not consider this species a true *Mareca*.

219. *Mareca fatularis*, Steph., 12. 131. *Anas Penelope*, Linn., 1. 202. *Canard Siffleur*, Buff., Ois. 9. 169. Pl. Enl. 825. *Wigeon*.

Irides red fuscous brown. Length, inclusive of tail, 19 to 20 inches (male), 18½ to 19 inches (females); tail 3½ to 3¾ inches. Gregarious. Absolutely identical with specimens from Devonshire. Contents of the gizzard as in the preceding species.

220. *MARECA AWSUREE*. *Mar. nigrescenti-brunnea; plumarum scapularium dorique apicibus flavescenti-brunneis; tegminibus alarum minoribus caudaeque superioribus saturatè castaneis; vertice lineaque cervicali fuscis; capite, collo, pectoreque pallide flavescenti-brunneis, ventre uropygionique saturatioribus ferrugineis; mento tegminibusque caudæ inferioribus sordidè albis.*

*Rostrum pedesque nigri. Longitudo (caudâ inclusâ) 18½—20 unc., caudâ 2½. Whistling Teal.*

This bird, of which Colonel SYKES has many specimens, is identical with a bird in the British Museum, from Africa; one in the Zoological Society, from Bengal; and one in the India House, from Java. In the whole of these, the lunules on the breast, neck, and upper part of the back, and the strong black short mane of the *Anas arcuata* are wanting. It is also larger than that bird, and Colonel SYKES is therefore led to believe this to be a distinct species, although strongly resembling it.

Gregarious, and abundant in Dukhun. Sexes alike in plumage. These birds are characterized by a very peculiar whistle when disturbed, by a proportional length of intestine one-third shorter than that of any other species of the *Anatidæ*, and by the inferior *larynx* being dilated into two oblong chambers, placed rather in front of, than lateral to the *trachea*.

Genus *Querquedula*, Ray. *Teal*.

221. *Querquedula Circa*, Steph., 12. 143. *Anas Circa*, Linn., 1. 204. *Sauvaille d'été*, Buff., Ois. 9. 268. Pl. Enl. 946. *Gargany Teal*.

- Length, inclusive of tail,  $16\frac{1}{2}$  to  $17\frac{1}{2}$  inches; tail 3 to 3.4 inches. Female the smaller bird, and quite dissimilar in plumage. Identical with British specimens. Gregarious. In addition to similar contents of the gizzards in other species, rice in the husk was found.
223. *Querquedula Crecca*, Steph., 12. 146. *Anas Crecca*, Linn., 1. 204. *Petite Sarcelle*, Buff., Ois. 9. 265. Pl. Enl. 947. *Common Teal*.  
Identical with male and female British specimens. Length, inclusive of tail,  $15\frac{1}{2}$  to 16 inches; tail 3 inches. Water-weed and gravel in the stomach. Colonel SYKES has in his possession specimens (male and female) resembling the female of *Querq. Crecca*; but in which the proportional length of the intestinal canal differs so much from that of *Querq. Crecca* ( $3:30$  to  $1$ , and  $5:57$  to  $1$ ), that he is induced to believe they may belong to a distinct species. It will be observed that the proportional length of the intestine ( $5:57$  to  $1$ ) closely approximates to that of a widely-different bird, the carrion-devouring *Percnopterus*.

Genus *Fuligula*, Steph. *Pochard*.

223. *Fuligula rufina*, Steph., 12. 188. *Anas rufina*, Fall. *Le Canard Siffleur huppé*, Buff., Ois. 9. 282. Pl. Enl. 928. *Red-headed Pochard*.  
Length, inclusive of tail, 25 inches; tail  $3\frac{1}{2}$  inches. Digestive muscle remarkably thick. Rare in Dukhun. Vegetable matters and gravel in the stomach.
224. *Fuligula* ———. *Ash-brown Pochard with white speculum*.  
This bird has a considerable resemblance to the female of *Ful. rufina*, as described by Mr. STERNS, but it has a black bill; and Colonel SYKES is not able to meet with a specimen to institute a rigid comparison; he therefore leaves the bird for future consideration. Length, inclusive of tail, 24 inches; tail  $3\frac{1}{2}$  inches. A coloured figure in HUNT'S British Ornithology (Norwich) represents the female of *Ful. rufina* with a red bill, red legs, and reddish-brown plumage, which militate against its identity with the present bird.
225. *Fuligula cristata*, Steph., 12. 190. *Anas Fuligula*, Linn., 1. 207. *Morillon*, Buff., Ois. 9. 227. Pl. Enl. 1001. *Tufted Duck*.  
Differs only in the more pronounced amethyst reflection of the back neck in the male from British specimens. Female identical. Irides bright yellow. Length, inclusive of tail, 18 to 19 inches; tail 2.5 to 2.7 inches. Female the smaller bird.

Fam. *Colymbidæ*, Leach.—Genus *Podiceps*, Lath.

226. *Podiceps Philippensis*, Steph., 13. 16. *Indian Grebe*, Lath., 10. 29. described from drawings of Sir JOHN ANSTATHER. *Le Castagneur des Philippines*, Buff., Ois. 8. 246. Pl. Enl. 945. BUFFON'S plate is excellent.  
Irides broad, of an ochry yellow; they dilate and contract. Length, from the bill to the rump,  $9\frac{1}{2}$  to  $9\frac{3}{4}$  inches; tail none. Common in Dukhun, where their unceasing habit of diving occasions their being called *Divers* by Europeans, although quite distinct from the genus *Colymbus*. From their remarkable quickness of eye, Colonel SYKES has known a dozen unsuccessful shots fired at the same individual, which constantly disappeared under water ere the shot reached him. Gregarious. Stomach simple, resembling that of *Heros*, and wholly unlike that of *Ducks*. Found in the stomach *larvæ* of water insects and shrimps, aliments common to the *Heron* tribe, and not found by Colonel SYKES in the gizzard of *Ducks*.

Fam. *Pelecanidæ*, Leach. Genus *Phalacrocorax*, Briss. *Cormorant*.

227. *Phalacrocorax Javanicus*, Steph., 13. 90. *Carbo Javanica*, Horsf. Linn. Trans. 18. 197. Figured in Illust. Ind. Zool., part 10. fig. 9. *Shag* of Europeans in Dukhun.

Absolutely identical with Dr. HORSFIELD'S specimens from Java. Differs from *Pelecanus Africanus* (*Phal. Africanus*), with which it has been confounded, in the scapulars and wing coverts being reddish-fuscous-brown instead of blue-gray, and being margined and tipped with lighter brown instead of black; in the first three quill-feathers being black instead of pale brown; in the secondaries not being so long as the quills; tail graduated instead of cuneiform; in the front of the neck being reddish and fuscous instead of black and white; finally, in the belly being rusty black instead of white varied with dusky. There can be no question, therefore, of the propriety of its being considered a distinct species by Dr. HORSFIELD. Colonel SYKES has seen hundreds of them, and notes these differences with several specimens lying before him. Irides remarkably narrow; crimson. Length, inclusive of tail, 22 to 23 inches; tail 6 inches. Sexes alike. The only spot of white on the bird is at the chin. Very numerous in Dukhun, appearing in the rivers in flocks of hundreds. Fish (some 3 inches long) and prawns found in the stomach of many birds; also capillary worms. Colonel SYKES remarks, that the generic character, "Face and throat naked" is inapplicable to this species.

Genus *Plotus*, Linn. *Darter*.

228. *Plotus melanogaster*, Gmel. 1. 580. *Anhinga noir du Senegal*, Buff., Ois. 8. 453. Pl. Enl. 960 & 107. *Black-billed Darter*, called the *Snake-bird* in Dukhun.

Irides bright yellow. Length, inclusive of tail  $37\frac{1}{2}$  inches; tail  $9\frac{1}{2}$  inches. Solitary. Rare in Dukhun, but frequently met with below the Ghauts. This bird has the singular faculty of being enabled to swim with the whole of its body under water, the long neck and head alone being visible, looking like a snake. Colonel SYKES' limits do not permit him to enlarge on the very peculiar formation of the stomach, more resembling that of a ruminant than a bird. Seven small carp and much deep-green vegetable fibre were found in the stomach of a female.

Fam. *Laridae*, Leach.—Genus *Sterna*, Linn. *Tern*.

229. *Sterna acuticauda*, Gray, Illust. Ind. Zool., part 6. fig. 3. *Small yellow-billed Tern*. *Sterna melanogaster*, Trimm., Pl. Col. 434?

Irides reddish deep brown. Length, inclusive of tail,  $13\frac{1}{2}$  to  $14\frac{1}{2}$  inches; tail  $6\frac{1}{2}$  to 7 inches, very forked and acute; the lateral feathers being subulate. Fish found in the stomach. Although the wings are so long, the flight is slow and with a good deal of flapping. Take their prey while on the wing by darting obliquely upon it. Do not dip under water, nor dart perpendicularly, like *Alcedo rudis*. This elegant and slender species Colonel SYKES shot 160 miles inland, and at an elevation of 1800 feet above the sea. Gregarious. Common in Dukhun.

230. *Sterna similis*, Gray, Illust. Ind. Zool., part 6. plate 8. fig. 2. *Tern, with a fuscous lake-coloured bill*.

Length, inclusive of tail,  $11\frac{1}{2}$  to 12 inches; tail 3.3 to 3.5 inches; slightly forked, and without the lateral, elongated, and subulate feathers of *Sterna acuticauda*. Fish only found in the stomach. Gregarious. Habits and locality of the last species. Colonel SYKES states it as curious, that all his specimens, seven in number, of *Sterna acuticauda* and *Sterna similis* proved to be females. Common in Dukhun.

231. STERNA SERENA. *Sterna supra cinerea*; fronte, vertice, cervicique saturate nitidè atris; corpore infra albo, hypochondriis parum cinereo tinctis; rectricibus lateraliibus albis.

Irides saturate rufescenti-brunneæ. Rostrum forte, flavum. Pedes rubri. Longitudo (caudâ inclusa) 17—17½ unc., caudæ 8—8½, rectricis 2.5.

This species differs from *Sterna affinis* of RUFFELL, tab. 14. p. 23, in its smaller size, and having red instead of black legs; in the white not being so brilliant, and in a stronger bill. RUFFELL'S *Sterna velox* appears to correspond in size with it. In the numerous species in the British Museum there is not one with which it can be identified. Proportionably to the shortness of the legs the claws are long, much arched, slender and sharp, and turn outwards. Hind claw never touches the ground. Same locality and habits as the preceding species, although rare in Dukhun. In the stomach and *æso-phagus* of one bird were found the extraordinary number of thirteen *Cyprini*, one of them  $2\frac{1}{2}$  inches long. Tail very much forked; lateral tail-feathers subulate, white, 8 inches long. Wings very narrow and long, reaching nearly to the end of the tail.

Genus *Viralva*, Leach.

232. *Viralva Anglica*, Steph., 13. 174. *Sterna Anglica*, Mont., Orn. Dict. *Sterna aranea*, Wils., Amer. Orn. 8. 143, pl. 72. fig. 6? *Marsh Tern*, Lath. *Gull-bill-ed Viralve*.

Colonel SYKES' specimens correspond exactly with specimens of this rare British bird in the British Museum, both in their winter and summer plumage. Irides deep red brown. Length, inclusive of tail,  $14\frac{1}{2}$  to  $16\frac{1}{2}$  inches; tail  $4\frac{1}{2}$  to  $5\frac{1}{2}$  inches. Sexes alike in plumage, but the female somewhat smaller than the male. Numerous fish found in the stomach of many birds. With the aspect, length of wing, lazy flights and habits of the *Tern*, this bird has a bill approximating to that of the *Gull*, not quite identical with the bill of the *Viralve*.

Colonel SYKES states, that the *domestic Duck* (*Anas Boschas*) is extensively bred by the Portuguese in the Western India, and that it is subject to a kind of apoplexy, which carries it off in a few minutes, although previously in apparent health. He has known a trader lose a flock of more than thirty in the course of one day; and he has himself had ten ducks struck simultaneously, stagger about for a short time as if drunk, run round in circles, fall on their backs, and die. He has not been able to discover any morbid appearances in the brain. In no instance, in the stomachs of the *Anatidæ*, were animal matters met with; and the contents consisted of grains, seeds, vegetables, and gravel.

Colonel SYKES, in closing his Catalogue of the birds of Dukhun, mentioned that the details he had given resulted from personal observation of the specimens, in a living or recent state. With few exceptions, the whole were shot by himself; and to guard against false impressions, he accumulated several individuals of the same species and of both sexes, and was rarely confined to a solitary bird.

## X.—Miscellaneous.

1.—*Climate of the Neelgherries (Nilgiris, or Blue Mountains), on the Malabar Coast.*

We have drawn the following abstract from the *Daily Atmospheric Register*, published in Dr. BAIRIE's recent work—"on the Topography, Climate, Soil, and Productions" of these hills, a work embodying every possible information regarding this new resort of invalids, and embellished, in the most profuse manner, with maps, coloured drawings, and botanical plates\*. As the volume itself will be in the hands of most of our readers, we do not think it necessary to make any further extracts than such as illustrate the meteorological table, but we recommend the author's "hints to invalids" to the perusal of such as feel inclined to visit Ootacamund. Captain HARKNESS's observations on the inhabitants of the Nilgiris, and a valuable list of plants by the Rev. Mr. SCHMID, are added in an Appendix.

*Pressure.*—"The range of the barometer on the hills appears to be considerably greater than in the same latitude at the level of the sea. I have no access to any accurate account of the range on the Malabar Coast, opposite to the hills, but I believe it does not exceed 0.250 of an inch. Now, on an inspection of the annexed meteorological tables, it will be seen, that in January, 1832, the barometer attained the height of 23.375, the maximum of its elevation since my observations began; while in the month of September previous, it had fallen as low as 22.675, (corrected to 32° Fahr.) shewing an extreme range of 0.700. This range appears however to differ annually; being for three years as follows:

" For 1831, it was 0.560.

" 1832, 0.539.

" 1833, 0.388, giving a mean annual range of 0.495.

"As might have been anticipated, the barometer appears to attain its maximum height in the cold dry weather of January or February, and its minimum during or immediately after the S. W. monsoons. It generally begins to sink gradually about the beginning of April, and continues descending (but with occasional starts) till August or September, when it again rises gradually till the cold weather sets in. But here (as is found to be the case elsewhere within the tropics) I have not been able to satisfy myself that any accurate prognostication of the state of the weather is to be deduced from the fluctuations of the mercurial column. I have seen it rise suddenly before or during heavy showers of rain, and sink, equally inexplicably, before a course of fine dry weather. The only agent which appears uniformly to act in the same way upon it is wind, the mercury always rising before or during the prevalence of high wind. I have also occasionally been able to predict wet weather, from observing the top of the column to be flattened, or concave, but not with any degree of certainty.

"The daily range of the barometer is very trifling, probably never exceeding 0.040 or .060 of an inch, and seldom greater than .035; but on this head, as on that of its horary oscillations, I am unable to speak confidently, from want of leisure to make the necessary observations; the horary oscillations occur, as far as I have observed, exactly at the same hours, and in the same succession, as elsewhere all over the globe; but according to Dr. DALMANHOY, only to half the extent observed at Madras, and they are not interrupted during the monsoon, as conjectured by Baron HUMBOLDT.

\* The work is published at the Calcutta Baptist Mission Press; the plates and maps by TASSIN. Mr. SMOULT, the Editor, gives, in the preface, a statement of the cost of publication, amounting to Sa. Rs. 3494, for the plates, and Rs. 758. 4. 0. for the letter-press. The subscription list contains nearly 300 names.

"The mean annual height of the barometer appears to vary considerably, and to have diminished annually for the last three years: this may have depended on the situation of the instrument\*.

"The mean of ten months: in 1831, was 22.932,  
 six ditto, in 1832, ,, 23.067,  
 eight ditto, in 1833, ,, 23.054, giving as an annual mean for  
 24 months in three years, 23.018. This is probably near the truth,  
 and Dr. DALMANOV, in his calculations to determine the height of Ootacamund  
 above the level of the sea, assumes it to be 23.005."

*Temperature.*—"According to theoretical calculation, the mean temperature of Ootacamund should be 52°.28.

"There is some discrepancy of opinion as to the correct method of ascertaining the mean observed temperature. The author of the able article, *Meteorology*, in the *Edinburgh Encyclopedia*, after an elaborate consideration of the various proposed methods, gives the preference to the mean of the daily extremes. According to this calculation, the mean of the daily extremes for 25 months is 58°.68, which we therefore assume as the mean annual temperature of Ootacamund. The daily range for nine months of this year, which may be considered as an average season:

"January,	20°40	June,	15°59
February,	20°33	July,	10°29 Minimum.
March,	23°33 Maximum.	August,	15°27
April,	19°73	September,	11°73
May,	16°48		

Giving a general mean of 17°01

"The greatest observed annual range (but in different years) appears to be 38° (viz. between 39° and 77°.)

"It is important to remark, that this range is still betwixt two points, which occur frequently in temperate climates, and is certainly less than what prevails in most of them. The maximum observed is 77°, only 2° above what is assumed as summer heat in England; and the minimum, 38°, is much above what frequently occurs even in the mildest parts of Europe.

"In stating the observed minimum at 38°, it must be recollected, that the observations were taken at a point raised above the lake, and about half way up the hill bordering the cantonment on the south.

"In the valley below, from the combined effects of radiation, evaporation, and the descent of the colder columns of air by their superior weight, which are moreover comparatively undisturbed by the wind, the temperature frequently falls below freezing point, and ice is often found in the dry seasons half an inch thick. Hoar-frost is commonly seen extending half way up the hills on every side, disappearing as the power of the sun's rays gradually increase. The difference is most evident in descending into the lower valleys on a dark clear and still

\* The height of Ootacamund, found trigonometrically by Captain WARD, was 7361 feet. From the Barometrical mean, 23,054, compared with Madras, 29,810, and corrected for temperature of the mean stratum of air  $\frac{81.7 + 57.6}{2} = 69.6$ , the altitude results, 7231 feet. The boiling point, noted in May, 198° Fahr., gives 7574 feet, but the Thermometer was probably in error.—J. P.

night, when the sudden immersion into the column of air next the ground, cooled by its contact with the radiating earth at the bottom of the valley, strikes one with a sudden chill. As a consequence of the same cause, the lower valleys are frequently filled with a dense fog, while the stratum of air immediately above is perfectly clear and transparent.

“ So powerful is this effect of radiation from the earth, that a cup of water or milk, placed on the ground, even in the higher situations, instantly freezes, while a thermometer, elevated three feet above it, will only indicate a temperature of 38°, 39°, or 40°. This fact leads to some important conclusions both as to the situation of houses, and of ground selected for horticultural or agricultural purposes. In a clear bright day, the thermometer generally attains its maximum at about 2 or  $\frac{1}{2}$  past 2 P. M., but this is, to the feelings, by no means the hottest part of the day, owing to the constant current of wind prevailing, from one quarter or another, at that time. About  $\frac{1}{2}$  past 8 or 9 A. M. is the time when the sun's rays appear to have most power, the air being then still, and its capacity for heat having been diminished by the increase of density arising from the cold of the preceding night. This it is important for invalids to observe, as well as the sudden chill produced by the sinking of the sun below the horizon in the evening, when the column of rarefied air next the surface rises aloft, and is rapidly replaced by a colder stratum from above.

“ The minimum generally occurs about half an hour before sun-rise, when as before observed, the lower valleys are generally filled with fog.

“ During the monsoon season, when the sky is covered with clouds, at once diminishing the power of the sun's rays, and obstructing the effect of radiation from the ground, the temperature is remarkably equable, the range seldom exceeding 12° or 14° in the open air, while in rooms without a fire, it is under 4 or 5°. The thermometer attached to one of my barometers, kept in a small sleeping room, without a fire-place, (though the house itself was rather exposed,) during the months of May, June, July, August, and September, 1831, never fell below 59°. 5, nor rose above 62°. This is therefore, notwithstanding many drawbacks, much the most favourable season for invalids, and should be selected, when a power of choice exists, as the period for ascending the hills.”

*Moisture.*—“ The air during the month of January, February and March, is intensely dry, the point of saturation, (or temperature to which the air must be reduced to deposit any part of its moisture,) being occasionally as low as 13°, the temperature of the air being 60°. In April it begins to fluctuate, and in May, the quantity of moisture increases very perceptibly. being accompanied by rapid changes of the electrical condition of the atmosphere, indicated by thunderstorms and heavy showers, but of short duration. During June, July, and August, it is nearly charged with moisture; in September, it is again fluctuating; in October and November, moist; and in December, it begins to re-assume its dry state.

“ In close connection with the above statement, we find, that there is little or no rain in the first three months, some showers in April and May, a good deal of drizzle and light rain in June, July, and August; the month of September varies, as does that of October; in November there are heavy falls, and in December the weather again becomes dry. This will be more distinctly seen in the table in which is given the fall of rain in each month during the greater part of four years, as observed by my friend Dr. GLEN, of the Bombay Establishment; the mean annual fall, as deduced from this table, is 44.88 inches, or 13. 58 inches great-

er than the mean fall in England, as stated by Mr. DALTON\*. The following table will probably be interesting, particularly to invalids, whose comfort depends so much on the capability of taking exercise: it presents the actual state of the weather for 366 days, from 1st March, 1831, to 29th February, 1832, which, from all I can learn, may be considered an average season:

Number of days of heavy rain, .....	19
Do. occasional showers with fair intervals,.....	81
Do. cloudy, .....	28
Do. clear and fine,.....	238
	366

*Abstract of Meteorological Observations, made at Ootaramund, Lat. 11° 25' N. Long. 76° 45' E. on the Nilgiris, in the years 1831, 32, and 33, by Dr. Baikie.*  
Barometrical Altitude, 7361 feet.

Months.	BAROMETER AT 320.					THERMOMETER.						
	Mean of Max. and min.	At 10 A. M.	Assumed mean.	Deviation from annual mean.		Mean of max. and min. Outside in Shade.			Assumed mean.	Deviation from annual mean.	Wind.	Rain.
	1831.	1832.	1833.			1831	1832	1833				
Jan....	—	23.228	23.134	23.200	+ .148	—	53.0	53.1	53.0	— 4.6	E.	0
Feb....	—	23.224	23.105	23.180	+ .128	—	53.5	56.0	54.5	— 2.1	N.E.	0.47
March,	23.175	23.029	23.167	23.124	+ .072	58.0	58.5	62.0	59.0	+ 1.4	E.	1.02
April, ..	23.085	23.025	23.109	23.073	+ .021	62.0	63.0	63.0	62.6	+ 5.0	N.E.	4.00
May, ..	22.983	22.996	23.018	22.999	— .053	60.5	64.5	61.5	62.2	+ 4.6	var.	6.50
June, ..	22.910	22.903	23.015	22.943	— .109	59.5	62.5	58.0	60.0	+ 2.4	W.	6.50
July, ..	22.861	—	22.944	22.900	— .152	58.0	56.0	58.7	57.2	— 0.4	sw.	4.27
Aug. ..	22.820	—	23.045	22.920	— .132	59.0	56.5	58.7	58.1	+ 0.5	sw.	4.00
Sept. ..	22.785	—	22.986	22.970	— .002	56.5	57.5	59.9	58.0	+ 0.4	W.	6.36
Oct. ..	33.056	—	—	23.060	— .003	58.0	—	—	58.0	+ 0.4	var.	6.51
Nov. ..	23.070	—	—	23.080	+ .028	56.0	—	—	56.0	— 1.6	N.E.	3.52
Dec. ..	23.174	—	—	23.180	+ .128	52.5	—	—	52.5	— 5.1	N.E.	1.73
				23.052	30				57.6			44.88

## 2.—Tibetan Grammar and Dictionary of M. Csoma de Körös.

We have to congratulate the learned world upon the completion of M. CSOMA'S labours, and the accession of a standard to the keys of oriental literature, upon which the utmost confidence may be placed by those who may hereafter seek a knowledge of the Tibetan language. The two volumes (600 pp. quarto) have been printed at the expence of Government, under the direction of the Asiatic Society, aided by the immediate superintendance of the author himself. The style of printing does great credit to the Baptist Mission Press; and although the Tibetan characters being from the old Serampur fount, are not well formed, this imperfection is removed by the copious lithographed alphabetical schemes at the end of the Grammar, where all the varieties of writing are faithfully rendered.

M. CSOMA has, perhaps wisely, withheld from his present work all disquisitions on the connection of the Tibetan with other languages, on the people, or their literature, further than to show that the latter is derived from Indian sources:

\* Edinburgh Encyclopedia, Article Meteorology.

and to give a few examples for the exercise of the student. He has however enumerated in page 180, a few of the principal Tibetan authors, and he has also given a chronological table with valuable notes; and a list of the various epochs of the death of SHAKYA, according to SURISHMATI, the pupil of PADMAKARPO. We cannot refrain from quoting the opening remarks of his preface.

“The wide diffusion of the Buddhistic religion in the eastern parts of Asia, having of late greatly excited the attention of European scholars, and it being now ascertained by several distinguished Orientalists, that this faith, professed by so many millions of men in different and distant countries in the East, originated in Central or Gangetic India, it is hoped, that a Grammar and Dictionary of the Tibetan language will be favourably received by the learned Public; since, Tibet being considered as the head-quarters of Buddhism in the present age, these elementary works may serve as keys to unlock the immense volumes, (faithful translations of the Sanskrit text,) which are still to be found in that country, on the manners, customs, opinions, knowledge, ignorance, superstition, hopes, and fears of great part of Asia, especially of India, in former ages.

“There are, in modern times, three predominant religious professions in the world, each counting numerous votaries, and each possessed of a large peculiar literature:—the Christians, the Muhammedans, and the Buddhists. It is not without interest to observe the coincidence of time with respect to the great exertions made by several Princes, for the literary establishment of each of these different religions, in the Latin, the Arabic, and in the Sanskrit languages, in the 8th and 9th century of the Christian Æra: by CHARLES THE GREAT, and his immediate successors, in Germany and France; by the Khalifs AL-MANSUR, HARUN AL-RASHID, and AL-MAMUN, at Bagdad; by the Kings of Magadha, in India; by KHRISORNG DE’HU TSAN, KHRI DE’SORNG TSAN, and RALPACHEN, in Tibet; and by the Emperors of the Thaug dynasty, in China. But it is to the honour of Christianity to observe, that while learning has been continually declining among the Muhammedans and the Buddhists, Christianity has not only carried its own literature and science to a very advanced period of excellence, but in the true and liberal spirit of real knowledge, it distinguishes itself by its efforts in the present day towards acquiring an intimate acquaintance with the two rival religious systems, and that too, in their original languages. Hence, in the north-western parts of Europe, in Germany, England, France, where a thousand years ago only the Latin was studied by literary men, there are now found establishments for a critical knowledge both of the Arabic and the Sanskrit literature.

“Hence, too, has been founded recently the *Oriental Translation Committee*, composed of the most eminent Orientalists of Europe, from whose labours so much has already been done, and so much more is expected. The students of Tibetan have naturally been the most rare, if they have existed at all, in this learned association. Insulated among inaccessible mountains, the convents of Tibet have remained unregarded and almost unvisited by the scholar and the traveller:—nor was it until within these few years conjectured, that in the undisturbed shelter of this region, in a climate proof against the decay and the destructive influences of tropical plains, were to be found, in complete preservation, the volumes of the Buddhist faith, in their original Sanskrit, as well as in faithful translations, which might be sought in vain on the continent of India. I hope that my sojourn in this inhospitable country, for the express purpose of mastering its language, and

examining its literary stores, will not have been time unprofitably spent, and that this Grammar and Dictionary may attest the sincerity of my endeavours to attain the object I had determined to prosecute.

“ Having in the Preface to my Dictionary expressed my respectful thanks to the British Government of India, for its patronage during my Tibetan studies ; and having there gratefully enumerated the kindnesses and good services which I have received from several Gentlemen, it would be superfluous here to repeat my acknowledgments. My selection of the English language, as the medium of introduction of my labours, will sufficiently evince to the learned of Europe at large, the obligations I consider myself under to that nation.”

Among the selections from the moral maxims of the Tibetan works, in page 165, the reader will be struck with the close, even verbal, agreement of one of them with the Latin version of the great Christian maxim, “ quod tu tibi non vis, alteri non feceris.” There is in the next page (art. 9) also a sentence against idolatry which M. CSOMA finds to breathe the very sentiments of the great CANUTE, as reported in BRUCKER'S *Historia Critica Philosophia*, vol. i. p. 330, and quoted there from JO. GEORGIUS KEYSERUS, *Antiq. Sept. et Celtic*, p. 18, thus :— “ ex legibus CANUTI regis Daniæ et Angliæ potentissimi. Ita enim inter alia : *Adorationem barbaram plenissimè vetamus. Barbara est autem adoratio, sive quis idola (puto gentium divos) solem, lunam, ignem, profluentem, fontes, saxa, cujusque generis arbores lignaque coluerit.*”

M. CSOMA has modestly declined all the honors which the Societies of Europe and India have sought to confer upon him : he cannot however deny himself the title, his present work has ensured to him, of an indefatigable student, a profound linguist, and of a man who has devoted his life to the cause of learning, regardless of any of its popular and attractive rewards, and anxious only for the approbation of posterity.

### 3.—Reply to D. S. in the July No. of the JOURNAL, page 367.

A correspondent in your July No. (who I regret has not given us his name, has made a statement of interest respecting the temperature of wells at Náhun, and the locality of the hyæna. As the temperature of all the wells I have hitherto tried in this country (and they are not a few) is considerably above that of the mean temperature of the place, I am inclined to believe this must also be the case at Náhun.

In answer to the query, as to what explanation can be given of the existence of fossil tropical plants in regions where such plants no longer thrive, I beg to refer to Mr. LYELL himself, vol. i. page 3 ; and his words afford such a good solution of the difficulty, that I cannot forbear quoting them at length. “ The great extent of sea gives a particular character to climates south of the Equator, &c. &c. The effect on vegetation is very remarkable :—*tree-ferns*, for instance, which require abundance of moisture, and an equalization of the seasons, are found in Van Dieman's Land, in lat. 42°, and in New Zealand, in lat. 45°.” I have endeavoured to infer that the elephant was capable of bearing a climate similar to this, whether successfully or not, must be left to those who reside in the hills to determine ; for they alone have the means of making proper observations, which will determine correctly this and other questions of interest, viz., what climate the hyæna, tiger, and rhinoceros are capable of bearing.

R. EVEREST.

Meteorological Register, kept at the Assay Office, Calcutta, for the Month of December, 1854.

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Day of the Month.	Barometer reduced to 32° Fahr.				Thermometer in the Air.				Depression of Moist-bulb Thermometer.				Hair Hygrometer.		Rain. Inches.	Wind.			Weather.				
	At 4½ A.M.	At 10 A.M.	At 4 P.M.	At 10 P.M.	Minimum at 4 A.M.	At 10 A.M.	Max. by Reg. Ther.	At 4 P.M.	At 10 P.M.	At 5 A.M.	At 10 A.M.	At 4 P.M.	At 10 P.M.	At 10 A.M.		At 4 P.M.	Inches.	Morning.	Noon.	Evening.	Morning.	Noon.	Evening.
1	.007	.088	.956	.012	64.2	73.7	93.2	75.8	69.2	4.2	9.8	12.0	6.7	81	77	.0	ne.	n.		clear.	clear.	clear.	
2	.983	.040	.944	.022	64.4	72.3	91.7	75.8	69.2	4.1	8.8	10.2	5.9	85	89	do	ne.	n.	do	do	do		
3	.991	.076	.970	.033	64.7	71.9	92.5	75.1	68.4	4.3	6.9	12.5	7.4	90	75	n.	ne.	n.	do	do	do		
4	.010	.166	.964	.069	67.2	72.2	96.6	75.4	67.0	5.9	7.4	8.6	3.0	89	84	n.	n.	n.	do	do	do		
5	.009	.092	.980	.046	69.0	73.2	96.5	75.6	74.2	0.0	6.4	7.1	5.8	91	90	n.	ne.	n.	do	do	cum. cir.		
6	.988	.080	.968	.016	69.5	72.9	90.0	76.6	72.5	5.0	6.4	7.7	7.3	93	89	nw.	n.	s.	cloudy.	hazy.	cloudy.		
7	.987	.034	.931	.062	68.2	71.8	75.0	74.0	71.0	5.2	6.8	6.0	4.5	89	91	ne.	n.	n.	hazy.	overcast.	do		
8	.905	.986	.966	.960	70.0	72.9	90.0	75.2	71.0	3.8	5.3	7.5	2.8	94	90	o.	ne.	n.	cloudy.	shower.	do		
9	.877	.970	.989	.954	68.2	72.9	78.2	73.9	67.2	2.0	5.3	5.7	1.3	95	95	e.	ne.	ne.	clear.	overcast.	clear.		
10	.930	.020	.938	.989	67.0	71.9	88.0	75.3	65.0	1.5	4.1	6.6	1.6	99	91	n.	n.	n.	clouds.	cloudy.	do		
11	.998	.006	.990	.015	64.4	68.9	84.7	73.6	63.6	1.4	4.1	7.4	2.5	97	89	n.	ne.	nw.	stratus.	do	hazy.		
12	.973	.044	.929	.014	64.4	71.2	90.0	74.0	69.0	1.4	4.8	8.3	3.3	95	86	o.	nw.	o.	clear.	clear.	fog.		
13	.989	.078	.970	.043	64.0	70.5	92.8	75.7	70.5	1.9	5.8	8.8	2.5	93	84	n.	nw.	o.	do	do	do		
14	.028	.071	.968	.020	66.8	72.0	97.7	74.5	69.7	2.1	7.4	9.8	6.2	87	80	o.	n.	o.	do	do	do		
15	.940	.050	.944	.018	65.4	71.9	93.6	76.1	69.7	2.2	6.7	9.6	4.3	90	82	ne.	n.	o.	fog.	do	clear.		
16	.986	.070	.928	.997	65.4	71.2	94.1	75.5	70.0	3.0	7.4	11.1	5.0	88	79	o.	ne.	n.	clear.	do	fog.		
17	.989	.044	.926	.004	69.4	70.6	90.3	76.3	69.1	8.4	7.9	11.2	3.7	86	80	o.	nw.	o.	dense fog.	do	do		
18	.970	.042	.980	.943	64.4	70.9	95.4	76.2	69.3	2.9	4.5	11.4	3.7	94	78	o.	nw.	o.	clear.	do	do		
19	.916	.956	.948	.917	63.2	70.4	87.8	76.0	67.4	3.0	5.7	12.2	5.4	92	78	o.	nw.	o.	do	do	clear.		
20	.913	.994	.912	.993	63.7	72.1	94.6	77.4	68.2	2.0	6.3	10.9	5.5	92	81	o.	nw.	n.	fog.	do	do		
21	.979	.068	.976	.046	66.5	72.9	96.1	76.9	72.0	2.0	6.4	8.8	5.8	93	87	o.	n.	o.	do	do	fog.		
22	.011	.072	.969	.006	67.2	72.7	93.9	79.5	71.0	0.0	4.3	9.8	4.0	97	85	w.	W.	sw.	do	do	clear.		
23	.000	.061	.998	.005	67.2	74.3	98.1	73.0	72.1	0.0	5.9	5.2	4.3	93	87	o.	n.	o.	dense do.	do	fog.		
24	.000	.070	.980	.033	68.5	74.8	94.1	78.0	73.3	1.2	6.1	7.7	5.8	90	89	o.	nw.	o.	fog.	do	clear.		
25	.986	.082	.970	.012	68.1	74.5	98.0	78.0	70.4	1.3	6.6	8.5	3.6	90	87	o.	nw.	n.	do	do	do		
26	.984	.096	.960	.052	68.2	73.4	95.1	77.6	72.0	2.3	7.0	8.9	6.3	89	86	o.	nw.	N.	clear.	do	do		
27	.994	.080	.950	.007	67.1	73.4	94.5	76.6	69.8	1.9	7.1	9.1	6.4	91	85	n.	nw.	N.	do	do	do		
28	.974	.050	.913	.004	65.4	72.4	94.3	75.9	70.2	1.7	6.6	8.7	3.2	90	84	n.	nw.	N.	do	do	do		
29	.974	.048	.933	.013	66.4	72.9	90.8	76.2	67.9	2.1	5.2	8.8	4.7	93	87	n.	nw.	n.	do	do dull.	do		
30	.983	.050	.930	.008	63.2	70.8	90.0	74.3	64.0	1.2	4.5	8.4	4.8	94	86	nw.	nw.	ne.	do	do mis.	do		
31	.980	.072	.922	.965	60.4	69.0	89.5	73.5	62.1	1.2	7.3	10.1	2.9	90	82	nw.	nw.	nw.	do	do	do		
Mean.	.978	.047	.941	.008	66.1	72.4	92.2	75.7	69.4	2.5	6.1	9.0	4.7	91.3	84.9	.02	light northerly.			warmer than usual.			

\* The instruments placed as usual. Having now completed two years of daily observations at the very inconvenient hours of 10½ P. M. and 4½ A. M. to furnish data for the nocturnal tide, these hours will henceforth be omitted, and other phenomena substituted.

Meteorological Register.

[Dec. 1854.]

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