UNIVERSAL
LIBRARY
OU_170927
UNIVERSAL
LIBRARY

TRANSACTIONS

OF

THE LITERARY SOCIETY

OF

MADRAS.

PART I.

London:
Printed by A. & R. Spottiswoode,
New-Street-Square

TRANSACTIONS

OF

THE LITERARY SOCIETY

OF

MADRAS.

PART I.

WITH ENGRAVINGS.

LONDON:

PRINTED FOR

LONGMAN, REES, ORME, BROWN, AND GREEN,

PATERNOSTER-ROW.

1827.

NOTICE.

The Madras Literary Society owed its origin to the late Sir John Newbolt, Chief Justice of the Supreme Court of Judicature at Madras, aided by the valuable exertions of Mr. Benjamin Guy Babington, of the Civil Service, its first Secretary. It numbered among its early associates several from whom communications of great interest and value were to be expected. But, shortly after its formation, the Society was deprived, by death or by removal from India, of several of its most able contributors; among whom stood pre-eminent, for indefatigable and successful research into the languages, history, and learning of Southern India, for extensive knowledge of literature, ancient and modern, Oriental and European, for accurate judgment and elegant taste, Francis Whyte Ellis. This distinguished scholar carried to his early tomb the stores he had accumulated; for he had resolved to dedicate his life to investigation until the age of forty, and, before that time, to prepare nothing for communication to the world. Scarcely had he completed the prescribed period of preparatory investigation, when death, with awful suddenness, deprived the world of the benefit of his labours.

The loss of such and so many of its most valued associates seemed to threaten an entire cessation of the Society's exertions, in collecting materials for publication. But, under the auspices of the late zealous and learned President, Sir C. E. Grey, now Chief Justice of Bengal, the papers which had from time to time been received were examined, and those now presented were selected to form the first Part of their Transactions.

The account of the Hindu trial by ordeal, which the Society received from the Abbé Dubois, a missionary long resident in the Mysore, and in the southern districts of the Peninsula, has been since incorporated by him in a work which he published in France, under the title of "Mœurs et Institutions des Peuples d'Inde;" but as that book, it is believed, has not been translated into English, and may not have fallen in the way of many readers of the present volume, it was not deemed proper to withhold it from the public, in the form in which it was presented to the Society by the learned Abbé.

The orthography of each writer has been retained, no standard having been agreed upon by which the various alphabets of India shall be represented in the Roman character. It is necessary to add, that many inaccuracies have been discovered in the manuscript sent home for publication, several of which it has been impossible to rectify, where reference could not be had to the original; and though some have been corrected, it is apprehended that others may have escaped detection. This explanation is necessary, that the errors of the transcriber may not be imputed to the writers of the several communications.

The initials E. C. G., and G. H., are those of Sir Charles Grey; to whom the public is indebted for the valuable paper arranged from Mr. Ellis's notes, and of Mr. George Hyne, by whose lamented death science has been deprived of an ardent and profound investigator.

CONTENTS.

Page

No. I. — On the Law Books of the Hindus. A Selection from the Papers of the late F. W. Ellis, Esq. of the H. C. Civil Service, Collector of Madras. - 1

No. II. — An Account of some Ancient Graves in the Vicinity of Oopulgutt. (Latitude 17° 2′ 50″ N. Longitude 78° 57′ 14″ E. 36 miles S.E. of Hyderabad.) Communicated to the Secretary by Captain Robert Young, Surveyor in the Nizam's dominions. - - - - - - - 26

No. III. — Notice of the Geological Features of a Route from Madras to Bellary, in April and May, 1822. By Captain W. Cullen, of the H. C. Artillery. 33

No. IV. — On the Alphabetical Notation of the Hindus. By C. M. Whish, Esq. of the Madras Civil Service. - - - - - - - 51

No. V. — On the Origin and Antiquity of the Hindu Zodiack. By C. M. Whish, Esq. of the Madras Civil Service. - - - - - - 63

No. VI. — Extract of a Letter from Charles Jones, Esq. of the Madras Medical Service. [With an Engraving.] - - - - - 78

No. VII. — Observations on the Geology of the Hyderabad Country. - - 79

No. VIII. — Meteorological Journal of the Weather on the Malabar Coast, in the Years from 1810 to 1823, with Observations. Communicated by Murdoch Brown, Esq. of Anjarakandy. - - - - - 89

No. IX. — Observations on the Saline Lake of Loonar; situated in Berar, in lat. 19° 10′ N. and long. 75° 3′ E. Communicated by Cornet J. E. Alexander, 1st Regiment Madras Light Cavalry. - - - - - 99

No. X. — Register of Weather, Thermometer, Sympusometer, and Pluviometer, at Arakan, in September, 1825. - - - - - - 103

No. XI. — An Account of the Ordeals prevailing among the Hindus. By the Abbé Dubois. - - - - - - - - - 108

No. XII. — A Translation by Ram Raz, Head English Master in the College of Fort St. George, of an ancient Grant in the Carnataca Language. - 119

TRANSACTIONS

OF

THE MADRAS LITERARY SOCIETY.

No. I.

ON THE LAW BOOKS OF THE HINDUS.

A Selection from the Papers of the late F. W. Ellis, Esq. of the H. C. Civil Service, Collector of Madras.

Mr. Ellis, shortly after the institution of the Society, read, in its meetings, some papers upon Hindu Law; which were afterwards deposited in the Library. The manuscript consists of five hundred folio pages, with about eighteen lines to a page; and it is divided into three lectures, and a note, of some length, in answer to the observations upon the Hindu laws, which are contained in the fourth chapter of the second book, of Mr. Mills's "History of British India." The first lecture is chiefly on the law-books of the Hindus: the second is entitled, "On the Constitution of the Hindu Courts, and the Functions of the Magistrate and Judicial Officers:" and the third is entitled "On Process, Pleadings, and Trial, in the Hindu Courts." The materials from which Mr. Ellis composed these lectures were, first, a translation, by himself, of a part of the Mitácharà of Vijnyaneswara *.

* There is another work, entitled, also, Mitaeshara, by Haradattacharya, mentioned in the third section of this lecture, but when the Mitácharà is spoken of, that of Vijnyaneswara is usually meant.

in which he availed himself of the assistance of some Brâhmans; of whose talents and acquirements he speaks in terms of great respect. Secondly, a translation by Vencata Narnayya, late interpreter in the Supreme Court, of a part of the Mádhavíyam, which is a general digest of the legal authorities prevalent in Southern India. Thirdly, a paper upon the expediency of compiling a new digest for this part of India, by Patábhi Ráma Sástri, the head master of law and Sanscrit in the college of Fort St. George. Fourthly, for some historical notices, Mr. Ellis states himself to be indebted to the extensive and invaluable MS. collection of the late Colonel Colin Mackenzie, to which he appears to have had free access in the lifetime of its possessor.

From the great reputation of Mr. Ellis, his liking for Indian pursuits, his unusual opportunities, and the intimate knowledge which he was known to have acquired of Brahmanical institutions, his papers were sure to contain some useful information; but the manuscript requires arrangement and compression; and Mr. E. himself states in it, that he intended to have made a corrected copy. I have here endeavoured to give the substance of the first lecture. The subject has been treated of by Sir William Jones, and by Mr. Colebrooke, and by Mr. Ward; but by none of them, as it seems to me, so perspicuously as by Mr. Ellis, nor with the same view of distinguishing the authorities of Southern India from those of the North. I have made some slight alterations of expression and arrangement; but I have no acquaintance with any of the Indian languages, nor any pretensions to the knowledge which, alone, would have justified me in making any alterations of the sense: my responsibility as to all, but a few unimportant notes, is that of an editor only.

The lecture is conveniently arranged under three heads, viz.

1. Of the Hindu law writings in general.

2. Of the differences between the schools of law of Northern and Southern India.

3. Of the books which are of the highest authority in the Dravida schools, or those of Southern India. C. E. G.

Sect. I.

OF THE HINDU LAW WRITINGS IN GENERAL.

Law is one of the fourteen great sciences of the Hindus: which are,

I. The Four Vedas * viz. Ric, Yejuh, Sámah, Atharvánah. Each of these is considered a distinct science, and of the three first, every Bráhman is supposed to be master of one at least, and he is distinguished by the Veda which he is understood to study. †

II. The six Angas, or bodies of learning which are subsidiary to the Vedas; namely,

1. Síesha, or rules for preserving the text of the Vedas. ‡

2. Vyácarana, the grammar of the dialect peculiar to the Vedas.

3. Chhandas, Prosody.

4. Niructam, Commentary on the text.

5. Iyautisham, Astronomy, teaching principally the calendar, by which the times of festivals are determined.

6. Calpa-sutram, the liturgy, or formula of all ceremonies enjoined by the Vedas.

III. The other great sciences are

1. Terca-sastram, Logic, of which there are two schools, the old and the new. §

2. Mímámsā, the doctrine of ceremonial rites, of which there are six schools, to one or other of which every Bráhman belongs: their founders were Apastamba, Bodháyana, Cartyáyana, Satyáshāda, A'swaláyana, Dhalub, 'hyáyana. There are also the distinctions, which run

* See Mr. Colebrooke's paper on the Vedas, in the 8th vol. of the Asiatic Researches. The Atharvánah is of inferior authority to the other three.

† Mr. Colebrooke says, "Since every priest was bound to study one Veda, no title was derived from the fulfilment of that duty; but a person who had studied two, was surnamed Divédi, and three Trevédi, &c. — 8th vol. As. Res. 373.

‡ Mr. Ward says, the subject is "pronunciation." — 1 *Ward's View, &c.* 269.

§ Mr. Ward, for the Terca-sastram, substitutes nyayu, or ethics. — 1 *Ward's View*, 269.

through these schools, of the Purva Mímámsā, or former doctrine, and Uttara Mímámsā, or latter doctrine.

3. Puránam, the Hindu system of theogony, ontology, and mythology, contained in eighteen principal works, all said to be by the sage Vyása *, and in several subordinate ones: in some or other of them may be found the legend of every principal temple and holy place.

4. Dherma Sástram, or law, which comprehends, however, not law alone, in the usual signification of the word, but rules for ceremonial observances and expositions of moral duty. †

The Dherma Sástram is considered to be a revelation from the Deity, and to be derived originally from the Sruti, or "that which was heard," from the mouth of Bráhma himself, and with which it is supposed invariably to correspond in substance, but not in words, as it is extant only in the Smriti, or "that which was remembered" by the sages through whom it was revealed to mankind. The Dherma Sástram is generally considered to be a distinct science of itself; but the commentators and compilers often refer to the Puránas for authorities and illustrations, and sometimes to the Sutras of the Mímámsā, with which the Dherma Sástram is closely connected: all the six founders of the Mímámsā schools having written also on law. Subject to this observation, the Hindu law writings may be classed under three heads.

1. The Smriti, or text books: these are attributed to various Rishis, or primeval sages, and are all in structure, and most of them in doctrine, the same as that of Menu, which has been translated by Sir W. Jones.

* Sir William Jones says, he is fully convinced they are not the productions of Vyasa. See *Preface to the Institutes of Menu*. And see further, on this subject, Mr. Colebrooke on the Vedas, in 8th vol. As. Res.

† Mr. Ward, to these fourteen sciences, adds the four oopŭ Védŭs, comprising the *ayoo*, on the science of medicine, drawn from the rig-vedŭ; the gandhŭrvŭ, on music, from the samú-védŭ; the dhŭnoo, on military tactics, from the yŭjoosh; and the *silpŭ*, on mechanics, from the ŭt 'hŭrvŭ. — 1 *Ward's View*, 269. This note affords a good specimen of the very different modes adopted by Mr. Ward and Mr. Ellis in expressing Sanscrit words.

2. The Vyác, Ryána, or commentaries and glosses on these text books.

3. The *Nibandhana-Granthá*, or digests, which are either of the whole body of law, or of particular portions of it: these are collected from the Múla Smritis, or original text books, and from those commentaries which are of the best authority. The number of Smritis, or original text books, is, in Southern India, generally reckoned eighteen; but the writers of these Ash'tàdàsa Smriti are emphatically called Smriti-Pravertaca, the select authors of the text books, which implies that there are others. * Many are quoted or referred to by law writers which are not now extant. Yájnyavalcya enumerates twenty authors of nineteen principal text books; namely, Menu, Atri, Vishnu, Haríta, Yájnyavalcya, Ushanas, Angiras, Yema, Apastamba, Samverta, Cártyáyana, Brihaspati, Parásara, Vyása, Sanca, and Lichita, (which two last were brothers, and wrote each a Smriti separately, and another jointly, and the three are now considered as only one work,) Dacsha, Gautama, Satátapa, and Vásisht,ha. † Parásara, whose name appears in this list, enumerates also twenty select authors; but, instead of Samverta Brihaspiti, and Vyása, he gives the names of Casyapa, Brigu, and Prachétas: and he says, that of four of the Smritis, one has been the principal authority in each of the four ages of the world.

In the Crita Yuga, that of Menu.

In the Treta, that of Gautama.

In the Devápara, that of Sanca and Lichita.

In the Cali, which is the present age, that of Parásara.

A commentator in this last work gives a list of twenty-six text books.

The commentaries and digests are too numerous to be here specified. ‡

* Mr. Colebrooke says, the Smriti has been promulgated by thirty-six ancient sages, who are named in three verses of the Padmapurána. — 1 *Dig. of Hindu Law*, *XIII. XVIII.*

† Mr. Ward says, it is the opinion of the Brahmans that, with the exception of Munoo, the entire work of no one of these sages has come down to the present time. — 1 *Ward's View*, 447.

‡ Many of them are noticed in the Preface to Mr. Colebrooke's Translation of the Digest

The only translations into English which we yet possess of the Sanscrit law books, are,

1. Halhed's translation, through the Persian, of the Vivadarnavasétu, which the translator calls "A Code of Gentoo Laws," and which must be classed as a general digest. * 2. Sir William Jones's translation of the Institutes, or Text Book of Menu. 3. Mr. Colebrooke's of the Digest of Jagannatha Tercapanchanana †, which comprehends, at most, only eight of the eighteen great divisions of law. 4. The translation, by the same gentleman, of Jimutaváhana's Treatise on Inheritance, or the Dáyabhága as it is called; and of that portion of the Vijnyaneswariyam, or Mitácharà, which treats of the same subject. ‡

Mr. Halhed's translation is valuable in this respect at least, that it contains more of the practice of Hindu law than any of the others: but it is a translation of a translation, and there are many symptoms that the first version has been made, like most other Persian translations, in a very loose and irregular manner. § It cannot be safely taken as an authority in a court of law.

Sir W. Jones's "Institutes of Menu," though exceptions may be

---

of J. Tercapanchanana; and some of them in the third section of this paper. Mr. Ward has given "A List of the Law Books still extant." — 1 *Ward's View*, 447. And Mr. Colebrooke believes, that he possesses nearly all the Sanscrit law books which are extant. — See *Preface to the Two Treatises*. Mr. Ellis, in his second lecture, remarks some points of similarity between the Smritis, or text books, and "*the law*" of the Old Testament; and considers the division of law writings into text books, commentaries, and digests, to bear a striking resemblance to the institutes, codes, and pandects of the Roman law, and even to the forms of the English law books.

* 4to. Lond. 1787.

† 3 vols. 8vo. Lond. 1801.

‡ 4to. Calcutta, 1810, and since reprinted at the College of Fort St. George.

§ See what is said on the subject of Persian translations in general, in Sir W. Jones's Preface to the Institutes of Menu, XVI. (p. 87. in 8vo. edition.) Of Mr. Halhed's Digest he says, in another place, "Though Mr. H. performed his part with fidelity, yet the Persian interpreter had supplied him only with a loose injudicious epitome of the original Sanscrit, in which abstract many essential passages are omitted, though several notes of little consequence are interpolated, from a vain idea of elucidating or improving the text." — *Preface to Colebr. dig. X.*

taken to many parts of it as a translation, is extremely valuable as a literary work; but, for practical purposes, its use is very little: the original being a text book of the oldest date *, without any commentary to adapt it to the circumstances of later times. † A mere text book is considered by Indian jurists as of very little use or authority for the actual administration of justice; it may almost be said that, the *only* conclusive authorities are held to be the Siddhantam, or *conclusions* of the authors of the digests and commentaries; each school adhering, of course, to the Siddhantam of its own authors.

The extraordinary compilation of Jagannatha Tercapanchanana, besides that it comprehends less than half the great divisions of Indian law, is manifestly not the work of a lawyer. ‡ The author is a grammarian and rhetorician, and, as his name implies, an acute logician; but, besides that he has confined himself to less than half the great heads of Hindu law, it is as if, in a Digest of English Law, passages of Milton and Shakspeare were cited in aid or exposition of the texts. § A still stronger objection to the Digest, as an authority in Southern India, is, that it is formed almost exclusively from writers of the Gäuda, or northern schools. ‖

* See Sir William Jones's Preface.

† The gloss of Cullucа Bhatta is indeed given, but merely for the *interpretation* of the text: there is no commentary for the application of it.

‡ Mr. Ward, however, states, that J. Tercapanchanana, who lived to the age of 112 years, or (as he says in another place) of 117, was supposed to be the most learned Hindu in Bengal, and used to give advice on the subject of the Hindu law in all difficult cases — 2 *Ward's View*, 183.

§ This remark refers to what Mr. Colebrooke has mentioned in the Preface, p. 19, of the compiler having cited the Rámáyana of Válmici, the earliest epic poem; and made some use of the dramas and epic poem of Cálidása, and lyric poetry of Jayadéva.

‖ This digest, of which Mr. Ellis speaks so slightingly, was made at the expence of the government, in consequence of the request and recommendation of Sir W. Jones. See 1 Colebrooke's Digest, v.—x. If there is any foundation for Mr. E.'s censure, it is much to be lamented that the native compiler was not restricted in his selection of materials. A low estimate of the value of this work is made also in 1 Wilks's Sketches, &c. 117; but I am told that this is only a repetition of the opinion of Mr. Ellis, whose assistance Colonel Wilks states to have been afforded to him in the composition of his work. Mr. Colebrooke, however, the translator of it, himself says of the digest, that "the author's method of dis-

In speaking thus of the Digest of J. Tercapanchanana, it is necessary to say, that the observations apply to the Hindu compiler alone, and that there could hardly have been a better translation made of it than that which Mr. Colebrooke has given.

His translation of the Two Treatises of Inheritance are very valuable as far as they go; but the first is liable to the same objection as the Digest of J. Tercapanchanana, that it is of authority in the Gäuda schools only, and not in Southern India.

Besides these few translations *, it is remarkable how little information relating to Hindu law is to be derived from any European accounts. A notion seems to have long prevailed in Europe, that the Hindus had no written laws †, although the law of the Smriti was in full operation throughout a great portion of India, long after De Gama's invasion, and in many of the provinces neighbouring on Madras, long after Madras became a British possession. Nothing respecting Hindu

cussing together the discordant opinions maintained by the lawyers of the several schools, without distinguishing, in an intelligible manner, which of them is the received doctrine of each school, but, on the contrary, leaving it uncertain whether any of the opinions stated by him do actually prevail, or which doctrine must now be considered to be in force, and which obsolete, renders his work of little utility to persons conversant with the law, and of still less service to those who are not versed in Indian jurisprudence, especially to the English reader. — See *Preface to the Two Treatises, &c. III.*

* Since Mr. Ellis made these observations, a translation, by P. M. Wynch, Esq. has been published (4to. Calcutta, 1818) of the Daya Crama Sangraha, of which Mr. Colebrooke, in his preface to his translation of the Dáya Bhága, says, that "it contains a good compendium of the law of inheritance, according to Jímúta Váhana's text, as expounded in his commentary of the Dáya Bhága." The Dattaka Mímámsá, and Dattaka Chandrika, have also been translated by Mr. Sutherland of Bengal.

† I doubted whether any other notion upon this point had ever prevailed except that which was correct, namely, that they have no enactments or statute law: just as the writers on English law consider our statute law to be our only written law (1 Black. Comm. 63), though what they call the *lex non scripta*, the unwritten or common law, is written in text books, digests, and commentaries as fully as Hindu law well can be. However, I find that Mr. Ellis was quite accurate; and that, within seventy years of the present time, even Montesquieu believed, upon the authority of the Jesuits, that in the South of India there were no law writings of any sort or kind. — See Note on the 1st chap. of the 6th book of the Esprit des Loix.

law is to be found in Pietro delle Valle, Bernier, Tavernier, Thevenot, or the other European travellers of the seventeenth century; with the exception of Abraham Rogers, a Dutch clergyman, who resided at Pulicat, and who, in a work which has been translated into French, under the title of "Le Théâtre d'Idolatrie, ou la Porte ouverte," &c.[1] has correctly noticed many of the observances of the Smritis, but without reference to any original authorities. The Jesuits, though it can hardly be doubted that they had obtained correct information on this subject, as on almost all others, have imparted very little of it in their "Lettres édifiantes et curieuses." The statements of later writers have been vague, superficial, and erroneous. Paolino di San Bartolomeo ventured to enter the lists against Sir William Jones, and to controvert his opinions respecting the Institutes of Menu; but the "Summary of the Laws of the Indians," which he has given in his "Voyage to the East Indies," under twelve heads, would serve as well for a summary of the Laws of any other people in a tolerably civilised state. There is much information scattered through the work of the Abbé Dubois, which would be important if it was supported by a reference to any original authority: but as this is not the case, it is doubtful whether it is the law itself which is meant to be given, or the practices, statements, and opinions only of those with whom the author conversed. The errors and inconsistencies into which Mr. Mill [Note A], Mr. Ward, and other writers have lately been led are very numerous.

[1] 4to. Amsterdam, 1670.

NOTES.

NOTE A.

The able author of the "History of British India" will not be offended that this remark on so important a subject is neither suppressed nor qualified. Mr. Ellis has left a paper in answer to Mr. Mill's Observations on Hindu Law. It is a fragment only, and, apparently, a very small part of what Mr. Ellis thought of putting together: the three following instances, however, are pointed out in it as errors of Mr. Mill.

1. Mr. Mill has said, vol. i. p. 130. of the first 4to. edition, that the power of legislation and of interpreting the laws amongst the Hindus exclusively belongs to the priesthood.

Mr. Ellis notices the error of ascribing to the whole body of Brahmans a sacerdotal character, an error into which Europeans seem very generally to have been led by the fact that none but Brahmans are priests; whence they have concluded that none but priests are Brahmans; and Sir W. Jones has countenanced this mistake by translating, in the Institutes of Menu, the words used to designate an individual of the first caste, viz. "Brahmanah" and "Viprah," Priest, and the feminine of them, "Brahmani" and "Viprà," Priestess. The latter mistake is particularly remarkable, as the wives of Brahmans, though they assist in the private devotions of their family, not only never officiate as priestesses, but have no part in the public ceremonies of religion, except as spectators. The truth is, the first caste of Hindus, though from their birth eligible to the priesthood, are not necessarily priests. The conduct of religious ceremonies, though the highest, is only one of the many duties appropriated to the caste; they are also, professionally, the *savans*, or men of letters, to whom the interests of science and literature are committed in all their branches, the hereditary teachers of the other classes, both in sacred and profane learning, and especially the lawyers. To these different occupations, and their subordinate divisions, they applied themselves as to so many distinct professions, the respective members of which never interfered with each other, any more than our divines do with our physicians, or either of these with our jurists: and hence have proceeded the several distinctions now actually obtaining among the Brahmans in Southern India. These are, first, Vaidica Brahmana, subdivided into Sastris, men of science; Achárya, teachers; and Pujáris, priests: the two former of these may perform the higher offices of religion in the solemn sacrifices, &c., or act as Puróhita, domestic chaplains, &c.; but the last only conduct the public worship in the temples, and are considered an inferior class: — secondly, Lougica or Niyógi Brahmana, secular Brahmanas, who gain their livelihood by the several worldly occupations permitted to the caste. These distinctions are now become hereditary; but as this is founded solely on custom, and not on law, the restriction is more nominal than real, as any Niyógi family may become Vaidica, if the head of it qualifies himself by the study of the sciences, and, *vice versâ*, any Vaidica may betake himself to worldly pursuits, sinking thereby, perhaps, in the estimation of his fellows, but not forfeiting his privileges and distinctions as a Brahman. *

2. Mr. Mill has said, vol. i. p. 128, "The administration of justice by the king in person stands in the sacred books as a leading principle of their jurisprudence, and the revolution of ages has introduced no change in this primeval practice."

Mr. Mill here makes a considerable mistake, if, as it seems from the context, he supposes that, in Hindu states, it is or was the practice to administer justice only in the presence of the king. It is true that in the Hindu governments there was always an *Aula Regis*, or court, at the seat of government, in which the king was supposed, according to the letter of

* The distinction of Brahmans into Vaidika and Lókika is repeatedly stated in Dr. F. Buchanan's "*Journey through Mysore;*" but he adds a third class, "*Numbi.*" "Each nation has its *Vaidika*, who subsist by charity, and dedicate their lives to study and devotion; its *Lókika*, who follow worldly pursuits; and its *Numbi*, or priests, who officiate in temples, and debase themselves by receiving monthly wages, and by performing menial duties to the idols. — Vol. i. p. 308. and see also p. 21; but it seems, from a subsequent passage, that the Numbi are an inferior class of the Vaidika. — P. 333.

the laws, to preside in person, though he might appoint a deputy, and always had assessors; but it is doubtful how far the practice was kept up, and, at all events, it is certain that there were three other principal courts known to the Hindu laws, and fifteen *sorts* of inferior courts, all having their several jurisdictions clearly defined, and many of them bearing a striking resemblance to the courts of the English common law.

Mr. Ellis's Second Lecture treats largely of these.

3. Mr. Mill says, vol. i. p. 170, "In respect to definitions, the Hindu law is in a state which requires a few words of elucidation. Prior to the art of writing, laws can have little accuracy of definition; because, when words are not written, they are seldom exactly remembered; and a definition whose words are constantly varying is not, for the purposes of law, a definition at all. Notwithstanding the necessity of writing to produce fixed and accurate definitions in law, the nations of modern Europe have allowed a great proportion of their laws to continue in the unwritten, that is, the traditionary state, the state in which they lay before the art of writing was known. Of these nations, none have kept in that barbarous condition so great a proportion of their law as the English. From the opinion of the Hindus that the Divine Being dictated all their laws, they acknowledge nothing as law but what is found in some one or other of their sacred books. In one sense, therefore, all their laws are written. But as the passages which can be collected from these books leave many parts of the field of law untouched, in these parts the defect must be supplied either by *custom* or the *momentary will* of the judges. Again, as the passages which are collected from these books, even where they touch upon parts of the field of law, do so in expressions to the highest degree vague and indeterminate, they commonly admit of any one of several meanings, and very frequently are contradicted and opposed by one another. When the words in which laws are couched are, to a certain degree, imperfect, it makes but little difference whether they are written or not: adhering to the same words is without advantage, when these words secure no sameness in the things which they are made to signify. Further, in modern Europe, the uncertainty adhering to all unwritten laws, that is, laws the words of which have no certainty, is to some degree, though still a very imperfect one, circumscribed and limited, by the writing down of decisions. When, on any particular part of the field, a number of judges have all, with public approbation, decided in one way; and when these decisions are recorded and made known, the judge who comes after them has strong motives, both of fear and hope, not to depart from their example. The degree of certainty, arising from the regard for uniformity, which may thus be produced, is, from its very nature, infinitely inferior to that which is the necessary result of good definitions rendered unalterable by writing: but such as it is, the Hindus are entirely deprived of it. Among them, the strength of the human mind has never been sufficient to recommend effectually the preservation, by writing, of the memory of judicial decisions. It has never been sufficient *to create such a public regard for uniformity, as to constitute a material motive to a judge:* and as kings, and their great deputies, exercised the principal functions of judicature, they were too powerful to be restrained by a regard to what others had done before them. What judicature would pronounce was, therefore, almost always uncertain, almost always arbitrary."

Mr. Ellis makes some severe remarks upon the positiveness with which these comprehensive but ill-founded assertions are made. The main source of Mr. Mill's error seems to be sufficiently disclosed by himself in the first sentence of his chapter on the Hindu laws: it is the very common one of having judged of the whole from a small part. He says, "Next to the

form of government, in determining the political condition of the people, is the body of law; or the mode in which the rights of individuals are created and secured. For elucidating this important point, in regard to the Hindus, *materials are abundant.*" But the materials on which Mr. Mill founds his opinions, seem to have been merely Sir Wm. Jones's Institutes of Menu, Mr. Halhed's Code of Gentoo Laws, and Mr. Colebrooke's Translation of Jagannatha Tercapanchanana's Digest. That they were utterly insufficient for his purpose, the section, to which this note is appended, sufficiently shews. When he supposes that there are no definitions on Hindu law, he has never seen, even in a translation, any one book of the second great class of Hindu law books, namely, the Vyáck yána, or Commentaries, and only the translations of two very imperfect works out of the great multitude of digests, and he relies mainly upon the Institutes of Menu, which, being a mere text book *, it has already been stated, is never used as an authority in Hindu courts, but when accompanied by an explanatory commentary, or incorporated with a digest. It is true that the Hindus have not preserved "reports," after the English fashion, of the decisions of their courts of justice; but when the "definitions" of the English common law are sought for, no less regard is paid to those which are found in Lyttelton's Tenures, or, perhaps, in Lord Coke's Commentary, than to those which appear in the "reports of cases;" and the commentaries of the Hindus are considered more decidedly by them to be integral parts of the body of their law than any commentary is in England.

But it ought, perhaps, to satisfy the most eager assertor of Hindu civilization, that Mr. Mill seems to consider the English common law to be almost as far as the Hindu system from approaching his ideal standard of perfection.

Note B.

Mr. Ellis appears to have intended to notice those European works only which either are translations from the Sanscrit, or give general views of Hindu law; otherwise he would have mentioned the numerous publications on the tenures of land, and what is called "proprietary right," especially the Appendix to the Fifth Report of the Select Committee of the House of Commons in 1812; the fifth chapter of the first volume of Colonel Wilke's Historical Sketches, and his own "Replies to Seventeen Questions proposed by the Government of Fort St. George relative to Mirasi Right." Many points of Hindu law are discussed, also, in the folio volume printed at Calcutta, entitled, "Reports of select Causes turning chiefly on Points of Hindu or Mahomedan Law, adjudged in Appeal before the Sudder Dewanny Adawlut in Bengal;" many others in Sir Thomas Strange's "Reports of Cases adjudged in the Supreme Court at Madras," 3 vols. 8vo., which, though not published for sale, have been printed and largely distributed amongst the friends of the author; who is also preparing for publication some most useful outlines of that portion of Hindu law which is preserved to the natives of India by the British institutions.

* The interweaving of the gloss of Culluca Bhatta with the Institutes of Menu cannot be considered as any material exception to this.

Sect. II.

OF THE DIFFERENCES BETWEEN THE SCHOOLS OF LAW OF NORTHERN AND SOUTHERN INDIA.

The religion; literature, and customs, but especially the Mímámsa, or doctrine of ceremonial rites, differ very materially in the two great moral divisions of India, Gaũda, and Drávida* ; the boundary between which may be taken, for general purposes, to be a line drawn from the mouths of the Indus to Ganjam, the most northern town in the presidency of Madras.†

The following are some striking instances of difference in the laws :

1. It is stated by Jaganautha Tercapanchanana, that if brothers, uncles, and nephews live together as an undivided family, and one of them dies without male issue, his widow has a right to have a partition of the property, and to take the share of the deceased. ‡

But it is said in the Vijnyaneswariyam, the Smriti Chandricá, and other books of authority in Southern India, that if, indeed, partition has

* Dr. F. Buchanan notices the great division of the Brahmans into northern and southern, and specifies many of the customs in which they differ. — *Journey through Mysore, &c. vol. i. p.* 307.

† This must be taken with some qualifications; for the Mitacshara of Vijnyaneswara, which Mr. Ellis (see sect. 3.) prefers to all others as an authority for Southern India, is stated by Mr. Colebrooke to be the standard authority in the schools of Benares, and, indeed, in all schools except that of Bengal. — See *Mr. C.'s Preface to his "Two Treatises," &c.* 3, 4.

It can hardly be necessary to add that Mr. E., in making this division of Gaũda and Drávida, must not be supposed to have extended erroneously the boundaries of the political division of Drávida, which never, I believe, included more than the country between Trepatty and Cape Comorin, and the Sea and the Ghauts. In classing the most important languages of India, a learned native, in a communication to the School-book Society of Madras, has divided them into the Pancha Gaũdam and Pancha Drávidam; and considers Gaũda to extend from the Himalaya mountains to the Nerbudda, and Drávida from the Nerbudda to Cape Comorin; but subdivides the latter into Shoodha Drávidam, Andhra Drávidam, Cannada Drávidam, Maharastra Drávidam, and Khoorjara Drávidam; the first is the political division, to which alone, I believe, in English writings, the name of Drávidam has usually been applied.

‡ 3 Colebr. Dig. 457. 576. 179. 481.

been made in the lifetime of the husband, who dies without male issue, his widow is entitled to that which he held as his sole property; but that, if the husband dies before partition, the widow cannot claim to divide, and is entitled only to a sufficient maintenance from the family.*

2. Jimutaváhana and J. Tercapanchanana say, that the son, during the lifetime of his father, has no dominion over property which has lineally descended; and that he cannot demand partition, but that the father may divide without the assent of the son. †

But the Vijnyaneswariyam and Madhavíyam declare that the father and son, during the lives of both, have equal dominion over property which has lineally descended, and that either, without the assent of the other, may demand partition. ‡

3. Jimutaváhana says, that partition of property, lineally descended, may not be made even by the father, if there is a probability of his having more sons. §

The Vijnyaneswariyam says, that it may be made even by the sons, and whilst there is still a probability of the birth of more sons. ‖

4. Jimutaváhana and J. Tercapanchanana say, that if the father be incapacitated, as by old age, infirmity, or insanity, for the management of his affairs, the sons may manage the property, but may not divide it. ¶

The Smriti Chandricá, Madhavíyam, &c. say, that in such case the sons may not only manage the property, but may divide.**

5. Jimutaváhana and Tercapanchanana say, that on partition of property lineally descended, the father should have a share double of that of each of the sons. ††

In the Vijnyaneswariyam, Smriti Chandricá, Madhavíyam, &c. it is said that the father and sons shall have equal shares. ‡‡

* Colebrooke's Mitacshara, 340.
† Colebrooke's Dayábhága, 25. 28.
‡ Colebrooke's Mitacshara, 278.
§ Cole. Dayáb. 24. 34.
‖ Colebrooke's Mitac. 279.
¶ 2 Col. Dig. 527.
** Col. Mitac. 260.
†† Col. Dayábhága, 43.
‡‡ Col. Mitac. 278.

6. Jimutaváhana seems to hold, that a man may bestow his whole property on another as a gift.*

In the Smriti Chandricá, Saraswativilásam, and Vijnyaneswariyam, &c. such gifts are declared to be invalid.

7. Jag. Tercapanchanana says, that a gift bestowed on a member of an undivided family is not subject to partition. †

In the Vijnyaneswariyam, &c. it is said that gifts, with some particular exceptions, are subject to partition. ‡

8. J. Tercapanchanana says, that if a man's land be held against him, within his view, by another, for twenty years, he loses his property in it.

In the Vijnyaneswariyam, Madhavíyam, Smriti Chandricá, and Saraswati-vilásam, &c. it is said that he loses the produce only.

9. J. Tercapanchanana says, that though no sin is incurred by adopting a child of the same Gotram §, yet a child of a different one ought to be preferred.

According to the Mímámsā of Southern India, an adopted child ought to be of the same Gotram, though it is admitted that if one of the same cannot be procured, one of a different Gotram may be taken.

10. It is a general rule of law, that when a wife dies without issue, her husband and father being alive, her property goes to her husband, if she was married according to the mode called Brahma, &c., but to the father if she was married according to the mode called Asura, &c. But Jimutaváhana and Jag. Tercapanchanana say, that the rule applies to that property only which is acquired at the time of her marriage; whereas the ‖ Vijnyaneswariyam, Madhavíyam, &c. state it to apply to her property whether acquired then or afterwards.¶

11. The adoption of a purchased son is considered, by all the northern

* 2 Col. Dig. 133. † 3 Col. Dig. 334. ‡ Col. Mitacshara, 270, 271.

§ Gotram is a tribe, or clan, descended from a common ancestor: a subdivision of the caste.

‖ 3 Col. Dig. 608. ¶ Col. Mitac. 368.

schools, to be forbidden in the present age; but it is allowed by the ancient law, and is universally practised in Southern India.*

This last discrepancy, however, is of a nature somewhat different from the rest. The others are cases in which the writings of the different schools are directly opposed to each other: but, with regard to the adoption of a purchased son, it must be allowed that in the Smriti Chandricá, which is a Drávida authority of the highest character, it is said that the taking of any of the eleven descriptions of sons, following the son of the body, was admitted in the former ages, but in the Caliyuga the adopted son only. Some doubts may be raised upon the meaning of these words, and a question may be made whether they were intended to apply to any others than Brahmans; and whether the prohibition, in this case, and in many others of those which apply only to the Caliyuga, is imperative, or merely recommendatory. But the strongest ground on which the legality of the practice may be supported is, that it is an immemorial and general custom of this part of India; and that, in the Drávida division, local custom frequently supersedes the general rule of law: it would be very difficult to enumerate all the established practices of Southern India, which are in direct contradiction to the Smritis: but, amongst the most remarkable, are the

* Mr. Ellis discusses this question at great length, drawing his arguments "from a paper which was written" in consequence of an opinion given by Mr. Colebrooke against the legality of the adoption; and he adds that, in conformity with that opinion, a formal adoption of a purchased son was set aside by the Supreme Court at Madras. The case to which he alludes, is probably that which is thus noticed by Sir T. Strange in his "Notes of Cases," &c. vol. i. p. 72. "In the first term of 1812, the question how far purchase constituted adoption, or adoption could result from *purchase*, arose in an action of trespass. The court, upon the trial, found for the plaintiffs, against the claim set up by the defendant as having been adopted. A new trial was moved for, and a rule to shew cause granted; but it never came again before the court. Upon this occasion my inquiries, which went to a great extent among pundits, including a great deal of correspondence with Mr. Colebrooke of Bengal, satisfied me that adoption, by this means, was obsolete in the present (the Cali) age, and no longer competent, unless on the ground of local usage and custom, of which there was no evidence in the case alluded to. The name of the case was *Goovoorummal and Another* v. *Mooneesamy*."

It is to be observed, therefore, that the Supreme Court did not make any decision upon the question of custom.

indiscriminate intercourse of married females with all males of equal or superior caste, which prevails in Maláylam, with other customs said to have been introduced by Sancaráchárya: the right of primogeniture in cases of land, to which *jura regalia* have ever been attached: the division of estates *per stirpes*, instead of *per capita*, in case of one person having several families by different wives: and the preference of males to females in the order of inheritance.

These instances, and many others, especially some relating to the conduct of religious ceremonies, and the superintendance of religious establishments, in which the inferior castes are allowed to take precedence of the Bráhmans, shew that, although the latter succeeded in abolishing the ancient religion of the South, that of the * Sámaner or Jainer, they did not succeed in completely introducing the law of the Smriti; but were obliged to permit many inveterate practices to continue, which, in order to hide the necessity to which they have submitted, they endeavour, by sophistry, to reconcile with the letter of the law as nearly as they can.

Section III.

Of the books which are of the highest authority in the schools of southern India.

There are legal institutions in Southern India, more ancient than those which have been introduced from the North; and it is in these chiefly that the difference between the two divisions consists: but, although these are of more remote date than any of the existing governments, they have not all been derived from one source, and in order to under-

* There seems to be good reason to suppose that the Sámaners were Boodhists, not Jainers. — See a paper of Mr. Erskine in 3d vol. of Bombay Transactions.

stand them, a short notice of some of the ancient dynasties of the South may be useful.

The earliest governments established in the southern part of the peninsula of India, of which there now remains any distinct memorial, were the three Tamil principalities called Shózham, Shéram, and Pándiyam*; which names are usually united with the words *Nádu*, country, or *Mándalam*, circle, as Shózha-nádu, Shéra-mándalam, &c. These three governments included all those countries, of which the Tamil and the Malyálam are now the spoken languages. It is impossible to fix accurately their limits; but, for the purpose of giving a general notion of them, it may be said that Shozham was the province of Tanjore; Sheram was Coimbatore, to which a part of the Malabar coast was subjected; and Pándiyam included the districts of Tinnavelly, Madura, the Marawar countries, and Trichinopoly. Contemporary with these, and comprehending the maritime provinces of the north-east of the peninsula, was the Tellugu kingdom of Calinga, to which And,hra † was united. These governments must have been established in very remote times. Ptolemy notices them all, and assigns to them their relative situations: Pliny also and other ancient European writers mention them; and of the three Tamil governments there still remain long lists of kings who reigned before the Christian era. The memory of these states as divisions of the country is so far from being obsolete, that through all changes of government the names have been retained,

* These are called Cholam, Cheram, and Pandiam, by Colonel Wilks and others; but Col. W. mentions that the sound expressed by the l or r in Chola or Chora is something between the L, the R, and the French j; and Mr. E. seems to have thought zh the nearest approach to it. — 1 Wilks's Sketches, 7.

† The Telinga, formerly called the Kalinga language, occupies the space to the eastward of the Mahratta, from near Cicacole, its northern, to within a few miles of Pulicat, its southern boundary, with the intervention, however, in a stripe of small dimensions, of the savage tongue of the Goands. This space was divided into the Andra and Kalinga dasums, or countries, the former to the south, the latter to the north of the river Godaveri; but, at the period of the Mahomedan conquest, the greater part of these united provinces seems to have been known to that people by the name of Telinguna, and Warankul as the capital of the whole. — 1 Wilks's Sketches, 6.

and are indeed the only ones which can properly be said to be in use even now among the people.

I omit to notice the coeval government of Carnátaca, established at Hila Bi'du; because the religion was Jaina, and the jurisprudence and institutions, of which few traces remain, were, in all probability, entirely distinct from those of the rest of this part of India.*

As early as the 311th year of the Salwáhana Sácam †, the officers of the King of Shéram divided amongst themselves his possessions on the coast of Malabar; and finally, though at what period is uncertain, Shéram was reduced to be a province of the Pándiya government. In the eighth century of the same æra, the limits of Shozham were greatly extended; Tondiya-mándalam, (the present Subah of Arcot,) had been previously reduced, and, by the conquest, in one direction, of And,hra at least, if not of all Calinga, and in another direction, of a large portion of what is now called the Carnatic, the northern boundaries of Shozham were carried at least to the Godaveri, and her western to Vishab,ha Parvatam, the hills of Nundidroog; and this is the first powerful state recorded in the history of Southern India. In the beginning of the twelfth century of the same era, the Cacatíya family established themselves to the north of the Crishna, and built Annumconda, or Orugallu ‡, where they fixed their seat of empire. About the year 1150 of the Sácam Gonapati, corresponding with A. D. 1228, the fourth prince of this line drove the Shózha Raja entirely out of Calinga; this fact and date being proved by a remarkable inscription on a stone now standing on the westernmost point of the island of Dive, and by existing lists of Tamil accountants removed at that time from the villages, and of the northern Bráhmans who were appointed to succeed them. Ultimately, the Prince of Orugallu wrested from the Shózha Raja all his territories except Shózham and Tondiya-mándalam,

* It seems, from this passage, that Mr. E. does not suppose any important Jain customs still to prevail; though a passage at the close of the second section seems to authorize the inference that he did.

† A.D. 389.

‡ Usually written Warankul. — See Wilks's Sketches, &c.

and thus established the second empire of Southern India; comprehending the whole of the territories now under Hyderabad, the northern Sircars, and a considerable portion of the Carnatic; and, generally speaking, the whole of the countries of which the Tellugu is now the colloquial language.

The third empire of the South, and considerably exceeding in extent those which preceded it, was that of Vidyanagara; this city was founded towards the end of the thirteenth century of the Salivâhana Sácam by the brothers Bucca and Harrihara, immediately after the capture of Orugallu, and its sovereign, Pratáparúdradéva, by the Paitans: successive conquests extended the empire of Vidyanagara through the regions watered by the Narmada *, the Godávari, the Crishnà, the Caveri, and the Tambraperna, till it comprised nearly the whole peninsula; but in 1486 of the Salwâhana † Sácam, the King Râma Ráyer was defeated by the Moslem princes of the Deccan, and his empire was dismembered, but not entirely overthrown. The Ráyers, during their successive removals to Pennaconda and Chandragiri, retained, until the extinction of their dynasty in 1568, S. S.,‡ a considerable territory in the countries now called the ceded districts, the Maîsur and the Subah of Arcot: and to the last were the nominal sovereigns of the Cartas of Maîsur, and of the Naics of Icare, Madura, and Tanjore.

It is not necessary to say any thing of the short rule of the Mahrattas in the lower Carnatic, or of the anomalous government of the Rayas of Tanjore, the dependents, if not the subjects, of the Nabobs of Arcot, although some works of law were written under their dominion. §

* As they seem to have been corrected with care, I have thought it right to preserve the Indian words as I found them written in Mr. Ellis's papers. This, which he writes Narmada, is, I suppose, the Nurbudda, as it is commonly written, or Nermudda; though, if it be so, Mr. E. gives a much wider extent to the Vidyanagara kingdom than has been usually assigned.

† A.D. 1564. ‡ A.D. 1646.

§ The whole of the foregoing historical sketch is given by Colonel Wilks, with slight variations; but the materials, viz. Colonel Mackenzie's collection, from which both sketches are

The principal law books, composed by authors who resided in Drávidam, are

1. *Aparácam*, so named from the author: it is a commentary on the text of *Yájnyavalcya*, and is supposed to be of earlier date than the *Mitácsharà* of *Vijnyaneswara*, which is also a commentary on the same text, and of which the author is understood, for the most part, to refer to the Aparácam, when he cites opinions without naming the source whence they are taken.

2. *Saraswati-vilásam*, a general digest attributed to the king Pratápa-rúdra-déva, but probably composed under his direction only.

3. Mádhavýam, a commentary on the Parásara Smriti, composed by Vidyaranya, but named after his brother.

4. Smriti-chandrica, a general and excellent digest: the author was Devanna * Bhatt.

5. Varadarájyam, by Varadarája, and Vaidyanathiyam, by Vaidyanatha. These are both general digests, the former framed principally on the Narada Smriti, by a native of the Subah of Arcot; the latter by a native of Tanjore: neither of them can well be of a date anterior to the Mahratta and Mahomedan conquests.

6. Mitácsharà, a commentary on the Gautama Smriti, but quoting occasionally from the other text books, by Haradattáchárya, a native of Shózham, and famous for various other compositions.

7. Vyavahára Mayúcha: this is one of the twelve Mayúchas, comprising the whole body of the Mímámsā, and was composed by Nílacónth-éswara.

8. Datta Mímámsā, by Vidyaranya Swámi; Datta dipaca, by Vyasáchárya; Dattacaumstab,ham, by Nagóji Bhatt; Datta Chandrica, by Gangadava Vazbey: these are general digests of the law of adoption; the two last were composed in Tanjore since the Mahratta conquest.

---

formed, still remains in MS., and it may be useful to have some of the results of an examination of it by two highly intelligent persons, instead of one. Mr. Hamilton also seems to have made use of the Mackenzie MSS. in forming his Gazetteer.

* Mr. Colebrooke calls him Devanda-Bhatt.

Besides these, there are several books, which, although their authors are generally supposed to have lived in Northern India, are nevertheless received as authorities in Drávidam.

1. The Midhatithiyam, a commentary on the text of Menu.

2. The celebrated Mitácharà of Vijnyaneswara; a commentary on the Smriti of Yajnyavaleya.

3. D,hárésvariyam, a general digest.

4. Jimnitavahaniyam, a general digest, which seems to have been the chief guide of Jagannatha Tercapanchanana.

5. Dattamímámsa by Nandipundita; and Dattab,hushanam, by Crishna Mirsra: these are digests of the law of adoption. Of all that have been mentioned, there are four which far exceed the rest in authority in Southern India; namely,

1. The Mitácharà of Vijnyaneswara.

2. The Mádhavíyam.

3. The Smriti-chandrica.

4. The Saraswati vilásam.

The Saraswati vilásam is a general digest, attributed to Pratáparúdra déva Maharàjáh, a prince of the Cacatiya family, and it was the standard law book of the Orugallu dominions. The influence of its regal origin, and the introduction of new notions, which probably were connected with the circumstances of the Mahomedan invasions, are very apparent in it. The will of the prince is, in this book, for the first time in Indian law, considered as paramount to the right of the subject; and the claim to the absolute property in the soil, on which the modern revenue system of India is founded, is here asserted. The existing institutions of the Circars, and of the dominions of the Nizam, are in a great measure derived from this work.

The Smriti-chandrica was composed during the existence of the Vidyanagara dominion, but apparently not under the sanction of the government, though in general authority it is nearly equal to the Saraswativilásam and Mádhavíyam. It is highly valuable as a literary work, for the complete information it affords of the constitution of the

several sorts of judicial tribunals, which existed in Southern India at the time when it was written; and for practical purposes it is very useful, on account of its affording precedents for the forms of process, deeds, &c., and for the clearness with which the points of law are discussed. Of all the Dravida compositions, it is almost the only one mentioned by Mr. Colebrooke, as known in Northern India.

The basis of the Mádhavíyam is the Parásara Smriti, which is distinguished from the rest as having been written for the Caliyugam, or present age of the world; but of this Smriti the second book, the Vyavahára cándam, which ought to comprise the legal institutes *, is entirely wanting, so that Vidyaranya, the author of the Mádhavíyam is obliged to select from the first book, A'chára cándam, a verse in which the princes of the earth are merely enjoined to conform to the dictates of justice: and then, in explaining what that justice is, the Mádhavíyam becomes in fact, though not in name, a general digest. The author of this book, at once the minister and the spiritual director of the first Ráyers, Bucca and Harihara, was himself the virtual founder of the Vidyanagara empire, and his book became the government standard of its law.

The Mitácsharà of Vijnyaneswara is generally supposed to have been composed in Northern India †; but it is sometimes claimed as a production of the South, and at any rate must have been brought thither at a very early period, as it is every where amongst native lawyers so much the standard of law, that if other books differ from it, their authority is rejected. It seems to have been the foundation on which the still existing institutions of the Shózha dominions were erected.

In choosing amongst these four principal works, the difficulty lies chiefly between the Mádhavíyam and Mitácsharà of Vijnyaneswara. The former may seem to have a claim as being nominally founded on

* An instance in which an equally small foundation has been taken, by Jagannatha Tercapanchanana, for almost as spacious a superstructure, is given by Col. Wilks, vol. i. p. 117.

† See Colebrooke's Preface to his Translation of the two Treatises of Inheritance, iv., and Preface to his Digest, xv. for a further account of the Mitácsharà. He gives, at least, as high an estimate of it as Mr. Ellis does.

that particular Smriti which was revealed for the guidance of the present age; but this claim has been already explained.* Another claim appears to be, that nearly all the territories of the Madras presidency were at one time parts of the Vidyanagara empire, for the use of which the Mádhavíyam was compiled; but this is by no means an unqualified advantage; for the books which have been specially composed for the purposes of any particular dynasty have usually fallen into disrepute as the dynasty itself declined; and it is moreover very doubtful whether the Vidyanagara princes made any alteration in the institutions of the Tamil nations which they subdued.

Upon the whole, the Mitácharà of Vijnyaneswara seems to be clearly the book which is of most general and absolute authority in Southern India, and accordingly to be that which, if a new digest should be compiled, is the best calculated to serve as a basis. Another accidental recommendation of it is, that the government of Madras are in possession of a translation of this work into the Tamil, made by a Pandáram of Madras named Pórùr Váttiyár who was eminently qualified for the undertaking, and who lived to complete the greater part of it; it was finished under the inspection of his brother, Sidambala Pandáram, head Tamil master at the college. †

In forming a digest, however, the greater part of the three other works, viz. the Mádhavíyam, the Smriti-chandrica, and Saraswátivilásam ought to be incorporated: and Patábhi Ráma Sástri, from

* See p. 23.

† Mr. Ellis, in his Second Lecture, says, "The exact form of the Mitacharà is this: First, the text of the original author, Yajnyavalcya, (which is written in that species of verse called Anushtup, consisting of tetrasticks, each line containing eight syllables,) is cited; sometimes a single line, sometimes two or three, but commonly a whole stanza, and now and then, though rarely, two or more stanzas. Secondly, a gloss, or perpetual commentary on the text is given; and, if the text is difficult, it is taken word by word, and regularly construed, (Anwayam,) and the grammatical connection pointed out: if the sense be clear, particular words only are explained, and their etymology given. Thirdly, the observations of the commentator on the point of law involved in the text are stated, and, when necessary, his Siddhántam, or decision, preceded by the reasons at length on which it is founded: quotations are also given from other text books, digests, and commentaries, and the opinions contained in them are discussed.

whose paper on this subject many of the observations in this lecture have been drawn, recommends that there should be added to the four others the Varadarajiyam: he admits that the Mitacshara of Vijnyaneswara is the most generally prevailing authority; but says, that in the Andhra country, the Smriti-chandrica and Saraswativilasam are chiefly esteemed; in the Dravida * the Saraswativilasam and Varadarajiyam; and in the Carnataca, the Madhaviyam and Saraswativilasam.

* See note at the beginning of the second section.

No. II.

AN ACCOUNT OF SOME ANCIENT GRAVES IN THE VICINITY OF OOPULGUTT.

(Latitude 17° 2′ 50″ N. Longitude 78° 57′ 14″ E. 36 miles S.E. of Hyderabad.)

Communicated to the Secretary by Captain Robert Young, Surveyor in the Nizam's dominions.

Oopulgutt, 17th April, 1822.

I have been desirous, for some time past, to open one of those places, called by the natives "The habitations of the Ràcshasas or Giants," and finding several places of this description in this neighbourhood, I commenced opening two this morning. All the places of this kind I have yet seen are externally alike. They consist of a number of rough, unhewn stones placed perpendicularly on the earth's surface, with which a circle is formed: the stones are near to each other, generally touching. The inside of the circle is sometimes quite flat, but is observed to be occasionally elevated a few feet above the surrounding ground; a little swell is also observable in the centre of some. These elevations, usually produced by heaps of stone thrown together promiscuously, give to such places the appearance of a cairn.

About twenty people were employed, and they only succeeded in opening three graves in four days: I found, therefore, that I had undertaken a more arduous task than I had imagined. The upper soil, for about one foot and a half, or two feet, is tolerably soft, resembling the common soil of the country: a little deeper, an infinite number of stones of all sizes were met with, so firm in the earth as to require the strongest effort of the iron crow to loosen them. The earth, at the depth of two and three feet in each grave, assumed the appearance

of soil taken from the bed of a tank, which had been beaten into a mortar, and afterwards deposited on the top of the stone kist or coffin; and during which operation the stones, alluded to as being so difficult to remove, must also have been lodged, when the mortar was yet soft. Small potsherds were occasionally turned up with this soil. By the evening, after the people had dug to the depth of four or five feet in some places, I felt inclined to give up the pursuit as fruitless; it was however resumed the following morning, when we experienced better success. I found we had began to dig at the wrong place, having commenced at the side instead of the centre. In a grave which was opened to-day, at the depth of about three feet, (the soil being similar to that described above,) the diggers discovered a large perpendicular stone; now the work went on with alacrity; a foot and a half deeper, a large flat stone opposed further progress; this stone extended till it was succeeded by a second and a third, and the whole length (about five feet) was terminated by another perpendicular stone, resembling that which was first discovered. When the earth was entirely removed from the top of all these stones, the coffin or kist was immediately seen, two broad flat stones having been previously discovered, one at each side, on which the three flat horizontal stones rested that were first found. These stones were from the granite formation, of which all the adjoining hills are chiefly composed. There appear to have been no more pains bestowed with the chisel than were required to make them fit close together; none of them bore the mark of an inscription; they were nearly of the same thickness, namely, three, four, and five inches. I expected the space under the flat, horizontal stones to prove hollow; but we found the inside filled with the same kind of earth as that above, and almost equally consistent. After removing the inside earth to the depth of three feet and a half, measuring from the top of the kist, we discovered a flat stone covering the bottom of the grave: some small pieces of bone were turned up with the earth, and also pótsherds, but nothing else. I had all the stones that formed the kist removed, but without any further result.

Having now discovered the easiest method of proceeding, another grave was opened on the following day. The first horizontal stones were found at a greater depth, and of larger dimensions; the inside was partly hollow, and the sides of the stones within covered with the cells of the white ant. The empty space inside of the stones only extended to the depth of about two feet and a half; below we found the same kind of earth as in the first. When some progress had been made in removing this earth, and at the depth of three feet and a half from the top of the kist, a complete earthern chatty * was found, and a few inches further down another, which was broken. The chatties were lying on their sides about the middle of the grave, and close to the eastern side. Each chatty contained a number of bones, which had the appearance of having been placed in the chatty a few at a time, and then covered over with earth; the operation being repeated until the chatty was filled. One of these chatties was taken out nearly whole, but was broken afterwards by some accident; the second fell to pieces when touched, as did also the bones it contained. About six inches further down, in the south-west corner of the vault, we found a human skull: it was perfectly whole before it was touched. I had the earth taken away all round it, thinking to get it out whole, but I was not successful. A curious black, stringy-looking substance, not unlike a curl of very long hair, was taken out of the skull. I apprehend this is a vegetable substance, but I am unable to say of what kind. One piece of this substance measured four feet five inches in length: it is quite hollow, and is about one eighth of an inch diameter: it shines, and is of a whitish colour inside.

In the north-west corner of the vault we discovered another skull, and in the same corner, a little deeper down, we found a great quantity of bones; and among them, at different depths, three skulls more of different sizes, none of which could be got out, as the bone crumbled to powder on being touched: the first skull had more consistency.

* Earthen pot.

In the other grave which was opened nearly the same things were found, only that in this last was discovered a goglet, nearly entire (having only a small chip in its mouth): the goglet still partly retains its glazed surface, and is of a beautiful jet-black colour. There were also found small pieces of a vessel apparently copper: the natives immediately called it a ghuntee or bell, and concluded that the person buried here had been a herdsman, or dhungar. The dimensions of the whole grave are laid down in the accompanying plan. (See Plate.)

Twenty-one stones formed the external circle of the second grave opened, and this seems to be the prevailing number. None of the kists could admit a very tall person: even a person six feet high could not be stretched in any I opened.

From the circumstance of there being chatties of different sizes containing bones, it might be inferred that the bodies were in the first instance burned, and the ashes and bones afterwards collected and lodged in the chatties used as urns. This mode of burial would resemble that practised by the inhabitants of Otaheite, as observed by Captain Cooke. I fear, however, it is fruitless to expect any conclusive evidence from the examination of such places, and that the mode of burial, as also the particular rites practised on those occasions by the former inhabitants of this part of the country, must for ever remain unknown to us. The total ignorance of the present race of natives regarding the nature and history of such places, is strong testimony of their antiquity. I have been informed, however, by a Mussulman, that they are the graves of a race of Malays, who came from the Eastern islands, and, settling themselves on the coast about Masulipatam, afterwards spread into the interior of the country. He further told me, that these Malays were Islaamites, and that they came to the coast about the period when the followers of Mahomet were spreading his doctrines among the islanders of the Eastern Archipelago.

The spot chosen for a grave is usually on the side of a slope, and in the vicinity of those hills, where the particular kind of granite used in the construction of the coffin could be easily obtained.

The external shape of the grave is invariably circular: these circles are not, however, all of the same size; the largest I measured was twenty-five feet diameter.

I think it remarkable, that I have seen none of these graves since I last left Hyderabad, and I have been moving about not more than twenty miles to the westward of Oopulgutt.

Hyderabad, 5th June, 1823.

I informed you in my last letter, that I had not observed any Raeshasa graves to the westward of Oopulgutt; I have, however, fallen in with some since; and having opened two, I have much pleasure in communicating to you the result.

Like the graves before described, they were formed of large flat stones, only somewhat differently arranged, and of larger dimensions. They were encircled as usual with a number of large stones having the appearance represented in the sketch I sent to you; but the circle was not generally so perfect as in those I have before noticed.

The first grave I opened was covered with a very large block of granite, which I should suppose, judging from its size, would weigh at least twenty tons. There was therefore no alternative but to dig round it. This large rock, which I am inclined to think was at one time entirely covered with earth, protruded some feet beyond the earth's surface, and rested on large broad stones which formed the ends and sides of the kist. These graves differed also from those I opened first, in having a circle of about two feet diameter cut in one of the end stones, and in having their length in a position nearly east and west, whereas all the others were north and south. In all other respects they were alike. They were both filled with the same compact red earth, which was in these last very moist; but that might be occasioned by their situation being in lower ground, and in the vicinity of a large tank.

I did not count the number of chatties and goglets taken out of each grave, so as to be able to state the quantity exactly; but, both whole and broken, I counted nearly thirty taken out of one vault, and suppose it may have contained altogether between forty and fifty of both kinds, of various shapes and sizes.

I have preserved some as specimens. Many chatties contained a variety of small bones in different stages of decay, and were all filled with earth. I was surprised at the number of skulls in both graves, lying in all positions, and at different depths. I have a skull in my possession almost perfect, and likewise a number of bones and teeth; the latter in a wonderful state of preservation, the enamel being still perfectly good.

I hope I shall be able to forward the whole to the Society at Madras, in as good a state of preservation as they are in at present: *i. e.* if you think them of sufficient interest to merit any notice.

If any doubt has hitherto existed amongst Europeans respecting the origin of such places, (to the natives they are still places of mysterious origin,) it is now, I may venture to say, entirely removed. The manner in which such deposits were made only now remains to be ascertained, and on this head I fear much uncertainty must still prevail.

I mentioned to you before, that I thought the bodies were in the first instance burned, and the bones and ashes collected afterwards and lodged in these vaults. This opinion is certainly strengthened by the appearance of some of the bones which indicates that they have been burned, but again there are other bones which do not present this appearance.

The skull Dr. Voysey supposes to be that of a female Hindoo: it indicates nothing to induce a suspicion of its being the skull of a Malay.

It is certain that these places of sepulture are more rarely met with, the greater the distance from the coast; but on this particular I shall be able to speak more decidedly when I shall have seen more of the country.

NOTE.

Dr. Edward Daniel Clarke, in his account of the terra-cotta vases at Argos, after offering some conjectures on the probable cause of depositing earthen vessels in sepulchres, observes, "Another curious subject of inquiry suggested by the sight of them is, whence the custom originated? for it is undoubtedly of much earlier date than any thing purely Grecian. It is impossible to discuss this question here; but it may briefly be stated, that in most ancient sepulchres of the *Celts*, in all parts of Europe, earthen vessels are also found, of the simplest form and rudest workmanship, apparently possessing a degree of antiquity far beyond the age denoted by any of the Grecian terra-cottas." And, at the close of his remarks, he says, "A full account of those monuments ought to constitute an independent work; and, whenever the subject is properly treated, the observations it is calculated to introduce will illustrate a part of history hitherto entirely unknown." — Clarke's Travels, vol. iii. p. 667.

The third volume of the Transactions of the Literary Society of Bombay gives an interesting description, with plates, by J. Babington, Esq. of the Pandoo Coolies in Malabar, and of the contents of those sepulchres.

No. III.

NOTICE OF THE GEOLOGICAL FEATURES OF A ROUTE FROM MADRAS TO BELLARY,

IN APRIL AND MAY, 1822.

By Captain W. Cullen, of the H. C. Artillery. [With a Sketch.]

I beg to submit to the Society an attempt to describe the geological features of a route which I lately passed over from Madras to Bellary. It accompanies a small collection of specimens of the prevalent rocks, and a barometrical section, which combined will, I hope, assist in affording some idea of the nature of the tracts in question.

The high road to Bellary was followed as far as Cuddapah; but from thence going north, by Chinnoor Nundialpett Poonnamila to Iddamacul, my route, from the last-mentioned village, lay nearly west by Giddeloor, over the Nulla Mulla range of hills by the Nundi Kunnuwi Ghaut*, by Banaganapilly, Piaplee, and Gootty, to Bellary. A great proportion of this route must, in favourable weather, be as beautiful, in point of scenery, as it is rich in geological interest; but at the period of my passing (the latter end of April and beginning of May), the excessive heat had checked all vegetation, and afforded but little inducement for excursions in quest of mineralogical specimens.

Referring the route to Arrowsmith's large map, which is sufficiently correct for the present purpose, it will be observed to offer an obvious

* Kunnuwi is Kanarese for Ghat. Nundikunnuwi means, therefore, Nundi Ghat.

distribution into five portions, each of them characterised by distinct geographical features.

First, The plain open tract from Madras to Naggery.

Second, The narrow mountainous belt extending from Naggery to the neighbourhood of Cummum.

Third, The open level country from the Nulla Mulla hills to Banaganapilly.

Fourth, The tract of tabular land between that town and Gooty.

Fifth, The level country from thence to Bellary.

The geological characters of this tract are equally remarkable, and admit of a division corresponding perfectly with its geographical features.

In the first division, the prevailing rocks are granite.

In the second, clay-slate and sandstone.

In the third, compact blue limestone.

In the fourth, clay-slate and sandstone.

In the fifth, granitic.

I have ventured to characterise each division by one or two rocks only, because in each of them the rocks specified were, in general, beyond all comparison the most abundant. In the several divisions, of course, were found many of those minerals by which the principal rocks are usually accompanied; but to enumerate the whole of these as they occurred may not be deemed necessary, since the specimens themselves are forwarded.

Before entering into a detail of the rocks prevailing in these tracts, it may be proper to notice, in a general way, their absolute heights above the sea.

The north-west side of Pootoor, at the distance of sixty-four miles from Madras, exclusive of windings, stands about 500 feet above the sea; exhibiting a rise of eight feet in the mile, and this proportion holds good throughout that part of the route, interrupted only by one undulation on the east side of Naggery, and by a second between Naggery and Pootoor.

These undulations, which rise 100 or 150 feet above the general

level, mark the course of chains of hills, which in such places cross the road; and, in general, in all these sections of the terrepleine of a country, similar abrupt elevations may be considered as indications of the presence and course of a chain of hills. There is a third rise a little beyond Pootoor, indicating, like the former, the presence of a mountainous range.

The valley of Tripetty is, on a mean, about 360 feet above the sea, but the river which runs through its centre little above 300. The mean height of the valley from Baulpilly to Wuntimettah, an interval of about 52 miles, is about 550 feet, and the town of Cuddapah itself a little below 500.

Chinnoor, on the Pennar river, five or six miles north of Cuddapah, is about 30 feet lower than that place; but the height of Jungumpilly, the next march, is 700 feet. There is then a fall of about 100 feet to the Saghilair river; after which it rises gradually to Alinuggar and Iddamacul, both of which places are on the same level, about 900 feet above the sea.

I was much disappointed in the height of the Nulla Mulla range, which, at the point where I crossed, did not attain an elevation of 1800 feet above the sea, and of little more, therefore, than 800 feet above the plains on either side.

The route across the plain, between the Nulla Mulla range and the table land at Banaganapilly, is nearly level, and about 800 feet above the sea; but the general declination of this plain appears to be from the Kistnah to the Pennar.

From Banaganapilly to Jeldroogum the ascent along the valley is pretty considerable, being 400 feet in about twenty miles, or 20 feet per mile.

The table land, commencing two or three miles west of Jeldroogum, and extending to Piaplee, a distance of eight or ten miles, is between 1700 and 1800 feet above the sea*; and Colonel Lambton has already

* But there is a very rapid descent from Piaplee towards Gootty, of 400 or 500 feet in the first ten miles. The plains west of Gootty are about 1200 feet above the sea.

stated that to be the mean height of the country between Gootty and Bellary. *

Although granitic have been mentioned as the prevailing rocks in the first division, none of them were seen *in situ* till about the thirty-seventh mile, in the bed of the river at the village of Nellatoor. The whole of the previous flat being a loose sandy soil, entirely free from rocky masses, or even almost so of fragments, with the exception of some stony swells to the north of Cunkama Choultry. I should observe, however, that all the pagodas, facings of tanks, &c., were built either of granite or laterite.

The blocks forming these latter have a rolled appearance, are a kind of coarse sandstone conglomerate or breccia, and perhaps originate from, or are connected with, the mountain-chain running north from Naggery Nose. The granite, which first makes its appearance at Nellatoor, may be traced as far as Curcumbaddy, with no other interruption save that of those singular beds or courses of trap which are apparently so common in all the granitic tracts of this country. All these beds appear to run nearly east and west. In the present instance they were remarkably numerous, forming chains of low hills, and crossing the route so frequently, as to occupy a space which, taken in the aggregate, would nearly equal that of the granite itself. Granite, however, evidently composes the great mass of hills, which commence a few miles to the south-west of Naggery, and which continuing near to the left of the road as far as Woramallipett, then stretch off to the west, till they are lost in the prolongation of the Tripetty range. The peculiar features of the granite are very marked and conspicuous in the whole of this western mass of hills, exhibiting itself on their slope, in those great bare masses of rock, which are so familiar to most people in this country, and on their summits in enormous detached rugged piles and fragments. But what contributes most powerfully to the

* This seems rather under the truth: — barometrical observations, which I have since had an opportunity of making, give from 1400 to 1500 feet for the mean altitude of the country between Gootty and the Hoggree river, eight miles east of Bellary.

interest of this part of the route are these singular courses or dykes of trap rocks, which may be observed crossing the country, without experiencing the smallest deviation or interruption in their course from the granitic barriers, which seem to oppose themselves on all hands to their progress.

Their deep black hue, and sharp, well-defined outline, contrasted with the light colour of the granite masses, through and over which they seem to pass, forcibly arrest the attention. Granite appears also to a considerable distance on the right or north-east side of the road, and probably constitutes the greater portion of the very remarkable hill called Naggery Nose, as I have traced it nearly to the foot of that hill. The hill just mentioned, however, as well as those immediately to the north of it, and whose outlines are equally singular, are evidently capped with rock of a different nature.

The caps, which occupy about one fifth or one sixth of the whole height of the hills, are precipitous and mural on their south and east sides, to the north sloping gradually off, until they fall almost into the same level with the plains. I attempted, both from Potoor and Woramullipett, to reach these hills, with the view of ascertaining their composition, but the distance was too great, and I could only approach their bases.

Judging from the external appearance of the cap, it is composed of two distinct rocks arranged in horizontal beds or strata. The upper and lower portion of it appeared to be of the same nature, being alike in colour, and marked by similar numerous, but irregular vertical seams and fissures; the effect, probably, of decomposition. The aspect of the central stratum or bed, was, however, different from either of those between which it lay. It was marked most distinctly throughout its whole extent, by regularly parallel and horizontal seams, which appeared to be those of stratification; its colour also, which was darker than the others, strengthening the supposition of its being a rock of a different nature. *

* I have since had an opportunity of examining the hills at Tripetty, where both the cap and slope of the hills appeared to consist of but one rock, and that sandstone. From

The western approach to these hills, for one mile and a half or two miles from their bases, was thickly strewed with nodules of several varieties of sandstone, the most common of which were of rather a close fine grain, sometimes so much so as hardly to be distinguished from quartz or hornstone. The finer-grained varieties were different shades of red or brown, but generally of a light colour. There was also great abundance of a very coarse variety, composed of rounded pebbles and fragments of quartz of all sizes, in the same specimen, from that of a pin's head to two or three inches in diameter, imbedded in a dark green basis. This variety was very remarkable. It was composed of rolled fragments and pebbles of quartz, which were generally of a white colour in a ground of dark green. The cement appears (on the march from Naggery to Potoor there were rolled masses of this variety twelve to eighteen inches diameter) to be hornblende, which communicating its tinge to the finer and transparent particles of quartz, affords a beautiful contrast to the large white pebbles imbedded in it. These nodules I should be disposed to trace from one or both of the two first-noticed portions of the cap, but I met with no fragments of any kind of schist, owing perhaps to my not having approached sufficiently near. It has been noticed, that the summits of this group of mountains, of which Naggery Nose forms the southernmost point, are mural and precipitous to the east and south, while to the north they fall gradually away, till they nearly coincide with the general level of the country. This latter appearance is very striking from Curcumbaddy, where the whole of that group is seen in reverse; Curcumbaddy itself being situated at the foot of one of these declivities, being a prolongation of the Tripetty range, which, from its outline and general aspect, I would infer to be of similar structure with that of Naggery.

---

this, and other corroborative instances on the route between Cuddapah and Ryachootee, I have little doubt that the caps of the Naggery range, of the great mass of hills east of that line, and, in short, of all the ranges exhibiting the same remarkable outlines, consist of varieties of sandstone or conglomerates.

The clay-slate, which occupies so great a portion of the subsequent route, first makes its appearance at Curcumbaddy; but the accumulation of sand and alluvial soil in the Tripetty valley, which is crossed on leaving Woramallipett, prevented my thus far tracing the continuity of the granite, although it is to be observed, with occasional beds of green stone, in several parts of the road. The last rock I recollect to have passed before reaching Curcumbaddy was a bed of porphyritic green-stone, about one mile and a half or two miles from the village. The granites of this division were generally of a light colour, shades of white and of a coarse texture; the darker varieties, however, inclining to brown or red, being, I think, the finer grained.

The quartz and felspar were by far the most abundant constituents, and gave the colour to the rock; the hornblende, which was of a dark green, being very irregularly and sparingly distributed. There seemed to be little or no mica.

The texture of the trap was very uniform, and of a fine grain, composed distinctly of hornblende and greenish white felspar.

The porphyritic variety, alluded to near Curcumbaddy, contained irregular crystals of felspar, of from one tenth to five tenths of an inch diameter, of the same colour as the felspar of the basis.

The transition of clay-slate is very sudden and complete. The low hills immediately at the back of Curcumbaddy consist of a compact quartzose, sandstone, or hornstone, but the clay-slate may be observed in contact with it, within 100 yards of the north side of the village. From this spot clay-slate forms the grand and almost sole constituent; for with the exception of occasional beds of calcareous schistus and flinty slate in the valleys and sandstone caps on some of the hills, the great mass of the two singular mountain-chains which form the boundary of this interesting valley, on a line of upwards of 150 miles, appears to consist entirely of that rock. I must add, however, that should an actual personal examination of the strata be considered indispensable in subjects of this nature, these observations must of course,

in such a case, be considered as only strictly applicable to the high road itself, or to a short distance on either hand.

The seams of stratification are, however, so entirely regular and distinct on the slope of the hills on either side, and in general so decidedly characteristic of these clay-slate tracts, that it is hardly possible to be mistaken in their nature, even at a distance of several miles. Towards the commencement, the hills are rather thickly clothed with wood; but on approaching Cuddapah, and all to the north of that place, the trees are stunted, and but thinly scattered over their sides, leaving the strata seams, like so many artificial terraces or ploughed furrows, distinctly exposed to view. The internal structure and colour of the slate, in a tract of such extent, were of course very various. At Curcumbaddy, and for a stage or two afterwards, chiefly shades of red; about Wuntimettah, purple and grey. Shades of these two last prevailed, I think, generally, till within eight miles south of Poonnamilla, when it suddenly altered to green; and this colour subsequently seemed to be constant in all the plains and low grounds. The general direction of the strata of clay-slate corresponded with that of the ranges of mountains which they composed, viz. about north-north-west and south-south-east, with a very great dip to the north-east; all the associated rocks being conformable, unless the *sandstone* caps should be an exception, which appeared to have a very slight dip, if the appearances noticed from Curcumbaddy and Nundialpett, may be considered as indications of it. However, of the latter I had few favourable opportunities for examination.

The strata of clay-slate appeared sometimes to be nearly vertical; but the exact dip was never measured.

The same dip and direction of the strata were exhibited in the fourth division of clay-slate.

Of the rocks associated with clay-slate the more important and general were sandstone, hornstone, calcareous schistus, flinty slate, and quartz. Calc tufa, and marls of infinite variety of colour and indur-

ation were also found nearly throughout, and in some places in extraordinary quantity.

The sandstone was usually found on the summits of the hills; the calcareous schist and flinty slate in the valleys; the quartz forming veins and layers in the seams of the clay-slate, and appearing therefore only where the latter was not concealed by alluvial depositions.

These were sometimes found all together, but it may be more convenient to consider each of them separately.

The quartz was generally of a white colour, and the layers of all degrees of thickness, from one tenth of an inch to one foot and a half. It was extremely subject to disintegration, covering the ground frequently in such quantity with its nodules, as completely to whiten it. These appearances were particularly remarkable on the march from Curcumbaddy to Baulpilly, from the vicinity of the hills on both flanks. Afterwards the valley opens, and the strata are generally concealed by the soil; but whenever rocks appear to any extent, quartz, either in veins or layers, will almost invariably be found pervading them. It is very abundant in the clay slate between Nundaloor and Wuntimettah, and here rather remarkable from containing numerous little nests of a kind of green earth: until, however, fifty miles north of Cuddapah, and clearing the hills beyond Jungumpilly, the individual masses of quartz are too inconsiderable in themselves, to serve in any other way than merely as a characteristic of the clay-slate, and other more important rocks.

The march from Jungumpilly to Poornamila, with the exception of the first five or six miles, is through an open level country, of perhaps fifteen miles square, as if it had been formed by the abstraction of a part of the central chain of hills which divide the southern and northern portions of this tract into two narrow valleys. The Saghilair river is crossed nearly in the centre of this open space; and it is immediately on reaching its northern bank that the quartz is observed to assume quite a new character, to constitute, as appears subsequently, one of the most important features in the remainder of the route.

A green schistus seems to prevail throughout this plain, and it continues as far north as Iddamacul, as may be observed from an examination of the wells; latterly also appearing above the surface in ridges of considerable elevation.

The strata of schistus in the bed of the Saghilair, which are nearly vertical, and of a bright green colour, present a very interesting appearance.

The direction of the strata at the ford corresponds with that of the bed of the river; and the stream, which appears subject to a very rapid rise and fall, has in consequence worn numerous deep narrow channels through the slate, presenting on all sides sharp perpendicular dikes of fifteen or twenty feet high, while they are often but a few inches in thickness. Almost immediately on reaching the north bank of the Saghilair, the quartz, which hitherto had never been met with but in the seams of the slate, and there seldom exceeding a breadth of eighteen inches, is now observed alone in immense blocks, and continuous masses, of fifty or sixty feet wide. Their direction corresponded, I think, generally with that of the strata of schistus, but they appeared above the soil unaccompanied by any other rock, and forming ridges of such magnitude and extent, as to give them the appearance of the summits of quartz hills, commencing to be denuded of soil, and forcibly impressing one with the idea of being in the vicinity of granite: nor was the impression, perhaps, altogether without foundation, as the small fort of Iddamacul, twenty miles further north, is built on an insulated hill of syenite.

The quartz ridges became gradually more numerous and extensive on my progress up the valley; but I lost them after leaving Iddamacul, and striking off to the westward by Giddeloor towards the Nulla Mulla range. Nothing could possibly be more interesting or striking than this small pile of sienitic masses, which, possessing all the peculiar rugged outline of a granitic hill, afforded the most singular contrast to the smooth, bare, undulated contour of the clay-slate ranges, on either side of the valley. The valley was here seven or eight miles

wide, and this hill rose out alone, as if forced up from below by volcanic agency, from the dead marshy flat in the centre of it. Its base might be 150 yards in diameter, and its perpendicular height about 100 feet. This sienite is composed of large crystals of black hornblende, and yellowish white felspar, very irregularly aggregated, with but little quartz, and that only in patches, and very unequally dispersed.

The sandstone which has been mentioned was usually found occupying the summits of the hills of clay-slate, and the opportunities, therefore, of actual examination were but rare. These opportunities occurred also at points very distant from each other, (but, perhaps, not the less corroborative from that circumstance, of the inference that the whole of these ranges are capped with varieties of sandstone,) viz. at *Curcumbaddy*, in the ghaut close to *Baulpilly*, in the passage through the range to *Cuddapah*, in the passage of the *Nulla Mulla* range, and lastly, in the fourth division, where, from the small elevation of the hills, these caps may be traced without the slightest interruption for upwards of five and twenty miles. The characters of the sandstone vary from that of a coarse conglomerate, such as that noticed on the route between Naggery and Pootoor, to that of the finest grain where it is difficult to distinguish it from quartz or hornstone, into both of which it seemed occasionally to pass. The colours were as various as the texture, being of all shades of red*, white, and green ; some of the varieties met with on crossing the hills to Cuddapah were rather handsome.

The sandstone forming the cap of the Nulla Mulla hills, where I crossed them between Kistnumchettypitty and Madapurum, was of great thickness, about 300 feet perpendicular, and its acclivity on both sides, the route lying directly over it, extremely steep and difficult. A great deal of rock, much of the same nature as the cap, and interstratified with the clay-slate, prevailed, however, for a space of three or

* The red varieties were most common, I think, west from Banaganapilly.

four miles, on both sides of this central ridge, but the clay-slate still continuing by far the most abundant, and in deep wells immediately at the foot of the cap on the east and west sides, exhibiting that rock alone to the very bottom. The above noticed were the chief occasions on which the sandstone was observed in extended masses; but nodules of that rock, as well as considerable apparently unconnected masses, were met with in several instances in the valleys, more particularly at the village of Chillumpett, between Codoor and Pollempettah, in the first part of the march from Nundaloor to Wuntimettah, between Poornamila and Alinaggur, in the ditch at Iddamaeul, &c.

There are two instances of the occurrence of rather a remarkable variety of quartzose rock in the course of the preceding route, which have not been yet noticed, because it differed very sensibly from any of the others, both in its colour and composition, and appeared likewise to be altogether independent of them. The first occurred on the west side of the pass between Baukrapett and Cuddapah, occupying about one mile of the route, and appearing to constitute the hills on both sides. The lower end of the line of hills, crossed three or four miles before reaching Nundialpett, were composed of rock precisely similar, and were, I imagine, merely a continuation of those forming the pass. I do not recollect any appearances of stratification in either case, although the course of the range was conformable to the general direction. Perhaps this rock rested on clay-slate, and may be considered as merely one of those transitions, formerly alluded to, from sandstone to quartz.* All the hills on the right of the road from Chinoor towards Aundialpett exhibited parallel lines on their slope, similar to those of clay-slate formerly adverted to.

The second variety occurred four or five miles north of Poornamila,

* I have since visited the inner range of hills near Cuddapah, running north-west from the pass. They consist of sandstone; towards their base rather coarse grained and dark coloured, but on the summit extremely compact and of a light colour, and giving the hills much of the appearance of quartz. This upper portion is very like the variety alluded to near Nundialpett, but wanted the rusty specks.

distinctly interstratified with clay-slate. Immediately on leaving that village, a low but very extensive and sharp ridge is observed to issue from the eastern boundary of the Poornamila plains, and crossing the road obliquely, to enter the clay-slate range forming the western boundary of the valley, which extends by Alinuggur towards Cummum.

This low range is very conspicuous, being at least six or eight miles in length, and running directly across the north-east portion of the plain. The high road lies immediately over it, near its western extremity. The rocks, in this instance, were distinctly stratified, and formed the crest on the centre of the ridge, bounded on both sides by clay-slate of a brownish grey colour and silky lustre.

I do not observe that I have any specimens of the quartz rock forming the west side of the pass to Cuddapah, but externally it resembles the specimens from Nundialpett. This latter was internally of a dark bluish grey colour, with rather a granular appearance, and having small earthy specks of a rusty brown, sparingly dispersed through it. The second variety in the ridge north of Poornamila appeared to be composed of similar ingredients, but the earthy specks in much greater quantity, and giving a decided colour to the rock. It contains also a few distinct crystals of a black or deep red colour, which appear to be garnets, and which may explain the nature of the rusty specks.

No limestone of any consequence was observed before reaching Wuntimettah, although calcareous depositions are to be met with; such as a white tufa in wells between Codoor and Pollumpettah, occasional traces of marl, and a singular reddish coloured limestone, or marl conglomerate, near Rajampett, between Pollumpettah and Nundaloor.

From the similarity of colour in the clay-slate, flinty-slate, and calcareous schistus, it is not improbable, however, that I may have occasionally been mistaken in my judgment as to their nature in the early part of my march, and even when better acquainted with them; for their resemblance is sometimes so strong as to render recourse to a

test absolutely necessary; an operation which would have occupied too much time to be constantly put in practice while actually on route.

An old pagoda at Wuntimettah is built of a dark blue limestone, of a fine and close texture, taking a good polish, and altogether a handsome, though rather a brittle building material. Some of the blocks were varied with shades of grey or white. Stratified masses of this limestone cross the road in great abundance for the first five miles, as far as the village of Baukrapett, from whence commences a considerable ascent, leading through the clay-slate range which forms the eastern boundary to the low and extensive flat country of the district of Cuddapah.

The deep covering of soil on the plains on the west side of this range concealed all traces of rocks; but the same dark blue limestone appeared to be the universal building material at Cuddapah, and must doubtless have been procured close at hand, although I did not myself meet with any quarries in the immediate vicinity. Varieties of this limestone were, however, common during all the rest of my progress to the north; although latterly, that is to say, after passing Poornamila, it altered considerably in its colour as well as in its texture, becoming more granular and crystalline, as well as of a light grey colour.*

Calc tufa, marls, and conglomerates were in great abundance from the first appearance of the regularly stratified limestone, in distinct depositions of considerable extent, as well as filling the seams of the clay-slate, particularly in the green variety near and subsequent to Poornamila. The red coloured, porphyritic-like limestone, which I have mentioned as occurring first near Rajampett, was met with frequently afterwards in the defile between Nundaloor and Wuntimettah, on entering the plains of the Saghilair, between Poornamila and Alinuggur, &c., and always in horizontal masses of very considerable extent, and from one and a half to two or three feet thick. Schist was generally

found immediately below, and its seams filled with depositions of the same nature.

This conglomerate is composed principally of spherical nodules of a kind of calc spar of a dull reddish colour, from one tenth to five or six tenths of an inch diameter, in an earthy basis of a light brown; small angular particles of quartz are also sparingly dispersed through it. This conglomerate is extremely hard, but not always compact, having frequently numerous vesicular cavities.

At Cuddapah I first noticed a very singular variety of calc tufa in nodules, or blocks, of from six to eighteen inches diameter, extremely hard, and of a dirty white or grey colour, as if from an intermixture of clay. They were very vesicular internally, and externally covered with hard, knotty, irregular-shaped protuberances, which were of a size proportionate with that of their respective nuclei. They were used, loosely piled together, to form inclosures.

This variety of calc tufa was met with frequently afterwards, and in great abundance; but I never had a good opportunity of examining it *in situ*.

In the banks of a nulla between Cuddapah and Chinnoor, as also in the bank of the Pennar at the latter village, I had a transient view of it in the mass; and it there appeared to form a horizontal stratum of two or three feet in thickness, a few feet below the surface.

Flinty slate and hornstone still remain for notice. I have mentioned the appearance of the latter at Curcumbaddy, in contact with the clay-slate; and the only recurrence of it that I recollect, possessing decidedly the character of that rock, was at the village of Yenapilla, three or four miles south-east of Nundaloor, where it appeared in large globular blocks, very much intersected by veins of quartz, over a space of four or five square miles. The flinty slate was much more abundant, being found interstratified with the clay-slate almost every march from Curcumbaddy to Wuntimettah.

The colour and texture of the hornstone were generally very uniform in each situation; but the flinty slate was frequently very much veined

with different shades of grey or blue. The strata were sometimes, however, perfectly uniform in their colour, being occasionally of a dark blue, at other times of a light grey, and externally strongly resembling the dark blue limestone of the district of Cuddapah.

These were the principal rocks that occurred in the clay-slate of the second division.

Besides varieties of all the rocks hitherto enumerated, several others will be found amongst the specimens forwarded, which the limits proposed for this paper will not admit of describing at present.

The third division, or compact blue limestone, will easily be disposed of, as it occupies the whole of the flat country, extending from the Nulla Mulla range to Banaganapilly, to the exclusion of every other rock. Its texture within this tract was tolerably uniform, but it exhibited a considerable variety of colour; near the Nulla Mulla hills it was generally of a dull lead grey, and this variety, on fracture, presented a foliated appearance; about Jellila, and particularly in the bed of the nulla at Tungtoor, where it was quarried for building, the limestone was of a dull brick red, and frequently also variegated with stripes and shades of a light grey or white.

In approaching Banaganapilly, and all about that town, the limestone was in great abundance, and its colour blue of different shades, but chiefly dark. The deposition of soil on these plains afforded only a few opportunities of examining the limestone; but, where visible, the strata seemed to be *nearly horizontal*. These varieties, especially the last, were very compact and fine grained, and with rather a conchoidal fracture. The fine village of Banaganapilly, and the celebrated diamond deposit, is situated near the base of a low range of tabular land, running about north and south, and forming the western boundary of the great limestone field just described. The range is here abrupt and precipitous, and very irregular and broken in its outline, running out into headlands, as well as having deep narrow valleys penetrating far within it to the westward.

Banaganapilly lies under the point of one of these promontories,

which projects five or six miles from the main range. These hilly tracts form the fourth division, or second of clay slate, but, perhaps, do not terminate that of the limestone; for, although the depth of alluvium in this narrow valley is so great as to conceal all rocky strata, yet, from the numerous nodules of limestone on the surface, and the amazing depth and extent of the depositions of calcareous tufa, and the reappearance of strata of limestone some miles east of Jeldroogum, which then continue, with little interruption, even on to the table land three or four miles west of that village, it is not improbable that a connection subsists throughout. With exception of the cap, which is of sandstone, and which has already been adverted to, the whole mass of land forming the right hand boundary of the valley commencing near Banaganapilly, and extending to Jeldroogum, appears to consist of clay slate nearly to the summit. There appeared to be table land also to the left, or south, and which, I imagine, also to be covered with sandstone (the Banaganapilly promontory I ascertained to be so, by ascending three or four miles to the west); but the immediate boundary of the valley on this side, although, like the former, composed of clay slate, instead of a sandstone cap, was crested in its whole length with a sharp black ridge of trap rock, formed of loose blocks piled upon each other.

The apparent base of the trap observed a pretty uniform level; nor was the ridge of much depth, the peaks, merely by rising somewhat higher occasionally, giving the bed an appearance of greater dimension. Its extreme narrowness, deep black colour, and the total absence of all traces of vegetation, formed a singular contrast to the rest of the hills, which were covered with long dry grass, and scattered jungle bushes. The connection of this singular bed of trap with the rocks at its two extremities, would probably offer a most instructive subject of investigation.

At the end, near Banaganapilly, it first offers itself to notice in a small, steep, conical hill, composed solely of green stone. I had previously, however, immediately almost on leaving Banaganapilly,

observed several partial appearances of lines of black rock, jutting out a few feet above the soil, in the plain on the north side of and near the base of the Banaganapilly promontory. These, I have now little doubt, were a continuation of the green stone bed. But it is at the western extremity at the head of the valley, close to Jeldroogum, where the hills close in on all sides, and where the route is crossed by the bed of trap, and all the rocks with which it is associated, that the attention is most forcibly excited. About one-half or one-third of a mile west of Jeldroogum the route lies over a ghaut, or ridge, of 300 or 350 feet perpendicular height, and, descending nearly as much on the opposite side, continues up a pretty level narrow valley for a mile or two, and then finally leads up another ghaut, of about the same height, on to a continuous table land, extending to Piaplee.

Blocks of limestone, of a light blue or grey colour, are common in the interval between Jeldroogum and the ghaut; but the low hills, forming the foot of the ghaut, were covered with large dark masses of rock, which I had imagined to be trap, but which, on examination, also proved to be limestone of a very dark blue. Limestones of other colours were also found intermixed, such as green, grey, &c.; the former on fracture, at a little distance, resembling a good deal a fine-grained green stone; but the whole of these were covered with a dark crust of clay slate, so that, unless close to them, it was not easy to distinguish the line of separation between the limestone and trap, which was the next in the order of succession, and at only a short distance from the foot.

The trap was again succeeded by limestone, and the latter by clay-slate, nearly to the summit, which was capped with rock of a beautiful flesh colour, with specks and shades of a delicate green, as if connected with its vicinity to the trap, and of so close and fine a texture as to appear homogeneous even through a lens. It exhibited a conchoidal fracture. The descent of the ghaut on the opposite side consisted of clay-slate nearly to the foot, when the limestone reappeared, and these two rocks then continued to alternate with each other to the foot of the

second ghaut, which, like all the former, was composed of clay-slate, capped with quartzose sandstone. Limestone, of a yellowish white colour, was found in considerable quantity near the top of the ghaut. This high land appears to extend far to the north and south, and uninterrupted by hills; but on the west side, at the distance of three or four miles, was bounded by a chain of hills, running also nearly north and south, and marking the termination of the second tract of clay slate. This line of hills appeared to be composed of clay slate and the quartz sandstone, but neither of them exhibiting, at a distance, those distinct stratified appearances hitherto so common. The route lies over a low part of the chain, and almost immediately afterwards all traces of clay slate disappear. The last rock, connected apparently with that formation, was a sandstone conglomerate, precisely similar to those singular nodules picked up between Naggery and Pootoor, and which here constituted two or three entire hills. Close to the road, a small open space of level ground, not more than three hundred yards wide, separated them from another small group of hills composed wholly of granite.

From this point commences the fifth, or granite division, the rocks prevailing, I believe, over the whole remaining interval to Bellary. I can, however, only speak with perfect certainty of the first fifteen or twenty miles, and of the last eight, having passed over the remaining part at night. The trap dikes, holding their usual course, were very common during the first mentioned portion of granite.

Regarding the economical purposes to which the several rocks met with in the course of the foregoing route might be applied, I believe I shall best consult the pleasure of the Society in simply referring to the specimens which have been forwarded. These, although individually extremely small, may enable persons better acquainted with the subject than myself, to form a judgment of the probable degree of their utility. The principal rocks, granite, trap, sandstone, schistus, and limestone, were, it will have been observed, in great abundance, and in considerable variety, even on the high road; but a little inquiry would

probably discover numerous other varieties, more useful, as well as more ornamental. The limestone particularly, of which there would appear to be a great variety, in colour as well as texture, from its facilities of working, would seem to merit some attention. I have seen some very handsome tablets of black or dark blue limestone from Kurnool. It has already been noticed, that the whole of the plain between the meridians of Kurnool and Cummum, and from the Kistnah to the Pennar, is composed of that rock. Some of the limestones, or marbles, may prove to possess that peculiar combination of clay, silica, and carbonate of lime, which is found to afford those valuable cements, having the property of setting under water. Major De Haviland, of the Engineers, had, I believe, already directed his attention to the discovery of such varieties.

From my imperfect acquaintance with the subject, I am aware, that in the above summary of the situations of the rocks over so great a space, I must necessarily have omitted noticing many circumstances which it would have been of consequence to record; but daily marches of from fifteen to twenty miles in the hottest season of the year, may of themselves be deemed an apology for those as well as other inaccuracies that may, perhaps, hereafter be discovered. I have, however, endeavoured to be faithful in my narrative of facts; and as such, in the present limited state of published information on these subjects in this country, they will, I trust, be received with indulgence.

W. CULLEN, Captain of Artillery.

Bellary, *May* 1823.

The altitudes, in the section which accompanies this paper, are deduced from barometrical observations, regularly made throughout the march. Observations of the maximum and minimum heights of the column of mercury were taken daily at each stage, and the mean of these was generally used in the calculations. Corresponding observations were obligingly furnished to me by Mr. Goldingham from the

observatory; from a comparison with which, and with another series of observations made by Major Beckett at Bellary, the altitudes of the several stations have been determined.

In former instances, most of the approximate altitudes which I have had opportunities of ascertaining in different parts of the peninsula. have been deduced solely from my own observations, a mode originating in some degree in necessity, and subsequently adhered to, partly from the same cause, but partly also from choice, from a desire to ascertain how far such approximations might be depended upon.

Few or no barometrical observations were at that period regularly made at any of the inland stations under this Presidency; and the stations where such records were kept were so remote from each other, as well as from my routes, as to occasion frequently very great differences in the altitudes derived from them.

I proposed accompanying this paper with a copy of my own barometrical observations, as well as of the corresponding ones at Madras and Bellary, with the several altitudes deduced from them; but I have not been able to accomplish my intention.

Colonel Lambton's base line near Gooty is nearly 1200 feet above the sea, and he assumed this as the mean altitude of the interval between that station and Bellary; an inference to which he was, perhaps, led by the plain, open appearance of the intermediate country. The barometer, however, stood on the 2d June at

Guddicul,	28600 m.	99°		Goontacul, 28528 m.	91°
	29920	92½		29910	87

making Guddicul 1420 Feet, Goontacul 1479 Feet } nearly above the sea.

W. CULLEN.

MADRAS, *July* 1823.

probably discover numerous other varieties, more useful, as well as more ornamental. The limestone particularly, of which there would appear to be a great variety, in colour as well as texture, from its facilities of working, would seem to merit some attention. I have seen some very handsome tablets of black or dark blue limestone from Kurnool. It has already been noticed, that the whole of the plain between the meridians of Kurnool and Cummum, and from the Kistnah to the Pennar, is composed of that rock. Some of the limestones, or marbles, may prove to possess that peculiar combination of clay, silica, and carbonate of lime, which is found to afford those valuable cements, having the property of setting under water. Major De Haviland, of the Engineers, had, I believe, already directed his attention to the discovery of such varieties.

From my imperfect acquaintance with the subject, I am aware, that in the above summary of the situations of the rocks over so great a space, I must necessarily have omitted noticing many circumstances which it would have been of consequence to record; but daily marches of from fifteen to twenty miles in the hottest season of the year, may of themselves be deemed an apology for those as well as other inaccuracies that may, perhaps, hereafter be discovered. I have, however, endeavoured to be faithful in my narrative of facts; and as such, in the present limited state of published information on these subjects in this country, they will, I trust, be received with indulgence.

W. CULLEN, Captain of Artillery.

BELLARY, *May* 1823.

The altitudes, in the section which accompanies this paper, are deduced from barometrical observations, regularly made throughout the march. Observations of the maximum and minimum heights of the column of mercury were taken daily at each stage, and the mean of these was generally used in the calculations. Corresponding observations were obligingly furnished to me by Mr. Goldingham from the

observatory; from a comparison with which, and with another series of observations made by Major Beckett at Bellary, the altitudes of the several stations have been determined.

In former instances, most of the approximate altitudes which I have had opportunities of ascertaining in different parts of the peninsula, have been deduced solely from my own observations, a mode originating in some degree in necessity, and subsequently adhered to, partly from the same cause, but partly also from choice, from a desire to ascertain how far such approximations might be depended upon.

Few or no barometrical observations were at that period regularly made at any of the inland stations under this Presidency; and the stations where such records were kept were so remote from each other, as well as from my routes, as to occasion frequently very great differences in the altitudes derived from them.

I proposed accompanying this paper with a copy of my own barometrical observations, as well as of the corresponding ones at Madras and Bellary, with the several altitudes deduced from them; but I have not been able to accomplish my intention.

Colonel Lambton's base line near Gooty is nearly 1200 feet above the sea, and he assumed this as the mean altitude of the interval between that station and Bellary; an inference to which he was, perhaps, led by the plain, open appearance of the intermediate country. The barometer, however, stood on the 2d June at

Guddicul,	28600 m.	99°	Goontacul,	28528 m.	91°
	29920	92½		29910	87

	Feet	
making Guddicul	1420	nearly above the sea.
Goontacul	1479	

W. CULLEN.

MADRAS, *July* 1823.

No. IV.

ON THE ALPHABETICAL NOTATION OF THE HINDUS.

It has been remarked, in the introduction to a translation of the *Līlāvatī*, a Treatise on *Hindu* Arithmetic and Geometry, by *Bhāscara Achāryah*, "that if the decimal notation did not originate in India, it must at least have existed there from time immemorial, for no traces whatever are to be found of an alphabetical notation."

The fact of the *Hindus* having been the inventors of the decimal system of notation has always been too firmly supported, and is still too generally believed, to allow of its truth being at all affected by the fallacy of the argument, *that no traces whatever of an alphabetical notation are now to be found*, being proved; and it may farther be remarked, that the word *Hindasi*, which the translator of the above work calls the decimal scale of arithmetic, is not only not to be derived from any *Hindu* word, being also according to several *Arabic* lexicons, معرب, or adapted to the genius of the *Arabic* tongue, from the *Persian* word *Andāz*, but also is used by *Arabian* mathematicians to mean especially, that mode of notation which is effected by the letters of the alphabet.

Arya Bhattah, who lived confessedly when the *Caliyugam* was far advanced, is the author of a certain mathematical tract named, after him, *Aryabhatīyam*, containing four chapters, and one hundred and twenty-three Slocas of the measure called *Aryā-vrittam*. In the commentaries

of the work that I have examined, it appears that this author was born when 3600 years of *Caliyugam* were passed, in the city of *Cusuma*, which name, with others of the same meaning with *Cusuma-pura*, namely, *Pushpapura*, &c. *the city of flowers*, is mentioned in the *Hēma-chandra* and other *Cōsahs* as being synonymous with *Pātālipuram*.

In the first chapter of the *Aryabhatīyam* are the following lines: —

" Varggākzarāni varggēvarggēvarggākzarāni kātngmanyah
Khadwinavakēswarā nava vargēvargēnavāntyavargēvā."

These, which, though small in bulk are extensive in import, embrace the following explanation: —

The consonants of the five classes of letters in the alphabet may be written in the places of *units*, *hundreds*, *tens of thousands*, *millions*, &c.; these are, *ka*, *kha*, *ga*, *gha*, *nga*; *ca*, *cha*, *ja*, *jha*, *nya*; *ta*, *tha*, *da*, *dha*, *na*; *pa*, *pha*, *ba*, *bha*, *ma*; in number *twenty-five*: the following unclassed letters, *eight* in number, namely, *ya*, *ra*, *la*, *va*, *xa*, *za*, *sa*, *ha*, are found only in the places of *tens*, *thousands*, *hundreds of thousands*, *tens of millions*, &c. The twenty-five letters from *ka* to *ma* represent the values respectively of numbers to 25, and any two of these joined together represent the sum of the two numbers which they severally express; thus ngm, nga, and ma together is 30. The unclassed letters are thus valued: *ya*, 30; *ra*, 40; *la*, 50; *va*, 60; *xa*, 70; *za*, 80; *sa*, 90; *ha*, 100. The letter *la* has the same value with the former letter *la*. These letters, in their simple form, represent only the significant number above assigned to them; to ascertain the place of figures in the natural scale of numbers in which they are to be understood, the vowels are thus annexed to them, it being understood, that whether it be a short vowel, or its corresponding long sound, no difference occurs. Thus, *kā* or *kā*, 1; *kī* or *kī*, 100; *ku* or *kū*, 10,000; *kri* or *kri*, 1,000,000; *kli* or *kli*, 100,000,000; *kē*, 10,000,000,000; *kai*, 1,000,000,000,000; *kō*, 100,000,000,000,000; *kau*, 10,000,000,000,000,000; in the same way the other letters, thus, *ya*, 30; *yi*, 3000; *yu*, 300,000; *yri*, 30,000,000; *yli*, 3,000,000,000, &c.; and *yau*, 300,000,000,000,000,000,

or three *parārdha*. If numbers to a greater extent be wanted, a *parārdha*, or *one hundred thousand billions*, can be expressed by *anuswaram*, or *visarga*.

The letters here alluded to are those used in writing the *Sanscrita* language, and are too well known to require being quoted. The system of English orthography, by which they are here expressed, is that followed in my paper on "The European Alphabet of the *Sanscrita* Language."

The author then proceeds to state examples in astronomy of the application of the rule: thus, in the present age of the world, "the sun will revolve in its course from *Aries* to *Pisces*, *Kyughri* years." In this *Khyu* is 20,000; *yu* is 300,000; and *ghri* is 4,000,000; their sum, 4,320,000 years for the duration of the Kaliyugam. "The moon will, during the period, revolve about the earth *cayagiyinguxuchlri* times:" in this *ca* is 6; *ya*, 30; *gi*, 300; *yi*, 3000; *ngu*, 50,000; *xu*, 700,000; *chlri*, 57,000,000; and their sum 57,753,336, the number of lunations during the present age.

I have not been able to discover, whether the alphabetical notation thus laid down in the *Aryabhatīyam* has been in use before the time in which its author flourished, or whether it were invented by himself to enable him to enter his calculations into *Slōkas* without the use of numbers, or numerical symbols. I am not indeed aware that it has since been in use among mathematicians, never having observed it in their works. It must, however, have been understood by them; for the three books *Līlāvatī*, *Laghu-bhāskarīyam*, and *Mahā-bhaskarīyam*, of *Bhāscara-Achāryah* are founded upon the principles of the *Aryabhatiyam*; the *Līlāvatī*, in particular, is composed from the second chapter of the work. The application of the rule must be very tedious in long calculations, and the promiscuous connections of letters, offensive to the eye and the ear, as violating every rule of *sandhi*, established for the better sound, and the better connecting of words, in the *Sanscrita* language; so great, indeed, is the incongruity, that the most

skilful in the characters of their country would not be able to read a line *off hand* without extreme difficulty.

Beside the alphabetical notation above explained, another system has, from time immemorial, obtained among the learned in the southern countries of the Peninsula. The great scope and variety of which this system is capable, justly entitles it to the rank that it holds in the estimation of those mathematicians who are acquainted with it; few cases occur in which the subject is not comprehended in the same words that contain the numerical value required; by which it becomes an easy *memoria-technica* in the most abstruse calculations. The alphabets thus valued are the same in the order, number, and power of the letters with the *Dēvanāgari* alphabet, whether it be the *Grantham*, *Aryya*, *Tuluh*, *Canarese*, *Telingoo*, *Mahratta*, or other character current in other southern countries of *India*.

In a certain treatise on astronomy, the rules for the value of letters are thus exhibited in a couplet of the measure called *Anashtub*:

"Nanyāvacaxca xūnyāni sankhyāq katapayādayah
Misrētuvandyahalsankhyana ca cintyō halaswarah."

This must be thus explained: The letters *na* and *nya*, and all *initial vowels*, are *cyphers*; *ka*, *ta*, *pa*, *ya*, the digit 1; *kha*, *tha*, *pha*, *ra*, 2; *ga da*, *ba*, *la*, 3; *gha*, *dha*, *bha*, *va*, 4; *nga*, *na ma*, *xa*, 5; *ca ta*, *za*, 6; *cha*, *tha*, *sa*, 7; *ja da ha*, 8; *jah*, *dha*, *la*, 9; among *double letters* the latter only hath a value, for mute consonants are to be reckoned.

It will appear from this, that in the *Sanskrita* alphabet, which contains 35 consonants, the first ten from *ka* to *nya*, have the values of 1, 2, 3, 4, 5, 6, 7, 8, 9, 0, respectively; the second *ten* from *ta* to *na*, respectively, the same as the *former ten*; the next *five*, namely, *pa*, *pha*, *ba*, *bha*, *ma*, the value of the first *five digits*; the following *nine*, from *ya* to *la*, the *nine digits* respectively; whilst the remaining *hza*, a compound letter, is valued according to the last letter in the compound, namely, *za*, *six*. These letters can be written in any place of figures, and are increased in value, in a ten-fold proportion, accordingly; nei-

ther are they affected in power by being connected with vowels, for these have no numerical value. The first place in writing is the place of *units*, in calculating.

It is impossible, I fancy, to fix the period at which this mode of numeration first became current in southern India; but it must have been at a very early period. The following is an extract from the work called *Jaimini-sūtram*, from the second part of the first chapter.

" Atha swāmsō grahānām panca mūshikamārjārāh; tatracatushpadah; mrityaū kandusthaulyamca; dūrē jalakushthadih; xēzēswapadāni; mrityu vajjāyāgnikanaxca; lābhē vanijyam; atra sarisripastanya haniza samē vāhanāducchōcchakramālpatanam; jalacarakhēcarakhetāh kandūrdushtagrandhayascaripphē tātākadaū dharmē, ucchēdharmanityatākaivalyanca."

In this *panca* is 61, which being divided by the number of signs, 12, leave *one*, which is the number required. In the same way *tatra* is 26, which, being divided by 12, leaves 2. Thus the words *mrityau, dūrē xēza ajja lābhē atra samē ripphē dharmē ucchē*, express, severally, the numbers 3, 4, 5, 6, 7, 8, 9, 10, 11, and 12; moreover, this mode of notation is used throughout the work, and is mentioned in the same work in the following Sutram: —

" Sarvatra savarnā bhāvārāsayaxca; na grahāh;"

in which the author explains his intention to use, in his work, numerical letters for the signs of the Zodiack, &c. but not for the planets.

Now it appears, in the astrological work called *Jyautisha-phala-ratnamālā*, whose first verse is,

" Xrī vikramārkkō jagatī talēsmin
Jīyādanuprakhyayaxā narēndrah
Puvōzayaq kōti suvarnnatō nām
Sa bāndhavam saptati vatsarāni,"

that the author of the work lived 70 years under the protection of *Vikramārkah*, of whose æra the 19th century is now passing, and this

book is founded entirely upon the *Jaimini-sūtram*; from which it occurs immediately, that the system of alphabetical notation, which I have just explained, existed nearly 2000 years ago.

In the country from which this is written, the last day of every year is entered in terms of days of the *Kaliyugam*, in a numerical line, which thus becomes the *memoria-technica* for the ensuing year, for astronomical and other purposes; and this practice, too, still continues to obtain, although 995 years have passed since a different æra has been introduced into the country: thus the last day of the month *Minah*, which concludes the year 4919 of the *Caliyuga* is expressed thus, *Tanusthastabdhisēvyah*, or 1,796,706 days of the *Caliyuga*; and the present *Kali*, as the memorial line is called, is *Kamsaghnassidhasevyah*, or 1,797,071, and continues to be the *Vākyam*, *word*, during the present year.

The learned in Malabar teach, that the day in which *Chērumān Perumal* went to heaven (died), or, as the Mahomedans assert, departed in their ships to Mecca, is preserved in the line *Swarggga sandēha prāpyah*, which is the 3528th year of the Kaliyugah; but, unfortunately for the truth of the assertion that *Chērumān Perumal* embraced the *Mahomedan* faith, that is about the two hundredth year before the flight of the prophet of that sect. The line itself explains the doubt that obscured the history of the period, with regard to the death or disappearance of that sovereign prince of Malabar. The epoch of the present æra of Malabar, of which the 995th is now commenced, is *Achāryya-vāgabhēdyā*. The word of the *Achāryah* is irrefragable, in which it is asserted, contrary to the general opinion of the origin of the current date, that the introduction of new rules of conduct, and laws and customs, into Malabar, by a native of it, the famous *Sankara-Achāryah*, fixed a new æra. In the pagoda called *Tirukōl-Kshetram*, near *Paulghaut*, in *Kēralam*, is the following couplet of the *Anushtub* measure, on the stone steps of the tank within its precincts: —

"Prasūtan tarhi saukhyan naf pratiz thāyām aharggnah
Turuzka bhityā sahlē nyastayōr atradēvayōh."

" The revolving day of the *Caliyugam* in which the two idols, which had been cast into this water through fear of the *Turushkars* (Mahomedans), were reinstated, is expressed thus : ' *Now joy is born unto us.*' " The words *Prasūtan tarhi saukhyannah*, which means *now joy is born unto us*, are numerically 01,786,672, in which the cypher has no value. Upon calculating the number of days of the Caliyugam, the fortunate event which it records and celebrates, is found to have happened in the 4892d year of that æra, or October 20, 1790. Again, astronomers aptly call the astronomical circle, in terms of its minutes, *Anantapuram*, " The city of endless space ;" the numerical value of the letters in which term is 21,600. An ingenious person has entered into a *Slōka* a few words, which express the year 1820 of our æra, approaching, in letters and also in numerical symbols ; thus *nakhāhijyā*, or, in figures, 1820. Now *jyā* means the earth, which is, according to numerical symbols, *one ; ahi* is a snake, which is *eight ; nakham* means the nails of the body, 20 ; so thus, by two different methods, the same date is expressed in the same words. The superiority of the *Hindu* over the *Arabian* method need not be mentioned.

Let us now compare the two systems I have explained, one with the other. In the *Sadratnamālā*, the proportion of the circumference to a diameter of one *parardha* (1 with seventeen cyphers), is *Bhadrāmbudhi sidha janma ganita xraddāsmayad bhūpagih*, or 314,159,265,358,979,324, which, according to *Aryabhatah*'s system, would present this incongruous form, Kyaukrojhlaicnēgllijlrichsugīsibha.

Let us also compare this system with that of symbols, used by writers on astronomy in *India* from time immemorial. The following is an extract from the second chapter of the *Sūryya Sidhāntam*, in which the twenty-four sines of the quadrant are exhibited by numerical symbols :

" Tatwāswinōnkābdhi kritā rūpa bhūmi dharārtavah
Khānkāshtau pancha sūnyēschāh bāna rūpa gunēndavah
Sūnya lōchana panchaika chidra rūpa munīndavah
Viyachchaudratidhritayō gunarandhrambarāswinah

Muni shadyamanētrāni chandrāgnikrita dasrakāh
Panchashta vishayākshīni kunjarāswinagāswinah
Randhra panchāshtakayamah vaswadryankayamastathā
Kritāshta sūryya jivalanāh nagādri sasi vahnayah
Shatpancha lōchana gunāh chandra nētrāgnivahnayah
Yamādri vahni jivalanārandhra sūnyārnnavagnayah
Rūpāgni sāgara gunāh vasutri krita vahnayah."

These five and a half Slokahs of the Anushtub measure, contain the sines in terms of minutes of the circumference, thus:

	Arc.	Sine.		Arc.	Sine.
1	3° 45′	225	13	48° 45′	2585
2	7 30	449	14	52 30	2728
3	11 15	671	15	56 15	2859
4	15 0	890	16	60 0	2978
5	18 45	1105	17	63 45	3084
6	22 30	1315	18	67 30	3177
7	26 15	1520	19	71 15	3256
8	30 0	1719	20	75 0	3321
9	33 45	1910	21	78 45	3372
10	37 30	2093	22	82 30	3409
11	41 15	2267	23	86 15	3431
12	45 0	2431	24	90 0	3438

The same 24 sines in terms of *minutes* of the circumference, with the *seconds* and *thirds*, are thus laid down in the *Tantrasangrahah*, in six Slōkas of the same measure with the former, in numerical letters.

" Xrezthannāmavarizthānām hīmādrirvēda bhāvanāh
Tapanobhanu suktajnyo madhyamam vidhi dohanam
Dhigajyo naxanam kaztam hrinna bhogasayambika
Mriga haranaresoyam virorana jayolsakah
Mulam vixudhannalasya ganezu viralanarah
Axudhi gupta ennora xrih sankukarno nagexwarah
Tanujo garbhajomitram xri manatra sukhi sakhe
Sariratrauhimaharo vegajnyah pathi sindhurah
Chayala yogajonilo nirmalo nasti satkule
Ratrau darpanamabhrangam nagastunganakhobali
Dhiroyuva katha lolah pujyo narijanairbhagah
Kanyagarenagavalli devo viswasthali bhriguh."

	Arc.	Sine.		Arc.	Sine.
1	3° 45′	224′ 5″ 22‴	13	48° 45′	
2	7 30		14	52 30	
3	11 15		15	56 15	
4	15 0		16	60 0	
5	18 45		17	63 45	
6	22 30		18	67 30	
7	26 15		19	71 15	
8	30 0		20	75 0	
9	33 45		21	78 45	
10	37 30		22	82 30	
11	41 15		23	86 15	
12	45 0		24	90 0	3437′ 44″ 48‴

It is unnecessary to mention which of these appear to be the most convenient mode of expressing a sum of high numbers, or to multiply instances of its application in astronomy, and on other occasions; suffice it to say, that even though the decimal scale of arithmetic have existed from time immemorial in *India*, it is still well ascertained that an alphabetical notation has been in use 1600 years ago in northern *India*, the date of whose origin cannot probably now be fixed; and that a totally different system of notation, by the letters of the same alphabet, has been in use in the south of *India*, the period of whose origin, though its existence is traced back for near two chiliads of years, is also indeterminable.

C. M. WHISH.

No. V.

ON THE ORIGIN AND ANTIQUITY OF THE HINDU ZODIACK.

The opinion of M. Montucla, that the Indian Zodiack was borrowed, either directly or mediately, from the Greeks, appears to me so well founded, upon the observations that I have made on perusal of a variety of Hindu works, that I deem it necessary, even although totally unacquainted with that learned author's arguments, to produce these observations before the public. By this publicity I shall rescue M. Montucla from apparent carelessness in research, and from the contempt of those who deem his opinion "a notion bordering on phrenzy;" while the opinion of the public may be directed to a channel of intelligence, from which it has been of late years turned, in consequence of men having too strictly relied upon the information of wily Brahmans and interested teachers; information dressed in all the purity of classic diction, in which the elegant Sir William Jones "knew so well to shine."

My intention is to prove, that the Indians have borrowed the dodecatemory division of the heavens, with the figures, &c., of the zodiacal constellations, immediately from the Greeks. Sir William Jones says *, "The Brahmans were always too proud to borrow their science from the Greeks, Arabs, Moguls, or any nation of Mlechch'has, as they call

* See p. 302, vol. ii. Asiatic Researches, 4to. edition.

those who are ignorant of the Vedas, and who have not studied the language of the gods.

"They have often repeated to me the fragment of an old verse, which they now use proverbially, '*na nicho yavanatparah*,' or no base creature can be lower than a Yavana; by which name they formerly meant an Ionian or Greek, and now mean a Mogul, or generally a Muselman.

"When I mentioned to different Pundits, at several times, the opinion of Montucla, they could not prevail on themselves to oppose it by serious argument; some laughed heartily; others, with a sarcastic smile, said it was a pleasant imagination; and all seemed to think it a notion bordering on frenzy."

I shall endeavour to refute these, and the few arguments of the same nature succeeding it, in the essay from which I quote.*

I shall first, then, describe the Indian sphere, as divided into a Lunar and Solar Zodiack, which, though these have already been treated upon so often, I hope to show in such a different light, as to make it subservient to the proof of a very material point — its antiquity.

The apparent path of the sun is divided into twelve portions, containing each thirty degrees. Their names are:

Mesha — The Ram.
Vrishabha — The Bull.
Mithuna — The Pair.
Karkata — The Crab.
Simha — The Lion.
Kanyā — The Virgin.
Tula — The Balance.
Vrischkika — The Scorpion.
Dhanah — The Bow.
Makara — The Sea-Monster.
Khumbha — The Water-Vessel.
Mīna — The Fish.

Their figures are thus described by Vāraha Mihira, a Hindu author

* In an essay embracing the various objects of an extensive speculation, the facts necessarily appear detached, and somewhat desultory. The chain of argument adopted by the author has, however, an obvious connection. He first endeavours to prove, by a comparison of the Greek and Sanscrit languages, that the duodenary zodiack of the Greeks was communicated, at an early period, to the Hindus; and he afterwards adduces testimony to show that, prior to this period, the Hindus were unacquainted with a duodenary division of the heavens. G. H.

of note, who flourished in an early century of the Christian æra, in the Hōra Sastram, chap. i. verse 5.:

" Matsyan ghati nri mithunam sagadam sa vīnam
Chāpī narōswa jaghanō makarō mrigasyah
Taulissasasya dahanā plaragācha kanyā
Seshāsswanāma sadrisasswacharāscha sarvē."

" Two fishes; one bearing a water-vessel: twins; a male bearing a weapon, and a female with a lute: a monster with a bow, his body that of a horse, with half that of a man: a monster, whose upper part is that of a beast, and whose nether end is that of a sea-monster: a man bearing a balance: a virgin on a raft, holding in her hand a lamp and some grain: the remainder are figured according to their particular names, and all partake of their several natures and elements." *

The commentary to this work, named Prabōdhana, remarks upon this verse, " The sign Minam contains two fishes, whose head and tail are alternately connected." (Then follow astrological remarks, here omitted.) Khumbha is a man bearing an ewer, &c.: Mithuna, twins: a youth bearing a staff, and a damsel with a Vīna: Dhanuh, a monster with the upper half of a man on a horse's body, wielding a bow: Capricorn, a monster, whose upper part is that of a beast, ending with the lower parts of the Makara: Kanyā, a virgin standing on a raft, having in her hands some grain and a lamp: the rest have the figures of those animals whose names they bear." Thus saith Yavanīswarah:

" Adyasmritō mēsha samāna rāsih
Kālasya mūrdhā gaditah purānaih
Sojāpi kasanjarakandaradri
Stīnagni dhatwā kararatna bhūmih

Vrishakritistu prathitō dwitiyah
Savaktra kanthan niyatam vidhatuh
Vanādi dhātu dwipagōkulānām
Krishīpalānāmadhivāsa bhūmih

* The reader will find a similar description of the signs by Sripeti, the author of the Retnamálà, in p. 292, vol. ii. Asiatic Researches, 4to. G. H.

Vīnāgadābhra mithunam tritiyah
Prajāpatēskandha bhujāmsa dēsah
Pranartakōtgāyakasilpaka stri
Krīdāraladyūta vihāra bhūmih

Karkī kulīrakritiramba samsthō
Pakshah pradēsō vihitaschaturthah
Kēdāravāli pulināni tasya
Dēvanarū ratnavivikta bhūmih

Simhastu sailē hridaya pradēsah
Prajāpātēh panjama ā hurāryāh
Tasyātavī durga guhā vanādi
Vyādhāvanī bhū bhuvana pradēsah

Pradīpikam grihya karēna kanyā
Naustha jalēshashthatikā bhruvanti
Sāchārthadhīra jatharam vidhatuh
Sanadwalū stri rati silpa bhūmih

Vīthyāstulāpānidharō manushya
Sthitassanābhī kadivastidēsah
Sulkartha vīthyū panapattanardhura
Sārdhādhivasōnnata sasya bhumih

Swabhrēshtamō vrischika vigrahastu
Prokta prabhōrmēdra guda pradēsah
Guhāvali swabhra chitatma guptih
Valmīka kīta jagaradra bhumih

Dhanivi manushyō haya paschimārdham
Tamāhurūrū bhavana pranētuh
Samasthitavyastasasasya vāji
Sutrāstrabhrāda rathaswa bhūmih

Mrigārdhamūrrō makaram
Janudwayōrdēsa muranti yathuh
Nadi vanāranya sarōdyanūpah
Swabhritya vāsō dasamah prithivyam

Skandhē turiktah purushasya kumbhō
Janghē tamēkadasamahūrāryāh
Tasyō darādhārakusasya pakshih
Trisanndhikadyūtanivēsa dēsah

Jalētumīnadwayamantya rāsih
Kālasya pādō vihitō parishthaih
Sapunya dēvadwija tirtha bhumih
Nadī samudrambudhanādhi vāsah."

These are the twelve signs.

Varaha then proceeds and says in the eighth verse:

" Kriya tāvuru jutuma kulīra lēya pārthonā juka kōrpyākhyāh
Taukshika ākokērō hridōgaschēthusi kramasah."

Thus: " Kriya, Tāvura, Juthuma, Kulīra, Leya, Parthona, Jūka, Kōrpia, thus are they called; Taukshika, Akōkēra, Hridōga, and Isthusi, in their order."

Upon which the commentary Vivaranam remarks, " These are the names without root or meaning, that is, exotic, of the twelve signs, beginning with Mēsha, the Ram," in these words, " Mēshadīnam paribhāshikāni sajnyantarāni."

We can, however, find both their meaning and their origin, thus:

Kriya	ΚΡΙΟΣ	Aries,
Tāvuru	ΤΑΥΡΟΣ	Taurus,
Juthuma	ΔΙΔΥΜΟΣ	Gemini,
Kulīra	ΚΑΡΚΙΝΟΣ	Cancer,
Lēya	ΛΕΩΝ	Leo,
Parthōna	ΠΑΡΘΕΝΟΣ	Virgo,
Jūka	ΖΥΓΟΣ	Libra,
Korpia	ΣΚΟΡΠΙΟΣ	Scorpio,
Taukshika	ΤΟΞΟΤΗΣ	Sagittarius,
Akōkēra	ΑΙΓΟΚΕΡΩΣ	Capricornus,
Hridōga	ΥΔΡΟΧΟΟΣ	Aquarius,
Isthusi	ΙΧΘΥΣ	Pisces.

These scarcely require any comment. The fourth name, Kulīra, does not, I fancy, resemble any name in the Greek tongue for a crab: but Karkin, the substantive having that meaning, is derived from ΚΑΡΚΙΝΟΣ, the word which completes the twelve Greek names of the signs; and is used in the fourth verse of the words of Yavana above

quoted. It is found also in the Hōra Sastram; thus, chapter xi. verse 9, "Karkinī lagnē tasthē jivē chandra sita," &c.; in which the noun, from which karkini is derived, is Karkinī, a crab. *

The Lunar division of the firmament shall now be considered. The heavens are divided by the Hindus into twenty-seven portions, called Nakshatra, a star, or constellation. They are as follow: —

1 Aswini.	10 Maghā	Mūla
Bharani	Pūrva Phalguni	20 Pūrvāshāda
Kritica	Uttara Phalguni	Uttarāshāda
Rōhinī	Hasta	Sravana
5 Mrigasirah	Chitra	Dhanishtha
Ardra	15 Swati	Satabhisa
Punarvasu	Visakha	25 Purvabhadrapāda
Pushya	Anurādha	Uttarabhadrapāda
Aslēsha	Jyeshtha	Rēvati.

A twenty-eighth constellation is occasionally placed between Uttarāshādha and Sravana, called Abhijit. It appears to be the bright star in

* The following quotation may not be deemed irrelevant, from the Hōra Sastra, chap. i. verse 4, in which it is mentioned that Kāla, or Time personified, is divided into twelve parts, and each member of this body, named Kāla Purusha, or Prajāpati, corresponds in order with the twelve zodiacal signs, thus:

"Kālāngāni varāngamāmananamurōhrit krōda vasobhritō
Vasto vyajanamūrujānuyugalē janghetalonghridwayē
Mēshāswi prathamānavarska charanāschakra stitha rasayoh
Rāsi kshētra griharkshē bhāni bhavananchaikartha sa pratyayē."

"The members of Kāla are the head, the face, the breast, the heart, the region below the breast, the belly, the abdomen, the privities, the thighs, the knees, legs, and the two feet."

This puts me in mind of the members of the body we read of in the almanack. I am not aware, and have not by me a single document to assist me, whether these members refer to the signs in the order of Varāha Mihira. I have only recollection of one verse of some memorial lines to the purpose, learned in infancy:

"The noble Lion centres in the heart;
The bashful Virgin claims the belly part;"

which corresponds in part with the saying of Yavanah above quoted. — *Note by the Author.*

Lyra. It is said among Hindu astronomers, that the stars which formerly composed this constellation have disappeared. It is not improbable that the stars, which compose Lyra a double star, were, in the early ages of astronomy, distinct; but, from their proper motion, have become so united as to be now indistinct to the naked eye, which may account for the circumstance of the constellation not being discernible as described in former sasters.

The mean calculation of the extent of these twenty-seven mansions is made simply by dividing 360, the number of degrees in a circle, by 27. The true divisions, or sphutāmsa of the asterisms are different.*

I shall now proceed to the main object of my paper. I am credibly informed by a very intelligent Brahman, whose prejudices, I am convinced, will not lead him to deceive, as his information has been fully explanatory upon the subject, that, in the three Vedā, the divisions of the year and of the heavens are as I shall relate. The subject is not discussed in those works; but, being casually mentioned in divers parts, is collected, and is as follows: — The year is lunar, consisting of 360 days and nights, of which the 360 nights are called the daughters, the 360 days the sons of the sun. The names of these months are, Tapa, Tapasya, which compose the season called Sisirah; Madhu, Madhava, of the season Vasantah; Sakra, Suchi, for the season Grishma; Nabha, Nabhasya, for Varsah; Isa, Urja, for Sarat; and Saha, Sahasya, for the season Himantah. The firmament of the stars is also divided into twenty-seven parts, called the wives of the Moon.†

* The number of the stars, and the computed positions of the asterisms, are given by Sir W. Jones, in his Essay on the Antiquity of the Indian Zodiack, inserted in the second volume of the Asiatic Researches. In the ninth volume of the same work is an excellent paper by Mr. Colebrooke, "On the Indian and Arabian Divisions of the Zodiack." It contains a table of the names, symbols, places, and number of the stars, of each of the lunar constellations, with several other concomitant circumstances. From this table it appears that the asterisms do not, by any means, occupy equal divisions of the Zodiack. — G. H.

† If the author's information be correct, the following passage by Sir W. Jones, in his Essay on the Antiquity of the Indian Zodiack, will lead to the inference that different copies of the sacred books contain statements which are contradictory, and which afford evidence that they are spurious: —

Independent of this division, there is no division at all of the path of the sun into twelve signs, and no mention at all of such constellations as the Ram, the Bull, &c. Moreover, in the Vedahs, there is no mention of the division of a month in any other way than that of the light and dark fortnights, which is subdivided into fifteen parts, or days; and no hebdomedary division is noticed. These fifteen days are called the first, the second, the third, the fourth, &c. of the light or dark half of the month. From this I am perfectly satisfied, in my own mind, that the use of the twelve signs of the heavens, and the seven days of the week, have been introduced by the Greeks, with the improvements that they certainly caused in the astronomy of the Hindus.

I have before quoted from Yavana, or Yavaniswara's ordinances: a word, then, with regard to the Yavanahs.

Varāha Mihira, the illustrious astronomer, bigoted astrologer, and rigid atheist, of an early period of our æra, mentions his authorities in the astrological work, from which I have already quoted, in the following lines, chapter vii. verse 1.: —

> "Maya yavana manindha saktipūrraih
> Diwasakarādishu vatsarāh pradishta
> Nava tithe visayāsivi bhūtā rudra
> Dasa sahita dasabhisswatungabheshu."

In these are mentioned Maya, Yavana, Manindha, Saktipurvah, (Parāsara,) as authorities upon the subject of discussion. I shall make a remark upon the two first of these.

It is acknowledged among Hindus, that the earliest astronomical rules, or opinions, which they have professed, are those of Măyă. These, they agree, were embodied in the work called the Sūrya Sidhāntah, by some disciple of his; but by whom, or in what generation of

---

"The Puránics, who reduce all nature to a system of emblematical mythology, suppose a celestial nymph to preside over each of the constellations, and feign that the god Loma, or *Lunus*, having wedded twelve of them, became the father of twelve genii, or months, who are named after their several mothers." — G. H.

the discipular descent, is not known, or at least not acknowledged. Now Maya was not an Hindu, but born in a country of Mleschahs, barbarians or foreigners; an Asurah, or species of divinity, and born in Romaka.* When we consider, therefore, that he was an Asurah, an astrologer, born in the west, and named Maya, we can propose some limit to his æra, by considering that the observations of the Magi of Chaldea, among the Babylonians, allowed to be the earliest astronomers among the ancients, only extend to the year 2342 before our Saviour. Let us examine the word Magus: the g must be pronounced soft as j; thus, in the Persian, the sound is مجوس majoos, pronounced muj-joos. To adapt the word to the genius of the Sanskrita tongue, the j must be changed to y; and the word, strictly grammatical, becomes Mayah, with the Sanskrita termination. Was Assyria, pronounced Asūria, then, the birth-place of the Maya, the Asurah, the first astrologer, who propagated the science of the heavens and the influences of the heavenly bodies among the Hindus?

To Maya, mentioned above, allusion is thus made, in the commentary of the work accompanying my copy. "Maya iti kaschidasurassuryasēvayā labdha varah jyotissastra vetta Maya: this is a certain Asurah, who having adored the sun, became, in reward for his homage to that deity, skilled in astrology." I shall only further observe on this personage, that, although some may cavil at my having called the Chaldean wise men Magi, when the term is more properly applied to the followers of Zoroaster, yet, as I find myself borne out in the expression by various authors, I shall be excused, I hope, on that point.

Yavanah is the next on the list. The commentary says of him: "Yavana mlescha nāmādhipah sopi hora sastravetta yavanah: this is a mlēscha, or βαρβαρος, so named. He, too, was well skilled in the science of astrology." Yavana, or Yavaniswarah, as he is called, the second authority in astronomy among Hindus, was then a foreigner.

* Romaka is the quarter of the surface of the globe contained between two lines, passing from the north to the south pole, one through Ougein, in east longitude 75°, and Lanca; the other 90° west from those places. — *Note by the author.*

The name Yavanah, or commonly Yōna, or Yōnaka, which (for the sake of euphony) is changed to Chonaka, is the title now given to the race of people called Māpillahs, the Mahomedans of the Malabar coast. This, however, is a local application of the term. The name is more often given, by the generality of Hindus, to the Ionians or Greeks. Thus, Alexander and his army are called Yavanah. That the Yavanah mentioned by Varāha was a Greek, may be strongly confirmed by the following consideration: let us read attentively a verse extracted from a work of Varaha Mihira, the Varaha Samhitam:

" Mlēschāhi yavanasteshu samyak sāstramidam sthitam
Rishivattehi pūjyante kimpunardaivavidwijah."

By these lines are instilled into the minds of Hindus, the consideration that the Yavanas were well skilled in astronomical and astrological science. It appears, also, that their progress in the knowledge of the heavens and planetary influences were so highly esteemed among the Brahmans, that they are instructed to reverence these Mleschas after the manner of their own Rishis, and to receive their sciences as orthodox. Thus we frequently find, in the astronomical and astrological works of the Hindus, Yavanīswara, or Yavanah, speaks " thus and thus" — the Yavanas say " so and so," &c.

Then who were the Yavanahs? In the second chapter of the Hōra Sāstra, by the author just quoted, are these verses:

" Hēlissūryaschandramāssītarasmih
Hēma vijjnyō bōdhanaschēnduputrah
Arō vakrah krūradrik chāvanēyah
Kōnō mandassūryaputrō sitascha

Jivōngirassuragururvachasāmpatirjyōk
Sukrō bhrigurbhrigusutassita asphujiccha
Rāhustamōgurasurascha sikhītukētuh
Paryayamanyadupalabhya vadēccha lōgāt."

" The name of the Sun is Hēli; of the Moon, Chandramā and Sītarasmih; of Mercury (Hemna, or) Hema, Vit, Jnyah, Bōdhanah, and

Induputrah; of Mars, Arah, Vakra, Kruradrik, and Avanēyah; of Saturn, Konah, Mandah, Suryaputrah, and Asitah; of Jupiter, Jivah Angiras, Suraguru, Vachasāmpati, and Jyok, and in the commentary Idyah; of Venus, Sukrah, Bhriguh, Bhrigusutah, Sitah, and Asphujit, or Apsujit; of Rahuh Tamah, Agu and Asurah; of Ketuh, Sikhi, &c.

The scholar will immediately perceive that the Greek names of the planets are distinctly to be traced in Varāha's enumeration, thus:

The Sun	Heli	ΗΛΙΟΣ	Helius,
Mercury	Hēma	ΕΡΜΗΣ	Hermes,
Mars	Arah	ΑΡΗΣ	Mars,
Jupiter	Jyok	ΖΕΥΣ	Jupiter,
Saturn	Kōnah	ΚΡΟΝΟΣ	Saturnus,
Venus	Asphujit	ΑΦΡΟΔΙΤΗ	Venus.

This arrangement is far from being fanciful. Moreover Idya, a name of Jupiter, is the Idæus, a title of that god with the Latins. Angiras seems to be Anxurus, another title of the same.*

The following curious lines, in the philological work of Pānini, show that the Hindus had a knowledge of Grecian literature: —

" Sutram, Indra varuna bhava sarva rudra mrida hīmāranya yava yavana mātulācharyān-āmānuk vartakam indradināmānugāmassyat hīmāranyayoamahativē yavāddōshē yavanāllī-phyām upāddhāya mātullābhyām vāchāryādanatwancha artham indrasya stri indrānī varun-asya stri varunani bhavasya stri bhavānī sarvasya strī sarvānī rudrasya stri rudrani mridasya stri mridānī mahaddhīmam himānī mahadaranyamaranyāni dushtō yavā yavanī yavanānām

---

* Even Jupiter and Diespiter appear the same with Dyupatih and Divaspatih, formed on true grammatical principles, from Dyō, the atmosphere, dium, and diva, which has the same meaning, united with patih, a lord or ruler; the compound being the " Lord of the Atmosphere:" thus Varāha Mihira says,

" Sikliū bhúkha payō marut ganānam
Vasinō bhumisutādayah kramēna."

" The regents of the elements, fire, earth, æther, water, and wind, are Mars, Mercury, Jupiter, Venus, and Saturn, respectively;" in which the planet Jupiter is dyupatih and divaspatih, or the lord of the atmosphere, diespiter: Usanah and Venus, also, for that planet may have a double denomination. — *Note by the author.*

liphih yāvanānī upāddhyaayāsyā stri upaddhyayānī upaddhyāyānī matulasya stri matulānī āchāryasya strī āchāryānī"

"Indra, varuna, bhava, sarva rudra mrida hīma, aranya, yava, yavana, mātula, achārya, with these are conjoined na; of Indra and others it is the feminine; of hīma and aranya it expresses extension or magnitude; and by it yava is deteriorated, and the letters of the yavanas expressed, &c. Thus the feminine of Indra is Indranī, of bhava, bhavanī, &c.; from hima is derived himānī, a great dew; from aranya, a forest, is derived aranyānī, an extensive, large forest; from yava, grain, pulse, is derived yavānī, damaged or bad grain; from yavana, a certain race, is derived yavanāni, the letters of that people," &c.

I will now make a remark upon the provebial expression mentioned by Sir William Jones, nanicho yavanāt parah, "no base creature can be lower than a Yavanna," which is well known among Hindus. This, however, refers to the Turushkaras, the Turks, or Moguls, and not to the Greeks: the term Yavana is applied to both in the present day, particularly to the Musulman, or nations of the circumcised; but formerly solely to the generous conqueror of Porus, (king Parvata or Parvataka of that age,) and rival of Chandragupta. Indeed, Vāraha Mihira uses the term Yavana more than 200 years before the empire of India had fallen a prey to the earliest Mahomedan conquests. In the Harivamsam, while relating the origin of different nations, it is specifically mentioned that the Yavanāh were formerly Kshētryahs, or of the second rank of Hindus. This fable arises, perhaps, from the knowledge of the character of this people, with which they first became particularly acquainted, namely, that of warriors.

Having endeavoured to show that the term Yavana, confessedly that of an Ionian or Greek, is to be applied, when found in works relating to astronomy, to that nation, I shall bring forward some testimonies of that particular Grecian, who introduced, no doubt, improvements into the astrology and astronomy of the Indians, since he is quoted on every subject. Though a mlescha, a barbarian or foreigner, he was received as a Rishi, on account of his extensive knowledge and the

purity of his character. Having arrived in India, in the early ages of their society, he is reported to have been the bosom friend of Garga, the sanctified Guru of Krishna. Fable apart, he was an illustrious teacher of enthusiastic scholars. His words were received as holy truths. In astrology, in astronomy, in ethics, and even in points of religious ceremonies, and the magical influence of charms, his ordinances, as proceeding from divinity, were immediately committed to their immortal language by his learned pupils, and now form a large volume, the basis of Hindu science. They are still extant, either as a collection with themselves, or scattered in the numerous commentaries of Hindu works of science; and I feel much confidence in proposing the question, "Shall not the investigator of Yavanīswara's sayings discover the golden verses of Pythagoras?" *

The author of the Hōra Sāstram also quotes the Yavanas and Yavaneswara, particularly; and also the Grecian names for the Zodiacal signs in the same form as Varāha. Of the former is the following quotation, in the chapter which treated on the age of the subject in calculating the horoscope: —

"Maya yavanah sidhasenā prabōdhamāndavya vishnugptādyaih
Ayurdāya vibhagō nrīnam samyakpuratanaih kathillah."

* In my copy of the Horā Sāstram I find these lines, having the term Yavanah underlined by me on a former perusal of the work, chapter xi. verse 1.: —

"Prāhuryavanāh swatungagaih krūraih krūra matirmahīpatih
Krāraistunavajīva sarmana pakshe kshityādhipah prajāyatē."

"The Yavanahs say," &c. The commentary (vivaranam) says, Iti yavanācharryā vadanti, "Thus say the Yavana wise men." — Chapter viii. verse 9.

"Swaih swaih pushta phalāni sarga samayē vaktirdasayah kramā
Dantyelagna dasāsubheti yavanā neschanti kēchittatha."

In this also the word Yavanāh is used in the plural number; again, chapter xii. verse 1.: —

"Nava digvasavastrikagni vedairgunitadwitrichaturvikalpajassyuh
Yavanaistrigunāhi shadchhatisākathitā vislaratotra tatsamasah."

In which Maya, Yavana, Sidhasena, Prabodha, Mandarya, and Vishnugupta, are mentioned as authorities on the subject the author is proceeding to discuss. Srīpatih also says,

" Pākam divadasadhā vadantī yavanādigbhēda bhinnantatha
Mānindhāh khalu bādarāyanamunistatrashtadha proktavān
Shadbhedam khalu sidha sena vibudhaistan devalādyaih punah
Bhēdairabdhi mitairudāradhishanna sri vishnuguptastribhih."

Sir William Jones remarks, " If any historical records be true, we know, with as positive certainty, that Amarsihn and Calidas composed their works before the birth of Christ, as that Menander and Terence wrote before that important epoch." On this I must observe, first, that it is very doubtful at the present day among men of learning of the Hindus, whether there ever was such a personage as that Calidāsa; many of the works attributed to him, among which is the Mēghadūta, being supposed to be written by Varāha Mihira himself, and many of them by other authors; and, secondly, it is as well established as we can desire, that Amera's Lexicon was written within one thousand years from the present date.

Sir William Jones also argues, " Of the planets I will only observe, that Sukra, the regent of Venus, is, like all the rest, a male deity." The fallacy of this can be proved by a verse from the Hōra Sāstram, so often quoted; it is from the second chapter, and 5th verse:

" Budha sūryasutan napunsakākhyan
Sasi sukrau yuvatī narastu sēshāh."

" Mercury and Saturn are hermaphrodites; Luna and Venus females; the rest of the planets are masuline deities." It is true, all the names of Venus are of the masculine gender, as also of the Moon; but when the influence of that planet is a matter of consideration, the deity is feminine.

I shall now refer to a verse from the Varāha Samhitam, which contains information of a very remarkable nature. The verse has been

before quoted by Sir William Jones, in his Supplement to the Essay on Hindu Chronology. My copy reads it thus:

> " Aslēshārdandakshinam uttaram ayanam raverdhanishthādyam
> Nānamo kadāchidāsīdyēnōctano purva sastreshu
> Sāmpradam ayanam savituh karkatakādyam mrigaditaschanyat
> Uktābhavō vikritch pratyaksha parikshinairvyaktih."

" Certainly the southern solstice was, at some period or other, in the half of Aslesha, and the northern solstice in the beginning of Dhanishta, according to what is recorded in former sastra. At the present time the solstices are in the beginning of Karkata and Makara; the difference from what is recorded is ascertained by actual inspection of the heavens."

The longitude of the Nakshatra Dhanishta is stated to be 290°, or 110° greater than Chitra, *Spica Virginis*, and is, therefore, in the 11th of Aquarius. Its distance from the ecliptic is stated to be 36°, the number of stars four. There can be but little doubt, then, that the Nakshatra Dhanishta consists of α, β, γ, δ, Delphini, of which the extremes β and γ were, in right ascension, 307° 2′ 34″ 74, and 309° 20′ 44″ 34, in A.D. 1800. As it is difficult to say in what part of the heavens the pole at that time was, and as Dhanishta is so far removed from the equator, it would be difficult to decide in what part exactly the colure cut the equator at that period. But, as the equinoctial points had receded 38° 0′ 10″ in 1800, the approximation of the Hindu recorded colure and that of the primitive sphere of Chiron is so remarkable, that we may strongly suspect that, as the Greeks most certainly introduced their sphere among the Indians, they also acquainted them with the stars through which the colures passed at its formation. *

* It is a remarkable circumstance, that Aswini is not the first of the lunar mansions with early astronomers, but rather Kritika. Can we conceive a better reason for moving the origin of their sphere by the Hindus, than the adapting it to an innovation which met with their general consent? The commencement of the two spheres is actually identified, by the change, with each other; and, as near as we can calculate, with the primitive sphere of Chiron. — *Note by the author.*

No. VI.

EXTRACT OF A LETTER FROM CHARLES JONES, ESQ. OF THE MADRAS MEDICAL SERVICE.

[With an Engraving.]

I INCLOSE you a drawing to be presented to the Literary Society at Madras; but, should you not think it worth presenting, do not. The stone from which this was copied is in possession of Mr. Money, Bombay Civil Service, and was found by some labourers that were opening a canal in Mesopotamia, that had been filled up, perhaps, some centuries. The canal reaches from the Euphrates at Helleh (which is built, according to historians, where part of Babylon stood) to the Tigris at Bagdad. There are five lines of characters over the head in the stone; but these three are all that could be deciphered, and these and the lower line before the head are clear. Should at any time the Babylonian character be understood, these will be easily translated, as they are very distinct. At the other end was another head (it is supposed), and the little pencil drawing is supposed to be a staff that was held in the hand of the figure.

No. VII.

OBSERVATIONS ON THE GEOLOGY OF THE HYDERABAD COUNTRY.

The country around Hyderabad is composed entirely of granite, intersected by quartz, which generally runs north and south, and by trap, which has no definite direction.

The hills are generally in ridges. In some instances they are insulated, of a mamillary form, or abrupt and precipitous.

The ridges are covered with detached masses of rock, and frequently (when seen at a little distance) have more the appearance of heaps of loose stones than of solid hills.

The mamillary hills are almost always devoid of vegetation, having a smooth surface, with large detached lamellæ lying loosely on their sides, and apparently ready to slide or tumble down on the slightest impulse into the neighbouring valleys.

The insulated hills often present on one or more sides a smooth, perpendicular surface, which makes a very sudden curve at the top, or undulates, and thus contracts the summit of the hill.

Sometimes we find the surface of the granite forming part of an immense curve, and rising very gently and to a small height above the surrounding plain. In other instances it is waved, and presents a great variety of outline.

Huge blocks of granite are every where strewed over the country, and are often piled over each other in the valleys, or on the sides or

summits of the hills, giving rise to the most fantastic shapes, and often closely resembling ruined buildings. It is not uncommon to see three or four immense masses of granite placed above each other, with their surfaces nicely adapted, having somewhat the appearance of the ruin of an ancient column, which might be expected to be soon levelled with the ground, by the agency of the weather.

All the granite of Hyderabad is stratified or lamellar. The strata and lamellæ vary in thickness, from less than an inch to many feet. They have no definite direction or dip; but are generally curved, sometimes to a small extent horizontal, waved, or perpendicular.

The granite on one side of a small hill, close to that of Shapoor, near the Beema, has the appearance (when seen at a little distance) of being columnar; but when it is examined more closely, it is evident that this appearance arises from the following circumstance: — The lamellæ of the granite are perpendicular, and had formerly made a very rapid curve at the top. By the influence of the weather this curve has been worn down, and has thus allowed the inferior perpendicular part of the lamellæ to separate a little from each other; and accordingly, when seen transversely, they closely resemble columns.

The internal structure of the granite is almost always small granular. * The proportions of its constituent parts vary exceedingly. In many instances the mica is entirely wanting; and when situated near quartz, the granite and quartz are frequently found to pass gradually into one another.

The colour of the granite is sometimes red, in other instances grey, white, or blackish, according to the colour of the felspar, and according as one or other of the constituent parts predominate. Different colours often occur at very small distances in the same stratum, or lamella; and it is not uncommon to meet with strata of different colours resting one another.

Frequently nodules and small veins of granite, having a very large pro-

* I will not venture to assert that it is invariably small granular, for my observations have not been sufficiently extensive.

portion of mica, and occasionally veins of pure mica, are found in the common granite, from which (in some cases,) they easily separate when the rock is broken; but in other instances they are intimately connected with, and gradually pass into the surrounding rock.

The quartz and trap, by which the granite is every where intersected, occur under the form of mountain masses and veins. Sometimes, though more rarely, the trap is found in nodules. The veins vary from a few inches to many miles in length. Their junction with the bounding rock is sometimes distinct, while in other cases they are intermingled at their sides with the neighbouring granite.

The quartz is sometimes intermixed with felspar, which makes it much more perishable than when pure, and accordingly when this is the case, we generally find it wearing down, and becoming disintegrated.

The trap is found under the forms of greenstone and basalt. It is either tabular, massive, or in globular concentric lamellar concretions, with occasionally disseminated crystals of augite. The globular variety is very easily acted on by the weather, in consequence of which it is in many situations completely disintegrated and converted into a black soil. In some places, where this variety of trap occurs in great abundance, it is worn down into small detached globular masses, which are every where strewed over the ground.

Almost all the granite of Hyderabad is quickly disintegrated when exposed to the atmosphere, and assumes a globular or irregular form when decomposing. Everywhere there are immense accumulations of disintegrated granite, at the bottom of the hills and in the vallies. I have known instances of wells being dug through it to the depth of sixty feet, without penetrating to the original rock. At the surface of the ground it is loose, but at considerable depths it is more or less perfectly consolidated; and the deeper we penetrate into it, the more perfect is its cohesion. It is not uncommon to meet with small quartz veins running through this consolidated debris, in various directions; and in many instances there is an appearance of imperfect stratification.

All the low vallies are covered by a plastic blackish coloured soil, generally known by the name of cotton ground. It varies in depth from a few feet to many fathoms; and when a section of it is examined, (which can be done in those places where it is worn down by rivers,) it is generally found distinctly arranged in strata, which are sometimes separated by thin layers of sand or gravel. These strata vary in thickness, are sometimes horizontal, in other instances waved, or more or less inclined to the horizon.

I have not had an opportunity of analysing this clay; but that its composition is by no means uniform, may be inferred from the circumstance of its outward appearance varying considerably in different situations. Sometimes it is of a blackish grey colour, and is somewhat friable; while in other cases it has a yellowish or whitish grey colour, and is much more cohesive.

At first sight one would imagine, that the Hyderabad country has at one time been subjected to the agency of some great destroying cause, which has fractured and torn asunder the hills, and precipitated their fragments into the neighbouring plains. But upon closer examination, I think we are naturally led to conclude, that the gradual operation of causes which are still in existence, have produced those effects which many would attribute to the operation of very powerful agents. In short, I believe that all these phenomena are the result of the long continued agency of the weather.

It is well known, that masses of granite which have been detached from the neighbouring hills, are worn down and disintegrated by the weather; and also, that the lamellæ or strata of granite, which still retain their original situation, when exposed to the atmosphere, split and slide down into the adjoining vallies. * Since then we have ocular proofs of the hills being broken down and disintegrated by the wea-

* The same effects are produced upon granite in India, by great degrees of heat alternating with moisture, as those that are produced upon granite in the Alps of Switzerland, by intense frost succeeded by thaw.

ther, and since these effects are never known to be produced by any other cause, can we hesitate to conclude, that all the accumulations of debris and detached masses of granite, have originated in the same manner? — Effects are daily produced under our immediate observation, exactly similar to those to be accounted for; and although, at first sight, the magnitude of the effect may appear out of proportion to the cause, yet the latter will be sufficiently adequate, if it be admitted, that it has continued to operate through an immense lapse of ages, a circumstance which no one can possibly doubt.

It may be argued, that earthquakes are much more powerful than the slow agency of the weather, and more adequate to produce the effects under consideration. Earthquakes are certainly among the most powerful causes with which we are acquainted, in effecting changes on the crust of our globe; yet their effects are very different from those I am attempting to account for. The lamellæ and strata of the Hyderabad granite, gradually break up and scale off, exactly in the same manner as we detach successively the layers of an onion. But this appearance is very different from what we would be led to expect, had it been produced by earthquakes, for in that case the ruined appearance of the granite would not have been confined to the surface, but would have extended to the centre of the hills.

One of the most curious and interesting appearances in the geology of the Hyderabad country, is that already mentioned, of large masses of granite resting firmly on one another, in the form of ancient ruins. These are quite different from the masses which have been detached from the neighbouring hills, and afterwards heaped confusedly together; for their surfaces are closely adapted, and four or five masses are often placed firmly on each other, as if by art. Sometimes they occur on the summit of a hill; in other instances, they are found completely insulated in a plain.

From all the circumstances connected with these masses, I think we must conclude, that at present they continue to occupy their origi-

nal positions; that they are the slight remains of strata which have been gradually worn down all around them; and that they now stand as monuments of what the depth and nature of these strata formerly were. This conclusion is as legitimate as that the strata on the opposite coasts of England and France were once continuous, deduced from the circumstances of their corresponding in their nature, relative position, and direction. In order to show more clearly on what grounds I rest the above conclusion, I will consider the subject a little more in detail. We often observe a hill composed of successive strata or lamellæ, the most superficial of which are more or less detached and broken up; that round its base are large accumulations of debris and detached fragments; and that on its summit are three or four masses resting firmly on one another, with their surfaces accurately adapted, except perhaps at their edges, where they have been affected by the weather. Now as we have here ocular proofs that a number of strata (which formerly belonged to this hill) having been detached and worn down; and as it would almost amount to an absurdity to suppose, that the masses on the summit have been conveyed from a distance, and placed there with their surfaces accurately corresponding, we must conclude, that the hill was formerly much higher than at present, and that while a number of its strata have been gradually worn down and swept from its surface, the masses at its summit (which at one time formed part of these strata) have remained steadfast in their original situations, probably from their being more durable, or from their horizontal position. It is very evident how this must happen, when it is recollected how the lamellæ of the granite are broken down and separated from those beneath. They split in various directions, and in this manner form a number of separate masses, which slide down the sides of the hill. Now, it is clear, that the part of the lamellæ on the summit has every chance of remaining stationary, for it rests horizontally, and while all the detached pieces around it slide down into the neighbouring vallies, it will maintain its situation. When the next bed is exposed to the atmosphere, and becomes detached from

that beneath, of course the part on the summit immediately under the fragment which remained stationary in the first instance, has every chance of continuing in its situation; and thus in the course of time the appearance above described will be produced. The same explanation is to be given of the origin of those masses which are found insulated in the plains. I imagine that they rest on the summit of what were formerly hills; but which are now completely buried under their own ruins.

The peculiar arrangement and structure of the quartz and trap in the granite of Hyderabad, afford abundant proofs of the correctness of Mr. Jameson's views of the formation of veins, viz. that they are of simultaneous formation with the rock which they traverse. In the Hyderabad country, we find quartz and trap under the forms of veins, nodules, and mountain masses, sometimes perfectly distinct from the surrounding granite, in other instances intermingling with it, and gradually passing into it. With these facts before us, can we doubt that these rocks are of cotemporaneous origin?

I have often been surprized that theorists, in their attempts to explain the various phenomena presented by the crust of our globe, have never employed causes of whose existence we have certain proof, and with whose effects we are well acquainted; but on the other hand have assumed the existence of causes of which we never had experience, and whose effects we never witnessed. Huttonians assume the existence of a central fire*, which they contend to be the cause of

* The heat of the Huttonians must be an extremely convenient as well as powerful agent, for it can both liquify and consolidate bodies. At one time it can inject a flood of melted basalt into the superincumbent rocks; at another time it can consolidate sandstone, and other secondary rocks, at the bottom of the ocean. There are two facts which are very hostile to this theory; first, the greater the pressure, the greater is the obstacle to the fusion of a body: — second, the greater the heat, the greater is the opposition to the consolidation of a body. Now, the Huttonian theory requires that the two great agents which it employs, viz. heat and pressure, should act in concert; the heat to liquify, or (as occasion may require) to consolidate bodies; the pressure to prevent the escape of volatile substances, which might be otherwise dissipated. These two forces, however, must oppose each other; for heat is one of the most powerful agents with which we are acquainted in

the consolidation of the debris of former hills, and consequently of its conversion into new rocks. But that such a supposition is by no means necessary, is evident from the circumstance, that this consolidation often takes place without the assistance of heat. I have already mentioned that the debris of the Hyderabad granite becomes gradually consolidated, merely by pressure; and that the greater the pressure, the more perfect is the consolidation. This is a power with whose effects we are well acquainted. By bringing the particles of bodies closer to each other, pressure becomes a powerful cause of consolidation; and I am convinced that without the assistance of any other agent, it is one of the most general and powerful causes of the changes which happen in the mineral kingdom.

CAMP KULLE-DGHEE, 1*st July*, 1824.

ROCK SPECIMENS FROM THE VICINITY OF HYDERABAD.

The specimens from No. 1 to 13., are the most common varieties of granite, in the Hyderabad country.

1, 2, 3, 4, are from Bowenpilly, several miles to the north of the city of Hyderabad.

5 and 6 are from Shumshabad, about 12 miles west of the city; 5 is from a stratum about half an inch thick, resting on that from which 6 was taken.

The specimens from 7 to 20 inclusive are from Moula Alley.

Moula Alley hill is a large mass of lamellar granite, of a mammillary form, having a smooth surface, perfectly devoid of vegetation, except

---

separating the particles of bodies, while pressure brings them closer to each other. The pressure of the ocean, therefore, although, in all probability, equal in itself to consolidate the debris of former hills into new rocks, may not be sufficient for that purpose, if opposed by a heat sufficiently powerful to liquify granite and trap; and a heat that would be equal to the melting of trap at the earth's surface, would be by no means adequate to do so under the pressure of mountains.

on a very few spots, where the disintegrated granite has formed a superficial bed of soil. The lamellæ of the granite in some places scale off, split in various directions, and gradually slide or fall down into the neighbouring vallies, where they continue to break down into still smaller masses, until they become completely disintegrated. The lamellæ vary from a few inches to many feet in thickness.

9 and 10 occur in great abundance in the hill of Moula Alley.

12. Red granite with very little mica. The bed from which this specimen was taken rests upon No. 9.

13. Granite with the mica in large concretions.

14. White granite without mica.

15. Granite containing a vein of mica.

16. A variety of granite with mica predominating, from a nodule in one of the common kinds of granite.

17. From a nodule in the granite.

18. From a nodule of trap in the granite.

19. From a trap vein about 12 feet thick, with part of the contiguous granite adhering to it.

20. Trap passing gradually into granite.

21, 22, 23, 24 from a vein of quartz in the granite, extending from near the city of Hyderabad, several miles in a northerly direction. This vein is of a very considerable magnitude. Being of a more durable nature than the granite, it has been much less affected by the weather; and while the granite in its vicinity has been worn down, and in a great measure levelled, it has remained in the form of a ridge. In several places the quartz is intermixed with felspar, which makes it more liable to be acted on by the weather, and accordingly we find that in these places it is worn down, and the continuity of the ridge is thus interrupted.

25. From a trap vein which extends from the cantonment of Secunderabad, in a westerly direction. When it approaches the quartz vein described above, it divides into two or three branches, and penetrates the quartz in several places.

26. Red granite without mica, from the vicinity of the quartz.

27. Quartz and felspar in large concretions, from the vicinity of the quartz.

28. Granite with epidotic veins, associated with the quartz, near the place where it is penetrated by the trap.

29, 30. Granite without mica found near the quartz.

31. Disintegrated granite from a depth of 4 or 5 feet from below the soil, beginning to consolidate.

32. From immediately under the soil.

33. Nodular basalt from a trap vein.

34. Nodules of trap found loose on the surface of the ground.

No. VIII.

METEOROLOGICAL JOURNAL OF THE WEATHER ON THE MALABAR COAST,

In the Years from 1810 to 1823, with Observations.

Communicated by Murdoch Brown, Esq., of Anjarakandy.

Months.	1810. Thermometer. Highest.	Lowest.	Mean.	Rain. Inches.	Decimal Parts.
January -	85°	70°	78°		
February -	87	78	82		
March -	88	75	81⅔		
April - -	89	78	84		37
May - -	89	76	82	20	82
June - -	84	75	78	27	
July - -	82	74	77	36	85
August -	82	75	78⅔	15	70
September	82	74	79	12	65
October -	86	74	80⅔	3	47
November	85	72	81	1	60
December	84	74	80	7	47
Mean heat of the year			80°16′		
Total fall of rain in the year				125	90
Greatest fall of rain in 24 hours on the 15th July - -				4	80
Monsoon commenced on the 20th May.					

Months.	1811. Thermometer. Highest.	Lowest.	Mean.	Rain. Inches.	Decimal Parts.
January -	84°	71°	78°		
February -	86	76	83⅓		
March -	89	76	83⅓		15
April -	90	78	84⅓	3	22
May - -	87	79	84	5	70
June - -	83	77	79	36	75
July - -	83	76	80	23	35
August -	82	76	79⅓	18	50
September	83	77	80⅓	2	70
October -	84	76	80⅓	13	67
November	84	72	77⅔		85
December	84	68	79		
Mean heat of the year			80 13′		
Total fall of rain in the year				104	90
Greatest fall of rain in 24 hours on the 1st June - -				4	50
Monsoon commenced on the 31st May.					

Months	1812. Thermometer. Highest.	Lowest.	Mean.	Rain. Inches.	Decimal Parts.
January -	85°	68°	79°		
February -	87	76	80½		
March -	88	77	84		
April -	90	80	85		45
May - -	89	77	83	4	85
June - -	82	76	78	39	5
July - -	84	76	78	18	45
August -	84	76	79	20	20
September	85	72	77	13	55
October -	86	74	80	3	5
November	85	76	79		10
December	84	69	79	3	
Mean heat of the year			80°50′		
Total fall of rain in the year				102	70
Greatest fall of rain in 24 hours on the 25th June - -				4	85
Monsoon commenced on the 31st May.					

Months.	1814. Thermometer. Highest.	Lowest.	Mean.	Rain. Inches.	Decimal Parts.
January -					
February -				1	10
March -					
April -					90
May - -					
June - -	93°	75°	81⅔°	23	40
July - -	82	75	76	43	20
August -				25	55
September				15	90
October -				3	65
November				1	40
December					
Mean heat of the year					
Total fall of rain in the year				115	10
Greatest fall of rain in 24 hours on the 17th July - -				3	90
Monsoon commenced on the 15th June.					

Months.	1813. Thermometer. Highest.	Lowest.	Mean.	Rain. Inches.	Decimal Parts.
January -	84	72	80°		
February -	86	76	81		
March -	88	78	85		3
April -	90	82	85		27
May - -	89	76	80	10	55
June -	83	76	79⅔	18	30
July - -	82	76	79	21	70
August -	83	76	79	25	60
September	84	68	78⅔	7	55
October -	84	75	78	9	85
November	86	73	80		
December	85	70	79		
Mean heat of the year			80°35′		
Total fall of rain in the year				93	85
Greatest fall of rain in 24 hours on the 13th October - -				4	60
Monsoon commenced on the 27th May.					

Months.	1815. Thermometer. Highest.	Lowest.	Mean.	Rain. Inches.	Decimal Parts.
January -					
February -					
March -					
April -				2	5
May - -				3	80
June - -				31	50
July - -				47	70
August -				10	90
September				18	40
October -				10	25
November				8	15
December					65
Mean heat of the year					
Total fall of rain in the year				133	40
Greatest fall of rain in 24 hours on the 11th June - -				5	40
Monsoon commenced on the 27th May.					

Months.	1816. Thermometer. Highest.	Lowest.	Mean.	Rain. Inches.	Decimal Parts.
January -					
February -					
March -					
April -					95
May - -				2	
June - -				24	95
July - -	80	74°	77$\frac{26}{30}$°	37	15
August -	82	74	77$\frac{15}{30}$°	22	80
September	83	75	78$\frac{23}{30}$°	7	90
October -	84	75	78	3	55
November	85	74	80		80
December	86	70	79$\frac{3}{4}$		
Mean heat of the year					
Total fall of rain in the year				100	
Greatest fall of rain in 24 hours					10
on the 23d July - -				3	75
Monsoon commenced on the 18th June.					

Months.	1818. Thermometer. Highest.	Lowest.	Mean.	Rain. Inches.	Decimal Parts.
January -	84°	68°	79°		
February -	87	70	81		
March -	89	74	84		
April -	90	77	85$\frac{1}{3}$		19
May - -	90	79	83$\frac{23}{30}$	1	7
June - -	89	76	80$\frac{1}{3}$	43	17
July - -	82	75	78	53	98
August -	81	75	77$\frac{1}{3}$	49	97
September	82	76	80$\frac{23}{30}$	11	77
October -	83	76	80$\frac{23}{30}$	6	27
November	86	72	82	2	57
December	84	71	79$\frac{1}{2}$		23
Mean heat of the year			81°		
Total fall of rain in the year				9	19
Greatest fall of rain in 24 hours					
on the 16th August - -				6	63
Monsoon commenced on the 5th June.					

Months.	1817. Thermometer. Highest.	Lowest.	Mean.	Rain. Inches.	Decimal Parts.
January -					
February -					
March -	89°	74°	81°		
April -	90	77	86$\frac{1}{3}$		10
May - -	92	77	81$\frac{23}{30}$	5	85
June - -	82	74	79	27	70
July - -	81	74	79$\frac{3}{30}$	53	
August -	84	75	78$\frac{23}{30}$	13	90
September	82	75	78$\frac{23}{30}$	14	90
October -	85	74	77$\frac{26}{30}$	12	75
November	84	75	79$\frac{11}{30}$	6	80
December	85	70	77$\frac{3}{4}$	1	7
Mean heat of the year					
Total fall of rain in the year				136	7
Greatest fall of rain in 24 hours					
on the 21st September -				4	55
Monsoon commenced on the 26th May.					

Months.	1819. Thermometer. Highest.	Lowest.	Mean.	Rain. Inches.	Decimal Parts.
January -	85°	67°	78$\frac{1}{3}$°		
February -	87	72	81		
March -	90	77	83		30
April -	90	80	86	1	76
May - -	90	78	85	3	45
June - -	86	76	80$\frac{1}{3}$	34	94
July - -	83	75	79	41	58
August -	82	76	76$\frac{2}{3}$	23	81
September	83	76	79	20	31
October -	84	76	80	2	66
November	85	72	80	6	66
December	87	72	81		
Mean heat of the year			80°78′		
Total fall of rain in the year				135	47
Greatest fall of rain in 24 hours					
on the 9th July - -				7	6
Monsoon commenced on the 9th May.					

Months.	1820. Thermometer. Highest.	Lowest.	Mean.	Rain. Inches.	Decimal Parts.
January -	86°	70°	80°		
February -	89	74	83		12
March -	89	76	84 1/3		
April -	90	77	84 1/3	3	44
May - -	86	77	82	17	54
June - -	83	75	78	15	29
July - -	81	74	77 2/3	29	53
August -	81	75	78 1/3	29	22
September	84	75	79 1/3	16	49
October -	86	75	81 1/3	2	40
November	86	72	81 1/3		92
December	85	72	81	2	63
Mean heat of the year			80°92′		
Total fall of rain in the year				147	58
Greatest fall of rain in 24 hours on the 29th June - -				5	38
Monsoon commenced on the 26th May.					

Months.	1821. Thermometer. Highest.	Lowest.	Mean.	Rain. Inches.	Decimal Parts.
January -	85°	74°	82°		
February -	88	70	81 1/3		
March -	90	74	83 1/3		14
April -	92	79	87		91
May - -	90	78	85	10	7
June - -	90	78	83 1/3	19	77
July - -	82	76	79	36	29
August -	83	76	79 1/3	24	80
September	85	78	81 1/3	4	15
October -	88	76	82 2/3	1	61
November	87	72	81 2/3		70
December	87	73	81 1/3		
Mean heat of the year			82°25′		
Total fall of rain in the year				98	44
Greatest fall of rain in 24 hours on the 5th August - -				4	66
Monsoon commenced on the 16th June.					

Months.	1822. Thermometer. Highest.	Lowest.	Mean.	Rain. Inches.	Decimal Parts.
January -	86°	74°	82°		73
February -	88	71	82 2/3		
March -	90	74	85		
April -	91	80	86 1/3		86
May - -	92	79	85 1/3	9	20
June - -	84	78	80 1/3	32	64
July - -	84	76	79	41	99
August -	82	77	76	24	85
September	84	77	79 1/3	16	91
October -	85	77	80 1/3	12	45
November	85	76	81	4	61
December	93	74	80 2/3	1	66
Mean heat of the year			81°50′		
Total fall of rain in the year				145	60
Greatest fall of rain in 24 hours on the 8th July - -				4	89
Monsoon commenced on the 2d June.					

Months.	1823. Thermometer. Highest.	Lowest.	Mean.	Rain. Inches.	Decimal Parts.
January -	86°	70°	80 2/3°		4
February -	87	76	83		
March -	88	79	84	3	55
April -	92	82	88		96
May - -	91	80	86 1/3	2	35
June - -	89	77	80 2/3	32	97
July - -	82	76	77	60	2
August -	82	77	79 2/3	10	22
September	83	77	80 1/3	8	74
October -	87	77	82 1/3	1	99
November	86	71	81 2/3		83
December	86	72	80 1/3		
Mean heat of the year			82°		
Total fall of rain in the year				121	67
Greatest fall of rain in 24 hours on the 15th July - -				6	46
Monsoon commenced on the 6th June.					

The house in which the observations were made from which the above tables were framed is situated at about eight miles' distance from the sea, and on ground not above twenty feet above its level. The surrounding country is chiefly hilly, and covered with trees, with stripes of paddy field winding between them. The thermometer is placed in an upstairs hall, into which the rays of the sun have no access, at the height of eighteen feet above the level of the earth, and from thirty-eight to forty feet above high-water mark. The pluviometer is of the most improved construction, from London, with a centigrade glass measure.

OBSERVATIONS ON THE TABLES FROM 1810 TO 1817 INCLUSIVE.

The abundance or deficiency in the crops of paddy does not depend on the quantity of rain that falls in the year, but on its falling seasonably and constantly, a little at a time, without any long continuance of either sunshine or rain. The very heavy and continued rains, which sometimes fall for twenty-four, and even thirty-six hours without intermission, are injurious to the growing crop, from the water running over the fields with such violence as to carry with it a great deal of the surface of the soil, which is the richest part of it, together with the manure, thereby rendering the plants less vigorous, and considerably diminishing the produce. For example, in the year 1817, though 136 inches of rain fell, the crop in general was but a middling one; whilst the crop of the preceding year 1816, in which only 100 inches fell, was a most abundant one.

The same observation is equally applicable to tree-produce, viz. cocoa-nuts, betel-nuts, jacks, mangoes, and pepper, which suffer only from long-continued drought, when the latter rains of November, and the early of April and May have both failed; then not only the following year's produce is deficient, but many cocoa-nut and betel-nut trees, and pepper-vines, wither and die in May and June. To all these another observation is uniformly applicable, with very rare exceptions,

viz. that they produce an abundant and deficient crop alternately. This I have ascertained from the records of produce of all those kinds during twenty successive years. The same, I believe, is observed of the tree-produce in Europe.

Although the variation of the thermometer appears, by the table, to be inconsiderable during the different months, yet the difference in the sensible heat in different months is, from other natural causes, great. In December and January, the wind blows, during the night and morning, very strong from the mountains, and passing over a country covered thick with lofty trees, where the humidity is condensed during the night, it is thereby refrigerated to an uncommon degree for the latitude, and feels in those months biting cold. In June, and July also, the sensible cold is considerably greater than the actual. The atmosphere then, from the quantity of rain daily falling, is loaded with humidity, and being strongly agitated by violent squalls at W. and S.W. from the sea, communicates a degree of chilly cold, not to be expected in these months in a low country so near to the line.

On the whole, however, the country is certainly a salubrious one. Chronical diseases are little known, either to the natives or Europeans. The only pestilence to which the natives were subject was the small-pox, which, since the introduction of the vaccine disease, has greatly diminished; and there can be little doubt that the population of the province has been considerably increased since it was ceded to the Company.

OBSERVATIONS ON THE TABLE FOR 1818.

The fall of rain during this year exceeds the average fall of the eight preceding years no less than 55 inches, 19 dec. parts, and the highest fall during those years, 33 inches, 12 dec. parts. The mean heat of the year also, notwithstanding this unusual quantity of rain, was about three-fourths of a degree more than during any of the eight preceding years; so that, on the whole, the state of the atmosphere in these

parts, during the year 1818, may be considered as presenting unusual phenomena with regard to both heat and moisture.

Other parts of the world have, during the same period, experienced unusual changes in the atmosphere. The great and premature heat that prevailed all over Europe; the progression of the icebergs from the frozen towards the torrid zone, and their appearance in latitudes where hitherto none had ever been seen; the melting and disappearance of the snow on the Himalaya mountains, to a much greater degree than for many preceding years; all unite to demonstrate an extraordinary and general change in the atmosphere; to trace, if possible, the causes of which, is an object most highly interesting to the progress of science and useful knowledge.

That the cause to produce such effects must be one of a general nature, and arising out of the grand, but to us as yet little known, system established by the Supreme Creator, there can be no doubt: but whether we are to look for it in the hypothesis of Herschel, "that the heat of the atmosphere of the earth depends on the density or rarefaction of that of the sun on the side towards the earth;" or whether it may be sought for in that slow but constantly operating motion of the earth, that elevates the poles; or arises from some part of the general system of the universe hitherto unperceived by men, I know not.

The bones of animals, the exuviæ of fish, and the vegetable remains discovered in the most northern climates, all the living kinds of which are, at present, peculiar to the countries near the equator, point to a period, when the situation of the globe must have been nearly the reverse of what it now is; and the result of the excavations made by Mons. Cuvier, near Paris, strongly supports this hypothesis. Not only were the exuviæ of tropical animals found at a great depth, but the various strata showed, that the sea had alternately covered, and been absent from, the space perforated, during very long periods. May not, therefore, the present change in the atmosphere be owing to the same cause by which those changes were operated?

OBSERVATIONS ON THE TABLES FROM 1819 TO 1823 INCLUSIVE.

The effects of the deficiency of rain in the year 1821, and the long-continued drought that ensued, to which I paid particular attention, were so important to the husbandman, as to render them well deserving of record; and in order to explain them more clearly, I shall state the result on each production separately.

Paddy. The crops of September were not deficient; but the second crops and all those of December were burnt up and produced little. But as Malabar produces a great surplus beyond its own consumption, and as there was little foreign demand during that year, grain continued abundant, and rose but little in price.

Betel-nut Trees. These suffered severely; and before the setting in of the rains of 1822, at the lowest estimation, a tenth of their number had perished; and those that withstood the drought were so much injured, that the ensuing crop was not above one-fifth of an ordinary one. The fruit being chiefly cultivated for home consumption, the price rose so high as to afford some compensation for the deficiency of the quantity of produce.

Cocoa-nut Trees. The effect of the drought on this palm illustrates the operation of nature in a very important point, hitherto, I believe, not much attended to by physiologists; that is, the period required, in trees of long duration, to elaborate the nourishment provided by the instrumentality of the roots and leaves, into fruit. During the whole of the years 1821 and 1822, the cocoa-nut trees continued to produce as usual, and the effect of the drought on them did not become evident until about January, 1823; from which month (though the rains of 1822 had been very abundant) their produce began to diminish, and continued so to do during all that year, which, on the whole, yielded not much above one-third of the average annual produce. It is hence evident that all the fruit produced from the month of August, 1821, when the rains of that year ceased, to the month of January, 1823, was already fully formed in the cabbage of the trees previous to the rains of 1821.

This shows, that three years are required for the elaboration of the sap, before the purpose of nature is fulfilled, by the fruit being brought to maturity; viz. two years in the trunk and cabbage of the tree, and one year from the time that the sheath or pod, containing the flowers and fruit, is protruded from the cabbage.

This valuable fact I have had various opportunities of ascertaining, by other means equally satisfactory.

In different situations I have selected cocoa-nut trees that had been neglected, where the jungle had been allowed to grow up around them, and which had produced no fruit during many years. The ground about them I cleared of jungle, and hoed it well to a considerable distance around them; their roots were then bared, and a quantity of manure put on them and covered with earth. In no instance was any improvement perceptible (though the hoeing frequently and annual manuring were continued) during the first two years. In the third year the branches began to increase in size, but not before the fourth was the pod, containing the flowers and fruit, protruded. This truth is also demonstrated by the cabbage of the tree, in which, by a careful inspection (if the tree be a full-bearing one), will be found twelve branches with their corresponding pods, flowers, and fruits, all completely and distinctly formed. We here see presented one of the most interesting objects that the vegetable kingdom affords; viz., all that is to be protruded from the tree during the ensuing twelve months, already formed so perfectly, that the number of fruit contained in each sheath can be counted by the naked eye. To conclude, the cultivator of this useful tree, the principal source of wealth to Malabar, was in a great measure remunerated for the diminution in number, by the increased price obtained for his cocoa-nuts, which in North Malabar was nearly doubled during the year 1823.

Pepper Vines. The drought was more destructive to this branch of cultivation than to any other. By the month of December 1821 great numbers of vines were withered, with the fruit on them, which came to nothing; and of the fruit on those vines which resisted the

drought a great proportion fell off, and of what remained the grains did not attain the usual size, and were, of course, very deficient in weight. The loss of vines in high and exposed places was estimated at one-fourth part of the whole, and in other places one-tenth, which, from my own observations at the time, I consider to be a low estimate. Besides this, the cultivator lost one year's labour in the progressive cultivation of the plant, for all the young vines planted in June and July 1821 perished.

The very heavy loss sustained by the cultivators of the pepper vine, was not, as in the preceding cases, in any part remunerated to them by rise in price. Pepper being cultivated solely for exportation, its price in foreign markets is regulated by the produce of that country where it is produced at least expence, and in greatest quantity. In the eastern islands and Malay peninsula, pepper is produced with little labour and expence, compared to what is required in Malabar, and without the risk of destruction by drought. The quantity therefore produced in those countries is ten times greater than in Malabar, including Travancore, so that no diminution in the annual produce here can sensibly affect the price of the article in the great marts of China, Europe, and Calcutta. All incidental losses, therefore, fall directly on the cultivator.

(Signed) M. BROWN.

ANJARAKANDY, *3d January*, 1824.

No. IX.

OBSERVATIONS ON THE SALINE LAKE OF LOONAR;

Situated in Berar, in lat. 19° 10′ N. and long. 75° 3′ E.

Communicated by Cornet J. E. Alexander, 1st Regiment Madras Light Cavalry.

It was towards the close of a cool and delightful evening in August 1823, that I was riding leisurely along in a wooded district in Berar; and at about forty miles from the encampment of Jaulnah, in company with a small party of Mugulla horse, in the pay of H. H. the Nizam, whom I had overtaken during my journeying. Whilst engaged in commonplace conversation with their leader, a Duffadar, who was armed cap-a-pié, with quilted jacket, Damascus blade, spear, shield, and what not, our discourse was interrupted, upon emerging from the shaded and gently-ascending path along which our road lay, by our approach to a low and lengthened mound, the summit of which having been attained, a most romantic and interesting spectacle was presented to us.

Beneath us, at the bottom of a mighty chasm, lay a deep, still lake, the water of which was slightly ruffled by the breeze, and beautifully tinted by the rays of the setting sun; it was of a circular form, and hemmed in by an amphitheatre of cliffs, which rose in precipitous ridges to an elevation of about 500 feet from its shore, environing it on every side, and preventing completely the egress of its waters. The rocks which surround this interesting lake cannot come under the denomination of hills, for they do not tower in any part above the level of the surrounding country; they merely form the sides of an immense caldron, the circumference of which is about three miles: in short, the

scenery, taken collectively, is a small counterpart of the celebrated Lake Avernus, differing from it in this respect, that no river

"Laco se condidit alto."

In lieu of which, a solitary spring of some magnitude, dashes in a small cascade from the eastern face of the rocks, and pours its waters into an artificial tank, surrounded by temples and pagodas dedicated to the god Siva; issuing from which it forms another cataract of about fifty feet in height, before it rushes on its turbid course to join the waters of the lake.

The whole landscape, though confined, is extremely pleasing; the dark green surface of these sunken waters strongly reflects the graceful forms of the princely palms (Borassus Umbelliformis) which fringe the margin, and advance their lofty stems into the waters of the lake. The sloping enclosure of rocks is covered half-way up with mangoe and tamarind trees, interspersed with the Rhododendron Maximus, or laurel-leaved Rhod, which here attains a height of ten feet. A little picturesque temple, on the opposite side of the lake from the fountain, advances its white walls to the brink. It is seldom or never visited by the inhabitants of the adjoining village, from the dread of tigers which inhabit the jungle around it, which also form a shelter for extensive herds of sambers, or neelgaes. The audacity of our small party in tasting of the waters of the lake was looked upon by the villagers as the grossest presumption and fool-hardiness.

Superstition, always delighting in dark ideas, early and eagerly seized upon this spot, and hither she led her votaries to celebrate her dismal orgies. The weatherworn appearance of the buildings around the spring sufficiently indicates that it has long been a seat of Hindu worship: at this time, however, the stone tank exhibited a lively and interesting sight; crowds of Mahrattah women, in a state of semi-nudity, laved their limbs in its refreshing waters; others were employed in washing their clothes, lightening their labour with singing, while a

solitary and aged Bramin poured his evening libation on the uncouth statue of the god.

It now remains to give some account of the waters of the lake, which, in a mineralogical point of view, are far from being uninteresting.

The name Loonar is derived from the Hindoostanee لونار, signifying a salt pit. The specific gravity of the water is very great. When I visited the lake immediately subsequent to the monsoon, the taste was uncommonly brackish; consequently in the hot season the weight of water must, I should imagine, be nearly equal to that of the Lake Asphaltes, or the Dead Sea, in Judea, which is 1.240.

By a rough analysis, the component parts in 100 are, I think, nearly as follows: —

Muriate of soda, - -	20.82
Muriate of lime, - -	10.60
Muriate of magnesia, - -	6.10
	37.52

Paper stained with turmeric, and immersed in the water, was changed into a deep brown, plainly indicating the predominance of the muriate of soda.

USES.

About six years ago, before the late Mahrattah war, the annual revenue which arose from the collection of the saline crust, on the margin of the lake, amounted to three lacs of rupees; since which the bunds or mounds of earth, which are built across the heads of gulleys, which descend into the lake, have been suffered to fall into a state of decay, in consequence of which a very small portion of the bed of the lake is dry in the hot season. The town of Loonar is now almost dilapidated. When I passed through it there was only a single doocan * in the

* Shop.

bazaar, which formerly was the resort of merchants from every part of India, as the extensive caravanseras on the outskirts of the town sufficiently indicate.

The chief use to which the sediment of the water was applied was in cleansing the shawls of Cashmere, an alkaline soap or رِیہ being manufactured out of the muriatiferous clay, and sent to that distant region. It was also used as an article of food by Musselmans, and formed an ingredient in the Pupreè khar, or alkaline cake. It was employed as aqua regia in the solution of gold, and tasted medicinally. From the small portion of the bed which is now annually left dry, it is applicable to very few of these uses. The fracture of a portion of the salt which I obtained was imperfectly foliated, crystallized in cubes, and the colour a greyish white.

In conclusion, I may remark, that no noxious smell arises from the waters, which are asserted to be unfathomable, and uninhabited by fish; but, by a strange antithesis, it is affirmed that the lake is the abode of numerous and large-sized alligators.

NOTE.

A small tract of rich vegetable mould, of a few acres in extent, on the east margin of the lake, is cultivated during the day, and employed in raising culinary vegetables.

No. X.

REGISTER OF WEATHER, THERMOMETER, SYMPUSOMETER, AND PLUVIOMETER,

AT ARAKAN, IN SEPTEMBER, 1825.

Hour.	Ther.	Symp.	Rain.	Wind.		WEATHER.
			Inches.	Direc.	Force.	
						Arakan, in quarters, Sept. 1, Thursday.
ix.	80.0	29.52		S.	Moderate.	Cloudy; light showers bet. 9 & 12, wind in gusts.
xii.	82.2	.48		Do.	Light.	Do. with sunshine; showers at 2.
iv.	82.0	.45		Do.	Do.	Do.
vi.	81.8	.47	0.565	Do.	Moderate.	Light clouds.
ix.	80.4	.59		Do.	Light.	Cloudy; rain; frequent showers between 9 & 12.
						Arakan, in quarters, September 2, Friday.
ix.	78.6	.62		S.	Moderate.	Cloudy; showers between 9 and 3.
iii.	82.0	.48		Do.	Do.	Do.
vi.	81.6	.48	0.430	Do.	Do.	Do.; rain at 8½,
ix.	79.6	.54			Calm.	Do. do.; rain towards morning.
						Arakan, in quarters, September 3, Saturday.
ix.	78.4	.57		W.	Light.	Cloudy; drizzling rain commenced at 6.
iii.	81.4	.44		S.	Do.	Do. Do.
vi.	81.0	.45	0.600	Do.	Moderate.	Do.
ix.	80.4	.55		Do.	Light.	Do.; rain during the night.
						Arakan, in quarters, September 4, Sunday.
viii.	78.0	29.61		S.	Light.	Cloudy; rain.
x.	80.0	.58		Do.	Moderate.	Do.
xii.	81.4	.56		Do.	In gusts.	Do.
ii.	80.0	.56		W.	Moderate.	Do.; heavy rain; heavy shower at 3.
iv.	78.6	.53		S.E.	Light.	Do.; shower at 5½.
vi.	78.6	.53	1.640		Calm.	Do.; rain.
ix.	78.6	.62		S.	Moderate.	Do.

Hour.	Ther.	Symp.	Rain. Inches.	Wind. Direc.	Wind. Force.	WEATHER.
						Arakan, in quarters, Sept. 5, Monday. ☾ last quarter, 10½ night.
ix.	78.0	.64			Calm.	Cloudy; shower at 8; showers between 9 and 3.
xii.	78.6	.54			Do.	Do.; light do.; frequent do. between 3 and 6.
iii.	79.0	.49	2.435	S.	Light.	Do.; rain.
vi.	78.0	.57		Do.	Do.	Do.; shower at 9½.
						Arakan, in quarters, September 6, Tuesday.
ix.	78.4	.57		S.	Moderate.	Cloudy: rain since day-break; incessant rain from 1¾ till 3.
iii.	80.0	.47			Calm.	Do. Do.
vi.	79.4	.52	1.353	NW	Moderate.	Do. Do. at 6¾.
ix.	78.0	.55			Calm.	Light clouds; rain throughout the night
						Arakan, in quarters, September 7, Wednesday.
ix.	78.4	.50		S.	Light.	Cloudy; drizzling showers between 9 and 12.
xii.	81.4	.41		Do.	Moderate.	Do.; sky clearing N.
iii.	84.0	.28		SW.	Do.	Do. with sunshine; rain between 3 and 4.
vi.	82.2	.30	0.165	Do.	Light.	Do.; rain at 7.
ix.	81.6	.42		S.	Do.	Do.; strong gusts of wind between 9 and 10; sky clear at 11.
						Arakan, in quarters, September 8, Thursday.
ix.	82.2	.32		S.	Brisk.	Clear, with a few light clouds.
xii.	86.4	.20		Do.	Do. in gusts.	Do. do.; slight shower at 1.
iii.	86.0	.21		Do.	Strong.	Do. do. do.
vi.	83.0	.30	0.018	Do.	Light.	Do. do. do.; cloudy at 7.
ix.	81.0	.38		Do.	Do.	Do. do. do.
						Arakan, in quarters, September 9, Friday.
ix.	81.8	.40		S.	Light.	Cloudy.
xii.	85.8	.32		Do.	Moderate.	Do.; light shower at 1½; heavy shower at 11¼.
iii.	84.2	.32			Calm.	Do.
vi.	83.4	.34	0.545	S.	Light.	Do.
ix.	82.2	.46		Do.	Do.	Do.; slight shower at 11; rain during the night.
						Arakan, in quarters, Sept. 10, Saturday.
ix.	79.8	.55		S.	Moderate.	Cloudy; rain since 8½; light rain till 11.
xii.	80.5	.50		Do.	Light.	Do.; do. at 11¼.
iii.	78.0	.53		W.	Do.	Do.; heavy do.; showers at 4 and 5½.
vi.	78.8	.49	1.695	Do.	Do.	Do.; shower at 8½.
ix.	77.9	.57			Calm.	Do.; rain; several showers between 9 and 11.
						Arakan, in quarters, September 11, Sunday.
ix.	78.0	.56			Light air.	Cloudy, with sunshine.
xii.	82.0	.50			Do.	Light clouds; bright sunshine.
iii.	85.4	.35			Do.	Cloudy; light shower at 4¼.
vi.	84.8	.40	0.770		Do.	Light clouds; sky clear at 8½.
ix.	82.8	.51		S.	Light.	Cloudy.

Hour.	Ther.	Symp.	Rain.	Wind.		WEATHER.
			Inches.	Direc.	Force.	
						Arakan, in quarters, September 12. Monday.
ix.	79.2	.58			Calm.	Cloudy; rain since day-break.
xii.	81.2	.52			Light airs.	Do.; light do. from 9 till 12.
iii.	83.8	.38			Do.	Do. do.
vi.	81.2	.41	1.305	S.	Light.	Do.; rain from 8 till 8½.
ix.	80.2	.50		Do.	Do.	Do.
						Arakan, in quarters, September 13. Tuesday.
ix.	79.8	29.52			Light airs.	Cloudy, with sunshine; rain before day-break.
xii.	83.2	.42		S.	Light.	Do. do.; shower at 2¾.
iii.	84.3	.30		W.	Do.	Do.; heavy shower at 5.
vi.	81.2	.45	1.055	Do	Do.	Do.
ix.	80.8	.48		S.	Do.	Do.; shower during the night.
						Arakan, in quarters, Sept. 14. Wednesday.
ix.	79.4	.52			Light.	Cloudy.
xii.	83.2	.42			Do.	Do. with sunshine.
iii.	86 8	.28		SW.	Strong.	Do. do.
vi.	85.0	.34	0.063	S.	Light.	Do.; a shower a little after 6.
ix.	83.8	.48		Do.	Do.	Do.; sky clear at 12.
						Arakan, in quarters, September 15. Thursday.
ix.	83.4	29.53		SW.	Light.	Cloudy, with sunshine.
xii.	86.8	.42			Do.	Light clouds, with do.; strong S.W. wind between 1 and 2.
vi.	86.5	.40			Do.	Clouds.
ix.	84.6	.50			Do.	Do.; light rains, from 9¼ till 10.
						Arakan, in quarters, September 16. Friday.
ix.	82.2	.52			Light airs.	Cloudy, with sunshine.
xii.	85.2	.46		S.	Moderate.	Do. do.
iii.	86.8	.35		SW.	Light.	Light clouds; do.; rain from 5 till 6.
vi.	83.0	.42	.665	S	Do.	Clouds.
x.	83.0	.50		Do.	Do.	Light do.; shower at 12.
						Arakan, in quarters, September 17. Saturday.
ix.	82.8	.48		S E.	Light.	Clouds; clear; sunshine.
xii.	87.4	.34		Do.	Brisk.	Do. do.; shower between 12 and 3.
iii.	88.0	.32		SW.	Strong.	Cloudy.
vi.	83.2	.44	.180	S.	Light.	Do.
ix.	82.0	.54			Calm.	Do.; light rain from 9 till 10½.
						Arakan, in quarters, September 18. Sunday.
ix.	81.2	.60		S E.	Light.	Cloudy; shower from 11½ till 12.
xii.	82.0	.58		E.	Do.	Do.
iii.	83.4	.49		S E.	Do.	Do; light rain.
vi.	82.4	.48	0.135	S.	Do.	Light clouds.
ix.	82.2	.54			Calm.	Cloudy.

Hour.	Ther.	Symp.	Rain. Inches.	Wind. Direc.	Wind. Force.	WEATHER.
						Arakan, in quarters, September 19. Monday, ☽ first quarter, ☌ 23 afternoon.
ix.	81.0	.62			Calm.	Light clouds; alternate shower and sunshine between 9 and 12.
xii.	83.8	.56			Light airs.	Cloudy; heavy rain till 12½; do. at 2 till near 3.
iii.	79.2	.62			Do.	Do.; do. at 5½.
vi.	78.6	.64	2.310		Do.	Do.; rain till 8½.
ix.	78.8	.66			Do.	Do.
						Arakan, in quarters, September 20. Tuesday.
ix.	81.2	.66			Light airs.	Clouds.
xii.	83.8	.56			Light.	Cloudy, with sunshine; thunder, with heavy clouds from S. W. to N. W. at 1; rain at 1.
iii.	84.0	.48		S.	Do.	Cloudy, with sunshine.
vi.	84.8	.48	0.275	W.	Calm.	Do.
ix.	83.6	.56			Light airs.	Light clouds.
						Arakan, in quarters, September 21. Wednesday.
ix.	81.2	.62			Calm.	Cloudy, with sunshine.
xii.	85.2	.46		S.	Light.	Do. do.; heavy clouds, with distant thunder N. W. between 12 and 1.
iii.	87.6	.35		SW.	Do.	Do. do.; light shower at 5½.
vi.	85.4	.39			Light airs.	Clouds.
ix.	84.2	.50			Do.	Light clouds; hazy circle round the moon at 11.; lightning E.
						Arakan, in quarters, September 22. Thursday.
ix.	80.6	29.55		N.	Light.	Cloudy, with occasional sunshine.
xii.	86.0	.36		NW	Do.	Scattered clouds; bright sunshine; distant thunder between 1 and 2.
iii.	89.0	.23		S.	Do.	Cloudy, with sunshine.
vi.	88.0	.26			Light airs.	Mackerel sky; heavy masses of cloud W.
ix.	86.8	.36			Calm.	Light clouds.
						Arakan, in quarters, September 23. Friday. Sun enters Libra 2 h. 36 m. afternoon.
ix.	82.6	.48			Light airs.	Light clouds.
xii.	86.8	.34			Do.	Do.
iii.	89.2	.20		W.	Light.	Clouds, with sunshine.
vi.	88.6	.26			Calm.	Clouds; thunder S. E.; thunder and lightning, with light showers between 7 and 8.
ix.	86.0	.39			Do.	Cloudy.
						Arakan in quarters, September 24. Saturday.
ix.	83.0	.43			Light airs.	Light clouds; bright sunshine.
xii.	88.4	.26		S.	Light.	Light fleecy clouds; do.
iii.	91.6	.12		W.	Do.	A few scattered clouds.
vi.	90.4	.20			Light airs.	Light clouds; distant thunder and lightning N. E. at 6½; cloudy.
ix.	87.2	.32		E.	Light.	Light clouds N. W.

Hour.	Ther.	Symp.	Rain. Inches.	Wind. Direc.	Wind. Force.	WEATHER.
						Arakan, in quarters, September 25. Sunday.
ix.	81.6	.42			Light airs.	Cloudy, with sunshine.
xii.	88.2	.25		SW.	Light.	Do. do.
iii.	88.4	.16			Do.	Do. do.
vi.	87.8	.24			Do.	Cloudy.
ix.	85.8	.32		S.	Light.	Cloudy; distant thunder N. at 10¼; heavy rain, with thunder and lightning during the night, 3.030 inches of rain during the night.
						Arakan, in quarters, September 26. Monday.
ix.	83.0	.46			Light.	Cloudy.
xii.	84.6	.42			Calm.	Do. with sunshine.
iii.	86.8	.31			Light airs.	Do.
vi.	86.6	.34	3.030		Do.	Light, do.
ix.	85.4	.46			Calm.	Do.
						Arakan, in quarters, September 27. Tuesday, ○ Full moon × 7 morning.
ix.	82.4	.54			Light airs.	Light clouds.
xii.	88.7	.38			Calm.	Do.
iii.	93.8	.22		SW.	Light.	Scattered clouds.
vi.	90.8	.28			Calm.	Clouds gathering eastward; distant thunder; light showers between 8½ and 9.
ix.	85.2	.43			Light airs.	Light clouds; hazy circle round the moon.
						Arakan, in quarters, Sept. 28. Wednesday.
ix.	83.8	.56			Light airs.	Light clouds.
xii.	88.2	.44		S.	Gale.	Cloudy, with sunshine; light shower; rain at 11¾.
iii.	86.0	.45			Light airs.	Do. dark, rain with thunder; light rain till 6.
vi.	81.2	.54	.230		Calm.	Do.; light rain.
ix.	81.2	.62			Calm.	Do.; rain.
						Arakan, in quarters, September 29. Thursday.
ix.	81 0	29.65			Calm.	Light clouds.
xii.	86.0	.50		SW.	Light.	Cloudy, with sunshine; shower at 11¾.
iii.	87.8	.42			Light airs.	Do. do.
vi.	87.4	.44	.070		Calm.	Do.
ix.	83.7	.53			Light airs.	Light clouds.
						Arakan, in quarters, Sept. 30. 1825. Friday.
ix.	83.0	.55		S.	Light.	Light clouds.
xii.	88.0	.40		Do.	Moderate.	Cloudy, with sunshine; thunder at 11½; heavy clouds; S. W.
iii.	86.0	.40			Light airs.	Do.; thunder; rain since 2¾.
vi.	84.4	.40	0.300		Do.	Light clouds.
ix.	83.6	.48		S.	Light.	Cloudy.
			19.834	Total quantity of rain during the month of September.		
				Total quantity of rain during the month of July, 60 inches.		
				Total quantity of rain during the month of August, 40 inches.		

R. OLIPHANT, Assist. Surgeon.

No. XI.

AN ACCOUNT OF THE ORDEALS PREVAILING AMONG THE HINDUS.

By the Abbé Dubois.

The judgment by ordeal is a leading feature of the Hindu jurisprudence, and recourse is had to it in dubious cases, either criminal or civil, in which evidence cannot be otherwise obtained.

This kind of judgment is frequently mentioned in the Hindu books, in which the gods themselves are represented as having often had recourse to it to establish the truth of dubious facts. The ordeal by fire was the most common among them.

There are four principal kinds of ordeals; viz. by the balance, by fire, by water, and by poison.

The most favourable times to proceed to the ordeals are the months (Cheitra, Veishaca, and Maryvijara,) April, May, and December. However, the ordeal by the balance can be performed at all times, except when the wind blows with violence.

The ordeals by fire and poison ought to be performed in the rainy and foggy season.

The ordeal by water ought to be performed in the hot season.

If the ordeals by fire and poison are performed in the hot season; and, on the other hand, if the ordeal by water be performed in the cold and foggy season, they will not succeed, and no satisfactory evidence

shall be obtained by them. The same will be the case if the ordeal by the balance be performed when the wind blows with violence.

ORDEAL BY THE BALANCE.

The person who is to pass through the ordeal must prepare for it by fast and ablutions. He will then call upon a learned Brahman, and expose to him the guilt laid to his charge. He shall listen to his answer, and conform himself to his instructions.

He will then go to the spot where the Brahmans are assembled, and after having made the evocation of virtue, he shall offer the pudja to the Brahmans, prostrate himself before them, and beg the favour of their *assirvahdam* (blessing).

He shall next address them in these terms:

" Tell that this day may be for me a happy day; a day of virtue; a day in which my innocence of the crime laid to my charge be acknowledged; a day in which I may be filled with good."

To which the Brahmans will answer three times:

" Let this day be for thee a happy day; a day of virtue; a day in which thy innocence be acknowledged; a day in which thou mayest be filled with good."

This ceremony, which bears the name of shasty-vassam, being over, the officiating Brahman shall offer the Homam (or sacrifice to fire), in honour of the nine planets.

Then shall be brought the balance, and a little white flag fixed upon it. Having purified the spot on which it is to be fixed, by doing it over with cow-dung, and spreading on it some stalks of the sacred grass *durba*, they will fix on the ground the stake destined to support the balance.

When all is ready, the officiating priest having brought a copper vase filled with water, into which some unboiled rice and flowers have been mixed, will lay it by the side of the balance; and, turning to the east, he will say,

" Adoration to the three worlds." *

He will immediately add,

" Goddess Virtue! come in this place; come here, accompanied by the Ashta-diacu-Pologa, or the eight gods, guardians of the eight corners of the world †, by the gods of Wealth and by winds."

After this mantra he shall offer the great pudja to the goddess Virtue. Then turning to the east, he will say,

" Adoration to Indra!" (the Lord of God.)

Turning to the south, he will say,

" Adoration to Yama!" (the Lord of Hell.)

To the west,

" Adoration to Varuna!" (the Lord of Water.)

To the north,

" Adoration to Cubera!" (the Lord of Wealth.)

To the south-east,

" Adoration to Agny!" (Fire.)

To the south-west,

" Adoration to Nehirita!" (the Lord of Demons.)

To the north-east,

" Adoration to Vahioru!" (Wind.)

To the north-west,

" Adoration to Isannia!" (the Lord of malevolent Spirits.)

He shall next offer the pudja in honour of all gods in general.

Then turning to the east, he shall offer the pudja to the gods of Wealth, who are eight in number, viz. Dara, Druba, Shama, Cubera, Appa, &c. &c.

Turning to the north-east, he shall offer the pudja to the twelve suns, whose names are Datra, Arguayama, Mitro ‡, Varuna, Buga, Indra, &c. &c.

* They are Suarga, Bulocam, Pattalam (heaven, earth, hell), designated under the generic name Tri-locam (the three worlds).

† Their names will be soon mentioned.

‡ This is one of the most common names of the sun; and is remarkable on account of its resemblance to the god Mitro of the ancient Persians, which was nothing else but the sun personified.

Turning to the south-west, he must offer the same pudja to the twelve Rudras, whose names are Vira-badro, Shambu, Guyrisha, Capatria, Stanaba, &c. &c.

He shall offer the same to the sixteen mothers, the names of whom are, Brammy, Cumatiry, Vishnary, Varahy, Mahindry, &c. &c.

He must next offer it to Ganiza, and finally to the eight winds, whose names are, Anima*, Maruta, Prama, Pranashisha, &c.

He finishes the whole by offering to Virtue the little pudja; that is, dust of sandal-wood, flowers, frankincense, akchatta, (or grains of unboiled rice made red with saffron-water), a burning lamp and neweddiam; the latter consists of articles of food.

He must, after that, make the Homam in the following manner: Having procured fire for the purpose, he shall make on it the evocation of the god Fire; and having purified it according to the right of the Védam he follows, he shall recite on it the Mantram Gayatry, and then cast into it a hundred and eight, or twenty-eight, or at least eight bits of the wood of the sacred tree Mahduga, after having dipped them into liquefied butter and boiled rice mixed together.

After these preparatory ceremonies, the accused person, who must be fasting and clothed with wet clothes, shall be placed on the weight of the balance, which is turned to the west, whilst the opposite weight shall be filled with bricks, and the grass durba, until both weights are in perfect equilibrium. After having remained for some time in this position, he will come down, and immediately go to perform his ablutions, without taking off his clothes.

When he returns, the officiating Brahman shall write the following mantram on two lines, so that both lines be perfectly equal, and contain the same number of letters.

"Sun, Moon, Wind, Fire, Suargam, Earth, Water, Virtue, Yama, Day, Night, Twilight of the day and the night, you know the deed of this man, and whether the crime laid to his charge be true or false."

* A most remarkable name. Anima, *Seu spiritus, id est ventris.*

He must write beneath these lines the crime laid to the charge of the accused, and the paper shall be put on his head.

In the meanwhile, the characters cannot be written with black ink; but any other colour different from this shall be used for the purpose.

The officiating purohita shall then address to the balance the following mantram:

"Balance! you know all that passes in the heart of men; you are acquainted with their vices and virtues; you are thoroughly acquainted with all that is most secret, and that which is out of the power of men to know. Behold now before you a man who is charged with a crime of which he declares himself innocent, and who wishes to be fully justified, through your means, before men; it is but just that you should declare yourself in his behalf, if he be really innocent."

Meanwhile the motions of the balance ought not to be directed by a contemplative, or a man acknowledged as a rogue, or even one of dubious character: the former would prove too much accessible to pity, and the latter would not be afraid to commit a crime. Wherefore a Brahman, acknowledged as a wise and virtuous man, shall be selected for the purpose, and when all is ready he shall address to the balance the following mantram:

"Balance! the Gods have established you to render justice to men, and make them know the truth: discover it to us in this circumstance; and if the man who is going to pass through your ordeal be really guilty, let him remain not in equilibrium, and let the weight of his sin drag him downwards."

The officiating Brahman will immediately cause the accused to be placed on the very same weight of the balance on which he had been before placed, and shall four times repeat, in singing, a stanza composed for the circumstance. If during this time the weight of the balance on which the accused is placed descends, he shall be declared guilty. If it ascends, he shall be declared not guilty. If both weights remain in equilibrium, he shall be declared half guilty. If the rope of the balance breaks, he shall be declared guilty.

After the ceremony, suitable presents shall be made to the assembled Brahmans, according to their rank and dignity.

Such are the ceremonies practised in the ordeal by the balance.

THE ORDEAL BY FIRE.

The preparatory ceremonies being the same as those described in the ordeal by the balance, it is useless to relate them again.

The following are the ceremonies peculiar to this kind of ordeal:

Eight circles shall be described on the ground, on a parallel straight line from east to west. Each circle must be sixteen inches of diameter; and a span of the same dimensions must be left between each circle.

Fire is the god of the first circle, Varuna of the second, Wind of the third, Yama of the fourth, Indra of the fifth, Cubera of the sixth, the Moon of the seventh, and Chabitry of the eighth.

A ninth circle shall be described separately, to the south of the eighth, dedicated to all gods.

All these circles shall be purified by doing them over with cow-dung, and by spreading on them some stalks of durba.

This done, the pudja shall be offered to each circle in particular.

In the meanwhile, the person who is to pass through the ordeal being fasting, and having made his ablutions without taking off his clothes, will come, and standing within the first circle described on the west side, and having his face turned to the east, both his hands shall be done over with wheaten meal diluted in curd; and then seven leaves of the tree assuata, seven leaves of the tree shony, and seven stalks of durba shall be tied up to his hands.

A blacksmith must next be sent for, and having given him a little iron bar, eight inches in length, and four seers in weight, he shall be required to cause it to be made red hot until it sparkles.

After that, the officiating purohita having brought fire in a new earthen vase, and having laid it to the south of the ninth circle, shall

purify it by proper mantrams according to the rite of the Vedam he follows, and shall then make the Homam by pouring a hundred and eight times some liquefied butter into this fire.

He will next make the evocation of virtue in the manner before described in the ordeal by the balance, and shall throw into water the red hot iron bar.

Having caused it to be made red hot another time, when it is sparkling, he must address to it the following mantram:

" Fire! you are the four Vedams, and under this title I am going to offer the Homam to you. You are the visage of all gods: you are also that of all learned men. You efface all our sins, and it is on this very account that you bear the name of *pure* and *purifier*. I am the greatest of all sinners; but I have the happiness of seeing you. Purify me of all my sins, and if this man who is going to pass through your ordeal be really guiltless, lose in his behalf your burning property, and do him no injury."

He shall then write the following mantram:

" Fire! you know all that passes in the heart of men," &c. &c. (as before, in the article of the balance.)

Having made the evocation of virtue, he will say,

" Adoration to the three worlds!" and immediately after he shall exclaim, " Fire! come here! come here! remain here! remain here!"

After that, he will offer a second time to this element the Homam, and a neweddiam of boiled rice.

These ceremonies being over, the officiating priest will order the accused to place himself within the first circle to the west, and taking with thongs the red hot iron, whilst it is still sparkling, he will say,

" Fire! you are witness of all the deeds of men; make us therefore know the truth in this circumstance."

And forthwith putting the sparkling bar on the hands of the accused, the latter shall measure all the circles, not in a running way, but placing both his feet within each circle.

When he has reached the eighth circle, he will cast the red hot iron bar upon straw, which must be put in fire by the contact.

If, during the time he is overrunning the circles, the iron bar fall from his hands, he shall be obliged to begin again.

If the sparkling iron bar has only burned the leaves tied up to his hands without injuring the skin, he shall be declared not guilty; and in order the better to ascertain the fact, some rice in the husk will be given him, and he shall be obliged to separate the grain from the husk, by strongly and repeatedly rubbing and compressing it between his hands.

If the skin of his hands has been injured, he shall be declared guilty.

If he has accidentally been burned in any other part of the body, it will be no matter, provided that the hands are uninjured.

After the ceremony, presents shall be distributed to the attending Brahmans.

ORDEAL BY WATER.

The preparatory ceremonies, mantrams, &c. are the same as those described in the ordeal by the balance. The ceremonies peculiar to the circumstance are the following:

A circle is described on the ground, and after it has been purified by doing it over with cow-dung, and by spreading on it some stalks of the grass durba, a pudja consisting of flowers, frankincense, and akchatta (or grains of unboiled rice made red with saffron water), is offered to the circle.

Another pudja is offered to all gods in general; and another in particular to Varuna (the god of water), consisting of dust of sandal-wood and a garland of flowers, to which is added a neweddiam, composed of honey, milk, and liquefied butter.

Then follows the evocation of the goddess Virtue, the Homam and pudja in the manner described before in the ordeal by the balance. The written mantram, mentioned in the same article, is put on the head

of the accused, and he is conducted to the shore of a tank, or of a river whose stream is moderately rapid.

The accused goes into water to his middle, and a stake is fixed near him in the bed of the river.

Then the officiating priest, turning to the east, shall address to water this mantram:

"Water! you are the life of all that has life. You create and destroy at your pleasure. You purify all things, and one is always sure to know the truth when one takes you for judge; deliver us therefore from the doubt in which we are, and make us know whether this man is guilty or not guilty.

Then a Brahman is required to go walking an ordinary pace, to a certain distance which has been measured for the purpose, and to come back.

At the instant he starts, the accused, taking hold with both his hands of the lower end of the stake fixed near him, plunges into water. If the head of the latter comes out of the water before the former has accomplished his walking, by coming back to the shore, he is declared guilty; if it comes out after, he is declared not guilty.

When both the accused and accuser are condemned to undergo the ordeal, both are ordered to plunge into water at the same instant, and he who comes out the first is declared guilty.

ORDEAL BY POISON.

The ceremonies, pudja, mantrams, &c. in this kind of ordeal are the same as those described before.

When all is ready, having procured a certain quantity of white arsenic, it is reduced to a fine powder, and mixed together with a measure of liquefied butter; then, after having performed the ordinary ceremonies, the officiating Brahman addresses to this substance the following mantram:

"Poison! you are a mischievous substance, created to destroy impure and guilty creatures. You were vomited out by the serpent Bashushy, at the very period when the gods and giants united together, churned the sea of milk in order to extract from it the *amrita*, and you were created for the purpose of killing the guilty giants. Behold now a man accused of a crime, of which he declares himself innocent. If he be really guiltless, lose in his behalf your mischievous qualities, or rather become to him an *amrita*," (nectar, ambrosia.)

The accused shall be dismissed after having swallowed up the poison. If, although sick, he survives three days, he shall be declared not guilty.

There still exists a great number of private ordeals, which do not require so much solemnity; such as that of obliging the suspected person to sink his arm to the elbow into a vase filled with boiling oil, with which cow-dung has been mixed, in order to increase its ardour; that of enclosing a snake (Cobra Capella) in a basket, into which a ring or a piece of money is cast, and the accused obliged to fetch the ring or piece of money after having been blindfold; and many others. If, in the first instance, he does not experience the effects of the boiling oil, and if he is not bitten by the snake in the second, he is reputed not guilty; and guilty if the reverse happens.

The ordeals are recurred to in dubious cases, not only by public magistrates, but also oftener by private persons, to ascertain a fact which interests them. A housekeeper, or the chief of a village in the houses of whom any article of value has been stolen, will frequently oblige the persons who compose their family, or the inhabitants of their village, to undergo the ordeal, in order to find out through it the thief. Jealous husbands will often have recourse to it, in order to ascertain the virtue of their wives.

These ordeals have in many instances the advantage of intimidating the persons against whom they are directed, who when they perceive that they cannot escape them, confess their guilt. But this advantage is far from compensating for the real and serious evils which in most

instances result from them, by causing the condemnation of persons often guiltless, who fancy that they may with impunity be undergone, and that the clements ought to bear a public and authentic testimony to their innocence, and lose for this purpose their inherent properties.

I know instances of married women unjustly suspected by their husbands, and obliged by them to make out their virtue by tlie ordeal of the boiling oil. The former, proud of their innocence, did not hesitate to undergo the ordeal, the consequences of which were a considerable swelling and inflammation of the arm, soon followed by gangrene and death.

It is no doubt the manner in which the sanctity of the oath is slighted by the Hindoos which has given rise to the ordeals. In fact, there is perhaps no people on earth among whom an oath is more common, and perjury more frequent, or committed with so little remorse. If in the most ordinary transactions of life they have no scruple to confirm them by the most awful oaths, and often by the most dreadful imprecations, they have still less to violate either when their interest requires it. And woe to the person, the honour, or other temporal interests of him who shall depend upon the oath of a Hindoo, if it be the interest of the latter to injure him!

(Signed) J. A. DUBOIS, Missionary.

No. XII.

A TRANSLATION,

By Ram Raz, Head English Master in the College of Fort St. George,

OF

AN ANCIENT GRANT IN THE CARNATACA LANGUAGE.

" Be prosperous! In the year of Saka 1412, on Tuesday the 15th of the increasing moon, in the conjunction of the planets in the lunar constellation of Critika, and in the month of Cartika of the year Saumya, — I, Virasrí Gajapati Gaud,éswara, the lord of the nine crores of the Carnataca infantry, and sovereign of the city of Calibarige, equal to Purushótama in glory, the king of kings, possessing dominions through valour, and endowed with all the virtues, having performed libation on the banks of the river Brahmagunde, do give the village of Potaveram, in the province of Ammanapolu, with the eight rights of enjoyment appertaining thereto, for the purpose of celebrating festivals to Sri Mahalingodbhava, the god of Chedulávadu. Whosoever shall support this gift, will obtain the fruit of performing a hundred sacrifices in Cási, and an increase of life, health, and prosperity; and whoever seizes it, will incur the crime of slaying a thousand black kine and Brahmans on the banks of Ganga."

SANSCRIT STANZAS.

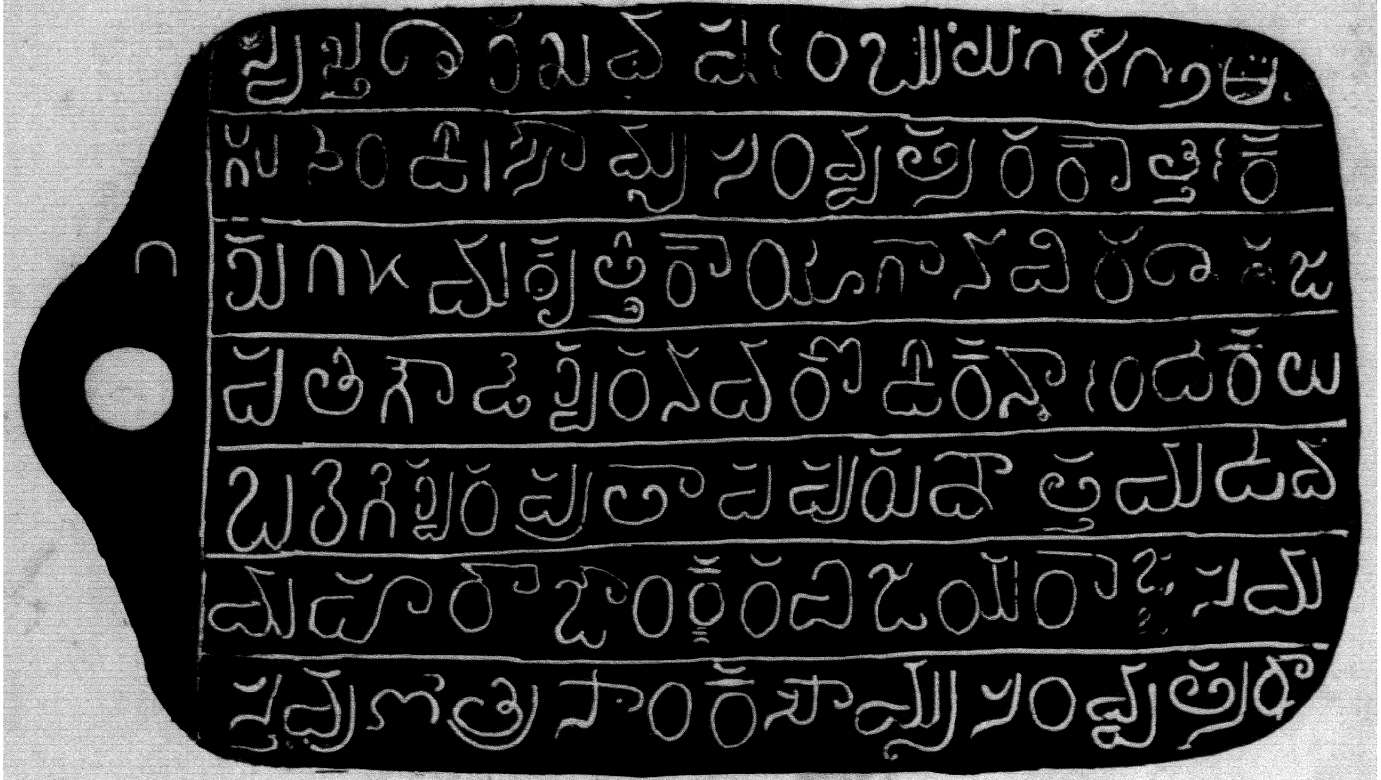
" I shall bear on my head the sandals of those, either of my own race or that of others, who, ever intent on virtue, may continue to protect my donation.

" To support that given by another is more meritorious than one's own gift; and, by seizing that given by another, one's own gift becomes fruitless.

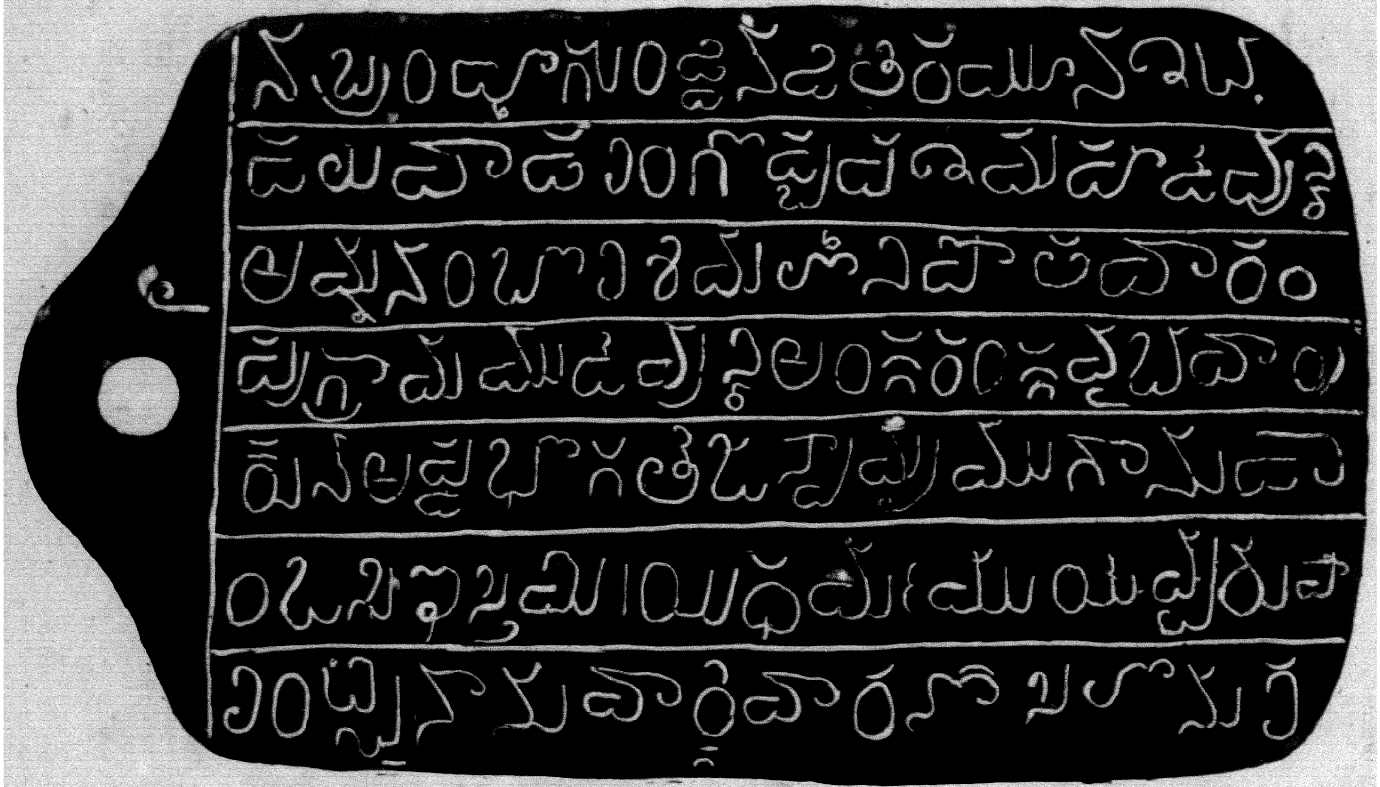
" He who seizes that given either by himself or by another, shall be born as a worm in the midst of ordure for sixty thousand years."

THE END.

LONDON:
Printed by A. & R. Spottiswoode,
New-Street-Square.

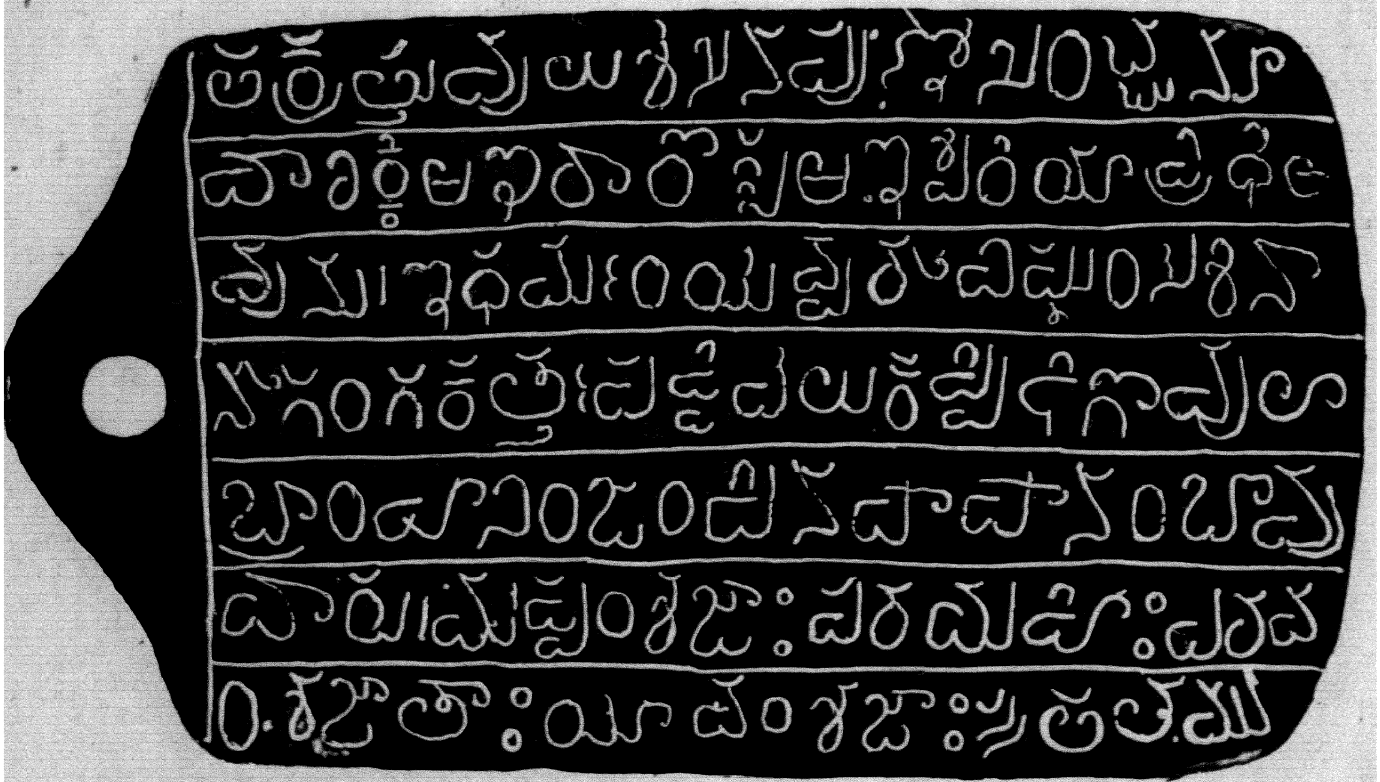


Published, by Longman, Rees, Orme, Brown, & Green, 1827.

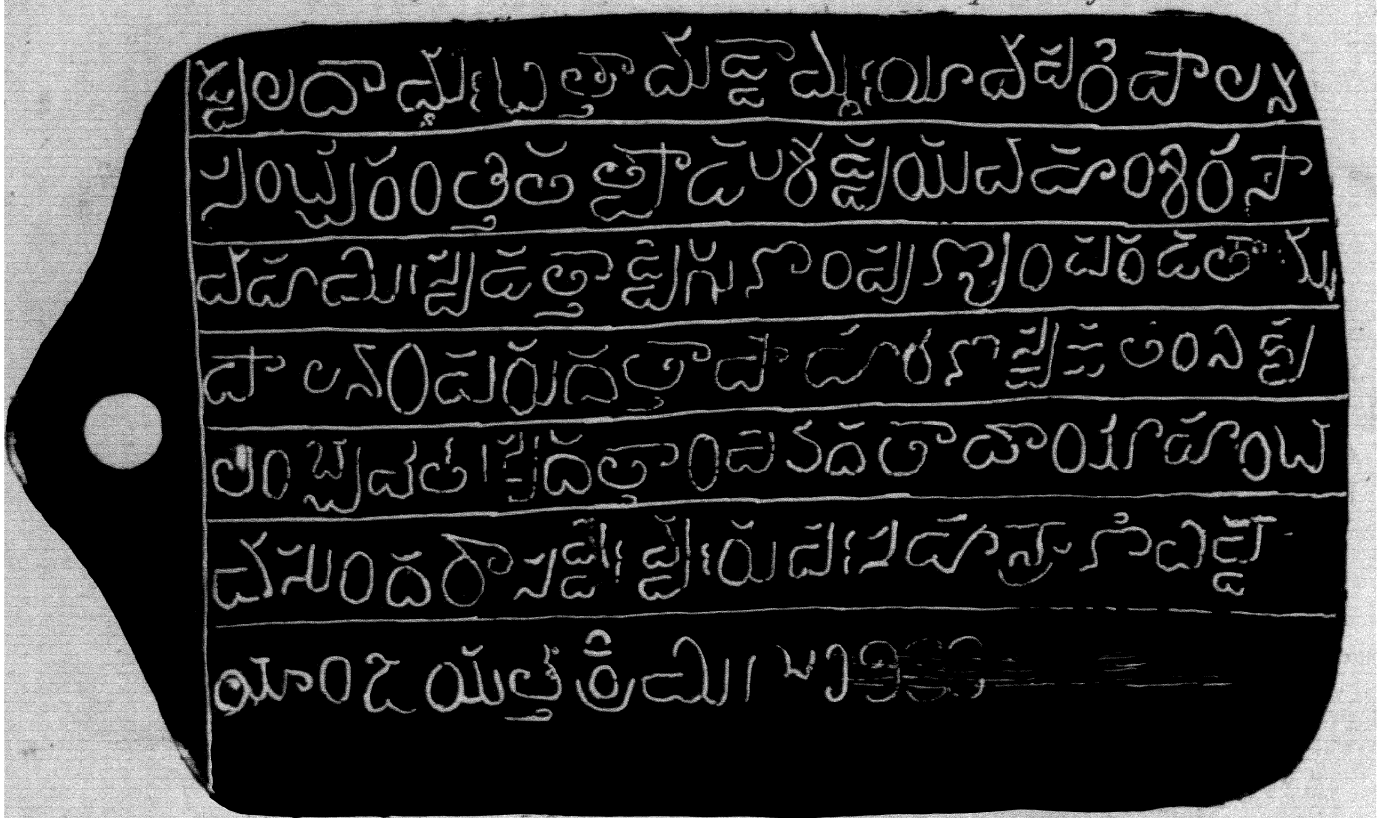


N.° 2.

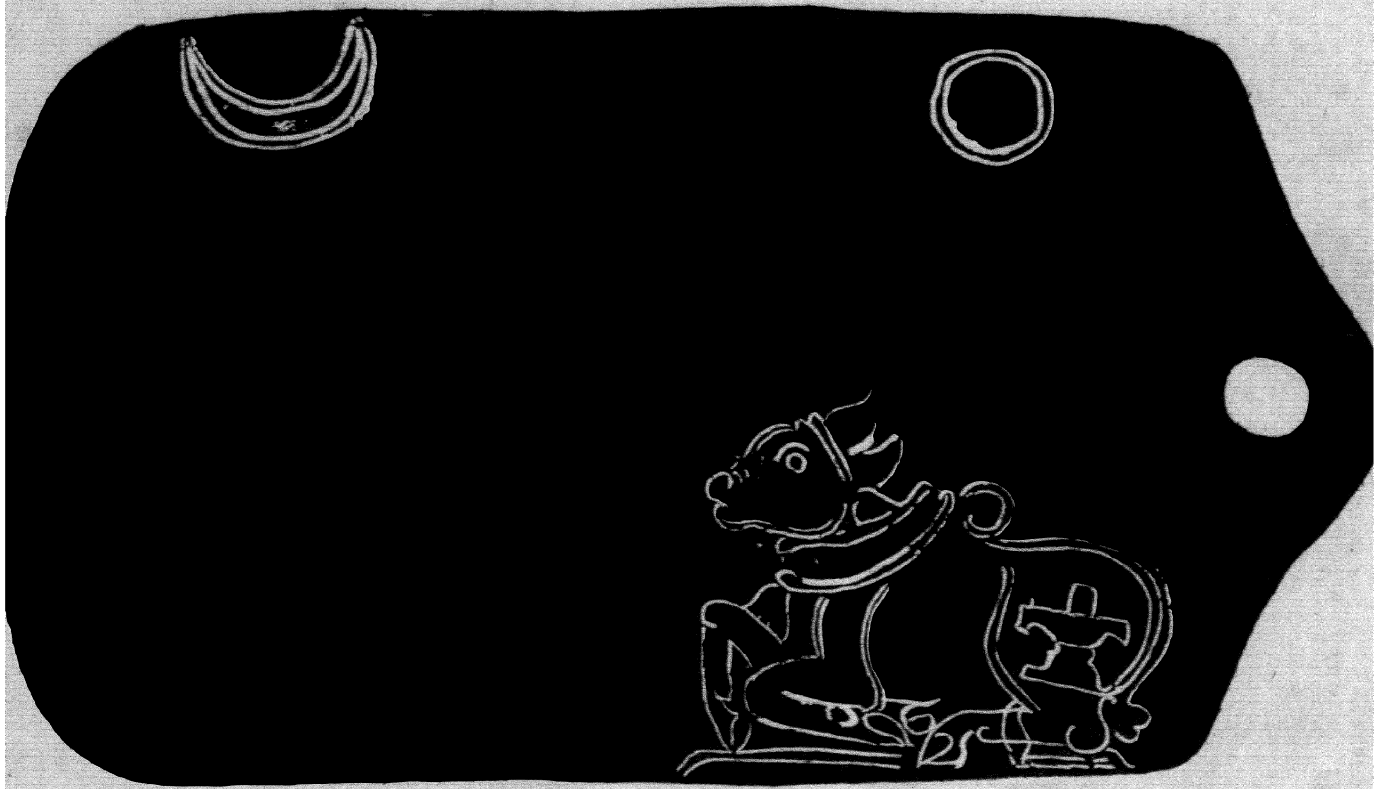
Published by, Longman, Rees, Orme, Brown, & Green, 1827.



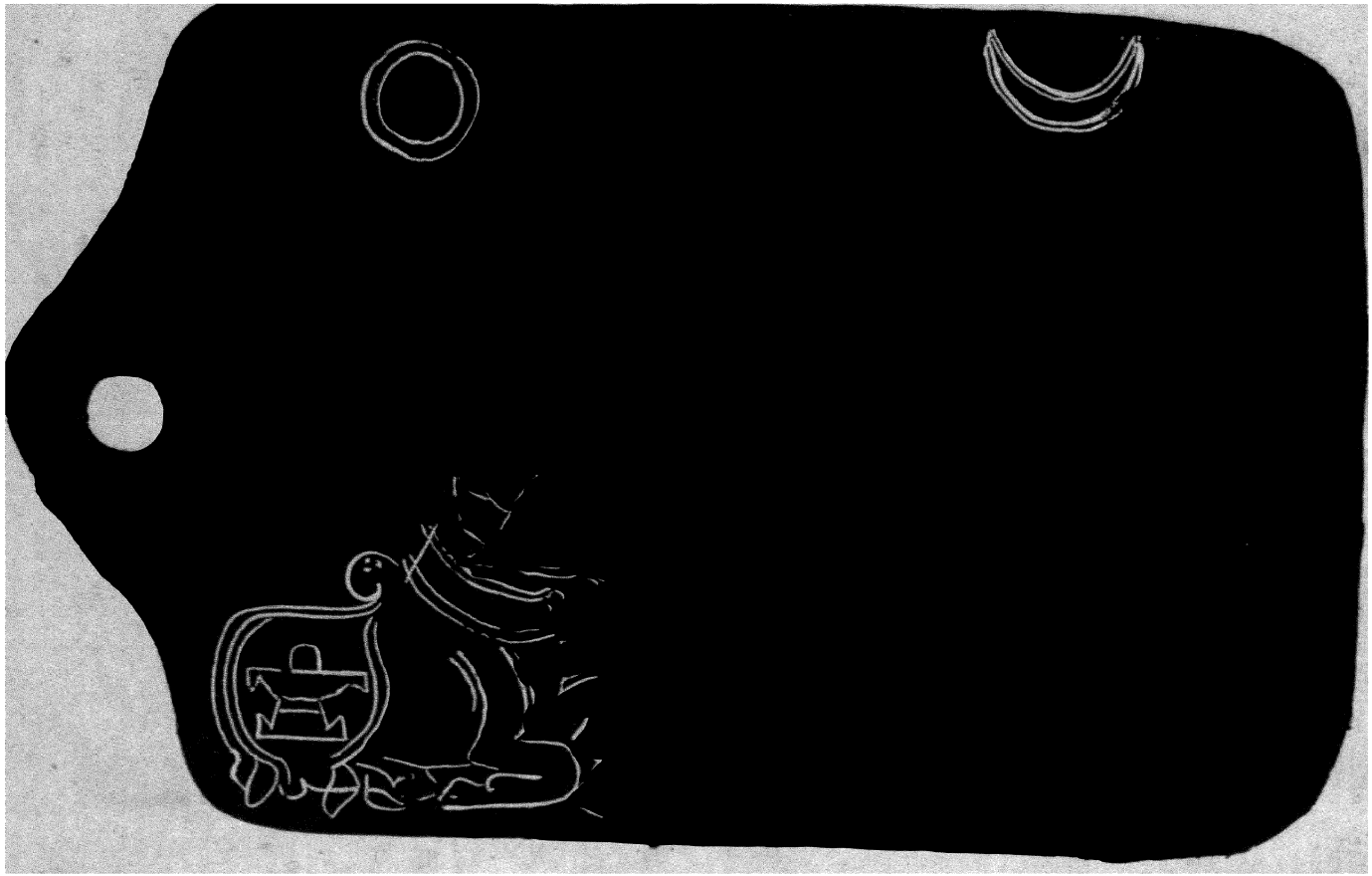
Published by, Longman, Rees, Orme, Brown, & Green, 1827.



Published, by Longman, Rees, Orme, Brown & Green, 1827.



Published by Longman, Rees, Orme, Brown, & Green. 1827.



Published by [illegible] Brown 182[illegible]

Paper XIII.

ANCIENT GRANT.

Pub'd by Longman, Rees, Orme, Brown, & Green, 1827.