THE
POPULAR EDITION.

ASIATIC RESEARCHES;
OR,
TRANSACTIONS
OF THE
SOCIETY,
INSTITUTED IN BENGAL,
FOR INQUIRING INTO THE
HISTORY AND ANTIQUITIES, THE ARTS, SCIENCES,
AND LITERATURE,
OF
ASIA.

VOLUME THE FIRST.

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THE

INTRODUCTION.

If this first publication of the Asiatic Society should not answer those expectations, which may have been hastily formed by the learned in Europe, they will be candid enough to consider the disadvantages, which must naturally have attended its institution and retarded its progress: a mere man of letters, retired from the world and allotting his whole time to philosophical or literary pursuits, is a character unknown among Europeans resident in India, where every individual is a man of business in the civil or military state, and constantly occupied either in the affairs of government, in the administration of justice, in some department of revenue or commerce, or in one of the liberal professions; very few hours, therefore, in the day or night can be reserved for any study, that has no immediate connection with business, even by those who are most habituated to mental application; and it is impossible to preserve health in Bengal without regular exercise and seasonable relaxation of mind; not to insist, that, in the opinion of an illustrious Roman, "No one can be said to enjoy liberty, who has not sometimes the privilege of doing nothing." All employments, however, in all countries, afford some intervals of leisure; and there is an active spirit in European minds, which no climate or situation in life can wholly repress, which justifies the ancient notion, that a change of toil is a species of repose, and which seems to consider nothing done or learned, while any thing remains unperformed or unknown: several Englishmen, therefore, who resided in a country, every part of which abounds in objects of curious and useful speculation, concurred in opinion, that a Society instituted at Calcutta, on the plan of those established in the principal cities of Europe, might possibly be the means of concentrating all the valuable knowledge, which might occasionally be attained in
Asia, or of preserving at least many little tracts and essays, the writers of which might not think them of sufficient importance for separate publication. The Asiatic Society was accordingly formed on the 15th of January 1784, by those Gentlemen, whose names are distinguished by asterisks in the list of Members at the end of this book; and ample materials have already been collected for two large volumes on a variety of new and interesting subjects. By this publication the institution may be considered as having taken root; but the plant will flourish or fade, according as the activity or remissness of the Members and their correspondents shall promote or obstruct its growth: it will flourish, if naturalists, chemists, antiquaries, philologers, and men of science, in different parts of Asia, will commit their observations to writing, and send them to the President or the Secretary at Calcutta; it will languish, if such communications shall be long intermitted; and it will die away, if they shall entirely cease; for it is morally impossible, that a few men, whatever be their zeal, who have great public duties to discharge, and difficult private studies connected with those duties, can support such an establishment without the most assiduous and eager auxiliaries.

Before we proceed to give a short history of the institution, it may be proper to declare, that the Society will pass no decision in their collective capacity on any point of literature or philosophy, but that the writers of such dissertations, as they shall think worthy to be published from time to time, must hold themselves individually responsible for their own opinions; a declaration, which is conformable, we believe, to the practice of similar Societies in Europe.

It having been resolved to follow, as nearly as possible, the plan of the Royal Society at London, of which the King is Patron, it was agreed at the first regular meeting, that the following Letter should be sent to the Governor-General and Council, as the Executive Power in the Company's territories; and their answer, which is also subjoined, was received in the course of the next month.
THE INTRODUCTION.

To the Honorable WARREN HASTINGS, Esq.
Governor-General, President;
EDWARD WHELER, JOHN MACPHERSON,
and JOHN STABLES, ESQUIRES,
Members of the Council of Fort William in Bengal.

HONORABLE SIR AND GENTLEMEN,

A SOCIETY, of which we are Members, having been instituted for the purpose of inquiring into the History Civil and Natural, the Antiquities, Arts, Sciences; and Literature of Asia, we are desirous, that you will honor us with accepting the title of our Patrons, and request you to consider this application as a token of the great respect, with which we are,

HONORABLE SIR AND GENTLEMEN,

Your most obedient and most humble Servants,

JOHN HYDE,
WILLIAM JONES,
JOHN CARNAC,
DAVID ANDERSON,
WILLIAM CHAMBERS,
FRANCIS GLADWIN,
JONATHAN DUNCAN,
THOMAS LAW,
CHARLES WILKINS,
JOHN DAVID PATERSON,
CHARLES CHAPMAN,
CHARLES HAMILTON,
GEORGE HILARO BARLOW.

Calcutta, January 22, 1784.
THE INTRODUCTION.

THE ANSWER.

Gentlemen,

We very much approve and applaud your endeavours to promote the extension of knowledge by the means, which your local advantages afford you in a degree, perhaps, exceeding those of any part of the Globe; and we derive great hopes of your attainment of so important an end from our personal knowledge of the abilities and talents of the Gentlemen, whose names we read in the subscription to your address.

We accept the title you have been desirous of conferring upon us of Patrons to your Society, and shall be happy to avail ourselves of any occasion that may occur of contributing to its success.

We are, Gentlemen,

Your most obedient humble Servants,

Warren Hastings,
Edward Wieler,
John Macpherson,
John Stables.
MR. HASTINGS therefore appeared, as Governor-General, among the Patrons of the new Society; but he seemed, in his private station, as the first liberal promoter of useful knowledge in Bengal, and especially as the great encourager of Persian and Sanskrit literature, to deserve a particular mark of distinction; and he was accordingly requested in a short letter to accept the title of President: it was, indeed, much doubted, whether he would accept any office, the duties of which he could not have leisure to fulfil; but an offer of the honorary title was intended as a tribute of respect, which the occasion seemed to demand, and which could not have been omitted without an appearance of inattention to his distinguished merit. His answer is also annexed.

GENTLEMEN,

I am highly sensible of the honor, which you have been pleased to confer upon me, in nominating me to be the President of your Society, and I hope you will both admit and approve the motives, which impel me to decline it.

From an early conviction of the utility of the institution, it was my anxious wish that I might be, by whatever means, instrumental in promoting the success of it; but not in the mode which you have proposed, which, I fear, would rather prove, if of any effect, an incumbrance on it.

I have not the leisure requisite to discharge the functions of such a station; nor, if I did possess it, would it be consistent with the pride, which every man may be allowed to avow in the pursuit or support of the objects of his personal credit, to accept the first station in a department, in which the superior talents of my immediate followers, in it would shine with a lustre, from which mine must suffer much in the comparison, and to stand in so conspicuous a point of view the only ineffective member of a body, which is yet in its infancy, and composed of Members with whose abilities I am, and have long been, in the habits of intimate communication, and know them to be all eminently qualified to fill their respective parts in it.

On these grounds I request your permission to decline the offer which you have done me the honor to make to me, and to yield my pretensions to the Gentleman, whose genius planned the institu-
tion, and is most capable of conducting it to the attainment of the great and splendid purposes of its formation.

I at the same time earnestly solicit your acceptance of services in any way in which they can be, and I hope that they may be, rendered useful to your Researches.

I have the honor to be,

GENTLEMEN,

Your most obedient and most humble Servant,

Fort William,  
January 30, 1784.  

WARREN HASTINGS.

On the receipt of this letter, Sir William Jones was nominated President of the Society; and, at their next meeting, he delivered the following Discourse.
A DISCOURSE
ON THE
INSTITUTION OF A SOCIETY,
FOR INQUIRING INTO THE
HISTORY, CIVIL AND NATURAL,
THE ANTIQUITIES, ARTS, SCIENCES AND LITERATURE,
OF
ASIÀ.
BY THE PRESIDENT.

GENTLEMEN,

WHEN I was at sea, last August, on my voyage to this country, which I had long and ardently desired to visit, I found, one evening, on inspecting the observations of theJay, that India lay before us, and Persia on our left, whilst a breeze from Arabia blew nearly on our stern. A situation so pleasing in itself, and to me so new, could not fail to awaken a train of reflections in a mind, which had early been accustomed to contemplate with delight the eventful histories and agreeable fictions of this eastern world. It gave me inexpressible pleasure to find myself in the midst of so noble an amphitheatre, almost encircled by the vast regions of Asia, which has ever been esteemed the nurse of sciences, the inventress of delightful and useful arts, the scene of glorious actions, fertile in the productions of human genius, abounding in natural wonders, and infinitely diversified in the forms of religion and government, in the laws, manners, customs, and languages, as well as in the features and complexions, of men. I could not help remarking, how important and extensive a field was yet unexplored, and how many solid advantages unimproved; and, when I considered with pain, that, in this fluctuating, imperfect, and limited condition of life, such inquiries and improvements could only be made by the united
efforts of many, who are not easily brought, without some pressing inducement or strong impulse, to converge in a common point. I consol’d myself with a hope founded on opinions, which it might have the appearance of flattery to mention, that, if in any country or community such an union could be effected, it was among my countrymen in Bengal, with some of whom I already had, and with most was desirous of having, the pleasure of being intimately acquainted.

You have realized that hope, gentlemen, and even anticipated a declaration of my wishes, by your alacrity in laying the foundation of a society for inquiring into the history and antiquities, the natural productions, arts, sciences, and literature of Asia. I may confidently foretell, that an institution so likely to afford entertainment, and convey knowledge to mankind, will advance to maturity by slow, yet certain, degrees; as the Royal Society, which at first was only a meeting of a few literary friends at Oxford, rose gradually to that splendid zenith, at which a Halley was their secretary, and a Newton their president.

Although it is my humble opinion, that, in order to ensure our success and permanence, we must keep a middle course between a languid remissness, and an over zealous activity, and that the tree, which you have auspiciously planted, will produce fairer blossoms and more exquisite fruit, if it be not at first exposed to too great a glare of sunshine, yet I take the liberty of submitting to your consideration a few general ideas on the plan of our society; assuring you, that, whether you reject or approve them, your correction will give me both pleasure and instruction, as your flattering attentions have already conferred on me the highest honor.

It is your design, I conceive, to take an ample space for your learned investigations, bounding them only by the geographical limits of Asia; so that, considering Hindustan as a centre, and turning your eyes in idea to the North, you have, on your right, many important kingdoms in the Eastern peninsula, the ancient and wonderful empire of China with all her Tartarian dependencies, and that of Japan, with the cluster of precious islands, in which many singular curiosities have too long been concealed: before you lies that prodigious chain of mountains, which formerly perhaps were a barrier against the violence of the sea, and beyond them
the very interesting country of Tibet, and the vast regions of Tartary, from which, as from the Trojan horse of the poets, have issued so many consummate warriors, whose domain has extended at least from the banks of the Hellespont to the mouths of the Ganges: on your left are the beautiful and celebrated provinces of Iran or Persia, the unmeasured and perhaps unmeasurable deserts of Arabia, and the once flourishing kingdom of Yemen, with the pleasant isles that the Arabs have subdued or colonized; and farther westward, the Asiatic dominions of the Turkish sultans, whose moon seems approaching rapidly to its wane.—By this great circumference the field of your useful researches will be included; but, since Egypt had unquestionably an old connection with this country, if not with China, since the language and literature of the Abyssinians bear a manifest affinity to those of Asia, since the Arabian arms prevailed along the African coast of the Mediterranean, and even erected a powerful dynasty on the continent of Europe, you may not be displeased occasionally to follow the streams of Asiatic learning a little beyond its natural boundary; and, if it be necessary or convenient, that a short name or epithet be given to our society, in order to distinguish it in the world, that of Asiatic appears both classical and proper, whether we consider the place or the object of the institution, and preferable to Oriental, which is in truth a word merely relative, and though commonly used in Europe, conveys no very distinct idea.

If now it be asked, what are the intended objects of our inquiries within these spacious limits, we answer, MAN and NATURE; whatever is performed by one, or produced by the other. Human knowledge has been elegantly analysed according to the three great faculties of the mind, memory, reason, and imagination, which we constantly find employed in arranging and retaining, comparing and distinguishing, combining and diversifying, the ideas, which we receive through our senses, or acquire by reflection, hence the three main branches of learning are history, science, and art. The first comprehends either an account of natural productions, or the genuine records of empires and states; the second embraces the whole circle of pure and mixed mathematics, together with ethics and law, as far as they depend on the reasoning faculty; and the third includes all the beauties of imagery, and the charms of inven-
tion, displayed in modulated language, or represented by color, figure, or sound.

Agreeably to this analysis, you will investigate whatever is rare in the stupendous fabric of nature, will correct the geography of Asia by new observations and discoveries; will trace the annals, and even traditions, of those nations, who from time to time have peopled or desolated it; and will bring to light their various forms of government, with their institutions civil and religious; you will examine their improvements and methods in arithmetic and geometry, in trigonometry, mensuration, mechanics, optics, astronomy, and general physics; their systems of morality, grammar, rhetoric, and dialectic; their skill in chirurgery and medicine, and their advancement, whatever it may be, in anatomy and chemistry. To this you will add researches into their agriculture, manufactures, trade; and, whilst you inquire with pleasure into their music, architecture, painting, and poetry, will not neglect those inferior arts, by which the comforts and even elegancies of social life are supplied or improved. You may observe, that I have omitted their languages, the diversity and difficulty of which are a sad obstacle to the progress of useful knowledge; but I have ever considered languages as the mere instruments of real learning, and think them improperly confounded with learning itself: the attainment of them is, however, indispensably necessary; and if to the Persian, Armenian, Turkish, and Arabic, could be added not only the Sanscrit, the treasures of which we may now hope to see unlocked, but even the Chinese, Tartar, Japanese, and the various insular dialects, an immense mine would then be open, in which we might labor with equal delight and advantage.

Having submitted to you these imperfect thoughts on the limits and objects of our future society, I request your permission to add a few hints on the conduct of it in its present immature state.

Lucian begins one of his satirical pieces against historians, with declaring that the only true proposition in his work was, that it should contain nothing true; and perhaps it may be advisable at first, in order to prevent any difference of sentiment on particular points not immediately before us, to establish but one rule, namely to have no rules at all. This only I mean, that, in the infancy of any society, there ought to be no confinement, no trouble, no ex-
pense, no unnecessary formality. Let us, if you please, for the present, have weekly evening meetings in this hall, for the purpose of hearing original papers read on such subjects, as fall within the circle of our inquiries. Let all curious and learned men be invited to send their tracts to our secretary, for which they ought immediately to receive our thanks; and if, towards the end of each year, we should be supplied with a sufficiency of valuable materials to fill a volume, let us present our Asiatic miscellany to the literary world, who have derived so much pleasure and information from the agreeable work of Kæmpfer, than which we can scarce propose a better model, that they will accept with eagerness any fresh entertainment of the same kind. You will not perhaps be disposed to admit mere translations of considerable length, except of such unpublished essays or treatises as may be transmitted to us by native authors; but, whether you will enroll as members any number of learned natives, you will hereafter decide, with many other questions as they happen to arise; and you will think, I presume, that all questions should be decided, on a ballot, by a majority of two-thirds; and that nine members should be requisite to constitute a board for such decisions. These points, however, and all others, I submit entirely, gentlemen, to your determination, having neither wish nor pretension to claim any more than my single right of suffrage. One thing only, as essential to your dignity, I recommend with earnestness, on no account to admit a new member, who has not expressed a voluntary desire to become so; and in that case, you will not require, I suppose, any other qualification than a love of knowledge and a zeal for the promotion of it.

Your institution, I am persuaded, will ripen of itself, and your meetings will be amply supplied with interesting and amusing papers, as soon as the object of your inquiries shall be generally known. There are, it may not be delicate to name them, but there are many from whose important studies I cannot but conceive high expectations; and, as far as mere labor will avail, I sincerely promise, that if, in my allotted sphere of jurisprudence, or in any intellectual excursion, that I may have leisure to make, I should be so fortunate as to collect, by accident, either fruits or flowers, which may seem valuable or pleasing, I shall offer my humble Nest to your society with as much respectful zeal as to the greatest potentate on earth.
THE SYSTEM OF
INDIAN, ARABIAN AND PERSIAN LETTERS.

SOFT AND HARD BREATHINGS.

\[
\begin{align*}
\text{a} & \quad \text{e} & \quad \text{ha} & \quad \text{hha} \\
\text{i} & \quad \text{o} & \quad \text{wa} \\
\text{u} & \quad \text{a} & \quad \text{au} & \quad \text{ra} \\
\text{ri} & \quad \text{ri} & \quad \text{li} & \quad \text{la} \\
\hat{\text{a}} & \quad \text{e} & \quad \text{i} & \quad \text{u} & \quad \text{a}
\end{align*}
\]

VOWELS DIPHTHONGS AND SEMIVOWELS.

\[
\begin{align*}
\text{a} & \quad \text{a} & \quad \text{e} & \quad \text{è} & \quad \text{ya} \\
\text{i} & \quad \text{o} & \quad \text{ò} & \quad \text{wa} \\
\text{u} & \quad \text{a} & \quad \text{au} & \quad \text{ra} \\
\text{ri} & \quad \text{i} & \quad \text{li} & \quad \text{la} \\
\hat{\text{a}} & \quad \text{è} & \quad \text{i} & \quad \text{u} & \quad \text{a}
\end{align*}
\]

CONSONANTS.

\[
\begin{align*}
\text{ca} & \quad \text{c'ha} & \quad \text{g} & \quad \text{g'ha} & \quad \text{na} \\
\text{ka} & \quad \text{kha} & \quad \text{g} & \quad \text{gha} & \quad \text{na} \\
\text{sa} & \quad \text{sha} & \quad \text{z} & \quad \text{zha} & \quad \text{sa} \\
\text{ta} & \quad \text{t'ha} & \quad \text{d} & \quad \text{d'ha} & \quad \text{na} \\
\text{ta} & \quad \text{th} & \quad \text{d} & \quad \text{dha} & \quad \text{na} \\
\text{pa} & \quad \text{p'ha} & \quad \text{b} & \quad \text{b'ha} & \quad \text{ma} \\
\end{align*}
\]

COMPOUNDS.

\[
\begin{align*}
\text{cha} & \quad \text{ch'ha} & \quad \text{ja} & \quad \text{jha} & \quad \text{nya} \\
\text{ža} & \quad \text{ža} & \quad \text{ža} & \quad \text{csh} & \quad \text{jña}
\end{align*}
\]
DEVANÁGRĪ LETTERS.
PERSIAN LETTERS.
TRANSACTIONS
OF THE
ASIATIC SOCIETY.

I.
A DISSERTATION
On the Orthography of Asiatic Words in Roman Letters,
BY THE PRESIDENT.

Every man, who has occasion to compose tracts on Asiatic Literature, or to translate from the Asiatic languages, must always find it convenient, and sometimes necessary, to express Arabian, Indian, and Persian words, or sentences, in the characters generally used among Europeans; and almost every writer in those circumstances has a method of notation peculiar to himself: but none has yet appeared in the form of a complete system; so that each original sound may be rendered invariably by one appropriated symbol, conformably to the natural order of articulation, and with a due regard to the primitive power of the Roman alphabet, which modern Europe has in general adopted. A want of attention to this object has occasioned great confusion in history and geography. The ancient Greeks, who made a voluntary sacrifice of truth to the delicacy of their ears, appear to have altered by design almost all the oriental names, which they introduced into their elegant, but romantic, histories; and even their more modern geographers, who were too vain, perhaps, of their own language to learn any other, have so strangely disguised the proper appellations of countries, cities, and rivers in Asia, that, without the guidance of the sagacious and indefatigable M. D'Anville, it would have been as troublesome to follow Alexander through the Panjab on the Ptolemaic map of Agathodæmon, as actually to travel over the same country in its present state of rudeness and disorder. They had an unwarrantable habit of moulding foreign names to a Grecian form, and giving them a resemblance to some derivative word in their own tongue: thus, they changed the Gogra into Agoranis, or a river of the assembly,
ON THE ORTHOGRAPHY

Uchah into Oxydraca, or sharpsighted, and Renas into Aornos, or a rock inaccessible to birds; whence their poets, who delighted in wonders, embellished their works with new images, distinguishing regions and fortresses by properties, which existed only in imagination. If we have less liveliness of fancy than the Ancients, we have more accuracy, more love of truth, and, perhaps, more solidity of judgment; and, if our works shall afford less delight to those, in respect of whom we shall be Ancients, it may be said without presumption, that we shall give them more correct information on the history and geography of this eastern world; since no man can perfectly describe a country, who is unacquainted with the language of it. The learned and entertaining work of M. D’Herbelot, which professes to interpret and elucidate the names of persons and places, and the titles of books, abounds also in citations from the best writers of Arabia and Persia; yet, though his orthography will be found less defective than that of other writers on similar subjects, without excepting the illustrious Prince KanteMIR, still it requires more than a moderate knowledge of Persian; Arabic, and Turkish, to comprehend all the passages quoted by him in European characters; one instance of which I cannot forbear giving. In the account of Ibn Zaidin, a celebrated Andalusian poet, the first couplet of an elegy in Arabic is praised for its elegance, and expressed thus in Roman letters:

Iekad hem tenagikom dhamaima;
Iaedha alatna alassa laula tassina.

“The time, adds the translator, will soon come, when you will deliver us from all our cares! the remedy is assured, provided we have a little patience.” When Dr. Hunt of Oxford, whom I am bound to name with gratitude and veneration, together with two or three others, attempted at my request to write the same distich in Arabian characters, they all wrote it differently, and all, in my present opinion, erroneously. I was then a very young student, and could not easily have procured Ibn Zaidin’s works, which are, no doubt, preserved in the Bodley library, but which have not since fallen in my way. This admired couplet, therefore, I have never seen in the original characters, and confess myself at a loss to render them with certainty. Both verses are written by D’Herbelot without attention to the grammatical points, that is, in a form which no learned
Arab would give them in recitation; but, although the French version be palpably erroneous, it is by no means easy to correct the error. If \( \ddalsa \), or a remedy, be the true reading, the negative particle must be absurd, since \( \tassaln\text{n} \) signifies we are patient, and not we despair; but, if \( \ddalsay \), or affliction, be the proper word, some obscurity must arise from the verb, with which it agrees. On the whole I guess, that the distich should thus be written:

\[
\begin{align*}
\text{\textit{Ye\'addu kh\'ina tun\'ajici\'um dem\'ay unr\'a}} \quad \\
\text{\textit{Yak\'di \ddalsa \ch\'s\'ay lau \l\'a \tassin\'a.}}
\end{align*}
\]

"When our bosoms impart their secrets to you, anguish would "almost fix our doom, if we were not mutually to console ourselves."

The principal verbs may have a future sense, and the last, word may admit of a different interpretation. Dr. Hunt, I remember, had found in Giggeius the word \( \text{dhem\'ayer} \), which he conceived to be in the original. After all, the rhyme seems imperfect, and the measure irregular. Now I ask, whether such perplexities could have arisen, if D'Herbebot or his Editor had formed a regular system of expressing Arabic in Roman characters, and had apprized his readers of it in his introductory dissertation?

If a further proof be required, that such a system will be useful to the learned and essential to the student, let me remark, that a learner of Persign, who should read in our best histories the life of Sultan Azim, and wish to write his name in Arabic letters, might express it thirty-nine different ways, and be wrong at last: the word should be written \( \text{Adzem} \) with three points on the first consonant.

There are two general modes of exhibiting Asiatic words in our own letters: they are founded on principles nearly opposite, but each of them has its advantages, and each has been recommended by respectable authorities. The first professes to regard chiefly the pronunciation of the words intended to be expressed; and this
method, as far as it can be pursued, is unquestionably useful: but new sounds are very inadequately presented to a sense not formed to receive them; and the reader must in the end be left to pronounce many letters and syllables precariously; besides, that by this mode of orthography all grammatical analogy is destroyed, simple sounds are represented by double characters, vowels of one denomination stand for those of another; and possibly with all our labor we perpetuate a provincial or inelegant pronunciation: all these objections may be made to the usual way of writing *Kummerbund*, in which neither the letters nor the true sound of them are preserved, while *Kemerbend*, or *Cemerbend*, as an ancient Briton would write it, clearly exhibits both the original characters and the Persian pronunciation of them. To set this point in* a strong light, we need only suppose, that the French had adopted a system of letters wholly different from ours, and of which we had no types in our printing-houses: let us conceive an *Englishman* acquainted with their language to be pleased with *Malherbe's* well-known imitation of *Horace*, and desirous of quoting it in some piece of criticism. He would read thus:

'La mort a des rigueurs à nulle autre pareilles;
On a beau la prier:
La cruelle qu'elle est se bouche les oreilles,
Et nous laisse crier.

'Le pauvre en sa cabane, ou le chaume le couvre,
Est sujet a ses loix,
Et la garde, qui yeille aux barrières du Louvre,
N'en défend pas nos rois!'

Would he then express these eight verses, in *Roman* characters, exactly as the French themselves in fact express them, or would he decorate his composition with a passage more resembling the dialect of savages, than that of a polished nation? His pronunciation, good or bad, would, perhaps, be thus represented:

'Law more aw day reegyewrs aw nool sruhh parelllyuh,
Onne aw bo law preeay:*

'Law croellyuh kellay suh booshuh lays oreellyuh,
Ay noo laysuh creeay. *
OF ASIATIC WORDS.

'Luh povre ong saw cawbawn oo luh chomuh luh coovruh,
'Ay soozyet aw say lwaw,
'Ay law gawrduh kee velly ò bawryayruh dyoo Loovruh
'Nong dayfong paw nos rwaw l'

The second system of Asiatic Orthography consists in scrupulously rendering letter for letter, without any particular care to preserve the pronunciation; and, as long as this mode proceeds by unvaried rules, it seems clearly entitled to preference.

For the first method of writing Persian words the warmest advocate, among my acquaintance, was the late Major Davy, a Member of our Society, and a man of parts, whom the world lost prematurely, at a time, when he was meditating a literary retirement, and hoping to pass the remainder of his life in domestic happiness, and in the cultivation of his very useful talents. He valued himself particularly on his pronunciation of the Persian language, and on his new way of exhibiting it in our characters, which he instructed the learned and amiable Editor of his Institutes of Timour at Oxford to retain with minute attention throughout his work. Where he had acquired his refined articulation of the Persian, I never was informed; but it is evident, that he spells most proper names in a manner, which a native of Persia, who could read our letters, would be unable to comprehend. For instance: that the capital of Azarbáiján is now called Tabrís, I know from the mouth of a person born in that city, as well as from other Iranians; and that it was so called sixteen hundred years ago, we all know from the Geography of Ptolemy; yet Major Davy always wrote it Tubburase, and insisted that it should thus be pronounced. Whether the natives of Semerkand, or Samarkand, who probably speak the dialect of Soghi with a Turanian pronunciation, call their birth-place, as Davy spelled it, Summurkund, I have yet to learn; but I cannot believe it, and am convinced, that the former mode of writing the word expresses both the letters and the sound of them better than any other combination of characters. His method, therefore, has every defect; since it renders neither the original elements of words, nor the sounds represented by them in Persia, where alone we must seek for genuine Persian, as for French in France, and for Italian in Italy.

The second method has found two able supporters in Mr. Halhed and Mr. Wilkins; to the first of whom the public is indebted for
a perspicuous and ample grammar of the Bengal language, and to
the second for more advantages in Indian literature than Europe,
or India, can ever sufficiently acknowledge.

Mr. HALHED, having justly remarked, 'that the two greatest
'defects in the orthography of any language are the application of
'the same letter to several different sounds, and of different letters to
'the same sound,' truly pronounces them both to be 'so common in
'English, that he was exceedingly embarrassed in the choice of letters
'to express the sound of the Bengal vowels, and was at last by no
'means satisfied with his own selection.' If any thing dissatisfies me,
in his clear and accurate system, it is the use of double letters for the
long vowels (which might however be justified) and the frequent inter-
mixture of Italic and Roman letters in the same word; which both
in writing and printing must be very inconvenient: perhaps it may
be added, that his diphthongs are not expressed analogously to the
sounds, of which they are composed.

The system of Mr. WILKINS has been equally well considered,
and Mr. HALHED himself has indeed adopted it in his preface to the
Compilation of Hindu Laws: it principally consists of double letters
to signify our third and fifth vowels, and of the common prosodial
marks to ascertain their brevity or their length; but those marks
are so generally appropriated to books of prosody, that they never
fail to convey an idea of metre; nor, if either prosodial sign were
adopted, would both be necessary; since the omission of a long mark
would evidently denote the shortness of the unmarked vowel,
or conversely. On the whole, I cannot but approve this notation
for Sanscrit words, yet require something more universally expressive
of Asiatic letters: as it is perfect, however, in its kind, and will ap-
pear in the works of its learned inventor, I shall annex, among the
examples, four distichs from the Bhágawat expressed both in his
method and mine: a translation of them will be produced on an-
other occasion; but, in order to render this tract as complete as pos-
sible, a fuller specimen of Sanscrit will be subjoined with the origi-
nal printed in the characters of Bengal, into which the Bráhmans of that
province transpose all their books, few of them being able to read the
Devanágari letters: so far has their indolence prevailed over their
piety!

* See Plate IV.
Let me now proceed, not prescribing rules for others, but explaining those which I have prescribed for myself, to unfold my own system, the convenience of which has been proved by careful observation and long experience.

It would be superfluous to discourse on the organs of speech, which have been a thousand times dissected, and as often described by musicians, or anatomists; and the several powers of which every man may perceive either by the touch or by sight, if he will attentively observe another person pronouncing the different classes of letters, or pronounce them himself distinctly before a mirror: but a short analysis of articulate sounds may be proper to introduce an examination of every separate symbol.

All things abound with error, as the old searchers for truth remarked with despondence; but it is really deplorable, that our first step from total ignorance should be into gross inaccuracy, and that we should begin our education in England with learning to read the five vowels, two of which, as we are taught to pronounce them, are clearly diphthongs. There are, indeed, five simple vocal sounds in our language, as in that of Rome; which occur in the words an innocent bull, though not precisely in their natural order, for we have retained the true arrangement of the letters, while we capriciously disarrange them in pronunciation; so that our eyes are satisfied, and our ears disappointed. The primary elements of articulation are the soft and hard breathings, the spiritus lenis and spiritus asper of the Latin grammarians. If the lips be opened ever so little, the breath suffered gently to pass through them, and the feeblest utterance attempted, a sound is formed of so simple a nature, that, when lengthened, it continues nearly the same, except that, by the least acuteness in the voice it becomes a cry, and is probably the first sound uttered by infants; but if, while this element is articulated, the breath be forced with an effort through the lips, we form an aspirate more or less harsh in proportion to the force exerted. When, in pronouncing the simple vowel, we open our lips wider, we express a sound completely articulated, which most nations have agreed to place the first in their symbolical systems; by opening them wider still with the corners of them a little drawn back, we give birth to the second of the Roman vowels, and by a large aperture, with a farther inflexion of the lips and a higher elevation of
the tongue, we utter the third of them. By pursing up our lips in
the least degree, we convert the simple element into another sound
of the same nature with the first vowel, and easily confounded
with it in a broad pronunciation: when this new sound is lengthened,
it approaches very nearly to the fourth vowel, which we form by
a bolder and stronger rotundity of the mouth; a farther contraction
of it produces the fifth vowel, which in its elongation almost
closes the lips, a small passage only being left for the breath.
These are all short vowels; and, if an Italian were to read the
words an innocent bull, he would give the sound of each correspon-
ding long vowel, as in the monosyllables of his own language,
sà, si, só, se, sth. Between these ten vowels are numberless gra-
dations, and nice inflexions, which use only can teach; and, by the
composition of them all, might he formed an hundred dipthongs, and
a thousand triphongs; many of which are found in Italian, and
were probably articulated by the Greeks; but we have only occasion,
in this tract, for two dipthongs, which are compounded of the first
vowel with the third, and with the fifth, and should be expressed by
their constituent letters: as those vocal compounds which begin with
the third and fifth short vowels, they are generally, and not incon-
veniently, rendered by distinct characters, which are improperly
ranged among the consonants. The tongue, which assists in forming
some of the vowels, is the principal instrument in articulating two
liquid sounds, which have something of a vocal nature; one, by striking
the roots of the upper teeth, while the breath passes gently through
the lips; another, by an inflexion upwards with a tremulous motion;
and these two liquids coalesce with such ease, that a mixed letter,
used in some languages, may be formed by the first of them fol-
lowed by the second: when the breath is obstructed by the pressure
of the tongue, and forced between the teeth on each side of it, a
liquid is formed peculiar to the British dialect of the Celtic.

We may now consider in the same order, beginning with the root
of the tongue and ending with the perfect close of the lips, those
less musical sounds, which require the aid of a vowel, or at least of
the simple breathing, to be fully articulated; and it may here be
premised, that the harsh breathing distinctly pronounced after each
of these consonants, as they are named by grammarians, constitutes
its proper aspirate.
OF ASIATIC WORDS.

By the assistance of the tongue and the palate are produced two congenial sounds, differing only as hard and soft; and these two may be formed still deeper in the throat, so as to imitate, with a long vowel after them, the voice of a raven; but if, while they are uttered, the breath be harshly protruded, two analogous articulations are heard, the second of which seems to characterize the pronunciation of the Arabs; while the nasal sound, very common among the Persians and Indians, may be considered as the soft palatine with part of the breath passing through the nose; which organ would by itself rather produce a vocal sound, common also in Arabia, and not unlike the cry of a young antelope and some other quadrupeds.

Next come different classes of dentals, and among the first of them should be placed the sibilants, which most nations express by an indented figure: each of the dental sounds is hard or soft, sharp or obtuse, and, by thrusting the tip of the tongue between the teeth, we form two sounds exceedingly common in Arabic and English, but changed into lisping sibilants by the Persians and French, while they on the other hand have a sound unknown to the Arabs, and uncommon in our language, though it occurs in some words by the composition of the hard sibilant with our last vowel pronounced as a diphthong. The liquid nasal follows these, being formed by the tongue and roots of the teeth, with a little assistance from the other organ; and we must particularly remember, when we attend to the pronunciation of Indian dialects, that most sounds of this class are varied in a singular manner by turning the tongue upwards, and almost bending it back towards the palate, so as to exclude them nearly from the order, but not from the analogy, of dentals.

The labials form the last series, most of which are pronounced by the appulse of the lips on each other or on the teeth, and one of them by their perfect close: the letters, by which they are denoted, represent in most alphabets the curvature of one lip or of both; and a natural character for all articulate sounds might easily be agreed on, if nations would agree on any thing generally beneficial, by delineating the several organs of speech in the act of articulation, and selecting from each a distinct and elegant outline. A perfect language would be that, in which every idea, capable of entering the human mind, might be neatly and emphatically expressed by one specific word; simple, if the idea were simple; complex, if complex;
and on the same principle a perfect system of letters ought to contain one specific symbol for every sound used in pronouncing the language to which they belonged: in this respect the old Persian or Zend approaches to perfection; but the Arabian alphabet, which all Mohammedan nations have inconsiderately adopted, appears to me so complete for the purpose of writing Arabic, that not a letter could be added or taken away without manifest inconvenience, and the same may indubitably be said of the Devandgari system; which, as it is more naturally arranged than any other, shall here be the standard of my particular observations on Asiatic letters. Our English alphabet and orthography are disgracefully and almost ridiculously imperfect; and it would be impossible to express either Indian, Persian, or Arabian words in Roman characters, as we are absurdly taught to pronounce them; but a mixture of new characters would be inconvenient, and by the help of the diacritical marks used by the French, with a few of those adopted in our own treatises on fluxions, we may apply our present alphabet so happily to the notation of all Asiatic languages, as to equal the Devandgari itself in precision and clearness, and so regularly that any one, who knew the original letters, might rapidly and unerringly transpose into them all the proper names, appellatives, or cited passages, occurring in tracts of Asiatic literature.

This is the simplest element of articulation, or first vocal sound, concerning which enough has been said: the word America begins and ends with it; and its proper symbol therefore is A; though it may be often very conveniently expressed by E, for reasons, which I shall presently offer. In our own anomalous language we commonly mark this elementary sound by our fifth vowel, but sometimes express it by a strange variety both of vowels and diphthongs; as in the phrase, a mother bird flutters over her young; an irregularity, which no regard to the derivation of words or to blind custom can in any degree justify. The Nagari letter is called Acar, but is pronounced in Bengal like our fourth short vowel, and in the west of India, like our first: in all the dialects properly Indian it is considered as inherent in every consonant; and is placed last in the system of the Tibetans, because the letters, which include it, are
first explained in their schools. If our double consonants were invariably connected, as in Sanscrit, it would certainly be the better way to omit the simple element, except when it begins a word. This letter answers to the fat-khāh, or open sound of the Arabs; and, in some few words, to the Zeber of the Persians, or an acute accent placed above the letter; but this Arabian mark, which was supplied in the Pahlavi by a distinct character, is more frequently pronounced at Isfahan either like our first or our second short vowel, as in chashm and ferdend, and the distinction seems to depend, in general, on the nature of the consonant, which follows it. Two of our letters, therefore, are necessary for the complete notation of the adār and saheb; and thus we may be able occasionally to avoid ridiculous or offensive equivocations in writing Oriental words, and to preserve the true pronunciation of the Persians, which differs as widely from that of the Muslims in India, as the language of our Court at St. James's differs from that of the rustics in the Gentle Shepherd.

When the first vowel, as the Persians pronounce it in the word bakht, is doubled or prolonged, as in bākht, it has the sound of the second Nāgari vowel, and of the first Arabic letter, that is, of our long vowel in cast; but the Arabs deride the Persians for their broad pronunciation of this letter, which in Iran has always the sound of our vowel in call, and is often so prolated, as to resemble the fourth and even the fifth of our long vowels. Its natural mark would be the short A doubled; but an acute accent in the middle of words, or a grave at the end of them, will be equally clear, and conformable to the practice of polished nations on the continent of Europe. The very broad sound of the Arabian letter, which they call extended, and which the Persians extend yet more, as in the word dān, may aptly enough be represented by the prosodial sign, since it is constantly long; whereas the mark hamzah as constantly shortens the letter, and gives it the sound of the point above or below it; as in the words āsil and Islām: the changes of this letter may perplex the learner but his perplexity will soon vanish, as he advances. In writing Asiatic names, we frequently confound the broad a with its correspondent short vowel, which we improperly
express by an O; thus we write Cossim for Kasim, in defiance of analogy and correctness. Our vowel in fond occurs but seldom, if ever, in Arabian, Indian, or Persian words: it is placed, nevertheless, in the general system with the short prosodial mark, and stands at the head of the vowels, because it is in truth only a variation of the simple breathing.

Our third vowel, correctly pronounced, appears next in the Nāgarī system; for our second short vowel has no place in it. This vocal sound is represented in Arabic by an acute accent under the letter; which at Mecca has almost invariably the same pronunciation; but, since, in the Zend, a character like the Greek E-psilon represents both our second and third short vowels, the Persians often pronounce zir like zeber, calling this country Hend, and the natives of it Hendīs: nevertheless it will be proper to denote the Sanscrit icār and the Arabian casr by one unaltered symbol; as in the words Indra and Imām.

The third vowel produced or lengthened is, for the reason before suggested, best marked by an accent either acute or grave, as in Italian:

Se cerca, se dice:  
L'amico dov'è?  
L'amico infelice,  
Rispondi, morì!  
Ah! no; sl gran duolo  
Non darlè per me,  
Rispondi, ma solo:  
Piangendo partì.

It was once my practice to represent this long vowel by two marks, as in the words Lebid and Deiwān, to denote the point in Arabic as well as the letter above it; but my present opinion is, that Lebid and Deiwān are more conformable to analogy, and to the Italian orthography, which, of all European systems, approaches nearest to perfection.

This is our fifth vowel; for our fourth short one is, like our second, rejected from the pure pronunciation of the Sanscrit in the
west of India and at Bánáras, though the Bengalese retain it in the first Nágari letter, which they call odr.: to the notation of this sound, our vowel in full and the Persian in gul should be constantly appropriated, since it is a simple articulation, and cannot without impropriety be represented by a double letter. It answers to upsilon, and, like that, is often confounded with iota: thus musc has the sound of misč among the modern Persians, as Nymphä was pronounced Nymphä by the Romans. The damm of the Arabs is, however, frequently sounded, especially in Persia, like our short O in memory, and the choice of two marks for a variable sound is not improper in itself, and will sometimes be found very convenient.

The same lengthened, and properly expressed by an accent, as in the word virtù: it is a very long vowel in Persian, so as nearly to treble the quantity of its correspondent short one; and this, indeed, may be observed of all the long vowels in the genuine Isfahani pronunciation; but the letter vaú is often redundant, so as not to alter the sound of the short vowel preceding it; as in khōsh and khōd: it may, nevertheless, be right to express that letter by an accent.

A vocal sound peculiar to the Sanscrit language: it is formed by a gentle vibration of the tongue preceding our third vowel pronounced very short, and may be well expressed by the prosodial mark, as in Rishi, a Saint. When it is connected with a consonant, as in Cṛśna, no part of it is used but the curve at the bottom. We have a similar sound in the word merrily, the second syllable of which is much shorter than the first syllable of riches.

The same complex sound considerably lengthened; and, therefore, distinguishable by the prosodial sign of a long vowel.

In Bengal, where the ra is often sunk in the pronunciation of compound syllables, this letter expresses both syllables of our word
ON THE ORTHOGRAPHY

lily: but its genuine sound, I believe, is \textit{lr}, a short triphthong peculiar to the \textit{Sanscrit} language.

Whatever be the true pronunciation of the former symbol, this is only an elongation of it, and may, therefore, be distinguished by the metrical sign of a long vowel.

Our second long vowel, best represented, like the others, by an accent, as in \textit{V\text{e}\text{id}a}, the sacred book of the \textit{Hindus}, which is a derivative from the \textit{Sanscrit root }\textit{vid}, to know. The notation, which I recommend, will have this important advantage, that learned foreigners in \textit{Europe} will in general pronounce the oriental words, expressed by it, with as much correctness and facility as our own nation.

This is a diphthong, composed of our first and third vowels, and expressible, therefore, by them, as in the word \textit{V\text{a}\text{id}ya}, derived from \textit{V\text{e}\text{id}a}, and meaning a man of the medical cast: in Bengal it is pronounced as the \textit{Greek} diphthong in \textit{poon\text{\text{"e}}n}, a shepherd, was probably sounded in ancient \textit{Greece}. The \textit{Arabs} and the \textit{English} articulate this composition exactly alike, though we are pleased to express it by a simple letter, which, on the continent of \textit{Europe}, has its genuine sound. In the mouth of an \textit{Italian} the constituent vowels in the words \textit{mai} and \textit{miec} do not perfectly coalesce, and, at the close of a verse, they are separated; but a \textit{Frenchman} and a \textit{Persian} would pronounce them nearly like, the preceding long vowel; as in the word \textit{Mai}, which at \textit{Paris} means our mouth of the same name, and at \textit{Isfahan} signifies \textit{wine}: the \textit{Persian} word, indeed, might with great propriety be written \textit{mei}, as the diphthong seems rather to be composed of our second and third short vowels; a composition very common in \textit{Italian} poetry.

Though a coalition of \textit{acdr} and \textit{ucdr} forms this sound in \textit{Sanscrit}, as in the mystical word \textit{bm}; yet it is in fact a simple articulation, and the fourth of our long vowels.
Here, indeed, we meet with a proper diphthong, compounded of our *first* and *fifth* vowels; and in *Persian* the constituent sounds are not perfectly united; as in the word *Firdausi*, which an *Italian* would pronounce exactly like a native of *Isfahan*. Perhaps, in *Arabic* words, it may be proper to represent, by an accent the letters *ya* and *wa*, which, preceded by the open vowel, form the respective diphthongs in *Zohair* and *Jauhri*; but the omission of this accent would occasion little inconvenience.

This is no vowel, but an abbreviation, at the end of a syllable, of the *nasal* consonants: thus the *Portuguese* write *Siaó* for *Siam* with a nasal termination; and the accurate M. D'Anville expresses great unwillingness to write *Siam* for the country, and *Siamois* for the people of it, yet acknowledges his fear of innovating, 'notwithstanding his attachment to the original and proper denominations of countries and places.' It appears to me, that the addition of a distinct letter *ga* would be an improper and inconvenient mode of expressing the nasal sound, and that we cannot do better than adopt the *Indian* method of distinguishing it, in *Sanscrit*, *Chinese*, and *Persian* words, by a point above the letter; as in *Sinha*, a lion; *Cânihâ*, the name of an illustrious Emperor; and *Sâmân*, a household.

This too is an abbreviation or substitute, at the close of a syllable, for the *strong aspirate*, and may be distinguished in the middle of a word by a hyphen, as in *dah-cha*, pain, though it seems often to resemble the *Arabian* *hâ*, which gives only a more forcible sound to the vowel, which precedes it, as in *hâcmah*, science. It is well known, that, when such *Arabic* words are used in construction, the *final aspirate* of the first noun has the sound of *tâ*; but, as the letter remains unaltered, it should, I think, be preserved in our characters, and expressed either by two points above it, as in *Arabic*, or by an accentual mark; since if we write *Zubdahu'l-mule*, or, *the Flower of the Realm*, with a comma to denote the suppression of the *âlef*, every learner will know, that the first word should be pronounced *Zubdat*. The *hâ* is often omitted by us, when we write *Persian* in
English letters, but ought invariably to be inserted, as in Shâhnâmah; since the aspiration is very perceptibly sounded in the true pronunciation of dergâh, rûbdâh, and other similar words. The Sanscrit character before us has the singular property of being interchangeable, by certain rules, both with ra and sa; in the same manner as the Sylva of the Romans was formed from the Æolic word hylva, and as arbós was used in old Latin for arbor.

\[\text{\textit{क}}\]

We come now to the first proper consonant of the Indian system, in which a series of letters, formed in the throat near the root of the tongue, properly takes the lead. This letter has the sound of our \( k \) and \( c \) in the words \textit{king} and \textit{cannibal}; but there will be great convenience in expressing it uniformly by the second of those marks, whatever be the vowel following it. The Arabs, and perhaps all nations descended from Sem, have a remarkable letter sounded near the palate with a hard pressure, not unlike the cawing of a raven, as in the word \textit{Kasim}; and for this particular sound the redundance of our own alphabet supplies us with an useful symbol: the common people in Hhejâz and Egypt confound it, indeed, with the first letter of \textit{Gabr}, and the Persians only add to that letter the hard palatine sound of the Arabian \( kâf \); but, if we distinguish it invariably by \( k \), we shall find the utility of appropriating our \( k \) to the notation of the Indian letter now before us. The third letter of the Roman alphabet was probably articulated like the kappa of the Greeks; and we may fairly suppose, that Cicero and Cithera were pronounced alike at Rome and at Athens: the Welsh apply this letter uniformly to the same sound, as in \textit{cae} and \textit{cefn}; and a little practice will render such words as \textit{citab} and \textit{cinnara} familiar to our eyes.

\[\text{\textit{ख}}\]

We hear much of aspirated letters; but the only proper aspirates (those, I mean, in which a strong breathing is distinctly heard after the consonants) are to be found in the languages of India; unless the word \textit{cachexy}, which our medical writers have borrowed from the Greek, be thought an exception to the rule. This aspiration may be distinguished by a comma, as the letter
before us is expressed in the word ch'aniitra, a spade. The Arabian, Persign, and Tuscan aspirate, which is formed by a harsh protrusion of the breath, while the consonant is roughly articulated near the root of the tongue, may be written as in the word makhzen, a treasury.

Whatever vowel follow this letter, it should constantly be expressed as in the words gul, a flower, and gil, clay; and we may observe, as before, that a little use will reconcile us to this deviation from our irregular system. The Germans, whose pronunciation appears to be more consistent than our own, would scarce understand the Latin name of their own country, if an Englishman were to pronounce it as he was taught at school.

The proper aspirate of the last letter, as in the word Raghu-vansa: the Persians and Arabs pronounce their ghain with a bur in the throat, and a tremulous motion of the tongue, which gives it a sound resembling that of r, as it is pronounced in Northumberland; but it is in truth a compound guttural, though frequently expressed by a simple letter, as in Gaza, which should be written Ghassah, a city of Palestine; and in gazelle, as the French naturalists call the ghasal, or antelope, of the Arabs. The Persian word mlgh, a cloud, is m̄gha in Sanscrit; as msh, a sheep, appears also to be derived from mēsha, by that change of the long vowels, which generally distinguishes the Iranian from the Indian pronunciation.

This is the nasal palatine, which I have already proposed to denote by a point above the letter n; since the addition of a g would create confusion, and often suggest the idea of a different syllable. Thus ends the first series of Nagari letters, consisting of the hard and soft guttural, each attended by its proper aspirate, and followed by a nasal of the same class; which elegant arrangement is continued, as far as possible, through the Sanscrit system, and seems conformable to the beautiful analogy of nature.

The next is a series of compound letters, as most grammarians consider them, though some hold them to be simple sounds articu-
lated near the palate. The first of them has no distinct sign in our own alphabet, but is expressed, as in the word China, by two letters, which are certainly not its component principles: it might, perhaps, be more properly denoted, as it is in the great work of M. D'Herbelot, by tsh; but the inconvenience of retaining our own symbol will be less than that of introducing a new combination, or inventing, after the example of Dr. Franklin, a new character. China is a Sanscrit word; and it will be convenient so to write it, though I feel an inclination to express it otherwise.

\[\text{চ} \]

The same composition with a strong breathing articulated after it. Harsh as it may seem, we cannot, if we continue the former symbol, avoid expressing this sound, as in the word ch'handas, metre.

\[\text{ঝ} \]

This too seems to have been considered by the Hindus as a simple palatine, but appears, in truth, to be the complex expression of dzh. Perhaps the same letter may, by a small difference of articulation, partake of two different sounds. This, at least, we may observe, that the letter under consideration is confounded, as a simple sound, with ya; and, as a compound, with za, one of its constituents: thus the yasmin of Arabia is by us called jasmin; while the same letter is Giorgi at Rome and Zorzi at Venice; or, (to give an example of both in a single word) yug, or junction, at Bândares, is jug in Bengal; and was pronounced zug, or, in the nominative, zugon, at Athens. We should, however, invariably express the letter before us by ja.

The Arabian letters dhal', 'dâd, and 'dâhâ, are all pronounced in Persia like za, with a sort of lisp, from an attempt to give them their genuine sound: they may be well expressed, as in fluxionary characters, by a series of points above them, ḵ, ž, ž̆.

\[\text{ব} \]

The preceding letter aspirated, as in the word j'hasha, a fish.

\[\text{গু} \]

This is the second nasal, composed of the former and the letter ya. As the Italian word agnello and our onion contain a composi-
tion of n and y, they should regularly be written anyello and onyon; and the Indian sound differs only in the greater nasality of the first letter, which may be distinguished, as before, by a point. A very useful Sanscrit root, signifying to know, begins with the letter ja, followed by this compound nasal, and should be written jyja; whence jiyâna, knowledge: but this harsh combination is in Bengal softened into gyâ: it is expressed by a distinct character, which stands last in the plate annexed.*

In the curious work entitled Tolíjahu’l Hind, or The Present of India, this is the fourth series of Sanscrit letters; but, in general, it has the third rank, more agreeably, I think, to the analogy of the system. This class is pronounced with an inflexion of the tongue towards the roof of the mouth, which gives an obtuse sound to the consonant, and may be distinguished by an accent above it. The first is the Indian īa, as in the word cıkāra, a rotten tree, and is commonly expressed in Persian writings by four points,* but would be better marked by the Arabian ìâ, which it very nearly resembles.

The same with a strong breathing after it, as in Vaicunêha, or unwearied, an epithet of Vishnu.

A remarkable letter, which the Muslinmans call the Indian dāl; and express, also, by four points over it: but it should, by analogy to the others, be distinguished by an accentual mark, as in the word danâda, punishment. When the tongue is inverted with a slight vibratory motion, this letter has a mixture of the ra, with which it is often, but incorrectly, confounded; as in the common word berâ for bêda, great. It resembles the Arabian dād.

The preceding letter aspirated, as in D’hâdâ, improperly pronounced Dacca. In the same manner may be written the Arabian

* See Plate II.
'dhā', but without the comma, since its aspirate is less distinctly heard than in the Indian sound.

This is the nasal of the third series, and formed by a similar inversion of the tongue. In Sanscrit words it usually follows the letters ra and sha, (as in Brāhmaṇa, derived from Brahmā, the Supreme Being; Vishnu, a name of his preserving power): or precedes the other letters of the third class.

Here begins the fourth series, on which we have little more to remark. The first letter of this class is the common ta, or hard dental, if it may not rather be considered as a lingual.

Its aspirate, which ought to be written with a comma, as in the word Aswatt'ha, the Indian fig-tree, lest it be confounded by our countrymen with the Arabian sound in thurayyā, the Pleiads, which is precisely the English aspiration in think; a sound, which the Persians and French cannot easily articulate: in Persian it should be expressed by s with a point above it.

The soft dental in Dēvata, or Deity.

The same aspirated, as in D'herma, justice, virtue, or piety. We must also distinguish this letter by a comma from the Arabian in dhahab, gold; a sound of difficult articulation in France and Persia, which we write thus very improperly, instead of retaining the genuine Anglo-Saxon letter, or expressing it, as we might with great convenience, dhus.

The simple nasal, sounded by the teeth with a little assistance from the nostrils, but not so much as in many French and Persian
words. Both this *nasal* and the former occur in the name *Nārāyana*, or *dwelling in water*.

**Next come the *labials* in the same order; and first the hard labial *pa*, formed by a strong compression of the lips; which so ill suits the configuration of an *Arabian* mouth, that it cannot be articulated by an *Arab* without much effort.**

**The proper aspirate of *pa*, as in the word *shepherd*, but often pronounced like our *fa*, as in *fela*, instead of *phela*, fruit. In truth, the *fa* is a distinct letter; and our *pha*, which in *English* is redundant, should be appropriated to the notation of this *Indian* labial.**

**The *soft labial* in *Buddha*, wise, and the second letter in most alphabets used by *Europeans*; which begin with a vowel, a labial, a palatine, and a lingual. It ought ever to be distinguished in *Nāgarī* by a transverse bar, though the copyists often omit this useful distinction.**

**The *Indian* aspirate of the preceding letter, as in the word *bhāsha*, or a spoken dialect. No comma is necessary in this notation, since the sound of *bha* cannot be confounded with any in our own language.**

**This is the last nasal, as in *Menu*, one of the first created beings according to the *Indians*: it is formed by closing the lips entirely, whilst the breath passes gently through the nose. And here ends the regular arrangement of the *Nāgarī* letters. Another series might have been added, namely, *sa, sha, sa, zha*, which are in the same proportion as *ta, tha, da, dha*, and the rest; but the two last sounds are not used in *Sanskrit*.**

**Then follows a set of letters approaching to the nature of vowels: the first of them seems in truth to be no more than our *third*
short vowel, beginning a diphthong, and may, therefore, be thought a superfluous character. Since this union, however, produces a kind of consonant articulated near the palate, it is ranked by many among the consonants, and often confounded with _ja_: hence _Yamunā_, a sacred river in _India_, called also the _Daughter of the Sun_, is written _Jomana_ by the _Greeks_, and _Jumna_, less properly, by the _English_.

र

The two liquids _na_ and _ma_, one of which is a lingual and the other a labial, are kept apart, in order to preserve the analogy of the system; and the other two are introduced between the two semi-vowels: the first of these is _ra_, as in _RA'MA_, the conqueror of _Silān_.

ल

The second is _la_, in _Laṅca_, another name of that island both in _Tibet_ and in _India_. A defect in the organs of the common _Bengalese_ often causes a confusion between these two liquids, and even the sound of _na_ is frequently substituted for the letter before us.

व

When this character corresponds, as it sometimes does in _Sanskrit_, with our _wa_, it is, in fact, our _fifth short_ vowel preceding another in forming a diphthong, and might easily be spared in our system of letters; but, when it has the sound of _va_, it is a labial, formed by striking the lower lip against the upper teeth, and might thus be arranged in a series of proportionals, _pa, fa, ba, va_. It cannot easily be pronounced in this manner by the inhabitants of _Bengal_, and some other provinces, who confound it with _ba_, from which it ought carefully to be distinguished; since we cannot conceive, that, in so perfect a system as the _Sanskrit_, there could ever have been two symbols for the same sound. In fact, the _Montes Parveti_ of our ancient geographers were so named from _Parveta_, not _Parbeta_, a mountain. The _wāw_ of the _Arabs_ is always a vowel, either separate or coalescing with another in the form of a diphthong; but in _Persian_ words it is a consonant, and pronounced like our _va_, though with rather less force.
Then follow three sibilants, the first of which is often, very inaccurately confounded with the second, and even with the third; it belongs to that class of consonants which, in the notation here proposed, are expressed by acute accents above them, to denote an inversion of the tongue towards the palate, whence this letter is called in India the palatine sa. It occurs in a great number of words, and should be written as in palāśa, the name of a sacred tree with a very brilliant flower. In the same manner may be noted the šaḍ of the Arabs and Hebrews, which last it resembles in shape, and probably resembled in sound; except that in Caśmīr, and the provinces bordering on Persia, it is hardly distinguishable from the following letter.

The second is improperly written sha in our English system, and cha, still more erroneously, in that of the French; but the form generally known may be retained, to avoid the inconvenience of too great a change even from wrong to right. This letter, of which sa and ha are not the component parts, is formed so far back in the head, that the Indians call it a cerebra: either it was not articulated by the Greeks, or they chose to express it by their Xi; since of the Persian word Ardashīr they have formed Artaxerxes.

The dental sa, which resembles the Hebrew letter of the same sound, and, like that, is often mistaken by ignorant copyists for the ma.

The strong breathing ḥa, but rather misplaced in the Nāgari system; since it is the second element of articulate sounds. The very hard breathing of the Arabs may be well expressed by doubling the mark of aspiration, as in Muhammad, or by an accent above it, in the manner of the long vowels, as in Ahmed.

The Indian system of letters closes with a compound of ca and sha, as in the word parīshā, ordeal: it is analogous to our x, a superfluous character, of no use, that I know of, except in algebra. The
Bengalese give it the sound of cya, or of our k in such words as kind and sky; but we may conclude, that the other pronunciation is very ancient, since the old Persians appear to have borrowed their word Racshah from the Rascha, or demon of the Hindus, which is written with the letter before us. The Greeks rendered this letter by their Khi, changing Dacchin, or the south, into Dakhin.

All the sounds used in Sanscrit, Arabic, Persian, and Hindī, are arranged systematically in the table prefixed to this dissertation*; and the singular letter of the Arabs, which they call din, is placed immediately before the consonants. It might have been classed, as the modern Jews pronounce ג, among the strong nasals of the Indians; but, in Arabia and Persia, it has a very different sound, of which no verbal description can give an idea, and may not improperly be called a nasal vowel: it is uniformly distinguished by a circumflex either above a short vowel, or over the letter preceding a long one, as ṭīm, learning; ṭālīm, learned.

Agreeably to the preceding analysis of letters, if I were to adopt a new mode of English orthography, I should write ADDISON’S description of the angel in the following manner, distinguishing the simple breathing, or first element, which we cannot invariably omit, by a perpendicular line above our first or second vowel:

Sō hwen sm énjel, bāi divain cāmánd,
With raisin tempests shécs a gilti land,
Sch az āv lét Ĳr pél Britanya pást,
Cālm and sirīn hi draivz dhi fyúryas blást,
And, plīz’d dḥ’ālmaițiz ārderz tu perfórm,
Raida in dhi hyerlwind and daircts dhi stārm.

This mode of writing poetry would be the touchstone of bad rhymes, which the eye as well as the ear would instantly detect; as in the first couplet of this description, and even in the last, according to the common pronunciation of the word perform. I close this paper with specimens of oriental writing, not as fixed standards of orthography, which no individual has a right to settle, but as examples of the method, which I recommend; and, in order to relieve the dryness of the subject, I annex translations of all but the first specimen, which I reserve for another occasion.

* See Plate 1.
थिमगवानुवाच ।

थमसेवासेवायेन नाज्यांत्या सद्दसत् परस्
पञ्चादशस्य वदेतत्त्व वोविशिष्येत सोभ्रःसः

करिदर यत् प्रतीयेत न प्रतीयेत चालमानि
तद्विद्राद्रामनो मायो यथा भासो यथा तमः

यथा महाति भूतानि भूतेः प्रभावचेष्वुनु
प्रविभाजनामप्रविभाजनी यथा तेपू न तेपूहि

प्रत्युवदेव जिन्द्राह्मसः प्रभुजिलास्चानामनः
चन्द्रचन्द्रिरिक्षायाम्य यत् स्थात् सर्वेऽ सर्वेऽ
I.

Four Distichs from the Sritbha'gawat.*

Mr. Wilkins's Orthography.

ahamévásamévágré nányadyat sadásat param
paschádaham yadétachcha yóvasíshyéta sósmyaham

ritétham yat pratíyéta na pratíyéta chátmaní
tadvidyádátmanó máyám yat'há bhásó yat'há tamah

yat'há mahánti bhútáni bhútéshúchchávachéshwanu
pravíshtányapravíshtáni tat'há tésu na téswhaham

etávadéva jijínyásam tattwa'jijínyásunátmanah
anwayavyatírécábhyám yat syát servatra servadá.

* See page 25. The Letters are in Plate 2.
The title of this fine piece properly signifies, *The Mallet of Delusion* or *Folly*, but may be translated, *A Remedy for Distraction of Mind*: it is composed in regular anapaestic verses according to the strictest rules of *Greek* prosody, but in rhymed couplets, two of which here form a *śilpa*.

মুক্ত জহির ধনাগমভূক্তঃ  করুত তন্তুসন্নিহিংসঃ  বিতৃক্তঃ ।
যল্লভস্তে নিজকল্পপূর্ণঃ  বিতৃতঃ  তেন বিনেদয় চিত্তঃ ॥

কক্তুভ কান্তঃ  কন্তু পুঃ  সংসারায়তমীতির বিচিত্রঃ ।
কর্মস্ত বা কুত আরাতঃ  কতকং চিত্রতঃ  তদিদং আতঃ ॥

মন্তরাধ্যভূক্তঃ  হরতি নিমেষাদ কালঃ  সর্বঃ ।
মায়ামিলমধমথিলঃ  হিষ্টঃ  ব্রহ্মাদত্ত প্রবিশাপতির বিদ্বাং ॥

নলিনীদলগতজলবতলঃ  তথাস্বভিমমতিশয় চপলঃ ।
ক্ষণাসহ সার্জনসপ্তিরেক  ভবতি ভবার্থবতরন্তে নৌকঃ ॥

বায়ননং তাবহরণঃ  তাবজননীজম্বের শযনঃ ॥
ইতি সংসারে স্ফুটতরপদোঃ  কথমহ মানব তব সম্ভাষঃ ॥

দিনযামিনয়ো সায়ন্ত্রাতঃ  শিশিরবন্ধভূপুনরায়তঃ ।
কালঃ ক্রীড়তি গঞ্জত্যায়ু  স্ততপি ন মুক্তাভসাবারঃ ॥

অঙ্গ গলিতঃ  গলিত মুওঃ  দস্তবীহীনঃ  জাতঃ  তুওঃ ।
কর্মদুঃ ক্ষমিত শোভিত দূঃ  তদপি ন মুক্তাভসাবারঃ ॥

স্ত্রীরবর্মন্দির তরুতলবাসঃ  শংস্তুভুতমলমতিন বাসঃ ।
সর্বপরিশ্রমোহোগতাগঃ  কস্ত মুক্তঃ  ন করোতি বিরাগঃ ॥

ময়ে মিত্রে পুল্লে বসন্তো মাকুর যত্নো বীরহস্কোঃ ।
ভবসমচিত্তঃ সর্ক্ত্রঃ  বাঙ্গালাচরাদ্যদি বিপুত্তঃ ॥
múdha jahíhi dhanágamattrishníám
curu tenubuddhimanahsu vitrishnám
yallabhasè nijacarmógáttam
vittam téna vinódaya chittam.

cá tava cántá castè putrah
sańsáróyatíva vichitrath
easyatwam va cutà áyáta
stattwam chintaya tadidam bhrátah.

má curu dhanajanayauvanagarvam
haráti nimésftát caláf sarvam
máyámayamidamac'hilam hitwá
brehmapadam previsású viditwá.

nalin'dalagatatálavattaralam
tadvajjívanamatsíaya chapalam
ceshenamiha sajjanaasángatirécá
bhawati bhawárnavatarané naucá.

yávajjananam távanmaranam
távajjananijaharè sayanam
iti sańsårè sp'hufatarađoshah
cat'hamiha mánava tava saútôshah.
dinayáminyau sáyampréta
śísiravasanta punaráyánta
cálah cónlita gach'hatýáyu
stadapi na muñchätayásáváyu.

angam galítam palitam muñdám
dantavihiñám játam tuñdám
carádhrita campita sóbhita dañdám
tadapi na muñchätayásábhdánám.

suravaramándíra tarutalavásah
śáyyábhútalamajínam vásah
servaparígrañá bhógatyágah
casya suc'ham na caróti vírágah.

śatram mitrè putrè bándhau
mácruv yatnam vighrásaúdha
bhavasamchittah servatratwam
vánch'hasyachirádyádi vishnutwam.

asháculáchala septasamúdráh
brehmapurasadardaradinacararudráh
natwám náham náym lóca
stadapi cimart'ham criyátè sócach.

twayí mayi chányatraicóvishnúh
vyart'ham cupyasí mayyasahjshnúh
servam pasýátmanyátmnám
servatrótsrìja bhédajñyánám.

válastávat cónlásacta
starúnastávattarúníractah
vrrirdhastavachchintámagnah
perémé brahmañi cópi na lagnah.

dwádása papjhañícábhiraséshah
śísýánám cät'hítóbhyupadësah
yéshám naisha caróti vivécam
téshám cah çurutámatirécam.
1. Restrain, deluded mortal, thy thirst of acquiring wealth; excite an aversion from it in thy body, understanding, and inclination: with the riches which thou acquirest by thy own actions, with these gratify thy soul.

2. Who is thy wife; who thy son; how extremely wonderful is even this world; whose creature thou also art; whence thou camest—meditate on this, O brother, and again on this.

3. Make no boast of opulence, attendants, youth; all these time snatches away in the twinkling of an eye: checking all this illusion like Māyā, set thy heart on the foot of BRAHME, speedily gaining knowledge of Him.

4. As a drop of water moves tremulous on the lotus-leaf, thus is human life inexpressibly slippery: the company of the virtuous endures here but for a moment; that is our ship in passing the ocean of the world.

5. The body is tottering; the head, grey; the mouth, toothless: the delicate staff trembles in the hand which holds it: still the flaggon of covetousness remains unemptied.

6. How soon are we born! how soon dead! how long lying in the mother's womb! how great is the prevalence of vice in this world! Wherefore, O man, hast thou complacency here below?

7. Day and night, evening and morning, winter and spring, depart and return: time sports, life passes on; yet the wind of expectation continues unrestrained.

8. To dwell under the mansion of the high Gods at the foot of a tree, to have the ground for a couch, and a hide for vesture; to renounce all extrinsic enjoyments; whom doth not such devotion fill with delight?

9. Place not thy affections too strongly on foe or friend, on
a son or a kinsman, in war or in peace: be thou even-minded towards all, if thou desirest speedily to attain the nature of Vishnu.

10. Eight original mountains, and seven seas, Brahma, Indra, the Sun, and Rudra, these are permanent: not thou, not I, not this or that people, wherefore then should anxiety be raised in our minds?

11. In thee, in me, in every other being is Vishnu; foolishly art thou offended with me, not bearing my approach: see every soul in thy own soul; in all places lay aside a notion of diversity.

12. The boy so long delights in his play; the youth so long pursues his damsel; the old man so long broods over uneasiness; that no one meditates on the Supreme Being.

13. This is the instruction of learners delivered in twelve distinct stanzas; what more can be done with such as this work fills not with devotion?
لا يمكنني قراءة النص العربي في الصورة.
III.

The following Elegy, which is chosen as a specimen of Arabic*, was composed by a learned Philosopher and Scholar, Mīr Muhammed Husain, before his journey to Haidarābād, with Richard Johnson, Esq.

mā ãnsa lá ãnsa ãllāt jāt ílāyya ãlāt ḥadḥar
álnaimu áthkala jafnahá wadkalbu tára bihi álḥadhr

rašadát ádšwīda kāšmiká
fatakhallāsat minhā álgharār
nasażdát khalákhiláni lehá
állā tufājīhá bishar .

teshcú ádšarika liḍhulmakin
fakadat bihá najma dīsahhar
fi lalākin kād cahhalat
bisawādihi jafna álkmār

wa terāt álghamāma cadjmulin
terā dinjūma álāt áshar
tebt ḥyūnūn lišemāi
állā haddiyikiká álzuhar

wadlberku yebsimu thegruhu ájabāni lhātíla álghiyar
wadarādu cáda yuχharrikú álismákha fi šummi álkhafar

fahawat tudšnikûn wakād ḥadharat tnākī mín khafar
wadldemū bellá khudūdahá
wasakal riya'du lišna'dhar

wateneffasat ëdh callamat
wáramat fuvādī biddinghar
dhallat tudštibunet álāt
án jedda ël ázmu dīsafar
ON THE ORTHOGRAPHY

kālat ādhabta fūwādanā
waddhaktahu herrar ūlsukar
kalī dawāmera ilihawar
wataulihu nāshī'acā ālghudar

watedāru min āridin ēlat
āridin wamā terdāi ālmekarr
yaumān tesīro bīca ālbihāru
watārāhān turmai āibarr

mā dhā āfādana jāulahān
kālī ālbilādī siwāi āldajaran
adīfita dīhba dīfēd
wanesita ārāma āiblisher

ām kad melīta jiwardanā
yā wālika khilīn kad nafar
fārhem kālat kalī ālladhi
rāma ālsułuwā qamad kādar.

The Translation.

1. Never, oh! never shall I forget the fair one who came to my tent with timid circumspection:

2. Sleep sat heavy on her eye-lids, and her heart fluttered with fear.

3. She had marked the dragons of her tribe, (the sentinels,) and had dismissed all dread of danger from them:

4. She had laid aside the rings, which used to grace her ankles; lest the sound of them should expose her to calamity:

5. She deplored the darkness of the way, which hid from her the morning-star:

6. It was a night, when the eye-lashes of the moon were tinged with the black powder (Alcohol) of the gloom;

7. A night, in which thou mightest have seen the clouds, like camels, eagerly grazing on the stars;

8. While the eyes of heaven wept on the bright borders of the sky;
9. The lightning displayed his shining teeth, with wonder at this change in the firmament;

10. And the thunder almost burst the ears of the deafened rocks.

11. She was desirous of embracing me, but, through modesty, declined my embrace.

12. Tears bedewed her cheeks, and, to my eyes, watered a bower of roses.

13. When she spake, her panting sighs blew flames into my heart.

14. She continued expostulating with me on my excessive desire of travel.

15. 'Thou hast melted my heart, she said, and made it feel inexpressible anguish.

16. 'Thou art perverse in thy conduct to her who loves thee, and obsequious to thy guileful adviser.

17. 'Thou goest round from country to country, and art never pleased with a fixed residence.

18. 'One while the seas roll with thee; and, another while, thou art agitated on the shore.

19. 'What fruit, but painful fatigue, can arise from rambling over foreign regions?

20. 'Hast thou associated thyself with the wild antelopes of the desert, and forgotten the tame deer?

21. 'Art thou weary then of our neighbourhood? O woe to him who flees from his beloved!

22. 'Have pity at length on my afflicted heart, which seeks relief, and cannot obtain it.'

Each couplet of the original consists of two Dimeter 1; ubics, and must be read in the proper cadence.
سپاس. این بخش مربوط به نوشته‌های مرتبط با موضوعاتی است که به‌طور خاص در مورد مسائل اخلاقی و استادیه مربوطه تاکید دارد. به‌نظر می‌رسد که این بخش به‌طور مهمی در تفسیر و تحلیل کتاب‌ها و پژوهش‌های مرتبط است. برای بررسی دقیق‌تر، نیاز به مطالعه بیشتری در مورد مطالب موجود در این بخش دارد.
IV.

As a specimen of the old Persian language and character, I subjoin a very curious passage from the Zend, which was communicated to me by Bahman, the son of Bahram, a native of Yazd, and, as his name indicates, a Parsi: he wrote the passage from memory; since his books in Pahlavi and Deri are not yet brought to Bengal. It is as supposed answer of Izad or God to Zera'htusht, who had asked by what means mankind could attain happiness.

As pid u mad che ce pid u mad ne khosnud bid hargis bhist ne vinid; be jayi cirfah bizaft vinid: mehn vaa be azarm nic darid, cehan vaa be hich ginah mayazariid: aj khishavendi dervish nang medarid: dadd u vendad i khalikeyecta beh cair darid; az ristikhi si ten pasin endi sheh nemayid; mabadd ce aski ten khish vaa dusakht cunid, vanache be khishen nashahad be casan mapasendid va ma cunid: herche be gitti cunid be maini az aieh pastrah ayed*.

A Verbal Translation.

"If you do that with which your father and mother are not pleased, you shall never see heaven; instead of good spirits, you shall see evil beings: behave with honesty and with respect to the great; and on no account injure the mean: hold not your poor relations a reproach to you: imitate the justice and goodness of the Only Creator: meditate on the resurrection of the future body; lest you make your souls and bodies the inhabitants of hell; and whatever would be unpleasing to yourselves, think not that pleasing to others, and do it not: whatever good you do on earth, for that you shall receive a retribution in heaven."

It will, perhaps, be suspected (and the language itself may confirm the suspicion), that this doctrine has been taken from a religion very different both in age and authority, from that of Zera'htusht.

V.

The following story in modern Persian was given to me by Mirza Abdurrahim of Isfahan; it seems extracted from one of the many poems on the loves of Mejnu'N and Laili, the Romeo and Juliet of the East. Each verse consists of a Cretic foot followed by two Choriamb, or a Choriambus and a Molossus.
مشير مسست مر بسبان المير
آپ دوگ ونخ لاندی چنون
یافتن بچون زا گا، شا نا عشق
آسیا لن شر بد خان، عشق
قصت 6 سهشیم. گستن شم
نفل او نقاش مسیر 3 شد
صاحب گست دوخت بیبان
پر کلن دا ایست چیده
در عرب پر طرفی غوضه سهند
بن امری بن بیارب و ایشان
ترکتونا چغری ابران دیده
دیده دوزمان فالو دوزن فرق ق
نازق یافتن جن قصر آن در حال.
کرو فرمان بلغا می در حاکم
کسی سر چمردم ساز تن
سوی دوچرخه روان چو چن
بدرد حنیف از دیگر ونچوان
کرو جیم شو بسوی دشت روان
بنا نشینت ارواح چنون
شمعی بدرن و غنیت چنون
ژو داد ریم آن سوی و ژا آن گیمر سوزنغر اند و خصر را
وقت ورگشت گلابک ژیها ژانا
والی کشور عشقت امیر یا
گردار چو نظیر مر یا میر
دیده ناری بیت عشق اخیر
بمعش شخص چنون گردو طن
زنیم ابران بن پناش بیرا یب
بی سری بدنش گشتربیقا موزه ان آباد، بابا بر یا
شیرماسی سری پستانی الیم
پرورش یافته دامنی گهم
абی رنگ در کمک لالایی جوین
خالی روهی‌رهی هامی و میذین
یافل چان راه بی کارشه‌نه تیشک
اسیتان شهد بیدری خانه‌ی تیشک
برسر دیرش شاکش جوین سیاه فیضند
کیسیه دیشکت اش گشته گیشک
در ارب از هم‌صمیر
بی‌در روستی رشته دیوان
ویده‌گرو دریان و مرده گیان و مرده گیان و مرده گیان و مرده گیان و مرده گیان و

* The reader will supply the point over س, when it stands for م.
OF ASIATIC WORDS.

torc tāzi ghemī hejrān didāh
pur guli dāghi mohabbat khādāh

didāh der šīšiyi khūd susi ferāk
talki-yi nakhri ferākesh bimezdak

yāfī khun kišqeh ān derd sigāl
card fermin bighalāmī der kāl

ceh sūyī najd kadam sās xī ser.
shau beh tājīl ravan chūn šerশer

ān ceh dīl bordah xī Mejnīn bī nīgāh
beh berem sūd biyāder hemrāz

raft dā māvar ghulāmāc der kāl
Lalī ān padishahi mulqi jemāl

beh ghulāmī digaresk shud fermin
ceh tā hem shau bi sūyī dasht ravan

jānībī znati ārbābi jōnūn
shemt pur nūrī mohabbat Mejnīn

sūd āser berem ān sūkhtah rā
ān jīgasūsī ghem āndūkhtah rā

raft dā bargasht ghulāmāc chú nīgāh
vali-yi cishvari tshkesk hemrāz

card urā chú nāzūr mardī ṣāmīr
did zārī bighemī tshk āsīr

cherche seresh shakhī jōnūn cardah vatūn
zakhmī hejrān bī tenesh širāhen

muṭī seri ber bedensh gashtah kobā
mūzakh dā ābilaṭī pā ber pā

Shānāk dā khārī mughlān ber mūš
khirkāh dā rīgī biyābān ber dūsh

gofī cāt gomshudahī vali-yi ghem
hīch khwāhī ceh temennāt dāhēm.
ON THE ORTHOGRAPHY

serferdasat cunam ãs micnat ã jah
Lallâ ãrem biberet khâler khwâh

goft nî nî ceh bâlîdest bûlî
serre râ hem nasari bâ khorsîlî

goft khwâhî ceh conî râst bigû
satri an šafshahî rokhsâri nîcî

yd nedârî bijemâlesh mallî
râst bergîyi bi jâni Lallî

goft caî kodvâhi ârbâbi cerem
kerrahi khâcî deret tâji serem

ber dilem'erdî zi Lallî caîflîst
khwâheshi vaîl zi bi înÎfîlst

bahri khorsendiyî in jozvi hakîr
bas buvad pertüvi dz mhîrî monîr

goft ã gardîd suyi dasht ravân
didah girîyân ã mishah âshêfishân

The Translation.

1. The man who had inebriated himself with milk from the nipple of Anguish, who had been nourished in the lap of Affliction,

2. Mejnu'în, mad with the bright hue and fair face of Lailî', himself a dark mole on the cheek of the desert,

3. Having found the way to the mansion of love, became fixed like the threshold on the door of love's palace.

4. Over his head the form of Madness had cast her shadow: the tale of his passion was loudly celebrated.

5. Among the Arabs a tumult arose on all sides: the relation of his adventures was a dessert in their assemblies.

6. A powerful Prince reigned in Arabia, possessing worldly magnificence and riches:

7. He had seen the depredations of Grief through absence from a beloved object: he had plucked many a black-spotted flower from the garden of love.
8. Even in his infancy he had felt the pain of separation: the bitter taste of that poison remained on his palate.

9. When he learned the story of that afflicted lover, he instantly gave an order to a slave,

10. *Saying*, 'Make thy head like thy feet in running towards *Najid*; go with celerity, like a violent wind:

11. 'Bring speedily with thee to my presence Her, who has 'stolen the heart of MEJNU'N with a glance.'

12. The stripling ran, and in a short time brought LAILI', that Empress in the dominion of beauty.

13. To another slave the Prince gave this order: 'Run thou 'also into the desert,

14. 'Go to that ornament of frantic lovers, MEJNU'N, the illu- 'mined taper of love.

15. 'Bring quickly before me that inflamed *youth*, that heart- 'consumed anguish-pierced lover.'

16. The boy went, and returned, in the twinkling of an eye, 'accompanied by the ruler in the territories of love.

17. When the Prince looked at him, he beheld a wretch in bondage to the misery of desire.

18. Madness had fixed her abode on his head: he was clothed, 'as with a vest, with the wounds of separation.

19. His locks flowed, like a *mantle*, over his body: his only sandal was the callus of his feet:

20. In his hair stuck a comb of *Arabian* thorns: a robe of sand from the desert covered his back.

21. 'O thou, said the Prince, who hast been lost in the valley 'of sorrow; dost thou not wish me to give thee the object of thy 'passion,

22. 'To exalt thee with dignity and power, to bring LAILI' 'before thee gratifying thy soul?'

23. 'No, no; answered he, far, far is it from my wish, that an 'atom should be seen together with the sun.'
24. 'Speak truly, replied the Prince, art thou not willing to
recreate thyself on the smooth plain of that beautiful cheek?'

25. 'Or hast thou no inclination to enjoy her charms? I adjure
thee, by the soul of Laili, to declare the truth!'

26. He rejoined: 'O chief of men with generous heart, a
particle of dust from thy gate is a diadem on my head.

27. 'The pain of my love for Laili is sufficient for my heart:
a wish to enjoy her presence thus would be injustice.

28. 'To gratify this contemptible soul of mine, a single ray
from that bright luminary would be enough.'

29. He spake, and ran towards the desert, his eye weeping, and
his eye-lashes raining tears.*

These couplets would fully answer the purpose of showing the
method, in which Persian may be written according to the original
characters, with some regard also to the Isfahane pronunciation; but,
since a very ingenious artist, named Muhammed Ghau' th, has
engraved a tetrastich on copper, as a specimen of his art, and since
no moveable types can equal the beauty of Persian writing, I annex
his plate*, and add the four lines, which he has selected, in English
letters: they are too easy to require a translation, and too insig-
nificant to deserve it.

_Huwa' l daia_

_Chashmi terahkum, si tò dàrim mà_
_keblah thyl rù becch àrim mà_
_Kàjati mà dò to ber àyed temàm_
_dàmenat dò cef nagùdàrim mà._

"VI.

The first specimen of Hindi, that occurs to me, is a little
_Ghazal_, or love-song, in a Choriambic measure, written by Gunna'
Beigum, the wife of Ghâ'ziulu'dîn Khân, a man of consummate
abilities and consummate wickedness, who has borne an active part
in modern transactions of Upper Hinaustân.

* See Plate VI.
ماعی جمعی صنی سا ز با ل سی میا
اب عشاق کو یعن میر یاما سی میا
آه اباب کویر با گی خر نوکا نے نیا
م صدی ہزار سیر اچورد ہت دو سی میا
میا سیری فرح گنگار نون تری امیت سے
100 یا سی سکی تبیین نویا ہیں ہیں
عوض دویں دیسی دو جب سے یہن سا رہے
جب لب زخم سن شومنیہ ہیمزی میا
حمت عشق عید کے بیل بن جگھر فنی
آن پہ سکی ماں گی نویا نو تلک فو سلی میا

Muddafi hemsে sokhan sáz bi sahiast hai
ab tamannah co yehan mushkdei mayusli hai

dh ab casrati daghi ghem ki khuban se temam
'safkai snah merë jalwai lausli hai

hai merë taraq jigar khuni tera muddatsë
ai kinner ciscê tujhê khwâishî pabûsi hai

dwaâzi derd mezè se wah bherê hain sârê
jis lebi zakhm nê shehshtri terê chust hai

tohnati tshk ðbas cartê hain mujhper Minnat
hain yeh sech milnê cê khuban se tû tuc khust hai.
The Translation.

1. My beloved foe speaks of me with dissimulation; and now the tidings of despair are brought hither to the desire of my soul.

2. Alas, that the smooth surface of my bosom, through the marks of burning in the sad absence of lovely youths, is become like the plumage of a peacock.

3. Like me, O Hinna, (the fragrant and elegant shrub, with the leaves of which the nails of Arabian women are dyed crimson), thy heart has long been full of blood: whose foot art thou desirous of kissing?

4. Instead of pain, my beloved, every wound from thy cimeter sucks with its lips the sweetness, with which it is filled.

5. The suspicion of love is vainly cast on Minnat—Yes; true it is, that my nature rather leads me to the company of beautiful youths.

Thus have I explained, by observations and examples, my method of noting in Roman letters the principal languages of Asia; nor can I doubt that Armenian, Turkish, and the various dialects of Tartary, may be expressed in the same manner with equal advantage; but, as Chinese words are not written in alphabetical characters, it is obvious, that they must be noted according to the best pronunciation used in China; which has, I imagine, few sounds incapable of being rendered by the symbols used in this essay.
II.

ASTRONOMICAL OBSERVATIONS

In FORT WILLIAM, and between MADRAS and CALCUTTA.

BY COLONEL THOMAS D. PEARSE,

COMMANDANT OF THE ARTILLERY, AND SECOND IN COMMAND OF THE BENGAL ARMY.

BEG leave to communicate to the Society some Astronomical Observations which I made at different times in Fort William.

The clock I used from December, 1775, was made by ELICOT: it beats dead seconds: there is one hand for minutes, and the hours revolve with the plate fixed to the hour wheel.

The pendulum can be lengthened without stopping the clock, by means of a screw, which supports the spring by which the pendulum hangs. And the pendulum is described in the 47th volume of the Philosophical Transactions, page 479. The clock-case is firmly screwed to the wall. The transit instrument was made by Sisson; it is four feet long, and has a double object glass. This is supported by two iron bars, which are joined to a square frame, that lies two feet under the floor, buried in brick work.

The upright bars are protected by a case of wood, which is fixed to the house, without touching them in any part.

At first I used the cornice of the Commandant's house to adjust by; but afterwards a slider, with a slit in it, was put up in the area of the fort, near the same place, behind which I could place a light to adjust with by night. There was another object also to the south, about 1500 yards off, which I could use by day; and both these were fixed when the transits by telescope and equal altitudes agreed; and were examined from time to time.

I had only a tolerably good HADLEY'S quadrant and quicksilver, till December, 1776, when I was lucky enough to get an 18 inch land quadrant, made by RAMSDEN, with a micrometer, to subdivide the nonius. This inverts, and is capable of the nicest adjustments. My first telescope was an 18 inch reflector, made by GREGORY.

In August, 1777, I obtained MR. SMITH'S refractor, made by DOLLOND, with a triple object glass, and a double object glass micrometer. And I made a polar axis for it of brass with rack work,
and a declination circle not divided, which also is racked; to which, when the micrometer was used, the telescope was fixed.

I likewise communicate observations made by myself chiefly, and by Lieutenant Colebrooke for me, to ascertain the longitudes and latitudes of places between Madras and Calcutta.

Going to Madras in 1782, I used an Hadley's octant and quicksilver, which I shall here describe.

The octant had a wooden index. I separated the part which carries the speculum from the arm; then fixed it into a lath, and turned it on its own centre: it was three-tenths of an inch thick; the thickness was divided into three parts, and then the edge was turned away on each side: so that the whole piece of wood became like three wheels of different diameters joined together on their flat surfaces, and the middle one was the biggest, that below was the next in size; and the upper one was the least, and only equal to the brass plate on which the speculum was screwed.

A plate of brass, nearly one-tenth thick, broad enough to admit of a hole as big as the under circular part of the turned wood, and to afford a rim of half an inch broad, was then fixed into the lath, and had a hole turned in it of that size; on one side it had an arm, as broad as the wooden index was.

A second plate of the same kind was also prepared; but the hole was larger, though less than the middle part of the turned wood.

The turned piece was then fixed to the octant by its pin, and the plate with the smaller hole, beneath it. As they fitted very nicely, the brass plate turned upon the wood round the centre of the octant, if that were held fast; and both turned on the centre pin, if they were pressed together.

The plate, with the large hole, was then laid above the turned wood, its centre coinciding with the common centre: the wooden arm of the index had the end nearest the centre cut away, above and below, equal to the thickness of the plates of brass: it was there fixed to the octant in the same manner as before it was cut off from the centre, and the brass plates were drilled and rivetted to it.

When these plates were pressed together, they held the turned piece as it were in a vice: when they were forced asunder, the turned piece might be moved independently; and there were in the direction of the radius two screws, one beyond the speculum,
and one between it and the nonius, for the purpose: they had button heads, and their shanks were as high as the top of the index speculum.

On the back of the octant there was a screw with a button head, th' thread entered the centre pin, and the shoulder pressed upon the plate which keeps that pin in its place.

The back screw and vice screws being slacked, the index speculum was brought parallel to the horizon glass, then the vice screws were turned to join the speculum to the index, as before the alteration was made.

To extend the power of the octant occasionally, it was nicely adjusted; then the index was carried to 90°, and there screwed to the limb: next, the back screw of the centre pin was forced, till by its pressure, the speculum piece was held fast; after that, the vice screws being slacked, the index was carried back to 0°, and there screwed to the limb. Whilst it was in this position, the vice screws were again turned, which fixed the speculum piece to the index, and then the back screw being slacked, the speculum followed its motions. When it was used, the index shewed the angle which was to be added to 90° for the angular distance.

By this contrivance, with an octant, I could take angles of 150°: and consequently meridian altitudes as far as 75°: and if the horizon glass and telescope could have been made to slide nearer towards the centre, it would have been increased still further.

In RAMSDEN's new quadrant there is a screw to adjust the horizon glass, and bring it parallel to the other: provided the index speculum is perpendicular to the limb, this is all well; but if that be inclined, as soon as the index quits 0°, there will be an error in the angles observed. I found it so experimentally, and corrected my quadrants accordingly, by turning the horizon glass round its own axis, then having adjusted, as usual, the error sideways was corrected by moving both glasses, by means of their adjusting screws, and dividing the error between them. If, when the horizon glass was restored to its proper position, there still was a lateral error, the operation was repeated. I do not find any mention of this in any of the instructions for using HADLEY'S instruments that I have seen.

The horizon was artificial, invented for the occasion, and
consisted of a wooden trough about \( \frac{3}{4} \) an inch deep, (or rather more,) filled nearly with quicksilver, which served to float a plate of thick glass, the under surface of which had been unpolished and blacked, that only one image might appear. This needs not any adjustment; the only requisite is, that the glass be equally thick all over, and smooth: that, which was used, was a part of a very large looking-glass, that had been broken by accident.

The watch was a time-keeper, by BROOKBANK, which goes whilst it is wound up, and is tolerably good, considered as a sale watch sent to India.

The telescope had a double object glass, with a brass stand, and was made by GREGORY: it magnifies 80 times, but, like all of this construction, that I have seen, it had a dark speck in the middle, and was not equally good in the whole field.

In the way back, we had a land quadrant, of 15 inches radius, made by B. MARTIN, and sent out by the India Company. It was used by MR. HURST in the transit of Venus. This could not be inverted. But to destroy the effects of collimation and error of level, the latitudes are all determined by stars taken north and south of each place, as the observations will shew.

T. D. PEARSE.
# ASTRONOMICAL OBSERVATIONS

made at CALCUTTA.

By T. D. P.

---

## JUPITER'S FIRST SATURNITE.

### IMMERSIONS.

<table>
<thead>
<tr>
<th>Date</th>
<th>Apparent time correct</th>
<th>Time by Ephemeris</th>
<th>Longitude</th>
</tr>
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<td>H. M. S.</td>
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<tr>
<td>1774, 14th Oct.</td>
<td>12.32.25</td>
<td>6.39.00</td>
<td>5.53.25</td>
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<td>23d do.</td>
<td>8.57.15</td>
<td>3.03.17</td>
<td>5.53.58</td>
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<td>1776, 13th Nov.</td>
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<td>8.04.46</td>
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<tr>
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<td>12.09.39</td>
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<td>13th.</td>
<td>15.50.59.3</td>
<td>9.57.02</td>
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<td>15th.</td>
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<td>5.54.05.1</td>
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<td>2.57.11</td>
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<tr>
<td>27th Dec.</td>
<td>9.38.58.8</td>
<td>3.45.01</td>
<td>5.53.57.8</td>
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</table>

*Jupiter very nearly vertical, and the glass shook much.*

*Dollond's triple object glass.*

### EMERSIONS.

<table>
<thead>
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<td>H. M. S.</td>
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<td>6.14.37</td>
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*Dollond's triple object glass.*

*Ditto.*

### SECOND SATELLITE.

### IMMERSIONS.

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<td>9.34.17.3</td>
<td>3.41.33</td>
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*Emerged from behind the body 9.27.04.3, and was quite clear of the body at 9.28.55.3.*

*Dollond's triple object glass.*
<table>
<thead>
<tr>
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Here the tables seem to have been corrected. Dollond's triple object glass.

### THIRD SATELLITE.

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<td>H. M. S.</td>
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<tr>
<td></td>
<td>9.04.20</td>
<td>3.07.49</td>
<td>Immersion.</td>
</tr>
</tbody>
</table>

But I thought I saw it about a minute before; however it was so very dim that I cannot be certain.

<table>
<thead>
<tr>
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<th>Longitude.</th>
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<td>H. M. S.</td>
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<td>H. M. S.</td>
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<td>15.31.51,3</td>
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<td>5.19.58</td>
<td>Do.</td>
</tr>
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<td>' 1777, 28th Jan</td>
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<td>4.22.53</td>
<td>Emersion.</td>
</tr>
<tr>
<td>1778, 3d April.</td>
<td>9.21.24,9</td>
<td>3.33.12</td>
<td>Do.</td>
</tr>
</tbody>
</table>

I think I might have seen it earlier, if I had expected it to emerge at a greater distance than one Satellite appeared, which was the case. Dollond's triple object glass. Rather doubtful.

<table>
<thead>
<tr>
<th>Date</th>
<th>Apparent time correct.</th>
<th>Time by Ephemeris.</th>
<th>Longitude.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>H. M. S.</td>
<td>H. M. S.</td>
<td>H. M. S.</td>
</tr>
<tr>
<td>1779, 2d May.</td>
<td>8.44.37,5</td>
<td>2.54.27</td>
<td>Immersion.</td>
</tr>
<tr>
<td></td>
<td>45.26,5</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>11.32.80,6</td>
<td>5.44.27</td>
<td>Emersion.</td>
</tr>
</tbody>
</table>

I thought I saw it, but Jupiter was so very bright it dazzled my eyes.
### Fourth Satellite

<table>
<thead>
<tr>
<th>Date</th>
<th>Apparent time correct. H. M. S.</th>
<th>Emersion. Immersion. Emersion.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1776, 2d Nov.</td>
<td>13.23.14.0</td>
<td>At the time of this observation, there was a very small star a very little to the west of the westernmost Satellite.</td>
</tr>
<tr>
<td>1777, 8th Jan. 25th.</td>
<td>9.28.49.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7.23.02.0</td>
<td></td>
</tr>
<tr>
<td>1778, 9th May.</td>
<td>8.25.13.0</td>
<td><em>Dollond’s</em> triple object glass.</td>
</tr>
</tbody>
</table>

**Other Observations of Jupiter and his Satellites.**

1776, 22d November, between 9 and 10, I saw a very small star, not bigger than a Satellite, very near to *Jupiter*. The configuration thus,

![configuration](image)

At 12. 9. 39, the configuration was thus,

![configuration](image)

that is, the two outermost Satellites had gone forward, and *Jupiter* back, in right ascension, visibly.

30th November, the configuration was thus,

![configuration](image)

that is, the star was north; distant from the limb in declination
about the quantity of the lesser axis. In right ascension the star was advanced further than Jupiter's centre, about a fifth of the axis. Some time after I found that the little Satellite, which was below the limb, had immersed into the disk; and soon after I saw the shadow of that Satellite upon the Great Belt. I observed the shadow go off the disk, and about an hour after that, the Satellite emerged a little to the north of the Great Belt. The times were noted, but the book was destroyed by accident. When Jupiter passed the meridian, I could not see the star in the transit telescope, but about 4' afterwards the configuration was thus,

\[ \text{\includegraphics{image.png}} \]

that is, a line drawn from the star to Jupiter's centre, made an angle with the Great Belt, which I judged to be about 41°, and in that direction, it was about the quantity of the lesser axis distant from the limb; so that Jupiter had moved back about 3/4 of his diameter, from the time I first saw him to-night till he passed the meridian.

1776, 8th December, my clock was stopped by an earthquake, which spoilt the observation of the immersion of Jupiter's first Satellite.

1776, 23d December, an Emersion of the first Satellite from the Disk.  

*Apparent time correct.*

The shadow touched the middle of the edge of the Great Belt, and made a visible notch in it ... ... ... ... 11.26.00

It was still visible ... ... ... ... 28.05

It vanished ... ... ... ... 30.50

Satellite at the edge of the limb ... ... ... 53.25

In contact emerged ... ... ... ... 58.53

1777, 25th January, 7.23.00.6, I saw a small star a little to the west of the westernmost Satellite, not so bright as either of them; it was hardly visible through the reflector.
IN FORT WILLIAM &C.

Configuration thus,

\[ W \]

26th, I could not find the star at \( h, \)

29th May, *Jupiter's second Satellite* immersed behind the disk \( \cdots \; \cdots \; 7.25.18,7 \)

1779, 2d May, an Immersion of *Jupiter's first Satellite* into the Disk.

Apparent time correct.

In contact \( \cdots \; 11.31.37,6 \)
Immiscion doubtful \( \cdots \; 35.19,6 \)
Certain \( \cdots \; 35.50,6 \)

If the immersions and emersions of this nature were calculated so as to set astronomers to look out for them, *Jupiter's satellites* might be rendered more useful than they now are in regard to longitudes by land; and that too, whether the calculations are accurate or erroneous.

For I mean to use an immersion or emersion of any kind, only to note an instant for taking the altitude of *Jupiter* at the place of observation.

If the instruments be of equal powers, and the eyes of equal strength, then certainly the altitudes will be taken by every person, who shall observe the same phenomenon at one and the same instant of time; and thence the distance of *Jupiter* from the meridian of each will be known to seconds, if we suppose the latitudes known before hand.

And if the telescopes of quadrants could be made sufficiently powerful to observe the satellites, then a single observer, at any place, could perform the whole without trouble or difficulty, and would only need a common watch, and a little more patience than would be requisite if the watch were perfect and calculation true.

But supposing the telescopes and quadrants as they are, and two observers at each place, one employed with the Satellite, and the other with the quadrant, then the latter must carefully keep the body of *Jupiter* on the line of altitude till the other tells him
to stop, which is to be done at the instant of observing the
epected phenomenon.

By this mode, a degree of longitude may be measured with
as much accuracy as a degree of latitude, and it is what I have
in contemplation to perform, as soon as I can get the requisite
instruments.

*Remarks on some erroneous Observations of Jupiter's first
Satellite.*

In 1778, I took notice, that when *Jupiter* is very near the
opposition, the observations are not to be depended on, and that
the Satellite vanished without changing colour. The same
happened in 1779, 1780, and again in 1784, at *Beemulwilsa*; there-
fore, I have put down the times of such observations, as they are
reduced to apparent time, from the known deviation of the clock
from mean time. The transit instrument was examined by stars
that pass over the zenith, and by others north and south, and by
equal altitudes, all which shewed it was as nicely in the meridian
as it well could be.

In 1779, on the 3d March, I observed η and μ Geminorum,
and the deviation was the same as that derived from the transits
of the sun on the 23d February and 5th March. In the observa-
tion of the moon 23d November following, the accuracy of its
position was ascertained, so that the times were correct; and the
errors depend on something at the Satellite and planet. Perhaps
*Jupiter’s* atmosphere may be so dense as to prevent the free passage
of the diminished light soon after the beginning of an eclipse, or
even before it. If so, these observations may tend to clear up that
point, and to measure the extent of that atmosphere.
<table>
<thead>
<tr>
<th>Date</th>
<th>Apparent time correct</th>
<th>Ephemeris. H. M. S.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1778, 4th Feb.</td>
<td>7:51.10,3</td>
<td>1:58.08</td>
</tr>
<tr>
<td>1779, 23d do.</td>
<td>9:02.51,0</td>
<td>3:10.01</td>
</tr>
<tr>
<td>2d March</td>
<td>10:58.15</td>
<td>5:05.17</td>
</tr>
<tr>
<td>9th do.</td>
<td>12:53.08</td>
<td>7:01.07</td>
</tr>
<tr>
<td>11th do.</td>
<td>7:20.35,3</td>
<td>1:30.10</td>
</tr>
</tbody>
</table>

These two were observed at Dum Dum, but the time was taken from the transit instrument by a watch, carried out before and back after, and compared with the clock.

1780, 13th March. 10:10.47,7 | 4:20.23

All these observations were made with Dollond's triple object glass.

**Observations of Venus.**

1776, 2d January, at 7:55 in the morning, I measured the distance between Venus and the Sun 46°.32'.

I was informed the natives were viewing it with astonishment, but I did not see it with the naked eye. Through the little telescope of my HADLEY's quadrant it appeared as bright as Capilla.

<table>
<thead>
<tr>
<th>Apparent time correct</th>
</tr>
</thead>
<tbody>
<tr>
<td>1777, 1st July, Venus passed the meridian 21:30.41.5</td>
</tr>
<tr>
<td>14th, Venus visible to the naked eye, and has been so three days.</td>
</tr>
<tr>
<td>Passed the meridian ... 21:01.02.0</td>
</tr>
</tbody>
</table>

**Distances from the Sun, measured with an HADLEY'S Quadrant.**

<table>
<thead>
<tr>
<th>West limb 41.57</th>
<th>...</th>
<th>...</th>
<th>21:21.58,5</th>
</tr>
</thead>
<tbody>
<tr>
<td>East do.</td>
<td>42.29</td>
<td>...</td>
<td>25.08.5</td>
</tr>
<tr>
<td>15th, Passad the meridian</td>
<td>...</td>
<td>...</td>
<td>20.59.29</td>
</tr>
<tr>
<td>16th, Do.</td>
<td>...</td>
<td>...</td>
<td>58.08.5</td>
</tr>
<tr>
<td>17th, Still visible.</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
</tbody>
</table>
From nearest limb 42.31 ... ... 0.08.10
From "furthest do. 43.05 ... ... 0.12.14

1780, 18th March, an Appulse of Venus to Mars.

<table>
<thead>
<tr>
<th>Inch</th>
<th>Non.</th>
<th>Distance</th>
<th>Apparent time correct</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.45</td>
<td>3</td>
<td>15.17.2</td>
<td>7.39.33.9</td>
</tr>
<tr>
<td>2.45</td>
<td>8</td>
<td>15.20.9</td>
<td>44.33.9</td>
</tr>
<tr>
<td>2.45</td>
<td>5</td>
<td>15.18.7</td>
<td>49.33.9</td>
</tr>
</tbody>
</table>

N. B. The scale of the micrometer is divided into twentieth parts of an inch, and the nonius subdivides these into twenty-five parts each.

The next morning the Sun’s diameters were measured.

<table>
<thead>
<tr>
<th>Inch</th>
<th>Non.</th>
<th>Horizontal</th>
<th>Vertical</th>
<th>Mean</th>
<th>Error of micrometer</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>5.15</td>
<td>5.10</td>
<td>5.15</td>
<td>6.625</td>
</tr>
</tbody>
</table>

Sun’s diameter by Ephemeris 32°11′6, from which the distances were calculated.

19th March, Difference of Declinations and right Ascensions.

<table>
<thead>
<tr>
<th>Inch</th>
<th>Non.</th>
<th>Apparent time correct</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.20</td>
<td>00</td>
<td>26.05.7 at 7.41.51.4</td>
</tr>
</tbody>
</table>
Mars passed the vertical wire 43.09.4
Venus do. 45.16.4

Mars was south of Venus.
IN FORT WILLIAM, &c. 59

Observations of Mars.

An Appulse of Mars to α Librae.

\[
\begin{array}{ccc}
\text{Inch.} & \text{Num.} & \text{Distances} \\
1,00" & 19 & = 6.18\,^\circ \\
1,00" & 17 & = 6.17\,^\circ \\
\end{array}
\]

... 10.50.05

... 10.58.05

The star was west of Mars.

Observations of the Moon.

1775, 12th January, an Occultation of Aldebaran.

Immersion ...

8.54.55

I believe the watch was set by equal altitudes, but I have lost the book in which the entry was made, and have only a copy of my observations as a register of this and the next that follows.

15th February, an Eclipse of the Moon.

End 10.15.00.5, apparent time correct.

1776, 3d March, an Occultation of Regulus.

Not having an ephemeris at the time, the observation was accidental, and consequently not prepared for. The transit instrument was but lately put up, and had not been much used, but it was the only resource for time: accordingly, it was adjusted truly as to level and wires, but it was not in the meridian accurately. Therefore the transits of several stars were taken to determine the position of the instrument, and the error of that being known, the times could be corrected by a very easy rule, which I subjoin. Let \( x \) be the error in seconds at the horizon, \( a \) and \( b \) the sines of the zenith distances of two stars, \( A \) and \( B \) the sines of the polar distances, \( d \) the difference of the errors of the clock, as found from the observed and the calculated transit of those two stars. Then \( \frac{x}{a} \)

will be the space at the equator for the equation to correct one,
and \( \frac{x}{b} \) the same for the other; and the sum of these two will be equal to \( d \times 15 \). or, which is the same thing, \( \frac{x}{a} + \frac{x}{b} = d \). Whence for all small angles \( x = \frac{15 \times d \times a - b}{a \times b + b \div a} \).

\( \zeta \) and \( \gamma \) Leonis were the two stars that were relied on for time and position, because they pass so nearly at equal distances from the zenith, that the mean of their errors of the clock would be so near to the true one, that any clock yet invented could not shew the difference actually.

The difference of their errors was 5\( ^\circ \),6 and thence the error of the transit instrument was only 1246\( ^\circ \).16 at the horizon, and the distance of the wires of the telescope is 1478\( ^\circ \).

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>( \beta ) West Lamb</td>
<td>10.58.19.5</td>
<td>-15.08</td>
<td>10.54.56.8</td>
<td>6.41.04</td>
</tr>
<tr>
<td>( \alpha ) Leonis</td>
<td>11.01.45.0</td>
<td>-7.16</td>
<td>10.54.56.8</td>
<td>6.41.03</td>
</tr>
<tr>
<td>( \zeta ) The Northern</td>
<td>63.11</td>
<td>-14.07</td>
<td>56.15.9</td>
<td>6.41.01</td>
</tr>
<tr>
<td>( \gamma ) The Southern</td>
<td>10.33</td>
<td>+ 3.01</td>
<td>11.04.06.0</td>
<td>6.41.41</td>
</tr>
<tr>
<td>( \delta ) The Northern</td>
<td>10.39</td>
<td>+ 3.01</td>
<td>11.04.06.0</td>
<td>6.41.41</td>
</tr>
<tr>
<td>( \epsilon ) The Southern</td>
<td>14.04</td>
<td>- 2.59</td>
<td>67.24</td>
<td>6.41.41</td>
</tr>
<tr>
<td>( \nu ) Ursae Majoris</td>
<td>14.08</td>
<td>+92.27</td>
<td>13.03.43.9</td>
<td>6.36.37</td>
</tr>
<tr>
<td>( \zeta ) Ursae Majoris</td>
<td>13.08.48</td>
<td>+92.27</td>
<td>13.03.43.9</td>
<td>6.36.37</td>
</tr>
<tr>
<td>Immersion,</td>
<td>48.40</td>
<td>+92.01</td>
<td>43.34</td>
<td>6.38.00</td>
</tr>
<tr>
<td>It was emerged, but I did not see the Emerson.</td>
<td>52.30</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6th March, equal Altitudes, by an Hadley's Quadrant and Quicksilver.

<table>
<thead>
<tr>
<th>Quadrant.</th>
<th>( h )</th>
<th>( h )</th>
<th>( h )</th>
<th>( h )</th>
</tr>
</thead>
<tbody>
<tr>
<td>30.00</td>
<td>rising</td>
<td>20.29.41</td>
<td></td>
<td>6.05.5</td>
</tr>
<tr>
<td>falling</td>
<td>27.42.30</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30.30</td>
<td>rising</td>
<td>20.32.14</td>
<td></td>
<td>6.05.0</td>
</tr>
<tr>
<td>falling</td>
<td>27.39.56</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>6.05.25</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Equation of equal altitudes | 7.10 |

\( \pm 5.58.15 \)
This compared with the error of the clock by $\xi$ and $\gamma$, shews that it was loosing $17''.06$ daily; at which rate, to the time that $\xi$ Ursæ Majoris passed the meridian, it must have lost $1''.95$, and the error by $\xi$ ought to have been $6'.39''.4$. The difference is only $1''.4$, which is not greater than the errors of observation may sometime be in stars of great declination.

<table>
<thead>
<tr>
<th>Result</th>
<th>Apparent time correct.</th>
</tr>
</thead>
<tbody>
<tr>
<td>West limb passed the meridian</td>
<td>... 10:51:23</td>
</tr>
<tr>
<td>Regulus</td>
<td>... 56:15:5</td>
</tr>
<tr>
<td>Immersion</td>
<td>... 13:56:00:15</td>
</tr>
<tr>
<td>And emerged in less than 50'.</td>
<td></td>
</tr>
</tbody>
</table>

1776, 30th July, an Eclipse of the Moon.

Beginning of total darkness.

<table>
<thead>
<tr>
<th>Apparent time correct.</th>
</tr>
</thead>
<tbody>
<tr>
<td>By eye</td>
</tr>
<tr>
<td>By telescope</td>
</tr>
</tbody>
</table>

Clouds prevented any other observations.

1777, 20th January, an Occultation of $\xi$ Geminorum by the Moon.

<table>
<thead>
<tr>
<th>Apparent time correct.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immersion</td>
</tr>
</tbody>
</table>

23d January, an Eclipse of the Moon.

<table>
<thead>
<tr>
<th>Apparent time correct.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eclipse began</td>
</tr>
<tr>
<td>Shadow well defined</td>
</tr>
<tr>
<td>Mare Humorum touched</td>
</tr>
<tr>
<td>Grimaldus, do.</td>
</tr>
<tr>
<td>Grimaldus passed</td>
</tr>
<tr>
<td>Mare Humorum, do.</td>
</tr>
<tr>
<td>Tycho's dark circle touched</td>
</tr>
</tbody>
</table>
Tycho's body, do.  ...  ...  ...  56.40,7  
Copernicus, do.  ...  ...  ...  9.26.28,7  
Dq. passed  ...  ...  ...  33.23,7  

Going off again.

Copernicus passed  ...  ...  ...  10.12.58,5  
Grimaldus, do.  ...  ...  ...  21.23,5  
Mare Humorum touched  ...  ...  ...  36.17,5  
Aristæus passed  ...  ...  ...  37.33,5  
Mare Humorum, do.  ...  ...  ...  47.23,5  
Regiomontanus, do.  ...  ...  ...  11.00.08,5  
Tycho's body  ...  ...  ...  02.33,5  
Tycho's dark circle passeó  ...  ...  ...  05.38,5  
Vendelin, do.  ...  ...  ...  12.23,5  
Faint Penumbra remained  ...  ...  ...  32.25,5  
Limb clear.  End  ...  ...  ...  33.33,5  
West limb passed the meridian  ...  ...  12.03.22,7  
East do. do.  ...  ...  ...  05.38,2  

The times are those of the shadow's edge, unless it be otherwise expressed.

1777, 13th February, an Occultation of µ Ceti.

\[
\text{Apparent time correct.}
\]

Immersion  ...  ...  ...  7.53.46,7  

I was very certain of the time of the immersion. Five seconds before it, the star began to change colour and to loose light sensibly; one second before the immersion, it was considerably broader and redder than at first; and the light was not so strong as before.

This supports the supposition of an atmosphere round the moon, though it does not extend to any great distance. It has been doubted, and is, I believe, not yet absolutely admitted. But our atmosphere may be doubted by an inhabitant of the moon, for if to its greatest extent, supposed 45 miles, it were of the same density as at the surface of the earth, which is not the case, it would not subtend a minute, as the earth is 8000 miles in diameter, and the greatest parallax only 62'.

1777, 16th May, an Appulse of the Moon to v Scorpii.

Apparent time correct.

West limb passed the meridian ... 7.59.50,1
v Scorpii do. ... 8.00.02,1

By the arch of the transit instrument, the star was 10' from the limb.

1779, 1st May, an Appulse of the Moon to Mars and Saturn.

Having brought the Moon's limb to run along a wire of declination,

Apparent time correct.

The eastern limb passed the vertical wire ... 10.23.09,5
Saturn passed the same ... 10.23.21,5
Saturn did not come within the scale of the micrometer.

For the right Ascensions.

Apparent time correct.

Mars

Saturn

Passed the meridian at ... 56.34
57.36

Eastern limb

Distances of the Moon and Mars.

Apparent time correct.

<table>
<thead>
<tr>
<th>Inch.</th>
<th>Non.</th>
<th>4.70 u 08.5 = 28.40,3</th>
<th>4.65 u 21 = 28.31,1</th>
<th>4.65 u 15 = 28.26,7</th>
<th>4.65 u 21 = 28.31,1</th>
<th>4.70 u 05 = 28.37,7</th>
<th>4.70 u 17 = 28.09,9</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>13.18.42,5</td>
<td>26.34,5</td>
<td>Mean of the three times and the same measure</td>
<td>31.53,5</td>
<td>36.49,5</td>
<td>41.06,5</td>
</tr>
</tbody>
</table>

1779, 3d May, an Appulse of the Moon to B Ophiuchi.

Difference of Declination.

Apparent time correct.

<table>
<thead>
<tr>
<th>Inch.</th>
<th>Non.</th>
<th>4.70 u 17 = 28.09,9</th>
<th>4.70 u 17 = 28.09,9</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10.22.58,1</td>
<td>10.22.58,1</td>
</tr>
</tbody>
</table>
ASTRONOMICAL OBSERVATIONS

The star was to the west of the Moon's horn from which the distance was measured, because the micrometer could not take in the limb.

\[
\begin{array}{ccc}
\text{Inch} & \text{Nom.} & \text{Apparent time correct.} \\
4,60 & 17 & 28.09,9 \\
& & ... \\
& & ... \\
& & 10.22.51,1
\end{array}
\]

Examination of the Micrometer.

1st May, 19.29. lesser diameter of the Sun ... 5,2 \(\equiv\) 13
Again, ... ... \(\equiv\) 15
Greater diameter ... ... \(\equiv\) 23
Again ... ... ... \(\equiv\) 24

Hence mean diameter ... 5,2 \(\equiv\) 17,5

There are twenty-five nonius to divide one twentieth of an inch. When the limbs coincided the zeros agreed.

The ephemeris gives 15'54",6 for the semi-diameter, therefore one nonius is equal to 0",7294.

1779, 23d November, an Eclipse of the Moon.

<table>
<thead>
<tr>
<th>Event</th>
<th>Astronomical time correct</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beginning</td>
<td>12.02.33,0</td>
</tr>
<tr>
<td>Shadow well defined</td>
<td>03.36,0</td>
</tr>
<tr>
<td>Aristarchus</td>
<td>10.37,9</td>
</tr>
<tr>
<td>Insula Ventorum</td>
<td>12.14.32,9</td>
</tr>
<tr>
<td>Copernicus</td>
<td>21.18,9</td>
</tr>
<tr>
<td>Mare Vaporum</td>
<td>32.07,8</td>
</tr>
<tr>
<td>Bright spot in Mare Vaporum</td>
<td>34.27,7</td>
</tr>
<tr>
<td>Tycho's body touched</td>
<td>35.29,7</td>
</tr>
<tr>
<td>Mare Sr renitatis, do. the border</td>
<td>35.47,1</td>
</tr>
<tr>
<td>Tycho passed</td>
<td>36.52,7</td>
</tr>
<tr>
<td>Mare Tranquilitatis touched</td>
<td>40.17,6</td>
</tr>
<tr>
<td>Ariadæus</td>
<td>41.37,6</td>
</tr>
<tr>
<td>Mare Serenitatis passed</td>
<td>44.07,6</td>
</tr>
<tr>
<td>Meero</td>
<td>51.37,5</td>
</tr>
<tr>
<td>Mare Crisium touched</td>
<td>52.37,5</td>
</tr>
<tr>
<td>Dp. passed</td>
<td>56.40,4</td>
</tr>
</tbody>
</table>
The apparent times here noted in these observations were derived from the mean times. The difference between the clock and mean time being applied to the hours shown by the clock. And as the difference or equation was derived from the transit instrument, here follows an examination of its position.

<table>
<thead>
<tr>
<th>Transits over the middle</th>
<th>Difference between the clock and mean time.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td>h, m, s</td>
</tr>
<tr>
<td>22d November,</td>
<td></td>
</tr>
<tr>
<td>O West limb</td>
<td>23h 42m 34s, 44s 53s</td>
</tr>
<tr>
<td>East do.</td>
<td></td>
</tr>
<tr>
<td>Centre</td>
<td>23h 43m 43s, 0s 195s</td>
</tr>
<tr>
<td>Eqtn. time</td>
<td></td>
</tr>
<tr>
<td>23d November,</td>
<td></td>
</tr>
<tr>
<td>a Arietis</td>
<td>9h 42m 02s</td>
</tr>
<tr>
<td>b West Limb</td>
<td>11h 38m 28s, 40s 51s</td>
</tr>
<tr>
<td>b East do.</td>
<td></td>
</tr>
<tr>
<td>Rigel</td>
<td>12h 50m 41s</td>
</tr>
<tr>
<td>Bellatrix</td>
<td>13h 00m 01s</td>
</tr>
<tr>
<td>Castor</td>
<td>15h 06m 51s</td>
</tr>
<tr>
<td>Procyon</td>
<td>14h 05s</td>
</tr>
<tr>
<td>1st December,</td>
<td></td>
</tr>
<tr>
<td>O West limb</td>
<td>23h 45m 26s, 47s 47s</td>
</tr>
<tr>
<td>East do.</td>
<td></td>
</tr>
<tr>
<td>Centre</td>
<td>23h 46m 36, 0s 5, 8</td>
</tr>
<tr>
<td>Eqtn. of time</td>
<td>10h 17m 7s</td>
</tr>
</tbody>
</table>
Equal Altitudes with the Quadrant which has only one Wire

N. B. Before and after this last transit.  
Another altitude not moved.

<table>
<thead>
<tr>
<th></th>
<th>h</th>
<th>u</th>
<th></th>
<th>h</th>
<th>u</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rising U limb</td>
<td>20.16</td>
<td>41</td>
<td></td>
<td>20.23</td>
<td>47</td>
</tr>
<tr>
<td>L limb</td>
<td>20.19</td>
<td>38.5</td>
<td></td>
<td>20.26</td>
<td>46.5</td>
</tr>
<tr>
<td>Falling L limb</td>
<td>27.13</td>
<td>27</td>
<td></td>
<td>27.06</td>
<td>17</td>
</tr>
<tr>
<td>U limb</td>
<td>27.16</td>
<td>23</td>
<td></td>
<td>27.09</td>
<td>19</td>
</tr>
<tr>
<td>Centre</td>
<td>23.46</td>
<td>32.4</td>
<td></td>
<td>23.46</td>
<td>32.4</td>
</tr>
<tr>
<td>Equation of equal altitude</td>
<td>14.7</td>
<td>4.37</td>
<td></td>
<td>23.46</td>
<td>36.7</td>
</tr>
</tbody>
</table>

Apparent time correct.

1780, 18th February, Ἐast limb passed the meridian... 10.39.31.6
15th April, Ἐast limb past the meridian ... 9.17.34
5th August, an Appulse of the Moon to Jupiter...

Ἐast limb passed a circle of the meridian ... 7.14.44

Jupiter’s western limb ... ... ... ... 14.43
Eastern do. ... ... ... ... 14.58
Centre ... ... ... ... 18.49
Ἐast limb ... ... ... ... 00.53
Jupiter’s centre ... ... ... ... 25.06
Ἐ ... ... ... ... 25.19″
Jupiter’s centre ... ... ... ... 42.31
Ἐ ... ... ... ... 43.08
Jupiter ... ... ... ... 51.21
Ἐ ... ... ... ... 52.15
Jupiter ... ... ... ... 8.42.22
Ἐ ... ... ... ... 44.42

The difference of declination of Jupiter and the nearest horn of the Moon, was ... 9°.01",4 at ... 7.28.40

Distances of Limbs.

14.33.2 ... ... ... ... 7.32.12
15.01.5 ... ... ... ... 35.36
15.32.7 ... ... ... ... 38.53
16.25.9 ... ... ... ... 44.31
17.06.5 ... ... ... ... 48.16
30.58.6 ... ... ... ... 8.35.49
## Observations at Large for Determining the Latitude of the Treasury Gate in Fort William in Bengal

<table>
<thead>
<tr>
<th>Face East</th>
<th>Face West</th>
<th>Mean or Observed Altitude</th>
<th>Equations</th>
<th>Refraction</th>
<th>Atection</th>
<th>Reduction</th>
<th>Altitude Correct</th>
<th>Declination</th>
<th>Latitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>auri</td>
<td>89° 57' 37.3&quot;</td>
<td>89° 58' 16&quot;</td>
<td>89° 57' 56.6&quot;</td>
<td>0 2&quot; 30&quot; 0.43&quot;</td>
<td>89° 57' 54.7&quot;</td>
<td>22° 30' 30.4&quot;</td>
<td>22° 33' 0.7&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>auri</td>
<td>88° 41' 47&quot;</td>
<td>88° 42' 28&quot;</td>
<td>88° 42' 07.5&quot;</td>
<td>1 2&quot; 82&quot; 0.03&quot;</td>
<td>88° 42' 06.5&quot;</td>
<td>21° 15' 26.2&quot;</td>
<td>19° 7&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tauri</td>
<td>89° 09' 49.7&quot;</td>
<td>89° 11' 04&quot;</td>
<td>89° 10' 26.9&quot;</td>
<td>0 7&quot; 55&quot; 0.39&quot;</td>
<td>89° 10' 25.1&quot;</td>
<td>21° 43' 46.5&quot;</td>
<td>21° 4&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tauri</td>
<td>88° 25' 48.8&quot;</td>
<td>88° 26' 45.0&quot;</td>
<td>88° 26' 16.9&quot;</td>
<td>0 7&quot; 62&quot; 0.7&quot;</td>
<td>88° 26' 16.9&quot;</td>
<td>20° 59' 23&quot;</td>
<td>66° 1&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tauri</td>
<td>88° 05' 07.9&quot;</td>
<td>88° 04' 17&quot;</td>
<td>88° 04' 2.5&quot;</td>
<td>0 11' 1.05&quot;</td>
<td>88° 04' 1.8&quot;</td>
<td>24° 28' 25.9&quot;</td>
<td>67° 7&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seminorum</td>
<td>89° 18' 11.7&quot;</td>
<td>89° 17' 08&quot;</td>
<td>89° 17' 39.8&quot;</td>
<td>0 16' 1.49&quot;</td>
<td>89° 17' 39.8&quot;</td>
<td>23° 15' 25.3&quot;</td>
<td>65° 3&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seminorum</td>
<td>89° 57' 17.3&quot;</td>
<td>89° 55' 53.8&quot;</td>
<td>89° 56' 37.6&quot;</td>
<td>0 44' 2.03&quot;</td>
<td>89° 56' 40.4&quot;</td>
<td>22° 35' 32.7&quot;</td>
<td>66° 2&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seminorum</td>
<td>87° 46' 28.2&quot;</td>
<td>87° 47' 17&quot;</td>
<td>87° 46' 52.6&quot;</td>
<td>0 84' 2.6&quot;</td>
<td>87° 46' 53.8&quot;</td>
<td>20° 20' 0.03&quot;</td>
<td>66° 2&quot;</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\[ \text{Mean} \ = \ 22° 33' 0.9" \]

| Signum ... | 83° 29' 09.7" | 6° 7" 82" 0.63" | 83° 29' 03.2" | 16° 02.58 N. | 22° 33' 54.8" |
| 1 ... | 58° 57' 52.2" | 33° 7" 51" 0.12" | 58° 57' 13.8" | 8° 28.15 N. | 34° 30.3" |
| D. ... | 74° 47' 00" | 15° 3" 22" 1.28" | 74° 46' 42.8" | 7° 20.57 N. | 34° 13.8" |
| E. ... | 84° 00' 29.9" | 6° 0" 25" 0.00" | 84° 00' 28.4" | 16° 34.11 N. | 33° 47.6" |
| Is ... | 51° 00' 43.5" | 45° 5" 46" 0.275" | 51° 00' 00" | 16° 25.0435" | 34° 15.7" |

\[ \text{Mean} \ = \ 22° 34.74" \]

| Illa ... | 66° 47' 18" | 23° 5" 6.8" 0.06" | 66° 47' 06.53" | 45° 45.12.5" | 22° 32.12.8" |
| Auri ... | 84° 08' 43" | 5° 6" 2.4" 0.37" | 84° 08' 40.2" | 28° 24.08" | 48° 2" |
| Tauri ... | 84° 59' 37.1" | 4° 8" 1.2" 0.37" | 84° 59' 34.7" | 7° 32.27.1" | 01° 8" |
| Ursae ... | 75° 21' 42.8" | 15° 0" 2.4" 1.275" | 75° 21' 31.4" | 47° 10.34" | 05° 4" |
| Minorum ... | 87° 12' 30" | 2° 9" 0.4" 2.08" | 87° 12' 29.43" | 35° 19.51.4" | 11° 7" |

\[ \text{Mean} \ = \ 22° 32.16" \]

\[ \text{Mean of the last two sets,} \ = \ 22° 33.11.7" \]

\[ \text{Double collimation, or difference of the last two sets,} \ = \ 1° 51.4 \]

\[ \text{Latitude by the whole,} \ = \ 22° 33.10.55" \]
ASTRONOMICAL OBSERVATIONS,

TRIVATOORE.

Observations by T. D. P. 1783.

On the meridian, December 5, ... $23.33.52.5$, slow $26.07.5$
On the meridian, December 6, ... $23.35.53.1$, slow $24.06.9$

Daily gain ... ... $2.00.6$

The equation of equal altitudes was applied.

An Emersion of Jupiter's first Satellite.

6th December, by watch emerged ... $6.31.53$
Too slow at noon ... $+26.07.3$
Gain till observation ... $-34.4$

Emersion ... $6.57.25.9$
Ephemeris ... $1.36.52.0$

Longitude in time ... $5.20.33.9$
in degress ... $80.08.28.5$

On the meridian, December 28 ... $23.26.37$
Equation of E. A. ... ... $-1.9$

$23.26.35.1$, slow $33.24.9$

On the meridian, December 30 ... $23.23.40.3$
Equation of E. A. ... ... $-1.9$

$23.23.38.4$, slow $36.21.6$

Daily loss ... $88.4$
*An Emersion of Jupiter's first Satellite.*

29th December, by watch emerged ... $^h^m^s$ 6.27.07
Too slow at noon ... ...  33.24.9
Loss till observation at 88, 4 ...  25.8

<table>
<thead>
<tr>
<th>Emersion</th>
<th>...</th>
<th>7.00.57.7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ephemeris</td>
<td>...</td>
<td>1.40.44.0</td>
</tr>
</tbody>
</table>

Longitude in time ... ...  5.20.13.7
in degrees ... ...  80.03.24.6
The mean of the two longitudes ... ...  80.05.56.5

The distance between the flag in* the fort, and the place of observation at Trivatoore, was determined by a long base measured in the sands, and by taking angles for trigonometrical calculations.

*Madras* flag, distance ... ... 2787.1 feet.
Bearing ... ... S. 10.33.50 W.
Which give difference of Longitude 50°.5.
Latitude 4°.30.7.

**VIPEREE.**

Having borrowed the quadrant that Mr. Hurst used in the transit of Venus, I was desired *not to alter* its line of collimation till I had determined the quantity of error; those observations are in the tables of latitude. It was used in the survey to Calcutta.

As I intended to observe at this place, I determined its distance from the fort as accurately as I could by trigonometry. The result is:

*Madras* flag, distance ... ... 8072.2 feet.
Bearing ... ... S. 23.15.00 E.
Which gives difference of Latitude 31°.5
LatITUDE of Trivatoore, see table
Madras south of it

... ... 13.09.00.4
... ... — 4.30.7

Latitude ... 13.04.29.7

LatITUDE of Viperee, see table
Madras south of it

... ... 13.05.05.4
... ... — 31.5

Latitude ... 13.04.33.9

Mean, 13.04.31.8

LongITUDE of Trivatoore, mean
Madras west of it

... ... 80.05.56.5
... ... — 00.50.5

Longitude ... 80.05.06.0

W U N G O L E W o r t h 782, commonly called O N G O L E.

Observations by T. D. P.

14th November, double altitudes of the pole, with the small sextant made by RAMSDEN, and the artificial horizon.

<table>
<thead>
<tr>
<th>Watch</th>
<th>Angles</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.16.12</td>
<td>34.45.30</td>
</tr>
<tr>
<td>21.00</td>
<td>47.30</td>
</tr>
<tr>
<td>31.00</td>
<td>45.30</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>49.00</td>
<td>46.30</td>
</tr>
</tbody>
</table>

these were with the small sextant.

49.00

this was with the large sextant.

9.29.18 34.46.15

17.23.08
+ 2.40* beneath meridian.
— 2.58 refraction.

17.22.50 meridian altitude,
1.51.13 polar distance.

15.31.37 Latitude,
16th November, with the octant double altitudes of the Sun.

<table>
<thead>
<tr>
<th>Time (12h)</th>
<th>Upper L.</th>
<th>Lower L.</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.00.28</td>
<td>111.51.00</td>
<td>110.48.20 M. A.</td>
</tr>
<tr>
<td>2.24</td>
<td>54.00</td>
<td></td>
</tr>
<tr>
<td>4.14</td>
<td></td>
<td>110.47.00</td>
</tr>
<tr>
<td>5.41</td>
<td>111.56.00 M. A.</td>
<td></td>
</tr>
<tr>
<td>6.36</td>
<td></td>
<td>Observed altitude... 55.41.05</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ref. and par. ... -34</td>
</tr>
<tr>
<td>Meridian altitude correct</td>
<td>... 55.40.31</td>
<td></td>
</tr>
<tr>
<td>Declination</td>
<td>... S. 18.49.05</td>
<td></td>
</tr>
<tr>
<td>Co. Latitude</td>
<td>... 74.29.36</td>
<td></td>
</tr>
<tr>
<td>Latitude</td>
<td>... 15°.30.24</td>
<td></td>
</tr>
</tbody>
</table>

1784, The Latitude observed by T. D. P. (see observations at large) was, 15°.29′.16″.

This is inserted only to bring to test the accuracy of the octant, which is mentioned (page 48) in the introduction: and it appears, that by a single observation made with it, the Latitude was determined within 1′.8″.

It serves also to shew that, though it is very difficult to take double altitudes of so faint a star, in low latitudes, even the polar star may be used to great advantage: and in these hot climates the stars only can be employed, for the Sun's heat at noon, after a long march, is really not to be borne by any constitution.

MAS ÜLIPATAM, 1782. By T. D. P.

27th October, 0° diameter forward 33, then set the speculum to 90°, backward 32, and shifted the index back.

Double altitudes of the Sun's lower limb, taken with the Hadley's octant and the artificial horizon.
ASTRONOMICAL OBSERVATIONS,

\[ \begin{array}{ll}
\text{Watch} & \text{Angles.} \\
ho & \circ \rightleftharpoons \\
12.19.21 & 120.52.20 \\
20.32 & 120.55.20 \\
28.17 & 121.21.00 \\
30.40 & 121.23.30 \\
31.38 & 121.24.00 \\
32.34 & 121.25.40 \text{ Meridian.} \\
34.23 & 121.23.20 \\
\end{array} \]

Observed meridian altitude \( \circ \), \( \circ \) L. L. 60.42.50

Error of quadrant \( \circ \) \( \circ \) \( -30 \)

Semi-diameter \( \circ \) \( \circ \) \( +16.10 \)

Ref. and par. \( \circ \) \( \circ \) \( -27 \)

Altitude \( \circ \) \( \circ \) \( 60.58.03 \)

Declination \( \circ \) \( \circ \) \( \text{S. 12.51.09} \)

\[ \begin{array}{l}
\text{Co. Latitude} \quad \cdots \quad 73.49.12 \\
\text{Latitude} \quad \cdots \quad 16.10.48 \\
\end{array} \]

28th October, quadrant the same as above.

The mode the same, double altitude \( \circ \) \( \circ \) \( 120.45.00 \)

Meridian altitude correct \( \circ \) \( \circ \) \( 60.37.42 \)

Declination \( \circ \) \( \circ \) \( \text{S. 13.11.55} \)

\[ \begin{array}{l}
\text{Co. Latitude} \quad \cdots \quad 73.49.37 \\
\text{Latitude} \quad \cdots \quad 16.10.23 \\
\end{array} \]

1st November, \( \bigodot \) diameter, 34 forwards, \( \{ \), then set the speculum to 90\( ^\circ \), 33 backwards, \( \} \)

\[ \begin{array}{ll}
\text{Time.} & \text{Upper L.} & \text{Lower L.} \\
\text{\( \circ \), \( \circ \)} & \circ \rightleftharpoons & \circ \rightleftharpoons \\
12.14.56 & 119.13.10 & 118.04.30 \text{ M. A.} \\
15.33 & \cdots & \cdots \\
16.11 & 119.14.50 \text{ M. A.} \\
\end{array} \]
Observed meridian altitude ... ... ... 59°19'.50"
Ref. and par. ... ... ... 30
Error of quadrant ... ... ... 30

Meridian altitude ... 59°18'.50"
Declination ... S. 14°30'.45"

Co. Latitude ... 73°49'.35"

Latitude ... 16°10'.25"

The same day Lieutenant Humphrys observed with a sextant made by Ramsden, about four inches radius; he made the angles of the lower limb 118°09'.00", and the error of his quadrant was—2', which gave the latitude 16°11'.05". This was intended as a kind of test of the instruments, but it was not a fair one, and yet the result is closer than could be expected, considering the difficulty of reading the small one.

Mean of three latitudes with octant 16°. 10'.32"

O On meridian, October 29th, \[
\begin{array}{l}
\text{30th, } h \quad 00.04.56 \text{ too fast } 4.56 \\
\text{31st, } h \quad 00.08.36,5 \quad \text{... } 8.36,5 \\
\text{November 1st, } h \quad 00.12.37 \quad \text{... } 12.37 \\
\text{00.16.36,5 } \quad \text{... } 16.36,5 \\
\end{array}
\]

Examination of the large watch used at the observation of Jupiter's Satellite.

29th October, altered the spring and set it a-going at one o'clock.

<table>
<thead>
<tr>
<th>Small Watch</th>
<th>Large Watch</th>
</tr>
</thead>
<tbody>
<tr>
<td>October 29th</td>
<td>22°37'.00&quot;</td>
</tr>
<tr>
<td>Too fast</td>
<td>8°23'.2</td>
</tr>
<tr>
<td>Solar time</td>
<td>22°28'.36,8</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th></th>
<th>Small Watch</th>
<th>Large Watch</th>
</tr>
</thead>
<tbody>
<tr>
<td>November 1st</td>
<td>1.46.00</td>
<td></td>
</tr>
<tr>
<td>Too fast</td>
<td>0.16.54</td>
<td></td>
</tr>
<tr>
<td>Solar time</td>
<td>1.29.06</td>
<td>1.35.57.5 too fast</td>
</tr>
</tbody>
</table>

Therefore in 51 hours solar time the large watch gained 46°,3.

*An Emersion of Jupiter's First Satellite.*

1st November, by watch emerged         ...        ... ^h^, ^m^, ^s^ 7.27.20
At last observation, too fast           ... 06.51.5
Gained afterwards at 46°,3              ... 05.3

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Emersion</td>
<td>7.20.23,2'</td>
</tr>
<tr>
<td>Ephemeris</td>
<td>1.56.15</td>
</tr>
</tbody>
</table>

Longitude in time ... 5.24.08.2

in degrees ... 81.02.03

The observations before written were made at the Chief's garden. The Fort flag was distant 2',5" in a strait line, and bore S. by. E. which give difference of

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Longitude</td>
<td>+0.30</td>
</tr>
<tr>
<td>Latitude</td>
<td>-2.28</td>
</tr>
<tr>
<td>Longitude of Gardens</td>
<td>81.02.03</td>
</tr>
<tr>
<td></td>
<td>+30</td>
</tr>
<tr>
<td>Longitude of Flag</td>
<td>81.02.33</td>
</tr>
<tr>
<td>Latitude of Gardens</td>
<td>16.10.32</td>
</tr>
<tr>
<td></td>
<td>-2.28</td>
</tr>
<tr>
<td>Latitude of the Flag</td>
<td>16.08.04</td>
</tr>
</tbody>
</table>
IN FORT WILLIAM, &c.

PEDDAPOORE, 1784.

Observations by T. D. P.

a Serpents, on the meridian, June 18th ... 9.36.45
Do. 19th ... 9.28.57.5

Acceleration for the time ... 7.47.5

Loss in one day ... 3.38.1

On the meridian, June 18th, ... 23.31.47.75 slow ... 8 12.25

An Emersion of Jupiter's first Satellite.

The Planet was extremely bright, and the Belts distinct and clear; the glass perfectly steady.

19th June, by watch changed colour ... 15.16.22

Immerged ... 15.18.38
Too slow at noon ... + 8.12.2
Loss to observation at 219 ... + 2.21

Immersion ... 15.29.11.25
Ephemeris ... 10.00.13

Longitude in time 5.28.58.25
in degrees ... 82.14.34

From the observations at Calcutta, it appears that there is a difference between the Longitudes derived from observations of immersions and emersions.
The mean of Longitudes, 10 in number, derived from observations of immersions, with an 18 inch reflector, was $h, \mu$ 5.53.53.77

Of emersions (2) with the same instrument 5.53.43.04

The single immersion with Dollond's triple object glass is 5.53.57.08

The mean of 4 emersions with the same 5.53.03.09

Difference by the reflector 0.00.10.77

By Dollond's refractor 0.00.54.90

The mean of all the immersions (11) 5.53.54.13

Emersions (6) 5.53.17.04

Difference 36.73

As the glass with which the observation was made differed from both, the difference derived from the whole is to be preferred, and so 9.25" are to be subtracted from this, to compare it with the other places, which were all emersions, and then the longitudes of Pedda poore by emersions will be 82°.05'.19".

KOSSIM KOTTA, 1782.

Observations by T. D. P.

9th October, double altitudes of Jupiter from the artificial horizon.

$h, \mu$ 7.47.00 — 55.10.00
48.36 — 54.28.50. Jupiter's R. A. at the time 17.32.06.7
49.57 — 54.01.20 Declination do. ... S. 23.12.10
50.58 — 53.37.10 © R. A. at do. ... 13.00.24.8
52.02 — 53.13.10 Latitude ... ... 17.42.30
53.05 — 52.50.00 Derived from the observed latitudes of Elmunchillie and Sobaurum.

7.50.16 Mean, 26.56.43 Apparent altitude.

— 1.51 Ref.

26.54.52
From the above data the planet had passed the meridian ... 3°16'.37;3
Jupiter's R. A. ... 17°32'.06,7

© R. A. ... 20°48'.44
Time ... 7°48'.19
Watch ... 7°50'.16
Too fast... 1°57'

The watch gained 12" daily by the meridian of Vizagapatam.

An Emersion of Jupiter's first Satellite.

9th October, by clock emerged ... 7°11'.45
Too fast at the observation ... — 1°57'

Emersion ... 7°09'.48
Ephemeris ... 1°38'.00

Longitude in tinte ... 5°31'.48
in degress ... 82°57'.00

VIZACPÂTÂM, 1782.

Observations by T. D. P.

An Emersion of Jupiter's second Satellite.

3d October, emerged ... 8°30'.58
Ephemeris ... 2°57'.20
Longitude ... 5°33'.38
83°24'.30".
7th October, immersion ... ... 8.09.57

The time was shewn by Mr. Russell's time-keeper, which was made by Arnold, and was regulated by the meridian line in his hall.

7th September, an Emersion of Jupiter's first Satellite.

by T. D. P. 1784.

7th September, by watch emerged ... ... 8.23.38
Sky remarkably clear, and glass steady.
Full splendor ... ... ... 25.40

Observations for Time.

Zenith Distance...

7th Sept., © U. L. 22.22.25

24.48

By arch of 90 96

41.29.20

D. 8.9

44.01.01

Lat. by 2 northern stars}
See observations at large
under Visacpatam.

17.44.33.4
17.38.46.5

2 southern stars}

N. B. Refraction + 50°
True Latitude ...

17.41.45

Error of Collimation ... +02.58

© Declination for the time and place ... N. 5.30.39

From the above data the time was ... ...

21.17.15.5

By the watch ... ...

20.23.36.5

The watch too slow 53.39
Day.
8th september, a Aquilla rising    $h', ''$  7.01.13  $h', ''$  7.03.16
      falling                    8.07.35         8.05.30
                        On the meridian     $h', ''$  7.34.24     $h', ''$  7.34.23 = 7.34.23.5
               Passage by calculation     ...     ...     8.29.55.5
Watch too slow                        ...     55.32

8th September, Zenith Distance.


<table>
<thead>
<tr>
<th></th>
<th>$h', ''$</th>
<th>D S.D. Mon.</th>
<th>$o', ''$</th>
</tr>
</thead>
<tbody>
<tr>
<td>☀ L.</td>
<td>19.13.55</td>
<td>90</td>
<td>56.59.20</td>
</tr>
<tr>
<td>☀ U.</td>
<td>16.06</td>
<td>96 60.03.05</td>
<td>56.59.23</td>
</tr>
<tr>
<td>U.</td>
<td>16.49</td>
<td>96</td>
<td>56.18.20</td>
</tr>
<tr>
<td>L.</td>
<td>19.00</td>
<td>96 60.00.07</td>
<td>56.18.04.6</td>
</tr>
<tr>
<td>U.</td>
<td>21.57</td>
<td>90</td>
<td>55.05.00</td>
</tr>
<tr>
<td>L.</td>
<td>24.09</td>
<td>96 58.03.00</td>
<td>55.04.41.2</td>
</tr>
<tr>
<td>U.</td>
<td>25.18</td>
<td>90</td>
<td>54.18.00</td>
</tr>
<tr>
<td>L.</td>
<td>27.28</td>
<td>96 57.03.20</td>
<td>54.17.12.7</td>
</tr>
</tbody>
</table>

19.20.20 Mean, ... 55.40.00.3

☀ Declination , ... N. 5.09.42
Latitude ... ... 17.41.45

From the above data, time

\[ h', '' \]

Watch ... 19.20.20

Watch slow 57.10

Therefore the watch lost in 22.57 ... 211,0
And consequently daily ... 221,0
ASTRONOMICAL OBSERVATIONS,

\[ \begin{array}{ccc}
\text{Day} & h' \, ^{\prime\prime} & \text{watch too slow} \\
8 \text{ at} & 7.34.23.5 & 55.27.9 \\
7 \text{ at} & 8.23.38 & \text{the emersion happened} \\
\text{Difference} & 23.10.45.5 & \text{loss in this time, at 221} \\
\end{array} \]

Therefore slow at emersion \( 51.59 \)

Emersion by watch \( 8.23.38 \)

Time of emersion \( 9.15.37 \)

Ephemeris \( 3.42.56 \)

Longitude in time \( 5.32.41 \)

in degrees \( 83.10.15 \)

October 23d, an Observation of Jupiter's first Satellite, by

MR. MAXTON.

The glass the same as mine; and the watch corrected by Mr. RUSSLER'S meridian line.

\[ \begin{array}{ccc}
\text{Emersion by watch} & \ldots & 10.05.30 \\
\text{Watch fast} & \ldots & -6.05 \\
\text{Emersion} & \ldots & 9.59.25 \\
\text{Ephemeris} & \ldots & 4.26.08 \\
\text{Longitude in time} & \ldots & 5.33.17 \\
\text{in degrees} & \ldots & 83.19.15 \\
\end{array} \]

This was the instant of first appearance, as well as Lieutenant COLEBROOKE'S, who observed the same at Visianagarum palace.

\[ \begin{array}{ccc}
\text{Longitude by T. D. P.} & \ldots & 83.10.15 \\
\text{by M.} & \ldots & 83.19.15 \\
\text{Mean} & \ldots & 83.14.45 \\
\end{array} \]
Mr. Russell also made an observation, which I do not use, because he noted the time of full splendor, which is uncertain; it follows:

<table>
<thead>
<tr>
<th>Date</th>
<th>Time of Day</th>
<th>Gain</th>
<th>Add to Observation</th>
</tr>
</thead>
<tbody>
<tr>
<td>16th October</td>
<td>( h ) : ( &quot; )</td>
<td>( 1.43,5 )</td>
<td>( 56^{&quot;},5 )</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Watch fast</td>
<td>( \ldots ) 2.02</td>
</tr>
<tr>
<td>Time of full splendor</td>
<td>( 8.04.39 )</td>
</tr>
<tr>
<td>Time of observation</td>
<td>( 8.02.37 )</td>
</tr>
<tr>
<td>Ephemeris</td>
<td>( 2.29.17 )</td>
</tr>
<tr>
<td>Longitude in time</td>
<td>( 5.33.20 )</td>
</tr>
<tr>
<td>in degrees</td>
<td>( 83^{&quot;}.20.00 )</td>
</tr>
</tbody>
</table>

**BEEMULWILSA, 1784.**

**Observations by Lieutenant Colebrooke.**

\(\odot\) On meridian, August 7th

\( h \) : \( " \) | \( 23.40.23.15 \) |
---|---|
Equation of E. A. | \( \ldots \) + \( ,60 \) |

\( 23.40.23.75 \) slow | \( 19^{"}.36.25 \) |

\(\odot\) On meridian, August 12th

\( h \) : \( " \) | \( 23.22.30,5 \) |
---|---|
Equation of E. A. | \( \ldots \) + \( 0.75 \) |

\( 23.22.31.25 \) slow | \( 37^{"}.28.75 \) |

Loss in 5 days | \( 17^{"}.52.50 \) |
Daily loss | \( 3^{"}.34.05 \) |
ASTRONOMICAL OBSERVATIONS.

An Immersion of Jupiter's second Satellite.

This was his first observation.

8th August, by watch immersed ... 12.33.20
Too slow at noon ... 19.36.25
Loss to the observation,
at 214", 5 ... 1.55.02

Immersion ... 12.54.51.45
Ephemeris ... 7.20.50

Longitude in time ... 5.34.01.45

in degrees ... 83.30.15.00

August 13th, by T. D. P.

Jupiter's first satellite vanished by the watch ... 11.32.28
6 or 8 seconds before the time noted it had not changed colour: a cloud came on, and hid it for about 8 seconds, and when it was gone, the satellite have vanished.

August 20th, by T. D. P.

Jupiter's first satellite vanished by the watch ... 14.02.30
The sky was clear, the glass steady: here I expected what happened, and was on my guard. The satellite vanished at a small distance from the body, i.e. before the contact, and without changing colour.
Day.

○ On meridian, August 19th ... 23:57:13.25
Equation of E. A. ... + 1.05

19th ... 23:57:14.75 slow ... 2.45.25

Immediately before this observation, the watch was set forward one hour without stopping it. By comparing this with the observation of the 12th, the watch lost daily, 3.36", 6.

The foregoing observation of time is only of use for the erroneous immersions of the 13th and 20th.

Day.

○ On meridian, August 27th 23:41:26.35
Equation of E. A. ... + 2.1

27th ... 23:41:28.6 slow 18.31,4

Day.

○ On meridian, August 29th ... 23:35:17.5
Equation of E. A. ... + 2.4

23:35:19.9 slow 24.40.1

Daily loss ... 3'.04", 4

An Emersion of Jupiter's first Satellite, by Lieutenant Colebrooke.

29th August, by watch emerged ... 12:27.00
Too slow at noon after the observation ... + 24:40.1
Loss after the observation ... ... — 1.25.5

Emersion ... 12:50:14.6
Ephemeris ... 7:16:33

Longitude in time ... 5:33:41,6
in degrees ... 83:25:16
On the meridian, September 2 ... \( \frac{h}{6} \, \frac{m}{23.20.47} \)
Equation of E. A. ... \( + 02,5 \)
\[ \frac{23.20.49,5 \, \text{slow}}{23.20.49.5 \, \text{slow}} \cdots \frac{\text{slow}}{39.10,5} \]

Altitude, 5th September \( \frac{h}{21.53.55,5} \) \( \frac{c}{67.31.35} \)
Refraction and parallax ... \( - 20 \)
Collimation ... ... \( + 51 \)
\[ \frac{67.32.06}{67.32.06} \]

Declination at the time and place \( 6.14.26 \)
Latitude ... \( 17.53.32 \)

From which data the time was \( \frac{h}{22.41.10,0} \)

By the watch ... \( 21.53.55,5 \) slow ... \( 47.20,5 \)
Whence the daily loss was ... \( 167'' 7 \)

An Emersion of Jupiter’s first Satellite.

The sky clear of clouds, and the glass steady, but the vapours had a perceptible motion through the telescope. The belts were very distinct.
5th September, by watch emerged \[ t \] \[ \text{h}, \text{m}, \text{s} \] 14.00.35

N. B. Full splendor 14.02.15. Too slow at the altitude of the \( \odot \) taken after the observation \[ + 47.20,5 \]

Loss after the observation, at 167\( " \).7 \[ - 54.4 \]

\begin{align*}
\text{Emersion} & \quad \ldots \quad 14.47.01.1 \\
\text{Ephemeris} & \quad \ldots \quad 9.13.36 \\
\end{align*}

\text{Longitude in time} \quad \ldots \quad 5.33.25.1

\text{in degrees} \quad \ldots \quad 83.21.18

\textit{Observations by Lieutenant Colebrooke.}

\( \odot \) On the meridian, September 29th \[ 23.38.27.6 \]

Equation of E. A. \[ \ldots \quad + 5.4 \]

\begin{align*}
\text{Equation of time} & \quad 23.38.33.0 \quad \text{slow} \quad 21.27.0 \\
& \quad 23.49.46.4 \quad \ldots \quad \text{slow} \quad 11.13.4
\end{align*}

\( \odot \) On the meridian, October 1st \[ 23.32.17.3 \]

Equation of E. A. \[ \ldots \quad + 5.7 \]

\begin{align*}
\text{Equation of time} & \quad 23.32.23.0 \quad \text{slow} \quad 27.37.0 \\
& \quad 23.49.08.6 \quad \ldots \quad \text{slow} \quad 16.45.6
\end{align*}

\text{Daily loss on solar time} \quad \ldots \quad 3^\circ 05^".1
ASTRONOMICAL OBSERVATIONS,

An Emersion of Jupiter's first Satellite.

30th September, by watch emerged ... 9.15.10
   Too slow at noon ... + 21.27
   Loss till observation, at 185",1 ... + 1.15

Emersion ... 9.37.52
Ephemeris ... 4.05.02

Longitude in time ... 5.32.50
in degrees ... 83.12.30

I suspect that a mistake was committed in writing down the
time, and that it ought to have been 9.16.10. But this is as it is
entered in the original book.
13th October, at 1'48" set the watch forward one hour without
stopping it.

☉ On the meridian, October 15th 23.51.53.5
   Equation of E. A. + 6.8

Equation of time 23.52.00.3 slow 7.59.7
   23.45.31.7 fast 6.28.6

The observation of the ☉ passage over the meridian was not
taken on the next day after the emersion as usual, and between the
17th and 18th the watch ran down, therefore the rate is ascertained
from the mean time, compared with the 29th September, and 1st
October.
And the watch lost by the 1st ... 173.6 daily.
by the 2nd ... 174.7

Mean ... 174.2
Daily variation ... +11.5

Daily loss on solar time ... 185.7

An Emersion of Jupiter's first Satellite.

16th October, by watch emerged ... 7.53.35[h. m.]
Too slow at noon ... +7.59.7
Loss till observation at 185.7 + 1.01.9

Emersion ... 8.02.36.6
Ephemeris ... 2.29.17.0

Longitude in time ... 5.33.19.6
in degrees ... 83.19.54

Result of the Observation of Longitude.

29th August, COLEBROKE ... 83.25.16 83.25.16
5th September, PEARSE ... 83.21.18 83.21.18
30th do. COLEBROKE ... 82.12.30 rejected.
16th October, COLEBROKE ... 83.19.54 83.19.54

Mean ... 83.19.44.5 83.22.09.3
ASTRONOMICAL OBSERVATIONS,

VIZIANAGARUM PALACE.

An Observation of Jupiter's second Satellite, by T. D. P.

22d October, by watch emerged ... ... \( h \) 7.16.06

Full splendor ... ... 18.18

Observations by Lieutenant COLEBROOKE.

\[ \begin{align*}
\text{Equal Altitudes,} \\
Fumulhoot & \text{ rising ... } 7.48.10 \cr & \text{ falling ... } 9.44.25 \cr * \text{ On the meridian ... } 8.46.17,5 \\
\text{ By calculation ... } 8.54.35,5 \text{ slow ... } 8.18 \\
\end{align*} \]

⊙ On the meridian, 22d ... \( h \) 23.50.14,5 \\
Equation of E. A. ... + 7,0,1

\[ \begin{align*}
& 23.50.21,5 \text{ slow ... } 9.38.5 \\
\end{align*} \]

23d October, * Fumulhoot rising ... \( h \) 7.51.39 \\
' falling' ... 9.29.05

\[ \begin{align*}
* \text{ On the meridian ... } 8.40.22 \\
\text{ By calculation ... } 8.50.46,2 \text{ slow ... } 10.24,2 \\
\end{align*} \]

⊙ On the meridian, 23d ... \( h \) 23.48.10,3 \\
Equation of E. A. ... + 7,6

\[ \begin{align*}
& 23.48.17,3 \text{ slow ... } 11.42,7 \\
\end{align*} \]

From the above, daily loss ... 125,2
An Emersion of Jupiter's first Satellite.

By watch emerged ... ... ... \(9^h 48^m 55^s\)
22d October, Jupiter's second Satellite emerged ... \(7^h 16^m 06^s\)
By Fumulhoot, watch slow ... ... \(+ 8^h 18^m\)

Loss in 1.30 after emersion, at \(125^\circ, 2\) ... — \(07^m, 8\)

Emersion ... \(7^h 24^m 16^s, 2\)
Ephemeris ... \(1^h 49^m 57^s\)

Longitude in time ... \(5^h 34^m 19^s, 2\)
in degrees ... \(83^\circ 34^\prime 48^\prime, 0\)

23d October, Jupiter's first Satellite emerged ... \(9^h 48^m 55^s\)
By Fumulhoot too slow ... ... \(+ 10^h 24^m 6^s\)

Loss in 1.8 after Fumulhoot passed at \(125^\circ, 2\) \(+ 06^m, 0\)

Emersion ... \(9^h 59^m 25^s, 6\)
Ephemeris ... \(4^h 26^m 08^s, 0\)

Longitude in time ... \(5^h 33^m 17^s, 6\)
in degrees ... \(83^\circ 19^\prime 54^\prime, 0\)

MR. MAXTON observed this at Vizacpatam, and the two observations shew only \(39^\prime\) difference of longitude; but the high hill that lies to the north of the palace bore from Beemulwlsa, N. 8° 25' E. and by trigonometry its distance was 22,978 miles; therefore it
ASTRONOMICAL OBSERVATIONS,

lay north of Beemulwilsa 19'28" and east 2'52". The palace lies 12'20",3 to the north by observations at large, and therefore to the east 1'48". But Beemulwilsa lies to the east of Vizacpatam. MR. MAXTON's eye, it may be presumed, is not so quick as Lieutenant COLEBROOKE's, and will suffice to account for the difference; for, by a particular survey round these parts, Vizianagur fort does lie 6'36" east of Vizacpatam.

NARRAINPOOR.

Which, by the table of the route, lies west of Vizianagarum palace 2'.

Observations by Lieutenant COLEBROOKE for Time.

<table>
<thead>
<tr>
<th>Date</th>
<th>Equation</th>
<th>Time</th>
<th>Daily Loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>October 31st</td>
<td></td>
<td>23:36:04.3</td>
<td>1:24.4</td>
</tr>
<tr>
<td>November 1st</td>
<td></td>
<td>23:34:39.5</td>
<td></td>
</tr>
</tbody>
</table>

Equation + 6.4

23:36.10.7 slow ... 23:49.3

23:34.46.3 slow ... 25:13.7
IN FORT WILLIAM, &c.

An Observation of Jupiter's first Satellite.

Sky remarkably clear, and glass steady.

31st October, emerged by watch ... ... $^h^m^s$ 6.00.45
Too slow at noon ... ... 23.49.3
Loss till observation at 84°4 ... ... 22.5

Emersion ... 6.24.56,8
 Ephemeris ... 51.26

Longitude in time ... 5.33.30,8
 in degrees ... 83.22.42,0

KALINGAPATAM, 1784.

Observations by Lieutenant Colebrooke for Time.

⊙ On meridian, November 7th ... 23.50.56.5
Equation of E. A. ... + 6.8

23.51.03.3 slow ... 8.56.7

β Cassiopæa on the meridian ... 8.49.48
By calculation ... 9.00.01.6 slow ... 10.13.6

Therefore the watch lost 1’16”.9 in 9 hours, and 205”.6 daily.

N. B. The watch had run down on the 5th, and the weather was changing from dry to cloudy, which ended in rain.
Glass steady, atmosphere rather thick

By watch emerged \( \ldots \ldots \ldots \) 8.13.35
Too slow by the star \( \ldots \ldots \ldots \) + 10.13.6
The star passed after the emersion 36'; loss for that time \( \ldots \ldots \ldots \) - 5.1

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<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Emersion</td>
<td>8.23.43.5</td>
</tr>
<tr>
<td>Ephemeris</td>
<td>2.47.01.0</td>
</tr>
<tr>
<td>Longitude in time</td>
<td>5.36.42.5</td>
</tr>
<tr>
<td>in degrees</td>
<td>84.10.37.5</td>
</tr>
</tbody>
</table>

**IECHAPOORE, 1782.**

**Observations by T. D. P.**

Double altitudes of Jupiter, with the octant and artificial horizon.

<table>
<thead>
<tr>
<th>Time</th>
<th>Angles,</th>
</tr>
</thead>
<tbody>
<tr>
<td>( h )</td>
<td>( \lambda )</td>
</tr>
<tr>
<td>8.10.03</td>
<td>64.28.10</td>
</tr>
<tr>
<td>13.03</td>
<td>63.30.00</td>
</tr>
<tr>
<td>15.08</td>
<td>62.45.20</td>
</tr>
<tr>
<td>18.53</td>
<td>61.50.30</td>
</tr>
</tbody>
</table>

Jupiter's R. A. at the time \( \lambda \) \( 17.21.46.6 \)
Declination \( \ldots \ldots \ldots 23.02.04S. \)
\( \odot \) R. A. at the time \( 11.55.08.2 \)
Latitude by COLEBROKE 1784, see Table.
See observations at large \( 19.06.45 \)

Ref. \( = 1.34 \)

31.32.41
IN FORT WILLIAM, &c.

From the above data, Jupiter had passed the meridian 2h 45m 59.2, and the time was ... 8h 12m 37.6
Watch ... 8h 14m 17s

Too fast ... 1h 39m 4s

An Eclipse of the Moon.

21st September ... 7h 00m 15s doubtful.

01h 40m began certainly.
02h 40m strong shadow came on.
04h 14m Penumbra touched a place which I name A.
09h 03m shadow touched A.
9h 06m 56s shadow touched the limb at B.
08h 11m Penumbra going.
10h 22m limb not perfectly bright.
11h 20m end certainly, and at B.

By comparison of the observations at A, it appears that the shadow required 4h 49m to move through the breadth of the penumbra. By comparing those at B, it appears that 4h 24m were then sufficient.
The mean of these will be very near the truth; it is 4'37''.

<table>
<thead>
<tr>
<th>Event</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shadow came on</td>
<td>7:02.40</td>
</tr>
<tr>
<td>Advance of penumbra</td>
<td>04:37</td>
</tr>
<tr>
<td>Beginning of eclipse</td>
<td>6:58.03</td>
</tr>
<tr>
<td>Shadow touched the limb</td>
<td>9:06.56</td>
</tr>
<tr>
<td>Retreat of penumbra</td>
<td>+04:37</td>
</tr>
<tr>
<td>End of eclipse</td>
<td>9:11.33</td>
</tr>
<tr>
<td>Duration observed</td>
<td>2:13.30</td>
</tr>
<tr>
<td>Duration by ephemeris</td>
<td>2:08.30</td>
</tr>
<tr>
<td>By ephemeris end</td>
<td>3:28</td>
</tr>
<tr>
<td>Beginning</td>
<td>1:19.30</td>
</tr>
<tr>
<td>Duration</td>
<td>2:08.30</td>
</tr>
<tr>
<td>Ephemeris middle</td>
<td>2:23.45</td>
</tr>
<tr>
<td>Middle observed by watch</td>
<td>8:04.48</td>
</tr>
<tr>
<td>Too fast</td>
<td>1:39.4</td>
</tr>
<tr>
<td>Ephemeris</td>
<td>2:23.45</td>
</tr>
<tr>
<td>Longitude in time</td>
<td>5:39.23,6</td>
</tr>
<tr>
<td>in degrees</td>
<td>84:50.54</td>
</tr>
</tbody>
</table>
GANJAM FORT, 1782.

Observations by T. D. P. Latitude determined.

4th September, horizon clear, octant \( \ldots \ldots \) \( h', \, ^{\prime \prime} \) 19.21.30
6th, Very hazy, by sextant, and quadrant, both agreed 19.21.03
16th Sextant 19.21.50
Octant 19.19.50
Mean 19.21.03

These were taken from the top of the Chief's house, the sea was the horizon; the height above the area of the fort was measured, but the height of that area was guessed at; the dip was taken corresponding to this height from the tables.

An Observation of Jupiter's fourth Satellite.

16th September 1782, immersion \( \ldots \ldots \) \( h', \, ^{\prime \prime} \) 6.45.27
The change of colour was noted at \( \ldots \ldots \) 6.44.04

Clouds prevented the observing of the emersion of this, and the immersion of the first, which happened that night.

GANJAM CAMP, 1784.

Observations by Lieutenant Colebrooke.

☉ On the meridian, November 20th \( \ldots \) 23.57.35.3
   Equation of E. A. \( \_ \_ \_ \_ \_ + 05.5 \)
   \( \ldots \ldots \) 23.57.41.8 slow \( \_ \_ \) 2.18.2
☉ On the meridian, 21st \( \ldots \) 23.56.00
   Equation of E. A. \( \_ \_ \_ \_ \_ + 05.5 \)
   \( \ldots \ldots \) 23.56.05.5 slow \( \_ \_ \) 3.54.5
☉ On the meridian, 22d
   Equation of E. A. 23.54.15.0
   \( \_ \_ \_ \_ \_ \_ \_ \_ 05.4 \)
   \( \ldots \ldots \) 23.54.20.4 slow \( \_ \_ \) 5.59.5
ASTRONOMICAL OBSERVATIONS,

* CASSIOPEA, 24th November.

<table>
<thead>
<tr>
<th></th>
<th>First Wire</th>
<th>Middle</th>
<th>Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rising</td>
<td>h. 7.28.20</td>
<td>34.40</td>
<td>42.40</td>
</tr>
<tr>
<td>Falling</td>
<td>h. 9.35.35</td>
<td>29.30</td>
<td>21.37</td>
</tr>
</tbody>
</table>

On the meridian ... 8.32.06.5 32.07.5 32.08.5 = h. 8.32.07.5
By calculation ... 8.39.51.2

Slow ... 7.43.7

Which compared with the last solar observation, gives 91", 3 daily loss.

An Emersion of Jupiter's first Satellite.

24th November, by watch emerged ... ...
Too slow by the star ... ...
Loss after the emersion, at 91", 3, ...

Emersion ... ...
Ephemeris ... 1.04.39.

Longitude in time ... 5.40.32.4
in degrees ... 86.08.06

JENIAUDJEPOOR, 1784.

Observations by Lieutenant COLEBROOKE.

<table>
<thead>
<tr>
<th></th>
<th>Middle</th>
<th>Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>17th December, CASSIOPEA rising</td>
<td>h. 6.31.40 42.03</td>
<td></td>
</tr>
<tr>
<td></td>
<td>falling</td>
<td>8.05.53 55.31</td>
</tr>
</tbody>
</table>

* On the meridian ... 7.18.46.5 18.47 = h. 7.18.46.7
By calculation ... 7.54.48.7

Watch slow ... 36.02.0
○ On the meridian, 17th ... 23.23:59.3
   Equation of E. A. ... +1

   23.24:00 slow ... 36.00

An Emersion of Jupiter's first Satellite.

By watch emerged ... ... 6.21.25
   Too slow by the * ... 36.02

   Emersion ... 6.57.27
   Ephemeris ... 1.11.50

   Longitude in time ... 5.45.37

   in degrees ... 86.24.15


Observations by Lieutenant Colebrooke.

N. B. Opposite Jellasore, on the Ballasore side of the river.

○ On the meridian, December 24th ... 23.19.34.1
   Equation of E. A. * ... -7

   23.19.33.4 slow ... 40.26.6

○ On the meridian, December 25th ... 23.18.12
   Equation of E. A. *. ... -1

   23.18.11 slow ... 41.49.0

Daily ... 82°.4
ASTRONOMICAL OBSERVATIONS,

An Emersion of Jupiter’s first Satellite.

17th December, by watch emerged ... ... \( h, a \) 
Full splendor. Too slow at the following noon 40.26,2
\( h, a \) 8.13.50 Loss after emersion, at \( a \) 82, 4 — 52

Emersion ... 8.52.16,2
Ephemeris ... 3.04.14

Longitude in time ... 5.48.02,2
in degrees ... \( 87.00.33,0 \)

An Emersion of Jupiter’s second Satellite.

25th December, by watch emerged ... ... \( h, a \) 
slow ... + 40.26,6
Loss till observation, at 82°,4 + 23,2

Emersion ... 6.45.29,8
Ephemeris ... — 55.57

Longitude in time ... 5.49.32,8
in degrees ... \( 87.23.12 \)
A Comparison of the Observations for Longitudes with corresponding Observations at different Places, to fix the Longitudes of those which were undetermined.

By T. D. Pearse.

CALCUTTA.

The observatory was at the Treasury Gate in Fort William.

Lunar Eclipses.

1776, July 30th, Immersion at Calcutta ... 17.01.16
Greenwich 11.08.21 5.52.55

As this was not of the best, I reject it.

1779, November 23d, I reject the beginning, because when compared with Tycho in the former part, it appears, from a like comparison of the Greenwich observations, that it is erroneous a full minute. The first Copernicus is also rejected. And by comparing the end doubtful with Tycho and Copernicus of the latter part in both sets, it appears to be the observation that must be compared with the end at Greenwich.
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>The body of Tycho touched</td>
<td>12.35.30</td>
<td>6.42.29</td>
<td>5.53.01.0</td>
</tr>
<tr>
<td>passed</td>
<td>36.53</td>
<td>43.36</td>
<td>17.0</td>
</tr>
<tr>
<td>Immersion</td>
<td>13.01.41.3</td>
<td>7.08.08</td>
<td>33.3</td>
</tr>
<tr>
<td>Emersion</td>
<td>14.40.13.3</td>
<td>8.46.23</td>
<td>50.3</td>
</tr>
<tr>
<td>Grimaldi touched</td>
<td>43.06.3</td>
<td>49.45</td>
<td>21.3</td>
</tr>
<tr>
<td>The middle of Copernicus</td>
<td>15.02.44.1</td>
<td>9.08.59.5</td>
<td>44.6</td>
</tr>
<tr>
<td>The body of Tycho touched</td>
<td>04.56</td>
<td>11.39</td>
<td>17.0</td>
</tr>
<tr>
<td>passed</td>
<td>06.23</td>
<td>12.49</td>
<td>34.0</td>
</tr>
<tr>
<td>The end</td>
<td>15.39.45.6</td>
<td>9.46.09</td>
<td>36.6</td>
</tr>
</tbody>
</table>

Mean, in time 5.53.28.3

in degrees 88.22.04.5

Jupiter's Satellites.

From the beginning in 1774, till the 27th December 1777, the observations were made with a middling 18 inch reflector. I allow 24" to compare it with the large reflector at Greenwich, and 12" for their refractor. The comparison is of actual corresponding observations, except in two cases, in which the Calcutta observations are one revolution later. The Longitudes of Paris and Stockholm are taken from Wargentin, Phil. Trans. vol. 67. Lundén, from thirty-three corresponding observations found in that same paper, Of Chislehurst, from Wollaston, vol. 74. Of Geneva, Oxford, and Marseilles, from Pigot, vol. 68 and 76. Nagpoore and Chunargur were communicated to me by Lieutnant Ewart, of the Bengal establishment, who observed at each place a considerable time.
### Table 1: Longitude of Calcutta

<table>
<thead>
<tr>
<th>Date</th>
<th>Place</th>
<th>Time</th>
<th>Correction for Longitude or Glass</th>
<th>Times correct</th>
<th>Longitude</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>h, a</td>
<td>h, a</td>
<td>h, a</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1774, October 14th</td>
<td>Calcutta, Stockholm</td>
<td>12.32.25 07:52.00</td>
<td>1st. Sat. Im. + 24</td>
<td>12.32.40</td>
<td>6.53.10.0</td>
</tr>
<tr>
<td>21st</td>
<td>Greenwich</td>
<td>8.44.47</td>
<td>1st. Sat. Im. - 09.25</td>
<td>8.35.00</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>Paris</td>
<td>8.59.20</td>
<td>- 24.05</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Geneva</td>
<td>8.36.20</td>
<td>- 4.59</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Oxford</td>
<td></td>
<td>Immersion, Men, Add one Revolution 1, Day 23rd</td>
<td></td>
<td></td>
</tr>
<tr>
<td>23rd</td>
<td>Calcutta</td>
<td>8.57.15</td>
<td>1st. Sat. Im. + 24</td>
<td>5.53.34.5</td>
<td></td>
</tr>
<tr>
<td>December 31st</td>
<td>Calcutta, Lunden</td>
<td>11.25.47 6.25.05</td>
<td>24. Em. -52.55</td>
<td>5.53.13.0</td>
<td></td>
</tr>
<tr>
<td>1776, November 11th</td>
<td>Greenwich</td>
<td>13.37.32</td>
<td>1st. Sat. Im. L. B. Refractor, Add one Revolution 1, Day 13th</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13th</td>
<td>Calcutta</td>
<td>8.05.38</td>
<td>1st. Sat. Im. + 12</td>
<td>5.53.30.3</td>
<td></td>
</tr>
<tr>
<td>17th</td>
<td>Calcutta</td>
<td>15.58.31.3</td>
<td>3rd. Sat. Im. + 12</td>
<td>5.53.33.8</td>
<td></td>
</tr>
<tr>
<td>December 18th</td>
<td>Calcutta, Marseilles</td>
<td>15.58.21 10.25.54</td>
<td>24. Sat. Im. -21.25</td>
<td>5.53.28.5</td>
<td>88.22.07.5</td>
</tr>
</tbody>
</table>

Result—Longitude of Calcutta: 5.53.28.5

### Table 2: Latitude of Greenwich

<table>
<thead>
<tr>
<th>Date</th>
<th>Place</th>
<th>Time</th>
<th>Correction for Longitude or Glass</th>
<th>Times correct</th>
<th>Longitude</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>h, a</td>
<td>h, a</td>
<td>h, a</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1782, September 21st</td>
<td>Ichapooore</td>
<td>9.05.16.6</td>
<td>A LUNAR ECLIPSE. The shadow touched the limb. 3.25.36</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nagpooore</td>
<td>8.58.49</td>
<td></td>
<td>8.53.49.6 84.33.09.0</td>
<td></td>
</tr>
<tr>
<td>October 9th</td>
<td>Kossim Kotta</td>
<td>6.39.43</td>
<td>JUPITER'S SATELLITES.</td>
<td>7.19.48</td>
<td>5.31.51.0 82.57.45</td>
</tr>
<tr>
<td>1784, September 5th</td>
<td>York, Greenwich</td>
<td>9.13.25.15</td>
<td>1st. Sat. E. Mean, Refractor, 4.31</td>
<td>11.49.49.1 5.33.34.0 83.23.39.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Paris</td>
<td>9.26.18</td>
<td>+ 4.31</td>
<td>9.13.15.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Beemulwilka</td>
<td>14.47.01.1</td>
<td>1st. Sat. E. Mean, -12</td>
<td>11.49.49.1 5.33.34.0 83.23.39.0</td>
<td></td>
</tr>
<tr>
<td>November 8th</td>
<td>Kalgapatam, Chunagur</td>
<td>8.19.45</td>
<td>1st. Sat. E.</td>
<td>2.47.09 5.36.34.3 84.08.37.0</td>
<td></td>
</tr>
<tr>
<td>Phenomenon and Face of the Quadrant</td>
<td>Date</td>
<td>Arch of 96.</td>
<td>Reading</td>
<td>Value</td>
<td>Arch of 90.</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>------</td>
<td>------------</td>
<td>---------</td>
<td>-------</td>
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</tr>
<tr>
<td>W. 9th.</td>
<td>6:5:01.5</td>
<td>4:54:39.2</td>
<td>4:55:00</td>
<td>4:54:54.2</td>
<td>13:18:18,0</td>
</tr>
<tr>
<td>W. 12th.</td>
<td>4:32.8</td>
<td>4:39:29.6</td>
<td>4:40:00</td>
<td>4:39:49.1</td>
<td>12:58:13.8</td>
</tr>
<tr>
<td>a Cygni W. 9th.</td>
<td>1783</td>
<td>31:20:53.5</td>
<td>31:19:10</td>
<td>35:31:9:3</td>
<td>44:30:53:8N</td>
</tr>
<tr>
<td>a Pegus E. 11th.</td>
<td>2:3:12</td>
<td>1:5:02.4</td>
<td>1:5:00</td>
<td>1:5:02.2</td>
<td>14:2:24:8N</td>
</tr>
<tr>
<td>4 Stars</td>
<td>1784</td>
<td>April 23d.</td>
<td>0:1:04</td>
<td>0:15:49.2</td>
<td>0:15:55</td>
</tr>
<tr>
<td>a Leonis W. 25th.</td>
<td>52:0:29</td>
<td>0:32:05</td>
<td>0:32:40</td>
<td>0:30:43</td>
<td>13:00:53 N</td>
</tr>
</tbody>
</table>
## Observations at large for determining the Latitudes of Places.

<table>
<thead>
<tr>
<th>Phenomenon and Face of the Quadrant</th>
<th>Date</th>
<th>Reading</th>
<th>Value</th>
<th>Arch of 90°</th>
<th>Zenith Distance corrected</th>
<th>Equation of alt.</th>
<th>Declination</th>
<th>Latitude by the observation</th>
<th>Name of the Place and its correct Latitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urs. Maj. W. 3d.</td>
<td>1784</td>
<td>May</td>
<td>46. 2.17</td>
<td>43.43.05</td>
<td>43.44.00</td>
<td>54.43.44.27</td>
<td>58.13.58. N.</td>
<td>14.29.31 N.</td>
<td>Pennara River, North Bank</td>
</tr>
<tr>
<td>Urs. Maj. W. 3d.</td>
<td>1784</td>
<td>May</td>
<td>44. 1.10</td>
<td>41.43.37.4</td>
<td>41.33.10</td>
<td>50.3.</td>
<td>50. 3.23 N.</td>
<td>14.39.14 N.</td>
<td></td>
</tr>
<tr>
<td>Urs. Maj. W. 6th.</td>
<td>1784</td>
<td>May</td>
<td>26. 0.15</td>
<td>24.29.05</td>
<td>24.29.10</td>
<td>26.</td>
<td>24.29.33.72 S.</td>
<td>14.27.47.75 S.</td>
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<tr>
<td>Urs. Maj. W. 6th.</td>
<td>1784</td>
<td>May</td>
<td>26. 0.22</td>
<td>20.05.00</td>
<td>20.05.40</td>
<td>20. 0.55</td>
<td>10. 1.46 S.</td>
<td>14.27.35.99 S.</td>
<td></td>
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<tr>
<td>Urs. Maj. W. 12th.</td>
<td>1784</td>
<td>May</td>
<td>44. 1.09</td>
<td>41.37.51</td>
<td>41.37.20</td>
<td>49.</td>
<td>41.38.24.5. N.</td>
<td>14.24.58.5. N.</td>
<td></td>
</tr>
<tr>
<td>Urs. Maj. W. 12th.</td>
<td>1784</td>
<td>May</td>
<td>26. 1.28</td>
<td>41.43.37.4</td>
<td>41.33.10</td>
<td>50.3.</td>
<td>50. 3.23 N.</td>
<td>14.39.14 N.</td>
<td></td>
</tr>
<tr>
<td>Urs. Maj. W. 12th.</td>
<td>1784</td>
<td>May</td>
<td>43. 3.15</td>
<td>41. 7.32</td>
<td>41. 8.10</td>
<td>44. 8.35</td>
<td>50. 3.23 N.</td>
<td>14.45.54 N.</td>
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<tr>
<td>Urs. Maj. W. 18th.</td>
<td>1784</td>
<td>May</td>
<td>26. 1.30</td>
<td>44.49.05</td>
<td>24.50.00</td>
<td>25.</td>
<td>24.49.16 10. 1.48 S.</td>
<td>14.47.04.8. S.</td>
<td></td>
</tr>
<tr>
<td>Urs. Maj. W. 18th.</td>
<td>1784</td>
<td>May</td>
<td>43. 3.14</td>
<td>41. 7.15</td>
<td>41. 7.10</td>
<td>44. 7.15</td>
<td>50. 3.23 N.</td>
<td>14.47.35.9. N.</td>
<td></td>
</tr>
<tr>
<td>Urs. Maj. W. 25th.</td>
<td>1784</td>
<td>May</td>
<td>45. 2.07</td>
<td>42.42.56</td>
<td>42.42.10</td>
<td>53.</td>
<td>42.43.11.3.</td>
<td>15.30.45.5. N.</td>
<td></td>
</tr>
<tr>
<td>Urs. Maj. W. 25th.</td>
<td>1784</td>
<td>May</td>
<td>44. 1.17</td>
<td>41.36.32</td>
<td>41.36.00</td>
<td>50.</td>
<td>41.37.06 50. 3.23 N.</td>
<td>15.30.56.5 N.</td>
<td></td>
</tr>
<tr>
<td>Urs. Maj. W. 30th.</td>
<td>1784</td>
<td>May</td>
<td>27. 2.22</td>
<td>25.28.25</td>
<td>25.29.00</td>
<td>27.</td>
<td>25.29.09 10. 1.48 S.</td>
<td>15.29.17.2. S.</td>
<td></td>
</tr>
<tr>
<td>Urs. Maj. W. 30th.</td>
<td>1784</td>
<td>May</td>
<td>43. 0.27</td>
<td>40.30.37</td>
<td>40.30.30</td>
<td>49.</td>
<td>40.30.22 50. 3.23 N.</td>
<td>15.32.00.5. N.</td>
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</tr>
<tr>
<td>Urs. Maj. W. 30th.</td>
<td>1784</td>
<td>May</td>
<td>27. 1.05</td>
<td>25.35.01</td>
<td>25.35.00</td>
<td>27.</td>
<td>25.35.27 10. 1.48 S.</td>
<td>15.33.23.9. S.</td>
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<tr>
<td>Urs. Maj. W. 60th.</td>
<td>1784</td>
<td>May</td>
<td>43. 0.17</td>
<td>40.26.13</td>
<td>40.26.05</td>
<td>49.</td>
<td>40.26.58 50. 3.23 N.</td>
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<td>Urs. Maj. W. 60th.</td>
<td>1784</td>
<td>May</td>
<td>27. 1.05</td>
<td>25.35.01</td>
<td>25.35.00</td>
<td>27.</td>
<td>25.35.27 10. 1.48 S.</td>
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<td>May</td>
<td>43. 0.13</td>
<td>40.24.29</td>
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<td>40.25.33 50. 3.23 N.</td>
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<td>May</td>
<td>36. 3.15</td>
<td>34.33.37</td>
<td>34.33.50</td>
<td>39.</td>
<td>34.34.29 50. 3.23 N.</td>
<td>15.49.19 N.</td>
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<tr>
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<td>1784</td>
<td>May</td>
<td>32. 3.21</td>
<td>30.51.25</td>
<td>30.51.05</td>
<td>34.</td>
<td>30.51.49 15. 8.03 S.</td>
<td>15.43.46 S.</td>
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<td>1784</td>
<td>May</td>
<td>27. 2.15</td>
<td>35.53.28</td>
<td>35.54.00</td>
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<td>35.54.12 10. 1.48 S.</td>
<td>15.52.24 S.</td>
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<td>1784</td>
<td>May</td>
<td>42. 3.</td>
<td>40. 6.00</td>
<td>40. 5.50</td>
<td>48.</td>
<td>40. 6.43 50. 3.23 N.</td>
<td>15.56.40 N.</td>
<td></td>
</tr>
</tbody>
</table>

Lieutenant Colebrooke had by this time acquired the art of using the quadrant, and his observations will appear where I did not take any. The next is his, and where his are substituted, they will be marked.

He did observe Chicoortoe, the result I had entered in my book, it was 15°. 34', 10" but his observation as lost.

Urs. Maj. W. 26th. | 36. 2.16 | 34.20.09,4 | 34.20.00 | 39 | 34.20.43.7 | 50.23.42 S. | 16.02.58,3 | Chandole, |
Libra. E.          | 33. 0.20 | 31. 5.02  | 31. 5.00 | 34 | 31. 5.35   | 15. 8.03 S  | 15.57 32   | 16 015,2 C, |
Urs. Maj. W. 28th. | 36. 1.22 | 34. 8.44  | 35. 8.05 | 35 | 34. 9.08.5 | 50.23.42 S  | 16.14.39.5 | Publlon, on the North Bank of the Kistna, |

Libra. E.          | 33. 1.15 | 31.16.54  | 31.17.00 | 34 | 31.17.31   | 15. 8.03 S  | 16. 5.28  | 16.1204,3 |

* The quadrant was pulled to pieces at Pennara Camp, and the line of collimation had not been

\[ j \] usted; it was performed before it was next used.
### Astronomical Observations

**Observations at large for determining the Latitudes of Places.**

<table>
<thead>
<tr>
<th>Phenomenon and Face of the Quadrant</th>
<th>Date of the Phenomenon</th>
<th>Reading</th>
<th>Value of Arch</th>
<th>Arch of 90°</th>
<th>Equation Obtained</th>
<th>Zodiak Distance Corrected</th>
<th>Declination by the Observation</th>
<th>Latitude of the Place and its Correct</th>
<th>Name of the Place</th>
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<tbody>
<tr>
<td>α Ursae Majoris, W. May 1784</td>
<td>1784.29</td>
<td>D.S.D. N</td>
<td>40°40.43</td>
<td>40°39.55</td>
<td>40°40.08</td>
<td>57°8 02.5 N</td>
<td>16°26 54.5</td>
<td>Moodenoore.</td>
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<tr>
<td>α Virginis, E. June 1784</td>
<td>1784.29</td>
<td>D.S.D. N</td>
<td>26°24.12</td>
<td>26°23.30</td>
<td>26°24.21</td>
<td>10°1.45 S</td>
<td>16°22 33</td>
<td>16°24 38.8 C.</td>
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<td>D.S.D. N</td>
<td>20°12.15</td>
<td>20°12.22</td>
<td>20°12.07</td>
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<td>16°44 13</td>
<td>16°44 17.5 P.</td>
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<td>D.S.D. N</td>
<td>33°38.24</td>
<td>33°38.49</td>
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<td>57°8 02.5 N</td>
<td>16°44 13</td>
<td>16°44 17.5 P.</td>
<td></td>
</tr>
</tbody>
</table>

**Sextidea.** 15°49 +

| α Virginis, E. 12th.             | 1784.31               | D.S.D. N | 26°55.26      | 26°55.20    | 26°55.52        | 10°1.48 S                | 16°54 04 C.                | 16°56 08.5 C.                          |
| α Virginis, E. 12th.             | 1784.31               | D.S.D. N | 26°58.04      | 26°57.05    | 26°57.05        | 10°1.48 S                | 16°56 15.5                  | Rajahmundry.                           |
| α Librae, E.                      | 1784.31               | D.S.D. N | 33°15.05      | 33°15.00    | 33°15.00        | 56°3 23 N                | 17°1.12                      | 17°1.12                               |
| β Librae, E.                      | 1784.31               | D.S.D. N | 25°35.53      | 25°35.00    | 25°35.53        | 8°4.33 S                 | 17°1.20                      | 17°1.20                                |
| β Scorpii, E.                     | 1784.31               | D.S.D. N | 27°1.07       | 27°1.00     | 27°1.07         | 8°4.33 S                 | 17°1.20                      | 17°1.20                                |
| γ Draconis, W.                    | 1784.31               | D.S.D. N | 36°2.24       | 36°2.20     | 36°2.20         | 8°4.33 S                 | 17°1.20                      | 17°1.20                                |
| α Virginis, E. 22nd.              | 1784.31               | D.S.D. N | 27°8.30       | 27°8.27     | 27°8.30         | 8°4.33 S                 | 17°1.20                      | 17°1.20                                |
| β Librae, E.                      | 1784.31               | D.S.D. N | 25°41.09      | 25°41.00    | 25°41.00        | 8°4.33 S                 | 17°1.20                      | 17°1.20                                |
| η Ursae Majoris, W. 1st.          | 1784.31               | D.S.D. N | 38°53.30      | 38°53.20    | 38°53.20        | 56°3 33 N                | 17°9.05                      | 17°9.05                                 |
| η Ursae Majoris, W. 1st.          | 1784.31               | D.S.D. N | 38°53.30      | 38°53.20    | 38°53.20        | 56°3 33 N                | 17°9.05                      | 17°9.05                                 |
| α Librae, E.                      | 1784.31               | D.S.D. N | 32°10.18      | 32°10.00    | 32°10.18        | 56°3 33 N                | 17°9.05                      | 17°9.05                                 |
| β Librae, E.                      | 1784.31               | D.S.D. N | 25°51.16      | 25°51.20    | 25°51.16        | 56°3 33 N                | 17°9.05                      | 17°9.05                                 |
| a Corvus, Bo.                     | 1784.31               | D.S.D. N | 9°50.40       | 9°50.40     | 9°50.40         | 10°1.48 S                | 17°12.10                     | 17°12.45 C.                             |
| a Scorpii, E.                     | 1784.31               | D.S.D. N | 36°42.06      | 36°41.50    | 36°42.06        | 19°12.01 S               | 17°39.34.5                  | 17°39.34.5 C.                          |

**Sextidea.** 33°32.5 +

From 17th to 20th June 1784. 1°90

1°90

| α Scorpii, E.                       | 1784.31               | D.S.D. N | 36°42.06      | 36°41.50    | 36°42.06        | 19°12.01 S               | 17°39.34.5                  | 17°39.34.5 C.                          |

**Sextidea.** 33°32.5 +

From 17th to 20th June 1784. 1°90

1°90

<p>| α Scorpii, E.                       | 1784.31               | D.S.D. N | 36°42.06      | 36°41.50    | 36°42.06        | 19°12.01 S               | 17°39.34.5                  | 17°39.34.5 C.                          |</p>
<table>
<thead>
<tr>
<th>Phenomenon</th>
<th>Date</th>
<th>Reading</th>
<th>Value</th>
<th>Arch of go.</th>
<th>Zenith Distance corrected</th>
<th>Declination</th>
<th>Latitude by the observation</th>
<th>Name of the place and its correct latitude</th>
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<tbody>
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<td>1784 June 7th</td>
<td>39.1235</td>
<td>36.8263</td>
<td>36.5730</td>
<td>43</td>
<td>36.5827</td>
<td>19.12.02</td>
<td>S</td>
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<td>'sorcerer E</td>
<td>12th</td>
<td>40.251</td>
<td>43.40.37</td>
<td>43.41.00</td>
<td>+</td>
<td>43.41.39</td>
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<tr>
<td>Jp. L. W.</td>
<td>5th</td>
<td>3.50.16</td>
<td>3.50.00</td>
<td>3.50.00</td>
<td>Ref @ Par. Semedia</td>
<td>+</td>
<td>3.50.00</td>
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<tr>
<td>Jp. L. W.</td>
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<td>9.29.50</td>
<td>9.29.50</td>
<td>+</td>
<td>9.29.20</td>
<td>27.27.03</td>
<td>N</td>
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<tr>
<td>Drake, W</td>
<td>10th</td>
<td>9.38.59</td>
<td>9.38.40</td>
<td>9.38.40</td>
<td>+</td>
<td>9.38.59</td>
<td>27.27.03</td>
<td>N</td>
</tr>
</tbody>
</table>

The four following Observations were taken by a quadrant made by RAPIDEN, eighteen inches radius, ich showed Altitudes.

| Lyra, W | Aug. 7th | 69.17.13 | 69.17.35 | -22 | 69.17.02 | 38.35.26 | 17.52.28 | N | 17.52.28 |
| Lyra, W | 29th | 70.03.00 | 74.45.47 | 74.46.0 | -15.0745 | 74.45.38 | 38.07.16 | N | 17.52.54 |
| Aquila*, E | 8th | 75.03.02 | 75.03.50 | 75.03.50 | 75.03.49 | 75.03.49 | 75.03.49 | 75.03.49 | 75.03.49 |
| Aquila*, E | 8th | 75.03.02 | 75.03.50 | 75.03.50 | 75.03.49 | 75.03.49 | 75.03.49 | 75.03.49 | 75.03.49 |
| Drake, W | 8th | 33.35.01 | 33.35.00 | 33.35.00 | 33.35.00 | 33.35.00 | 33.35.00 | 33.35.00 | 33.35.00 |
| Aquarii, E | 23rd | 23.42.10 | 23.42.10 | 23.42.10 | 23.42.10 | 23.42.10 | 23.42.10 | 23.42.10 | 23.42.10 |
| Aquarii, E | 23rd | 23.42.10 | 23.42.10 | 23.42.10 | 23.42.10 | 23.42.10 | 23.42.10 | 23.42.10 | 23.42.10 |
| Aquarii, E | 23rd | 23.42.10 | 23.42.10 | 23.42.10 | 23.42.10 | 23.42.10 | 23.42.10 | 23.42.10 | 23.42.10 |
| Aquarii, E | 23rd | 23.42.10 | 23.42.10 | 23.42.10 | 23.42.10 | 23.42.10 | 23.42.10 | 23.42.10 | 23.42.10 |
| Aquarii, E | 23rd | 23.42.10 | 23.42.10 | 23.42.10 | 23.42.10 | 23.42.10 | 23.42.10 | 23.42.10 | 23.42.10 |
| Aquarii, E | 23rd | 23.42.10 | 23.42.10 | 23.42.10 | 23.42.10 | 23.42.10 | 23.42.10 | 23.42.10 | 23.42.10 |

* From the reading of a Aquula, 29th August, subtract 49°, † and from β Aquilae 45°.
# ASTRONOMICAL OBSERVATIONS

**OBSERVATIONS at large for determining the Latitudes of Places.**

From henceforward all the Observations were taken by Lieutenant COLEBROOKE.

<table>
<thead>
<tr>
<th>Phenomenon and Face of the Quadrant</th>
<th>Date</th>
<th>Arch of 96</th>
<th>Value</th>
<th>Arch of 96</th>
<th>Zenith Distance corrected</th>
<th>Declination</th>
<th>Latitude by the observation</th>
<th>Name of the place and its correct Latitude</th>
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<td>19 01.19</td>
</tr>
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<td>β Cassiopeae</td>
<td>41.01.28</td>
<td>38.52.37.1</td>
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<td>38.53.04.6</td>
<td>57.57.46.7</td>
<td>N</td>
<td>19 04.41</td>
</tr>
</tbody>
</table>

Note: The observations were taken by Lieutenant COLEBROOKE.
## Observations at Large for Determining the Latitudes of Places

<table>
<thead>
<tr>
<th>Phenomenon and Face of the Quadrant</th>
<th>Date</th>
<th>Reading</th>
<th>Value</th>
<th>Arch of 90.</th>
<th>Zenith Distance corrected</th>
<th>Declination</th>
<th>Latitude by observation</th>
<th>Name of the place and its correct Latitude</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>α Andromedae, W.</strong></td>
<td>1784, Nov. 15th</td>
<td>9:01:10</td>
<td>8:44:45,5</td>
<td>8:45:00</td>
<td>8:45:00</td>
<td>27:53:39</td>
<td>N:19:08:59</td>
<td>Ichapoe,</td>
</tr>
<tr>
<td><strong>γ Pegasi, E.</strong></td>
<td>15th</td>
<td>5:01:23</td>
<td>5:05:25,3</td>
<td>5:05:00</td>
<td>5:05:17,5</td>
<td>13:59:13,5</td>
<td>N:19:04:30,8</td>
<td>Bora,</td>
</tr>
<tr>
<td><strong>Fumulhooit, E.</strong></td>
<td>17th</td>
<td>53:01:15</td>
<td>50:01:54,3</td>
<td>50:02:00</td>
<td>50:03:04,2</td>
<td>30:45:22,5</td>
<td>S:19:17:41,7</td>
<td>Munisur Cotta,</td>
</tr>
<tr>
<td><strong>Fumulhooit, E.</strong></td>
<td>18th</td>
<td>53:01:16</td>
<td>49:59:40,4</td>
<td>49:59:30</td>
<td>50:00:42,2</td>
<td>30:45:22,5</td>
<td>S:19:15:19,7</td>
<td></td>
</tr>
<tr>
<td><strong>β Cassiopeae, W.</strong></td>
<td></td>
<td>41:00:03</td>
<td>38:27:34,7</td>
<td>38:26:30</td>
<td>38:27:38</td>
<td>57:57:50,6</td>
<td>N:19:25:55</td>
<td></td>
</tr>
<tr>
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<td></td>
<td>8:02:29</td>
<td>8:10:52,2</td>
<td>8:10:50</td>
<td>8:10:59,1</td>
<td>27:53:59,6</td>
<td>N:19:43:00</td>
<td></td>
</tr>
<tr>
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<td>8:02:12</td>
<td>8:03:26</td>
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<td>8:03:21</td>
<td>27:53:59</td>
<td>N:19:50:38</td>
<td></td>
</tr>
<tr>
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<td></td>
<td>33:03:05</td>
<td>31:12:30,7</td>
<td>31:12:00</td>
<td>31:12:40</td>
<td>11:19:35</td>
<td>N:19:55:14,4</td>
<td></td>
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<tr>
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<td>37:02:00</td>
<td>35:11:34,3</td>
<td>35:11:00</td>
<td>35:11:57</td>
<td>55:21:23</td>
<td>N:20:09:26</td>
<td>Peeply,</td>
</tr>
<tr>
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<td>8th</td>
<td>41:02:07</td>
<td>38:57:27,1</td>
<td>38:57:00</td>
<td>38:57:59,6</td>
<td>59:59:36</td>
<td>N:20:08:56</td>
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<tr>
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<td>33:02:00</td>
<td>31:24:22,6</td>
<td>31:24:00</td>
<td>31:24:46</td>
<td>11:19:35</td>
<td>S:20:05:11</td>
<td>Balluwa,</td>
</tr>
<tr>
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<td>9th</td>
<td>8:00:08</td>
<td>7:33:31</td>
<td>7:33:00</td>
<td>7:33:23</td>
<td>27:53:59</td>
<td>N:20:20:36</td>
<td></td>
</tr>
<tr>
<td>Phenomenon and F.t. of the Quadrant</td>
<td>Arch of 96</td>
<td>Value</td>
<td>Arch of 96</td>
<td>Zenith Distance corrected</td>
<td>Declination</td>
<td>Latitude by the observation</td>
<td>Name of the place and its correct Latitude</td>
<td></td>
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<tr>
<td><strong>γ Cassiopeae</strong>, W.</td>
<td>1784, Dec. 10th</td>
<td>40.02.22</td>
<td>39.04.02.6</td>
<td>39.03.30</td>
<td>46</td>
<td>30.94.30</td>
<td>59.52.54</td>
<td>N. 20.28.21.7</td>
</tr>
<tr>
<td><strong>η Ceti</strong>, E.</td>
<td>1784, Dec. 15th</td>
<td>44.02.16</td>
<td>41.50.09.4</td>
<td>41.40.40</td>
<td>51</td>
<td>41.50.45.7</td>
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</tr>
<tr>
<td><strong>α Cephei</strong>, E.</td>
<td>20.00.29</td>
<td>18.57.44.7</td>
<td>18.57.40</td>
<td>19</td>
<td>18.58.01.4</td>
<td>1.43.03</td>
<td>N. 20.41.04.4</td>
<td>Ichnumpoore River, north side, 20.51.57</td>
</tr>
<tr>
<td><strong>γ Cassiopeae</strong>, W.</td>
<td>1784, Dec. 17th</td>
<td>36.02.20</td>
<td>36.26.18.5</td>
<td>36.26.00</td>
<td>39</td>
<td>34.26.48.2</td>
<td>55.21.23</td>
<td>N. 20.54.34.7</td>
</tr>
<tr>
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<td>34.01.04</td>
<td>32.18.19.3</td>
<td>38.08.20</td>
<td>35</td>
<td>32.08.55</td>
<td>11.19.35</td>
<td>S. 20.49.20</td>
<td>Chorakootco, 20.59.09</td>
</tr>
<tr>
<td><strong>δ Cassiopeae</strong>, W.</td>
<td>1784, Dec. 19th</td>
<td>41.00.15</td>
<td>38.32.50.5</td>
<td>38.32.30</td>
<td>45</td>
<td>38.32.55.3</td>
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</tr>
<tr>
<td><strong>α Cephei</strong>, E.</td>
<td>40.02.18</td>
<td>38.06.43.4</td>
<td>38.05.30</td>
<td>44</td>
<td>38.06.30</td>
<td>59.05.56</td>
<td>N. 21.06.26.0</td>
<td></td>
</tr>
<tr>
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<td>32.01.04</td>
<td>30.15.49.3</td>
<td>30.15.30</td>
<td>33</td>
<td>30.15.06</td>
<td>9.17.47</td>
<td>S. 20.58.21</td>
<td></td>
</tr>
<tr>
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<td>41.00.29</td>
<td>31.27.44.4</td>
<td>31.27.30</td>
<td>29</td>
<td>41.28.37.4</td>
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<td>N. 21.07.40.4</td>
<td></td>
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<tr>
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<td>23.00.29</td>
<td>21.42.06</td>
<td>21.42.00</td>
<td>22</td>
<td>21.42.25</td>
<td>0.36.32</td>
<td>S. 21.05.53</td>
<td>Kainile Humme, 21.15.15</td>
</tr>
<tr>
<td><strong>ν Cassiopeae</strong>, W.</td>
<td>36.01.15</td>
<td>34.05.39.5</td>
<td>34.05.20</td>
<td>38</td>
<td>34.06.08</td>
<td>55.21.23</td>
<td>N. 21.15.15</td>
<td>Daumدورpour, 21.15.52</td>
</tr>
<tr>
<td><strong>η Ceti</strong>, E.</td>
<td>40.01.16</td>
<td>37.51.05.7</td>
<td>37.51.00</td>
<td>44</td>
<td>37.51.47</td>
<td>59.06.56</td>
<td>N. 21.15.09</td>
<td>Aummitta, 21.23.01.2</td>
</tr>
<tr>
<td><strong>ζ Ceti</strong>, E.</td>
<td>32.02.06</td>
<td>30.34.57.5</td>
<td>30.30.20</td>
<td>33</td>
<td>30.31.06</td>
<td>9.17.47</td>
<td>S. 21.13.19</td>
<td></td>
</tr>
<tr>
<td><strong>α Cassiopeae</strong>, W.</td>
<td>23.00.24</td>
<td>32.55.53.3</td>
<td>32.55.30</td>
<td>38</td>
<td>32.55.09.5</td>
<td>56.21.23</td>
<td>N. 21.25.13.5</td>
<td></td>
</tr>
<tr>
<td><strong>κ Cassiopeae</strong>, W.</td>
<td>36.01.13</td>
<td>32.55.39.4</td>
<td>32.54.20</td>
<td>35</td>
<td>32.40.24</td>
<td>11.19.35</td>
<td>S. 21.20.49.3</td>
<td></td>
</tr>
<tr>
<td><strong>γ Andromedae</strong>, W.</td>
<td>43.02.24</td>
<td>40.51.04.5</td>
<td>40.50.70</td>
<td>40</td>
<td>40.50.57</td>
<td>62.36.07</td>
<td>N. 21.38.14.5</td>
<td></td>
</tr>
<tr>
<td><strong>α Persei</strong>, E.</td>
<td>20.03.35</td>
<td>19.38.05.8</td>
<td>19.37.40</td>
<td>21</td>
<td>19.38.17</td>
<td>41.17.22</td>
<td>N. 21.39.0.5</td>
<td></td>
</tr>
<tr>
<td><strong>η Ceti</strong>, E.</td>
<td>23.02.18</td>
<td>22.09.47.2</td>
<td>22.10.00</td>
<td>22</td>
<td>22.10.16</td>
<td>0.30.34.0</td>
<td>S. 21.33.44.0</td>
<td></td>
</tr>
<tr>
<td><strong>κ Cassiopeae</strong>, W.</td>
<td>24.03.02</td>
<td>40.49.16.8</td>
<td>40.49.00</td>
<td>40</td>
<td>40.49.54.4</td>
<td>62.36.07</td>
<td>N. 21.46.12.6</td>
<td></td>
</tr>
<tr>
<td><strong>ζ Ceti</strong>, E.</td>
<td>23.03.09</td>
<td>22.19.54</td>
<td>22.19.30</td>
<td>22</td>
<td>22.20.04</td>
<td>0.30.52</td>
<td>S. 21.43.20.0</td>
<td></td>
</tr>
<tr>
<td><strong>ι Eridani</strong>, E.</td>
<td>43.01.30</td>
<td>40.46.10</td>
<td>40.46.00</td>
<td>40</td>
<td>40.46.54</td>
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<tr>
<td><strong>κ Cassiopeae</strong>, W.</td>
<td>27.03.02</td>
<td>37.16.40</td>
<td>37.16.00</td>
<td>48</td>
<td>37.17.15</td>
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<td>N. 21.49.43.3</td>
<td></td>
</tr>
<tr>
<td><strong>α Ceti</strong>, E.</td>
<td>23.02.10</td>
<td>22.20.02</td>
<td>22.20.00</td>
<td>24</td>
<td>22.20.34</td>
<td>0.30.52</td>
<td>S. 21.44.42.0</td>
<td></td>
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<tr>
<td><strong>α Ceti</strong>, E.</td>
<td>33.01.27</td>
<td>33.14.40.6</td>
<td>33.14.00</td>
<td>38</td>
<td>33.14.59.3</td>
<td>11.19.35</td>
<td>S. 21.55.25.3</td>
<td></td>
</tr>
<tr>
<td><strong>κ Cassiopeae</strong>, W.</td>
<td>39.02.11</td>
<td>37.06.32.5</td>
<td>37.06.00</td>
<td>43</td>
<td>37.06.59.3</td>
<td>59.06.56</td>
<td>N. 21.59.36.7</td>
<td></td>
</tr>
</tbody>
</table>

Astronomical Observations, at large for determining the Latitudes of Places.
OBSERVATIONS at large for determining the Latitudes of PLACES.

<table>
<thead>
<tr>
<th>Phenomenon and Face of the Quadrant</th>
<th>Arch of 96</th>
<th>Arch of go.</th>
<th>Zenith Distance corrected.</th>
<th>Latitude by observation.</th>
<th>Name of the place and its correct Latitude</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>γ Cassiopeae, W.</strong></td>
<td>39.03.21</td>
<td>37.25.10</td>
<td>37.24.40</td>
<td>37.25.37</td>
<td>59.32.55</td>
</tr>
<tr>
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<td>35.02.06</td>
<td>33.10.30</td>
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<td>39.03.02</td>
<td>37.16.49</td>
<td>37.16.30</td>
<td>37.17.22</td>
<td>59.32.55</td>
</tr>
<tr>
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<td>35.01.08</td>
<td>35.51.10</td>
<td>35.50.40</td>
<td>36.51.43</td>
<td>59.56.56</td>
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<td>52.28.57</td>
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<td>11.19.35</td>
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<td>31.02.59</td>
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<td>30.13.25</td>
<td>52.37.59</td>
</tr>
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<td>18.03.14</td>
<td>17.40.50</td>
<td>17.40.30</td>
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<td>40.06.50</td>
</tr>
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<td>24.01.12</td>
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<td>40.07.26</td>
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<td>22.58.48</td>
<td>00.36.32</td>
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<td>00.36.32</td>
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<td>36.24.57</td>
<td>36.25.00</td>
<td>36.25.42</td>
<td>59.56.56</td>
</tr>
<tr>
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<td>55.03.22</td>
<td>52.25.36</td>
<td>52.25.30</td>
<td>52.26.48</td>
<td>29.51.02</td>
</tr>
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<td>29.49.53</td>
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<td>52.37</td>
</tr>
<tr>
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<td>52.34.24</td>
<td>52.34.40</td>
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<td>30.01.45</td>
<td>52.37.39</td>
</tr>
<tr>
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<td>52.33.21</td>
<td>59.51.02</td>
</tr>
</tbody>
</table>

Mr. Burrows published, in the Lady's Diary, a Theorem similar to mine, page 71: he shewed it to me last year; my original Book of Observations convinced him, that his publication could not have been known to me when I wrote the Theorem.
III.
A ROYAL GRANT OF LAND,

*Engraved on a Copper Plate, bearing date twenty-three years before Christ, and discovered among the ruins at Mongueer.*

Translated from the Original Sanscrit, by Charles Wilkins, Esq. in the Year 1781.

DEB PAAL DEB*

PROSPERITY!

His wishes are accomplished. His heart is steadfast in the cause of others. He walks in the paths of virtue. May the achievements of this fortunate Prince cause innumerable blessings to his People!

By displaying the strength of his genius, he hath discovered the road to all human acquirements; for being a Soogot (1) he is Lord of the Universe.

Gopaal, King of the World, possessed matchless good Fortune: he was Lord of two Brides; the Earth and her Wealth. By comparison of the learned, he was likened unto Preetoo, (2) Sogor, (3) and others, and it is credited.

When his innumerable army marched, the heavens were so filled with the dust of their feet, that the birds of the air could rest upon it.

He acted according to what is written in the Shastra, (4) and obliged the different sects to conform to their proper tenets. He was blessed with a son, Dharmo Paal, when he became independent of his forefathers, who are in heavens.

His elephants moved like walking mountains; and the earth, oppressed by their weight, and moulder into dust, found refuge in the peaceful heavens.

He went to extirpate the wicked, and plant the good; and happily his salvation was effected at the same time: for his servants

* In this translation the Sanscrit names are written, as they are pronounced in Bengal; but, in the following paper, the translator has adopted the more elegant pronunciation of Unnines and Cashmir.
visited Kedaar, (1,) and drank milk according to the law: and they offered up their vows, where the Ganges joins the ocean, and at Gokornaa, (2,) and other places, (3,)

When he had completed his conquests, he released all the rebellious princes he had made captive; and each returning to his own country laden with presents, reflected upon this generous deed, and longed to see him again; as mortals, remembering a pre-existence, wish to return to the realms of light.

This prince took the hand of the daughter of Porobol, Raajaa of many countries, whose name was Ronnaa Debee; and he became settled.

The people, being amazed at her beauty, formed different opinions of her; some said it was Locke (4,) herself in her shape; others, that the earth had assumed her form; many said it was the Raajaa's fame and reputation; and others that a household goddess had entered his palace. And her wisdom and virtue set her above all the ladies of the court.

This virtuous and praise-worthy princess bore a son, Deb Paal Deb, as the shell of the ocean produces the pearl:

In whose heart there is no impurity; of few words, and gentle manners; and who peaceably inherited the kingdom of his father, as Bodheestwo (5,) succeeded Soogot.

He who, marching through many countries making conquests, arrived with his elephants in the forests of the mountains of Beendhoo, (6,) where seeing again their long lost families, they mixed their mutual tears; and who going to subdue other princes, his young horses meeting their females at Kombaage (7,) they mutually neighed for joy.

He who has opened again the road of liberality, which was first marked out in the Kreeto Joog (8,) by Bolce, (9,) in which Bhaargob (10,) walked in the Tretaa Joog, (11,) which was cleansed by Korno (12,) in the Dwapor Joog, (13,) and was again choked up in the Kolee Joog (14,) after the death of Sokodwesee, (15,)

He who conquered the earth from the source of the Ganges as far as the well-known bridge which was constructed by the enemy of Dosaasyo, (16,) from the river of Luckeccool (17,) as far as the ocean of the habitation of Boroon, (18,)
At Moodgo-gheerée, (1,) where is encamped his victorious army, across whose river a bridge of boats is constructed for a road, which is mistaken for a chain of mountains, where immense herds of elephants, like thick black clouds, so darken the face of day, that people think it the season of the rains; whither the princes of the north send so many troops of horse, that the dust of their hoofs spreads darkness on all sides; whither so many mighty chiefs of Jumboodweep (2,) resort to pay their respects, that the earth sinks beneath the weight of the feet of their attendants. There Deb Paal Deb (who, walking in the footsteps of the mighty lord of the great Soogots, the great commander, Raajaa of Mohaa Raajaas, Dhormo Paal Deb, is himself mighty lord of the great Soogots, a great commander, and Raajaa of Mohaa Raajaas) issues his commands. To all the inhabitants of the town of Meseeka, situated in Kreeeneela, in the province of Sree Nogor, (3,) which is my own property, and which is not divided by any land belonging to another; to all Raanok and Raaje-pootro; to the (4,) Omaatyo, Mohaa-kaarttaa-kreeteecko, Mohaa-Dondo-Nayk, Mohaa-Preetsaah, Mohaa-Saamont, Mohaa-Dow-Saadhon-Saadhonecko, Mohaa-Koovnugaraa-Matyo; to the Promaatreec and Sorobhongo; to the Raajastanecyo, Ooporecko, Daasaapraaducecko, Choorood-dhornecko, Daandecko, Dondopyaseeko, Sowl-keeko, Gowlmecko, Kyotropo, Pranuto-paalo, Kotltopaalo and Kaandaaroyko, to the Todaaajokoto and the Beeneejokoto; to the keeper of the elephants, horses and camels; to the keeper of the mares, colts, cows, buffaloes, sheep, and goats; to the Dootopyprofessional, Gomaa-Gomecko, and Obheedworaanoo; to the Beesypotec, Toropotec, and Torcecko. To the different tribes, Gower, Maalob, Khoso, Hoon, Koplecko, Kornaato, Laasaato, and Bhoto; to all others of our subjects, who are not here specified; and to the inhabitants of the neighbouring villages, from the Braahmon and fathers of large families, to the tribes of Medo, Ondhuroko, and Chondaalo.

Be it known that I have given the above-mentioned town of Meseeka, whose limits include the fields where the cattle graze, above and below the surface, with all the lands belonging to it; together with all the Mango and Modhoo trees; all its waters, and all their banks and verdure; all its rents and tolls, with all fines for crimes, and rewards for catching thieves. In it there shall be no molestation, no passage for troops; nor shall any
one take from it the smallest part. I give likewise every thing that
has been possessed by the servants of the Raajaa. I give the
Earth and Sky, as long as the Sun and Moon shall last. Except,
however, such lands as have been given to God, and to the Braah-
mouns, which they have long possessed and now enjoy. And that
the glory of my father and mother, and my own fame, may be
increased, I have caused this Saason (1) to be engraved, and grant-
ed unto the great Botho Bechkoraato Meesro, who has acquired all
the wisdom of books, and has studied the Beads (2), under Osla-
yono; who is descended from Owopomonyobo; who is the son of the
learned and immaculate Botho Beraahoraato; and whose grand-
father was Botho Beessworaato, learned in the Beads, and expert in
performing the J ag, (3).

Know all the aforesaid, that as bestowing is meritorious, so
taking away deserves punishment; wherefore leave it as I have
granted it. Let all his neighbours, and those who till the land, be
obedient to my commands. What you have formerly been
accustomed to perform and pay, do it unto him in all things.
Dated in the 33d Sombot, (4) and 21st day of the month of Maargo.

Thus speak the following Slokes (5) from the Dhorno
Onoosaason:

1. "Ram hath required, from time to time, of all the Raajaas
that may reign, that the bridge of their beneficence be the same,
and that they do continually repair it.

2. "Lands have been granted by Sogor, and many other
Raajaas; and the same of their deeds devolves to their successors.

3. "He who dispossesses any one of his property, which I
myself, or others, have given, may he, becoming a worm, grow
rotten in ordure with his forefathers!

4. "Riches and the life of man are as transient as drops of
water upon a leaf of the lotus. Learning this truth, O man! do
not attempt to deprive another of his reputation.”

The Raajaa, for the public good, hath appointed his virtuous
son, Raajyo Paal, to the dignity of Jowbo Raajja. He is in both
lines of descent illustrious, and hath acquired all the knowledge
of his father.
NOTES.

Page 112. (1.) Soogot—signifies an atheist, or follower of the tenets of Sogoto, a philosopher, who is said to have flourished at a place called Kecott, in the province of Behar, one thousand years after the commencement of the Kole Joog, or Iron Age; of which this is the 4882d year. He believed in visible things only, or such as may be deduced from effects the cause of which is known: as from smoke the existence of fire. He wrote many books to prove the absurdity of the religion of the Brahmons; and some upon astronomy and other sciences, all which are said to be now in being. He further held that all our actions are attended by their own rewards and punishments in this life; and that all animals, having an equal right to existence with man, should not be killed either for sport or food.

(2.) Preetoo—was the son of Beno, and Raajaa of a place called Beetoor, near Lucknow. He flourished in the first age of the world, and is said to have levelled the earth, and, having prepared it for cultivation, obliged the people to live in society.

(3.) Sogor—the name of a Raajaa who lived in the second age at Ojoodro, and is said to have dug the rivers.

(4.) Shastra—book of divine ordinances. The word is derived from a root signifying to command.

Page 113. (1.) Kedaar—a famous place, situated to the north of Hindostan, visited, to this day, on account of its supposed sanctity.

(2.) Gokornad—a place of religious resort near Punjab.

(3.) This and a few other passages appear inconsistent with the principles of a Soogot: to reconcile it therefore, it should be remarked, that, as he was issuing his orders to subjects of a different persuasion, it was natural for him to use a language the best calculated to strike them with awe, and bind them to a performance of his commands. The Pundit, by whose assistance this translation was made, when he was desired to explain this seeming contradiction, asked whether we did not, in our courts, swear a Mussulman upon the Koran, and a Hindoo by the waters of the Ganges, although we ourselves had not the least faith in either.

(4.) Locke—the Hindoo goddess of fortune.

(5.) Bodheestro—was the son of Soogot.

(6.) Rendhyo—name of the mountains on the continent near Ceylon.

(7.) Kombige—now called Cambay.

(8.) Kreo Joog—the first age of the world, sometimes called the Sutte Joog, or age of purity.

(9.) Bolee—a famous giant of the first age who is fabled to have conquered earth, heaven, and hell.

(10.) Bhaurgoth—a Brahman who, having put to death all the princes of the earth, usurped the government of the whole.

(11.) Tretaa Joog—the second age, or of three parts good.

(12.) Korno—a famous hero in the third age of the world. He was general to Dourjedhun, whose wars with Foodister are the subject of the Mohhabharat, the grand epic poem of the Hindoos.

(13.) Dvapar Joog—the third age of the world.

(14.) Kole Joog—the fourth or present age of the world, of which 4882 years are elapsed.

(15.) Sokodvseet—an epithet of Berkromaadeetya, a famous Raajaa. He succeeded his brother Sokadaetya, whom he put to death.
(16.) Dosaaasyo—one of the names of Ra'bon, whose wars with Raam are the subject of a poem called the Raamayon.

(17.) Luckeewool—now called Luckepoor.

(18.) Boroon—God of the ocean.

According to this account the Raajaa's dominions extended from the Cow's Mouth to Adam's Bridge in Ceylon, said to have been built by Raum in his wars with Raabon; from Luckepoor as far as Goorerat.

Page 114. (1.) Mood-go-heeree—now called Mongeer.

(2.) Jumboodeepee—according to the Hindoos geography, implies the habitable part of the earth.

(3.) Sree Nogor—the ancient name of Patna.


Page 115. (1.) Suason—signifies an edict.

(2.) Biaads—Hindoo Scriptures.

(3.) Jooq—sacrifice.

(4.) Somboot—implies the æra of Raajaa Beekromadeetyo. The Brahmos throughout Hindostan keep time according to the three following epochs: The Kolyode, from the flight of Kreeshno, or commencement of the Kolee Joog, 4882 years. The Somboot, from the death of Beekromadeetyo, 1837 years. The Sokaahdo, from the death of Raajaa Soko 1703.

(5.) Stokes—stanzas, commonly, but erroneously, written Ashlogues.
IV.

AN INSCRIPTION ON A PILLAR NEAR BUDDAL.

TRANSLATED FROM THE SANSCRIT,

BY CHARLES WILKINS, ESQ.

SOME time in the month of November, in the year 1780, I discovered, in the vicinity of the town of Buddal, near which the Company have a factory, and which at that time was under my charge, a decapitated monumental column, which at a little distance has very much the appearance of the trunk of a coco-nut tree broken off in the middle. It stands in a swamp overgrown with weeds, near a small temple dedicated to Hārgovīśī, whose image it contains. Upon my getting close enough to the monument to examine it, I took its dimensions, and made a drawing of it; and soon after a plate was engraved, from which the accompanying is an impression.

It is formed of a single stone of a dirty grey complexion; and it has lost by accident a considerable part of its original height. I was told upon the spot that it had, in the course of time, sunk considerably in the ground; but upon my digging about the foundation I found this was not the case. At a few feet above the ground is an inscription, engraved in the stone, from which I took two reversed impressions with printer’s ink. I have lately been so fortunate as to decipher the character; and I have the honour to lay before the Society a transcript of the original in the modern writing, and a translation; and at the same time exhibit the two impressions I took from the stone itself.

The original character of this inscription is very different from the modern form; but it so much resembles that on the plate found by Col. Watson at Mongneer, that I am induced to conclude it to be a work of the same period. The language is Sāṁskṛt, and the whole is comprised in twenty-eight metrical verses of various measures.

14th July 1785.

CHARLES WILKINS.
Prosperity!

I.

VēERĀ DĒV was of the Sāndēlyā race, (1,) from him was descended Pānchāl; of whose generation, and of whom, was Gārgā born.

I.

He, another Sākrā, (2,) was suler but of one quarter, and had no authority in other regions. He, too, was defeated by Dityā (3,) chiefs; but being a virtuous prince, he became supreme over every country without reserve; and his conduct was such, that he laughed Vṛccāsapatī (4,) to scorn.

III.

Eeχā (5,) was his wife; and, like love, she was the mistress of his heart. She was admired for the native purity of her mind, and her beauty was like the light of the moon.

IV.

In his countenance, which was like the flower of the waters, (6,) were to be traced the lines of four sciences, (7,) The three worlds were held in subjection by his hereditary high rank.

From these two was descended a Brāhmān like Kāṃalayōnēc, (8,) and he took unto himself the name of Srī Dārblā-pānēc.

V.

Whose country (extending to Rēvā-Jānāk, (9,) to the father of Gowrrēc, (10,) whose piles of rocks reek with the juice exuding from the heads of intoxicated elephants, and whose snow-white mountains are brightened by the sun's rays; to the two oceans: to that

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(1.) A tribe o. Brāhmāns still extant.
(2.) Kēndrā, the God of the Heavens, who is supposed to be the Guardian of the East.
(3.) Evil spirits, Kēndrā is said to have lost his kingdom, for a while, to the Assārs, or Evil spirits.
(4.) The Tutor of the good spirits and the Planet Jupiter.
(5.) Love. Desire.
(6.) The Lotus.
(7.) Arms, Music, Mechanics, Physics.
(8.) Brāhmā.
(9.) Perhaps the Narbadda.
(10.) The snowy mountains that part India from Tartary. Gowrrēc, one of the names of the Parvatī, the consort of Seēv.
whence Arjūn (1) riseth from its bed, and to that wherein the sun sinketh in the west) the Prince Sṛṭe Dēv Pāl, (2) by his policy, rendered tributary:

VI.

At whose gates (although the prospect, hidden by the dust arising from the multitude of marching force, was rendered clear from the earth being watered by constant and abundant streams, flowing from the heads of lustful elephants of various breeds) stood, scarce visible, amongst the vast concourse of nobles flocking to his standard from every quarter, Sṛṭe Dēv Pāl, in expectation of his submission.

VII.

Whose throne that Prince (who was the image of Eṇḍrā, and the dust of whose feet was impressed with the diadems of sundry potentates) himself ascended with a flash of glory, although he had formerly been wont to offer him large sums of Pīṭās, (3) bright as the lunar rays.

VIII.

To him was born, of the Princess Sārkārā, the Brāhmaṇ Sāṇēśwār, who was like Sōm, (4) the offspring of Āṭrē, and a favourite of the Most High.

IX.

He adopted the manners of Dhūnānjay, (5) and did not exult over the ignorant and ill-favoured. He spent his riches amongst the needy. He neither vainly accepted adulation, nor uttered honey words. His attendants were attacked by his bounty; and because of his vast talents, which the whole universe could not equal, he was the wonder of all good men.

X.

Anxious for a home and an asylum, he took the hand of

(1.) The charoteer of the sun.—The Aurora of the Hindoos.
(2.) If this be the prince mentioned in the copperplate found by Col. Watso, he reigned at Mongooler above 1800 years ago.
(3.) A square coin.
(4.) The moon.
(5.) One of the sons of Pandoo, commonly called Arjoo.
Rānnā, (1), a Princess of his own likeness, according to the law, even as Śēva the hand of Śēva, (2)—even as Hārīc (3) the hand of Lākhmēe.

XI.

From this pair proceeded into life, bursting forth like Gōhā, (4), with a countenance of a golden hue, the fortunate Kēdārā Mērsā, whose actions rendered him the favourite of heaven.—The lofty diadem, which he had attained, shone with faultless splendour, kissing the vast circumference of the earth. His extensive power was hard to be limited; and he was renowned for boundless knowledge raised from his own internal source.

XII.

The ocean of the four sciences, which had been at a single draught drunk up, he brought forth again, and laughed at the power of Agāstya, (5).

XIII.

Trusting to his wisdom, the king of Gouer (6) for a long time enjoyed the country of the eradicated race of Īdīkal, (7), of the Hoons (8), of humbled pride, of the kings of Drāvēer (9), and Gōryār, (10), whose glory was reduced, and the universal sea-girt throne.

XIV.

He considered his own acquired wealth the property of the needy, and his mind made no distinction between the friend and the foe. He was both afraid and ashamed of those offences which condemn the soul to sink again into the ocean of mortal birth; and he despised the pleasures of this life, because he delighted in a suprême abode.

(1.) A princess of this name is also mentioned in Colonel Watson's plate.
(2.) Śēva is the feminine of Śēv.
(3.) Hārīc, a name of Vēshmōh.
(4.) Gōhā, a name of Kārīk.
(5.) Who is said to have drunk up the ocean.
(6.) The kingdom of Gouer anciently included all the countries which now form the kingdom of Bengal, on this side the Brāhmānpātra, except Mongueer.
(7.) Onxa.
(8.) Huns.
(9.) A country to the south of the Carnatack.
(10.) Goozerat.
PILLAR NEAR BUDDAL.

XV.

To him, emblem of Vrēchāspātē, (1) and to his religious rites, the prince Srēē Sōōrā Pāl (who was a second Eendrā, and whose soldiers were fond of wounds) went repeatedly; and that long and happy companion of the world, which is girt with several oceans as with a belt, was wont, with a soul purified at the fountain of faith, and his head humbly bowed down, to bear pure water before him.

XVI.

Vānwā, of celestial birth, was his consort, with whom neither the fickle Lākshmēē, nor Sāīē, (2) constant to her lord, were to be compared.

XVII.

She, like another Dēvākēē, (3) bore unto him a son of high renown, who resembled the adopted of Yāsōdhēē, (4) and husband of Lākshmēē, (5).

XVIII.

This youth, by name Srēē Gōdrāvā Mēēsrā was acquainted with all the constellations. He resembled Rām, the son of Jāmādāgūēē, (6) He was another Rām.

XIX.

His abilities were so great, that he was solicitous to discover the essence of things, wherefore he was greatly respected by the Prince Srēē Nārāyān Pāl. What other honour was necessary?

XX.

His policy (who was of no mean capacity, and of a reputation not to be conceived) following the sense of the Vēds, was of boundless splendor; and, as it were, a descent of Dhārmā, the Genius of Justice. It was regulated by the example of those who trust in the power of speech over things future, who stand upon the connexion

(1) The preceptor of the good spirits, and the planet Jupiter.
(2) The consort of Sēēnshēē.
(3) The real mother of Krēēshēēndā.
(4) The foster-mother of Krēēshēēndā.
(5) Roṇkēēmūēēē the consort of Krēēshēēndā. She is here called Lākshmēēīē, in compliance with the idea of her being a descent of that Goddess.
(6) This is neither the conqueror of Ceylon, nor the brother of Krēēshēēndā.
of family, who are in the exercise of paying due praise to the
virtues of great men, and who believe in the purity of Astrology.

XXI.

In him was united a lovely pair, Läksmēē and Sārāswätēē, the
disposer of fortune, and the Goddess of Science, who seemed to
have forsaken their natural enmity, and to stand together pointing
at friendship.

XXII.

He laughed to scorn him who, in the assemblies of the learned,
was intoxicated with the love of argument, and confounded him
with profound and elegant discourses framed according to the
document of the Sāstrās; and he spared not the man who, because
of his boundless power and riches, was overwhelmed with the pride
of victory over his enemy in the field.

XXIII.

He had a womb, but it obstinately bore him no fruit. One
like him can have no great relish for the enjoyments of life! He
never was blessed with that giver of delight, by obtaining which a
man goeth unto another almoner, (1).

XXIV.

He, who was, as it were, another Vālmēēkēē, (2,) born in this
dark age of impiety, amongst a dreadful and a cruel race of
mortals, was a devout man, who displayed the learning of the
Vēds in books of moral tales.

XXV.

His profound and pleasing language, like Gāṅgā, flowing in a
triple course (3,) and constant stream, purifieth and delighteth.

XXVI.

He, to whom, and to those of whose generation, men were

(1.) He had no issue to perform the Srādh for the release of his soul from the bonds of sin.
By another almoner is meant the Deity.
(2.) The first poet of the Hindoos, and supposed author of the Ramāyana.
(3.) He is supposed to have written in three languages.
wont to resort as it were to Brāhma, waited so long in expectation of being a father, that, at length, he himself arrived at the state of a child.

XXVII.

By him was recorded here upon this lasting column, the superior beauty of whose shaft catcheth the eye of the beholder, whose aspiring height is as boundless as his own ideas, which is, as it were, a stake planted in the breast of Kālēe, (1) and on whose top sits Tārkshyā, (2) the foe of serpents, and favourite bird of Haree, the line of his own descent.

XXVIII.

Gārōdr, like his fame, having wandered to the extremity of the world, and descended even unto its foundation, was exalted here with a serpent in his mouth.

This work was executed by the artist Bṛndōo Bhādrā.

(1, 2) Time.  
(2) Otherwise called Gārōdr.
REMARKS ON THE TWO PRECEDING PAPERS.

BY THE PRESIDENT.

No man has greater respect than myself for the talents of Mr. Wilkins, who, by deciphering and explaining the old Sanscrit inscriptions lately found in these provinces, has performed more than any other European had learning enough to accomplish, or than any Asiatic had industry enough even to undertake: but some doubts having arisen in my mind concerning a few passages in the two preceding translations, I venture to propose them in the form of notes with entire deference to his judgment.

P. 112. l. 12. This fortunate Prince—Is not the first couplet in honour of Buddha, one of whose names, in the Amarodh, is Sugata? A follower of his tenets would have been denominated a Saugat, in the derivative form. We must observe, that the Baudhhs, or Saugats, are called Atheists by the Brahmans, whom they opposed; but it is mere invective; and this very grant fully disproves the calumny, by admitting a future state of rewards and punishments. Sugata was a reformer, and every reformer must expect to be calumniated.

P. 112. l. 21. When his innumerable army—The third stanza in the original is here omitted, either by an oversight, or because the same image of weeping elephants occurs afterwards, and might have been thought superfluous in this place: nevertheless, I insert a literal translation of it.

"By whom, having conquered the earth as far as the ocean, it was left, "as being unprofitably seized; so he declared: and his elephants weeping "saw again in the forests their kindred, whose-eyes-were-full-of-tears."

P. 113. l. 11. Of many countries—The Pandits insist that Rashtramita, in the original, is the name of a particular country.

P. 115. l. 20. Dated in the 33rd Sombot—That is, year; for Samvat is only an abbreviation of Sambasara. This date, therefore, might only mean the thirty-third year of the King's reign; but, since Vicrama'ditya was surnamed the foe of Sacā, and is praised by that name in a preceding stanza, we may safely infer, that the grant was dated thirty-three years after the death of that illustrious Emperor, whom the king of Gaur, though a sovereign prince, acknowledged as lord paramount of India.

P. 120. Verse II. A virtuous prince—Many stanzas in this inscription prove, that the Sândilya family were not princes, but that some of them were prime ministers to the kings of Gaur, or Bengal, according to this comparative genealogy:

Kings.
Go'Pa'la.
Dhermapa'la.
De'vapa'la. B.C. 23.
Ra'jyapa'la.
Su'rapa'la.
Na'ra'yanapa'la. A.C. 67.

Ministers*
Pa'ncia'la.
Garga.
* Derbhapa'ni.
Some'swara.
* Ce'da'ramis'ra.
* Guravamis'ra.

So that, reckoning thirty years to a generation, we may date the Pillar of Guravamis'ra in the sixty-seventh year after Christ. A Pandit, named Ra'dha'ca'nta, with whom I read the original, appeared struck with my remark on the two families, and adopted it without hesitation; but if it be just, the second stanza must be differently interpreted. I suspect Dharma,
the Genius of Justice or Virtue, to be the true reading, instead of Dharma, or virtuous; and have no doubt that parò must be substituted for parò: the sense will then be, that Indra was ruler in the East only; and, though valiant, had been defeated even there by the Daityas or Titans, but that Dharma was made sovereign over him in all quarters.

P. 120. Verse V. Whose country—The original is:

à réva’janac’a nmatan’ajamadastimyachchhi’hīlāsāṅghatēh,
ã gaurī piturisvarāvandraciranaihpushtayatsimnāgirēh,
ma’tan’da’stamayōdaya’runa’jala’da’ va’r’ira’sudwayāt,
nityā yasya bhuva’i bhachār carada’ni sri dēvapādō nipah.

The father of Rēvā is the Mahāndra mountain in the south, in which that river has its source; as the father of Gaurī is the Hīmalaya in the north, where Is’wara, who has a moon on his forehead, is believed often to reside: hence Ra’ dha’c’anta proposed a conjectural emendation, which would have done honour to Scaliger or Bentley. Instead of indra, which is a name of the sun, he reads indu, or the moon, by changing only a small straight line into a small curve; and then the stanza will run thus:


The words connected by hyphens are compounds in Sanscrit.

P. 121. Verse VI. Submission—I understand avasa’ra in this place to mean the leisure of the minister from public affairs, for which even the king waited at the head of his army.

P. 121. Verse VII. Sums of Peētās—The common sense of pit’ha is a chair, seat, or throne; and in this sense it occurs in the thirteenth verse. Ud’ upachch habi’pi’ham, or with-a-sat-as-bright-as-the-moon, appears to be the compound epithet of āsana’m, or chair of state, which though the king had often given to his minister, yet, abashed by his wisdom, and apprehensive of his popularity, he had himself ascended his throne with fear.

P. 121. Verse X. The tenth stanza is extremely difficult, as it contains many words with two meanings, applied in one sense to the Minister Ce’d’ra’ ma’s’ra, but, in another, to Ca’r’tice’ya, the Indian Mars; thus, in the first hemistich, s’i’ch’im meas’ fire, or a peacock; s’i’ch’, a bright flame, or a crest; and s’act’, either power or a spear. As the verse is differently understood, it may be a description of the Brāhmaṇs or of the Deity.

P. 122. Verse XII. The Brāhmaṇs of this province insist, that by the four Vidya’s, or branches of knowledge, are meant the four Veda’s, not the Upavikda’s, or Medicine, Archery, Music, and Mechanics; and they cite two dictioms from the Agnipurāṇa, in which eighteen Vidya’s are enumerated, and among them the four Veda’s; three only of which are mentioned in the Amaraṇa, and in several older books. In this verse also Ra’ dha’c’anta has displayed his critical sagacity; instead of nala he reads bala; and, if his conjecture be right, we must add, “even when he was a boy.”

P. 123. Verse XVI. Constant to her lord—Ra’ dha’c’anta reads anāpatayā, or childless, for anāpata’ya; Satī having borne no children till she became regenerate in the person of Pa’rvati’.

P. 124. Verse XXIII. It obstinately bore him no fruit—The original stanza is uncommonly obscure: it begins with the words yonīrūbhūva, the two first syllables of which certainly mean a womb; but several Pandits, who were consulted apart, are of opinion, that yd is the relative, of which
some word in the masculine gender, signifying *speech*, is the antecedent, though not expressed: they explain the whole stanza thus:— "That speech, which came forth (*nirbhātā*) inconsiderately, of which there was no fruit, he was a man who spoke nothing of that kind for his own gratification: he was a man also, by whom no present-of-playthings was ever given, which the suppliant having received goes to another more bountiful giver." If the relative had been *yan* in the neuter gender, I should have acquiesced in the translation offered by the Pandits; but the suppression of so material a word as *speech*, which, indeed, is commonly feminine in Sanscrit, appears unwarrantably harsh according to European ideas of construction.

P. 124. Verse XXVI. If the preceding interpretation be just, the object of the pillar was to perpetuate the names of *Gurava Mis'ra* and his ancestors; and this verse must imply, that he expected to receive from his own sons the pious offices which he had performed to his forefathers.
V.

SOME ACCOUNT OF THE

SCULPTURES AND RUINS AT MAVALIPURAM,

A PLACE A FEW MILES NORTH OF SADRAS, AND KNOWN TO SEAMEN BY
THE NAME OF THE SEVEN PAGODAS.

BY WILLIAM CHAMBERS, ESQ.

As amidst inquiries after the histories and antiquities of Asia
at large, those of that division of it in which this society resides,
may seem on many accounts to lay claim to a particular share of its
attention, a few hints put down from recollection, concerning some
monuments of Hindoo antiquity, which, though situated in the
neighbourhood of European settlements on the Choromandel coast,
have hitherto been little observed, may it is conceived, be accept-
able, at least as they may possibly give rise hereafter to more ac-
curate observations, and more complete discoveries on the same
subject. The writer of this account went first to view them in the
year 1772, and curiosity led him thither again in 1776; but as he
neither measured the distances nor size of the objects, nor com-
mitted to writing at the time the observations he made on them,
hopes to be excused if, after the lapse of so many years, his
recollection should fail him in some respects, and his account fall
far short of that precision and exactness, which might have been
expected, had there then existed in India so powerful an incentive
to diligent inquiry, and accurate communication, as the establish-
ment of this society must now prove.

The monuments he means to describe, appear to be the re-
 mains of some great city, that has been ruined many centuries
ago; they are situated close to the sea, between Covelong and
SADRAS, somewhat remote from the high road, that leads to the
different European settlements. And when he visited them in
1776, there was still a native village adjoining to them, which
retained the ancient name, and in which a number of Brahmins
resided, that seemed perfectly well acquainted with the subjects of
most of the sculptures to be seen there.
The rock, or rather hill of stone, on which great part of these works are executed, is one of the principal marks for mariners as they approach the coast, and to them the place is known by the name of the Seven Pagados, possibly because the summits of the rock have presented them with that idea as they passed: but it must be confessed, that no aspect which the hill assumes, as viewed on the shore, seems at all to authorize this notion; and there are circumstances, which will be mentioned in the sequel, that would lead one to suspect, that this name has arisen from some such number of Pagados that formerly stood here, and in time have been buried in the waves. But, be that as it may, the appellation by which the natives distinguish it, is of a quite different origin: in their language, which is the Tamulic; (improperly termed Malabar,) the place is called Māvalipuram, which, in Sanscrit, and the languages of the more northern Hindoos, would be Mahābalipūr, or the City of the great Bel. For the Tamulians, (or Malabars,) having no h in their alphabet, are under a necessity of shortening the Sanscrit word maha, great, and write it mā*. They are obliged also, for a similar reason, to substitute a v for a b, in words of Sanscrit, or other foreign original that begin with that letter; and the syllable anv, at the end, is merely a termination, which, like um in Latin, is generally annexed to neuter substances†. To this etymology of the name of this place it may be proper to add, that Bālt is the name of a hero very famous in Hindoo romance; and that the river Māvaligonga, which waters the eastern side of Ceylon, where the Tamulic language also prevails, has probably taken its name from him, as, according to that orthography, it apparently signifies the Ganges of the great Bālt.

The rock, or hill of stone, above mentioned, is that which first engrosses the attention on approaching the place; for, as it rises abruptly out of a level plain of great extent, consists chiefly of one single stone, and is situated very near to the sea beach, it is such a kind of object as an inquisitive traveller would naturally turn aside to examine. Its shape is also singular and romantic, and, from a dis-

* They do indeed admit a substitute, but the abbreviation is most used.
† This explains also, why the Sanscrit word Ved, by which the Hindoos denominate the books of the law of their religion, is written by the Tamulians Vedam, which is according to the true orthography of their language, and no mistake of European travellers, as some have supposed; while the same word is called Bhed by the Bengalis, who have in effect no V in their alphabet.—See Dow, Vol. I. Dissertation. P. 41.
tant view, has an appearance like some antique and lofty edifice. On coming near to the foot of the rock from the north, works of imagery* and sculpture crowd so thick upon the eye, as might seem to favour the idea of a petrified town, like those that have been fabled in different parts of the the world by too credulous travellers†. Proceeding on by the foot of the hill, on the side facing the sea, there is a pagoda rising out of the ground, of one solid stone, about sixteen or eighteen feet high, which seems to have been cut upon the spot out of a detached rock, that has been found of a proper size for that purpose. The top is arched, and the style of architecture, according to which it is formed, different from any now used in those parts. A little further on, there appears upon an huge surface of stone, that juts out a little from the side of the hill, a numerous group of human figures in bas-relief, considerably larger than life, representing the most remarkable persons, whose actions are celebrated in the Mahâbhârata, each of them in an attitude, or with weapons or other insignia, expressive of his character, or of some one of his most famous exploits. All these figures are, doubtless, much less distinct than they were at first; for, upon comparing these and the rest of the sculptures that are exposed to the sea air, with others at the same place, whose situation has afforded them protection from that element, the difference is striking; the former being everywhere much defaced, while the others are fresh as recently finished. This defacement is nowhere more observable, than in the piece of sculpture which occurs next in the order of description. This is an excavation in another part of the east side of the great rock, which appears to have been made on the same plan, and for the same purpose that Choraltries are usually built in that country; that is to say, for the accommodation of travellers. The rock is hollowed out to the size of a spacious room, and two or three rows of pillars are left, as a seeming support to the mountainous mass of stone which forms the roof. Of what pattern these pillars have originally been, it is not easy now to conjecture; for the air of the sea has greatly corroded them, as well as all the other parts of the

* Among these, one object, though a mean one, attracts the attention, on account of the grotesque and ridiculous nature of the design; it consists of two monkeys cut out of one stone, one of them in a stooping posture, while the other is taking the insects out of his head.
† See Shaw's Travels, P. 155, et seq.
cave. And this circumstance renders it difficult to discover, at first sight, that there is a scene of sculpture on the side fronting the entrance. The natives, however, point it out, and the subject of it is manifestly that of Krishen attending the herds of Nund Ghose, the Admetus of the Hindoos; from which circumstance, Krishen is also called Gopaul, or the cowherd, as Apollo was entitled Nomius.

The objects which seem next to claim regard, are those upon the hill itself, the ascent of which, on the north, is, from its natural shape, gradual and easy at first, and is in other parts rendered more so, by very excellent steps cut out in several places, where the communication would be difficult or impracticable without them. A winding stair of this sort leads to a kind of temple cut out of the solid rock, with some figures of idols in high relief upon its walls, very well finished, and perfectly fresh, as it faces the west, and is therefore sheltered from the sea air. From this temple again there are flights of steps, that seem to have led to some edifice, formerly standing upon the hill; nor does it seem absurd to suppose, that this may have been a palace, to which this temple, as a place of worship, may have appertained. For, besides the small detached ranges of stairs that are here and there cut in the rock, and seem as if they had once led to different parts of one great building, there appear in many places, small water channels cut also in the rock, as if for drains to an house; and the whole top of the hill is strewed with small round pieces of brick, which may be supposed, from their appearance, to have been worn down to their present form, during the lapse of many ages. On ascending the hill by its slope on the north, a very singular piece of sculpture presents itself to view. On a plain surface of the rock, which may once have served as the floor of some apartment, there is a platform of stone, about eight or nine feet long, by three or four wide, in a situation rather elevated, with two or three steps leading up to it, perfectly resembling a couch or bed, and a lion very well executed at the upper end of it by way of pillow, the whole of one piece, being part of the hill itself. This the Brakmens, inhabitants of the place, call the bed of Dhernmarajah, or Judishter, the eldest of the five brothers, whose fortunes and exploits are the leading subject in the Mahabharat. And at a considerable distance from this, at such a dis-
tance, indeed, as the apartment of the women might be supposed
to be from that of the men, is a bath excavated also from the solid
rock, with steps in the inside, which the Brahmins call the bath of
Dropey, the wife of Judishter and his brothers. How much credit
is due to this tradition, and whether this stone couch may not
have been anciently used as a kind of throne rather than a bed, is
matter for future inquiry. A circumstance, however, which may,
seem to favour this idea is, that a throne in the Sanscrit, and
other Hindoo languages, is called Singhdsen, which is composed of
the words Singh, a lion; and dsen, a seat.

These are all that appear on that part of the upper surface of
the hill, the ascent to which is on the north; but, on descending
from thence, you are led round the hill to the opposite side, in
which there are steps cut from the bottom to a place near the sum-
mit, where is an excavation that seems to have been intended for a
place of worship, and contains various sculptures of Hindoo Deities.
The most remarkable of these, is a gigantic figure of Vishnuo, asleep
on a kind of bed, with a huge snake wound about in many coils by
way of pillow for his head; and these figures, according to the
manner of this place, are all of one piece, hewn from the body of
the rock.

But though these works may be deemed stupendous, they are
surpassed by others that are to be seen at the distance of about a
mile, or a mile and an half, to the southward of the hill. They con-
sist of two Pagodas, of about thirty feet long by twenty feet wide,
and about as many in height, cut out of the solid rock, and each
consisting originally of one single stone. Near these also stand an
elephant full as big as life, and a lion much larger than the natural
size, but very well executed, each hewn also out of one stone.
None of the pieces that have fallen off in cutting these extraordi-
nary sculptures, are now to be found near or any where in the
neighbourhood of them, so that there is no means of ascertaining
the degree of labour and time that has been spent upon them, nor
the size of the rock or rocks from which they have been hewn, a cir-
cumstance which renders their appearance the more striking and
singular. And though their situation is very near the sea-beach, they
have not suffered at all by the corrosive air of that element, which
has provided them with a defence against itself, by throwing up before them a high bank, that completely shelters them. There is also great symmetry in their form; though that of the Pagodas is different from the style of architecture, according to which idol temples are now built in that country. The latter resembles the Egyptian; for the towers are always pyramidal, and the gates and roofs flat, and without arches; but these sculptures approach nearer to the Gothic taste, being surmounted by arched roofs or domes, that are not semicircular, but composed of two segments of circles meeting in a point at top. It is also observable that the lion in this group of sculptures, as well as that upon the stone couch above mentioned, are perfectly just representations of the true lion; and the natives there give them the name, which is always understood to mean a lion in the Hindoo language, to wit, Singh; but the figure, which they have made to represent that animal in their idol temples for centuries past, though it bears the same appellation, is a distorted monster, totally unlike the original; insomuch that it has from hence been supposed that the lion was not anciently known in this country, and that Singh was a name given to a monster that existed only in Hindoo romance. But it is plain that that animal was well known to the authors of these works, who, in manners as well as arts, seem to have differed much from the modern Hindoos.

There are two circumstances attending these monuments, which cannot but excite great curiosity, and on which future inquiries may possibly throw some light. One is, that, on one of the Pagodas last mentioned, there is an inscription of a single line, in a character at present unkown to the Hindoos. It resembles neither the Deva-nagre, nor any of the various characters connected with or derived from it, which have come to the writer's knowledge from any part of Hindostan. Nor did it, at the time he viewed it, appear to correspond with any character, Asiatic or European, that is commonly known. He had not then, however, seen the alphabet of the Basle, the learned language of the Siamese, a sight of which has since raised in his mind a suspicion, that there is a near affinity between them, if the character be not identically the same. But as these conjectures, after such a lapse of time, are somewhat vague, and the subject of them is perhaps
yet within the reach of our researches, it is to be hoped that some method may be fallen upon of procuring an exact copy of this inscription.

The other circumstance is, that though the outward form of the Pagodas is complete, the ultimate design of them has manifestly not been accomplished, but seems to have been defeated by some extraordinary convulsion of nature. For the western side of the most northerly one, is excavated to the depth of four or five feet; and a row of pillars left on the outside to support the roof; but here the work has been stopped, and an uniform rent of about four inches breadth has been made throughout the solid rock, and appears to extend to its foundations, which are probably at a prodigious depth below the surface of the ground. That this rent has happened since the work begun, or while it was carrying on, cannot be doubted; for the marks of the mason’s tools are perfectly visible in the excavated part on both sides of the rent, in such a manner as to show plainly that they have been divided by it. Nor is it reasonable to suppose that such a work would ever have been designed, or begun, upon a rock that had previously been rent in two.

Nothing less than an earthquake, and that a violent one, could apparently have produced such a fissure in the solid rock: and that this has been the case in point of fact, may be gathered from other circumstances, which it is necessary to mention in an account of this curious place.

The great rock above described is at some small distance from the sea, perhaps fifty or an hundred yards, and in that space the Hindoo village before mentioned stood in 1776. But close to the sea are the remains of a Pagoda, built of brick, and dedicated to Sih, the greatest part of which has evidently been swallowed up by that element; for the door of the innermost apartment, in which the idol is placed, and before which there are always two or three spacious courts surrounded with walls, is now washed by the waves; and the pillar used to discover the meridian at the time of founding the Pagoda is seen standing at some distance in the sea. In the neighbourhood of this building there are some detached rocks,

washed also by the waves, on which there appear sculptures, though now much worn and defaced. And the natives of the place declared to the writer of this account, that the more aged people among them remembered to have seen the tops of several Pagodas far out in the sea, which being covered with copper (probably gilt) were particularly visible at sun rise, as their shining surface used then to reflect the sun’s rays, but that now that effect was no longer produced, as the copper had since become incrusted with mould and verdegrease.

These circumstances look much like the effects of a sudden inundation; and the rent in the rock above described makes it reasonable to conjecture, that an earthquake may have caused the sea to overflow its boundaries, and that these two formidable enemies may have joined, to destroy this once magnificent city. The account which the Brahmins, natives of the place, gave of its origin and downfall, partly, it should seem, on the authority of the Mahabharat, and partly on that of later records, at the same time that it countenances this idea, contains some other curious particulars, which may seem to render it worthy of attention. Nor ought it to be rejected on account of that simulous garb, in which all nations, but especially those of the east, have always clad the events of early ages.

"Hirinâcheren (said they) was a gigantic prince, that rolled up the earth into a shapeless mass, and carried it down to the abyss, whither Vishnoo followed him in the shape of an hog, killed him with his tusks, and replaced the earth in its original situation. The younger brother of Hirinâcheren was Hirinakashap, who succeeded him in his kingdom, and refused to do homage to Vishnoo. He had a son named Pralhaud, who at an early age openly disapproved this part of his father’s conduct, being under the tuition of Sokerdâhrî. His father persecuted him on this account, banished him, and even sought to kill him, but was prevented by the interposition of heaven, which appeared on the side of Pralhaud. At length Hirinakashap was softened, and recalling his son to his court, where, as he sat in full assembly, he began again to argue with him against the supremacy of Vishnoo, boasted that he himself was lord of all the visible world,
and asked what Vishnou could pretend to more. Pralhand replied, that Vishnou had no fixed abode, but was present every where. Is he, said his father, in that pillar? Yes, returned Pralhand. Then let him come forth, said Hirinakassap; and, rising from his seat, struck the pillar with his foot; upon which Vishnou, in the Narasinghah Awtar, that is to say, with a body like a man, but an head like a lion, came out of the pillar, and tore Hirinakassap in pieces. Vishnou then fixed Pralhand on his father's throne; and his reign was a mild and virtuous one, and as such was a contrast to that of his father. He left a son named Namachee, who inherited his power and his virtues, and was the father of Balee, the founder of the once magnificent city of Mahabalipoor, the situation of which is said to be described in the following verse, taken from the Mahabharat.

गंगायाँ दक्षिणेभागे योजनानां शतद्वयं
पंक्योजन मात्रो पुरबार्बिन्त पञ्चिमे।

The sense of which is literally this:

"South of the Ganges two hundred Yojen
Five Yojen* westward from the eastern sea.

Such is the Brahmim account of the origin of this place. The sequel of its history, according to them, is as follows:

"The son of Balee was Bandacheren, who is represented as a giant with a thousand hands. Anuredh, the son of Krishen, came to his court in disguise, and seduced his daughter; which proceeded a war, in the course of which Anuredh was taken prisoner, and brought to Mahabalipoor; upon which Krishen came in person from his capital Durrikah, and laid siege to the place. Sh guarded the gates, and fought for Bandacheren, who worship-

* The Yojen is a measure often mentioned in the Sanscrit books, and, according to some accounts, is equal to nine, according to others twelve English miles. But at that rate the distance here mentioned, between this place and the Ganges, is prodigiously exaggerated, and will carry us far south of Ceylon. This, however, is not surprising in an Hindoo poem, but, from the second line it seems pretty clear, that this city, at the time this verse was composed, must have stood at a great distance from the sea.
"ped him, with his thousand hands; but Krishna found means to
overthrow Sth, and having taken the city, cut off all Bandchere's
hands, except two, with which he obliged him to do him homage.
He continued in subjection to Krishna till his death; after which
a long period ensued, in which no mention is any where made
of this place, till a prince arose, whose name was Malcheren, who
restored the kingdom to great splendour, and enlarged and beau-
tified the capital. But in his time the calamity is said to have
happened by which the city was entirely destroyed; and the
cause and manner of it have been wrapt up by the Brahmins in
the following fabulous narration. Malcheren, (say they,) in an
excursion which he made one day alone, and in disguise, came to
a garden in the environs of the city, where was a fountain so
inviting, that two celestial nymphs had come down to bathe there.
The Rajah became enamoured of one of them, who condescended
to allow of his attachment to her; and she and her sister nymph
used thenceforward to have frequent interviews with him in that
garden. On one of those occasions, they brought with them a
male inhabitant of the heavenly regions, to whom they intro-
duced the Rajah; and between him and Malcheren a strict
friendship ensued; in consequence of which he agreed, at the
Rajah's earnest request, to carry him in disguise to see the court
of the divine Inder, a favour never before granted to any mortal.
The Rajah returned from thence with new ideas of splendour and
magnificence, which he immediately adopted in regulating his
court, and his retinue, and in beautifying his seat of government.
By this means Mahabalipour became soon celebrated beyond all
the cities of the earth; and an account of its magnificence
having been brought to the gods assembled at the court of Inder,
their jealousy was so much excited at it, that they sent orders to
the God of the Sea to let loose his billows, and overflow a place
which impiously pretended to vie in splendour with their celestial
mansions. This command he obeyed, and the city was at once
overflowed by that furious element, nor has it ever since been able
to rear its head."

Such is the mode in which the Brahmins choose to account
for the signal overthrow of a place devoted to their wretched
superstitions.
It is not, however, improbable, that the rest of this history may contain, like the mythology of Greece and Rome, a great deal of real matter of fact, though enveloped in dark and figurative representations. Through the disguise of these we may discern some imperfect records of great events, and of revolutions that have happened in remote times; and they perhaps merit our attention the more, as it is not likely that any records of ancient Hindoo history exist but in this obscure and fantastic dress. Their poets seem to have been their only historians, as well as divines; and whatever they relate, is wrapped up in this burlesque garb, set off, by way of ornament, with circumstances hugely incredible and absurd, and all this without any date, and in no other order or method, than such as the poet's fancy suggested, and found most convenient. Nevertheless, by comparing names and grand events, recorded by them, with those interspersed in the histories of other nations, and by calling in the assistance of ancient monuments, coins, and inscriptions, as occasion shall offer, some probable conjectures, at least, if not important discoveries, may, it is hoped, be made on these interesting subjects. It is much to be regretted, that a blind zeal, attended with a total want of curiosity, in the Mohammedan governors of this country, have been so hostile to the preservation of Hindoo monuments and coins. But a spirit of inquiry among Europeans may yet perhaps be successful; and an instance, which relates to the place above described, though in itself a subject of regret, leaves room to hope that futurity may yet have in store some useful discoveries. The Kanzy of Madras, who had often occasion to go to a place in the neighbourhood of Mahabalipoor, assured the writer of this account, that within his remembrance a ryot of those parts had found, in plowing his ground, a pot of gold and silver coins, with characters on them which no one in those parts, Hindoo or Mohammedan, was able to decypher. He added, however, that all search for them would now be vain, for they had doubtless been long ago devoted to the crucible, as, in their original form, no one there thought them of any value.

The inscription on the Pagoda mentioned above, is an object which, in this point of view, appears to merit great attention. That the conjecture, however, which places it among the languages
of Siam, may not seem in itself chimerical, the following passages from some authors of repute are here inserted, to show, that the idea of a communication having formerly subsisted between that country and the coast of Choromandel, is by no means without foundation; nay, that there is some affinity, even at this day, between the Balic and some of the Hindoo languages: and that the same mode of worship seems formerly to have prevailed in the Deckan, which is now used by the Siamese.

MONSIEUR DE LA LOUBERE, in his excellent account of Siam, speaks thus of the origin of the Balic language.

"The Siamese, says he, do not mention any country where the Balic language, which is that of their laws and their religion, is at present in use. They suppose, indeed, on the report of some among them, who have been on the coast of Choromandel, that it bears some resemblance to some of the dialects of that country; but they at the same time allow, that the character in which it is written is not known but among themselves. The secular Missionaries settled at Siam believe that this language is not entirely a dead one; because they have seen in their hospital a man from the neighbourhood of Cape Comorin, who mixed several Balic words in his discourse, declaring that they were in use in his country, and that he himself had never studied, nor knew any other than his mother tongue. They at the same time mention, as matter of certainty, that the religion of the Siamese comes from those parts; as they have read in a Balic book that Sommonacodem, the idol of the Siamese, was the son of a King of Ceylon.*"

The language of the man mentioned in this passage, who came from the neighbourhood of Cape Comorin, could be no other than the Tamulic; but the words here alluded to may very possibly have been derivatives from the Sphanscrit, common to both that and the Balic.

* "Les Siamois ne nomment aucun Pays, ou la langue Bali qui est celle de leurs loix et de leur religion, soit auzjourd'hui en usage. Ils soupconnen a la verité, sur le rapport de quelques-uns d'entre eux, qui ont ete a la côte de Coromandel, que la langue Bali a quelque resemblance avec quelque un des dialects de ce pays la mais ils conviennent en même temps que les lettres de la langue Bali ne sont connues que chez eux. Les Missionnaires séculiers a Siam croient que cette langue n'est pas entierement morte; parce qu'ils ont vu dans leur hospital un homme des environs du Cap de Comorin, qui metoit plusieurs mots Balis dans son langage, assurant qu'ils etoien en usage en son pays, et que luy n'avoit jamais etudie, et ne savoir que sa langue maternelle. Ils donnent d'ailleurs pour certain que la religion des Siamois vient de ces quartiers là, parce qu'ils ont lu dans un livre Balic que Sommonacodem que les Siamois adorent, etoit fils d'un Roy de l'isle de Ceylon."
In another part of the same work, where the author treats of the history of Sommonacodom at large, on the authority of the Balic books, he says:

"The father of Sommonacodom, according to the same Balic "book, was a King of Teve Lanca, that is to say of the famous "Ceylone*."

Here it is observable, that, while the country of Siam seems to be utterly unknown, both to the natives of Ceylone and Hindostan, Ceylone, should nevertheless be so well known to the Siamese, and under the same appellation it bears in the Shanscrit. An epithet is also here prefixed to it, which seems to be the same as that used by the Hindoos in speaking of that island; for they also call it, in Shanscrit, Dève Lanca, or the Sacred Lanca. From several passages in the same work it also appears, that the Shanscrit word Mahâ, which signifies great, is constantly used in the Balic language in the same sense. And the names of the days of the week are most of them the same in Shanscrit and in Balic, as may be seen in the following comparison of them:

\[
\begin{array}{lll}
\text{Shanscrit.} & \text{Balic.} & \text{Day.} \\
\text{Aditta-vâr,} & \text{Van Athit,} & \text{Sunday.} \\
\text{Soma-vâr,} & \text{Van† Tchân,} & \text{Monday.} \\
\text{Mungolâ-vâr,} & \text{Van Angkaan,} & \text{Tuesday.} \\
\text{Bouta-vâr,} & \text{Van Pout,} & \text{Wednesday.} \\
\text{Brahspati-vâr,} & \text{Van Prahout,} & \text{Thursday.} \\
\text{Soucrâ-vâr,} & \text{Van Souc,} & \text{Friday.} \\
\text{Sânyâ-vâr,} & \text{Van Sâoa,} & \text{Saturday.} \\
\end{array}
\]

The same author gives, in another place, an account of a pretended print of a foot on a rock, which is an object of worship to the Siamese, and is called Prabât, or the venerable foot. For prâ, in Balic, he says, signifies venerable, which agrees with prâper and pramesht in Shanscrit; and bât in the same tongue is a foot, as pâd in Shanscrit. After which he goes on to say:

"We know that in the island of Ceylone, there is a pretended "print of a human foot, which has long been held in great venera-

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* * "Le pere de Sommonacodom etoit, selon ce mesme livre Bal, un Roy de Teve Lanca, cét a dire un Roy de la celebre Ceylan."
† Here one Hindoo word is substituted for another, for Tchân in Hindostany, and Tchander in Shanscrit, signify the moon as well as Soma.
tion. It represents, doubtless, the left foot; for the Siamese say "that Sommonacodom set his right foot on their Prabat, and his left "foot at Lanca".*

From KNOX'S History of Ceylon it appears, that the impres-
sion here spoken of is upon the hill called, by the Chingelays,
Hamalell; by Europeans, Adam's Peak; and that the natives
believe it to be the foot-step of their great idol Buddou; between
the worship of whom, as described by KNOX, and that of Som-
monacodom, as related by M. DE LA LOUBERE, there is a striking
resemblance in many particulars, which it may be proper here to
enumerate.

1st. Besides the foot-steps above mentioned, there is a kind
of tree (which, from description, appears to be the Pipel tree, so
well known in India) which the Chingelays hold sacred to Buddou,
and the Siamese to Sommonacodom; insomuch that the latter
deem it meritorious to hang themselves upon it. The Chingelays
call it Bogahah; for galah, in their language, signifies a tree; and
bo seems to be an abbreviation of Bod or Buddou; and the Siamese
call it, in Balic, Pra si Maka'Pout, which, according to DE LA
LOUBERE's interpretation, signifies the tree of the great Pout†.
This, he supposes to mean Mercury; for he observes that Pout,
or Poot, is the name of that planet in the Balic term for Wednes-
day; and in another place, he says, Pout is one of the names of
Sommonacodom. It is certain that Wednesday is called the name
of Bod, or Budd, in all the Hindoo languages, among which the
Tamulic, having no b, begins the word with a p, which brings it
very near the Balic mode of writing it. It is equally certain
that the days of the week, in all these languages, are called after
the planets in the same order as with us; and that Bod, Budd, or
Pood, holds the place of Mercury. From all which it should
appear that Pout, which, among the Siamese, is another name
for Sommonacodom, is itself a corruption of Buddou, who is the
Mercury of the Greeks. And it is singular that, according to M.
DE LA LOUBERE, the mother of Sommonacodom is called, in Balic,

* "On fait que dans l'isle de Ceylan, il y a un pretendu vestige de pied humain, que
"depuis long temps y est en grande veneration. Il represente sans doute le pie gauche, car
"les Siamois disent que Sommonacodom posa le pie droit a leur prabat, et le pie gauche a
"Lanca."

† In vulgar Siamese they call it Ton-pó.
Maha-mania, or the great Mania, which resembles much the name of Maia the mother of Mercury. At the same time that the Tamuliic termination en, which renders the word Ponden, creates a resemblance between this and the Woden of the Gothic nations, from which the same day of the week is denominated, and which, on that and other accounts, is allowed to be the Mercury of the Greeks.

2dly. The temples of Sommon Hodgam are called Pihân; and round them are habitations for the priests, resembling a college; so those of Buddou are called Vihâr, and the principal priests live in them as in a college. The word Vihâr, or, as the natives of Bengal would write it, Bithâr, is Shauscrit; and FERISITAH, in his History of Bengal, says, that this name was given by the Hindoos to the Province of Behâr, because it was formerly so full of Brahminus, as to be, as it were, one great seminary of Learning, as the word imports.

3dly. The Siamese have two orders of priests, and so have the worshippers of Buddou. Both the one and the other are distinguished by a yellow habit, and by another circumstance, which must be mentioned in the words of the respective authors. KNOX says of the Buddou Priests, "They have the honour of carrying the Talipot with the broad end over their heads foremost, which "none but the King does." And M. DE LA LOUBERE says of the Siamese priests, "To defend themselves from the sun they have "the Talapat, which is their little umbrella, in the form of a "screen.""

The word here used is common to most of the Hindoo languages, and signifies the leaf of the Palmyra tree. M. DE LA LOUBERE mentions it as a Siamese word, without seeming to know its origin or primary signification.

4thly. The priests of Buddou, as well as those of Sommon Hodgam, are bound to celibacy, as long as they continue in the profession; but both the one and the other are allowed to lay it down and marry.

5thly. They both eat flesh, but will not kill the animal.

* "Pour se garentir du soleil ils ont le Talapat, qui est leur petit parasol en forme d'écran."
6thly. The priests of either nation are of no particular tribe, but are chosen out of the body of the people.

These circumstances plainly show that this is a system of religion different from that of the Vēds; and some of them are totally inconsistent with the principles and practice of the Brahmins. And, indeed, it is manifest, from KNOX'S whole account, that the religion of the Chingelays is quite distinct from that which prevails at this day among the Hindoos, nor does it appear that there is such a race of men as that of the Brahmins among them. The only part in which there seems to be any agreement is in the worship of the Deblahs, which has probably crept in among them from their Tamulian neighbours; but that is carried on in a manner very different from the Brahminical system, and appears to be held by the nation at large in very great contempt, if not abhorrence. KNOX'S account of it is this: "Their temples (i.e. those of the Deblahs) are, he says, "called Covels," which is the Tamulic word for Pagoda. He then goes on to say, "A man piously disposed, builds a small house at his own charge, which is the temple, "and himself becomes priest thereof. This house is seldom called "God's House, but most usually Jacco, the Devil's." But of the prevailing religion he speaks in very different terms, and describes it as carried on with much parade and splendour, and attended with marks of great antiquity. "The pagodas, or temples of their gods, "says he, are so many that I cannot number them. Many of them "are of rare and exquisite work, built of hewn stone, engraven "with images and figures; but by whom, and when, I could not "attain to know, the inhabitants themselves being ignorant therein. "But sure I am, they were built by far more ingenious artificers "than the Chingelays that now are on the land. For the Portu-"guese, in their invasions, have defaced some of them, which there "is none found that hath skill enough to repair to this day." In "another place, he says, "Here are some ancient writings, engraven, "upon rocks, which puzzle all that see them. There are divers great "rocks in divers parts in Cande Uda, and in the northern parts. "These rocks are cut deep with great letters for the space of some "yards, so deep that they may last to the world's end. No body "can read them, or make any thing of them. I have asked Malas-"bars and Gentoos, as well as Chingelays and Moors, but none of
them understood them. There an ancient temple, Goddiladennf
in Yattanour, stands by a place where there are these
"letters." From all which the antiquity of the nation and
their religion is sufficiently evident; and from other passages it is
plain, that the worship of Buddon, in particular, has been from
remote times a very eminent part of that religion; for the same
author, speaking of the tree at Anurodghburro, in the northern part
of the island, which is sacred to Buddon, says, "The due per-
formance of this worship they reckon not a little meritorious;
insomuch that as they report, ninety Kings have reigned there
successively, where, by the ruins that still remain, it appears they
"spared not for pains and labour, to build temples and high
"monuments to the honour of this God, as if they had been born
"to hew rocks and great stones, and lay them up in heaps. These
"Kings are now happy spirits, having merited it by these labours."
And again he says, "For this God, above all other, they seem to
"have an high respect and devotion," &c.

And from other authorities it will appear, that this worship
has formerly been by no means confined to Ceylon, but has pre-
vailed in several parts of India prior to that of the Brahmins:
"nay, that this has been the case even so late as the ninth and
twelfth centuries of the Christian Era.

In the well-known Anciennes Relations, translated from the
Arabic, by that eminent orientalist Eusebius Renaudot, that the
Arabian traveller gives this account of the custom of dancing-
women, which continues to this day in the Deccan, but is not known
among the Hindoos of Bengal, or Hindostan proper.

"There are in India public women, called women of the idol,
"and the origin of this custom is this: when a woman has made
"a vow for the purpose of having children, if she brings into the
"world a pretty daughter, she carries it to Bod, (so they call the
"idol which they adore,) and leaves it with him."+

This is a pretty just account of this custom, as it prevails at

* Anciennes Relations des Indes et de la Chine, de deux Voyageurs Mahometans, qui y allèrent dans le neuvième Siecle. Paris 1718, &c.

+ "Il y a dans les Indes des femmes publiques, appelées, femmes de l'idole, l'origine de cette coutume est celle. Lors qu'une femme a fait un vœu pour avoir des enfants, si elle met au monde une belle fille, elle l'apporte au Bod, c'est ainsi qu'ils appellent l'idole qu'ils adorent, auprès duquel elle la laisse, &c. Anc. Rel. p. 109.
this day in the Decan; for children are, indeed, devoted to this profession by their parents, and when they grow up in it, they are called, in Tanulic, Devadasi, or female slaves of the idol. But it is evident they have changed their master since this Arabian account was written, for there is no idol of the name of Bod now worshipped there. And the circumstance of this custom being unknown in other parts of India, would lead one to suspect, that the Brahmins, on introducing their system of religion into that country, had thought fit to retain this part of the former worship, as being equally agreeable to themselves and their new disciples.

The same Arabian travellers give us an account of a very powerful race of Hindoo kings, according to them, indeed, the most powerful in India, who then reigned on the Malabar coast with the title of Balhdra. Their dominion appears to have extended over Guzerat, and the greatest part, if not the whole, of the ancient kingdom of Visnapoor. For the Arabian geographer quoted by M. RENAUDOT, makes Nahelvdrah the metropolis of these princes, which is, doubtless, Nahervalah, the ancient capital of Guzerat; though M. RENAUDOT seems not to have known that place; and the rest of the description sufficiently shows the great extent of their dominion southward. M. D'ANVILLE speaks of this race of kings on the authority of the Arabian geographer Edrisi, who wrote in the twelfth century, according to whom it appears, that their religion was, even so late as that period, not the Brahminical, but that of which we are now speaking. M. D'ANVILLE's words are these: “Edrisi acquaints us with the religion which this Prince professed in saying, that his worship was addressed to Bodda, who, according to St. Jerome and Clemens Alexandrinus, was the founder of the sect of the Gymnosophists, in like manner as the Brahmins were used to attribute their institution to Brahma*.”

The authority of Clemens Alexandrinus is also cited on the same subject by Relandus in his 11th Dissertation, where, treating of the language of Ceylone, he explains the word Vehdr, above spoken of, in these terms.

* "L'Edrisi nous instruit sur la religion que professe cette Prince, en disant que son culte a adoré à Bodda, que selon St. Jerome et St. Clement d'Alexandrie, avoit ete l'institute des Gymnosophistes comme les Brahmanes rapportaient à Brahma leur institut.” Ann. Geog. de L'Inde, p. 94.
"Vehâr signifies a temple of their principal God Buddou, who, as Clemens Alexandrinus has long ago observed, was worshipped as a God by the Hindoos."

After the above quotations, the following extract from the voyage of that inquisitive and ingenious traveller M. Gentil, published in 1779, is given as a further and very remarkable illustration of this subject.

"This system is also that of the Brahmins of our time; it forms the basis of that religion, which they have brought with them into the southern parts of the Peninsula of Hindostan, into Madura, Tanjore, and Maissore.

"There was then in those parts of India, and principally on the Coast of Choromandel and Ceylone, a sort of worship, the precepts of which we are quite unacquainted with. The God, Baouth, of whom at present they know no more in India than the name, was the object of this worship; but it is now totally abolished, except that there may possibly yet be found some families of Indians, who have remained faithful to Baouth, and do not acknowledge the religion of the Brahmins, and who are on that account separated from and despised by the other castes.

"I have not, indeed, heard that there are any such families in the neighbourhood of Pondichery; but there is a circumstance well worthy of remark, which none of the travellers that have treated of the Coast of Choromandel and Pondichery seem to have noticed. It is this, that at a short league's distance to the south of this town, in the plain of Virapatnam, and pretty near the river, we find a statue of granite very hard and beautiful. This statue, which is from three feet to three and a half in height, is sunk in the sand to the waist, and weighs doubtless many thousand weight; it is, as it were abandoned in the midst of this extensive plain. I cannot give a better idea of it, than by saying, that it exactly agrees with and resembles the Somnonacodom of the Siamese; its head is of the same form, it has the same features, its arms are in the same attitude, and its ears are exactly similar. The form of this divinity, which has certainly been

* "Vehâr, templum detrimenti Buddou \(\text{βοϊν}\) quem Indos ut Deum venerant quum ohin notavit Clemens Alexandrinus. Strom. lib. 1. p. 223. Rel. Diss. pars teria, p. 85."
made in the country, and which in no respect resembles the present idols of the Gentooos, struck me as I passed this plain. I made various inquiries concerning this singular figure, and the Tamuliens, one and all, assured me that this was the God Baouth, who was now no longer regarded, for that his worship and his festivals had been abolished ever since the Brahmins had made themselves masters of the people’s faith*.

M. GENTIL then goes on to say a good deal more upon this subject, in the course of which he supposes, that this Deity is the Fo of the Chinese, whose worship, by their own accounts, was brought from India. And, indeed, the abridgment of the name Pout, mentioned in a note of this paper, which the vulgar Siamese reduce to the single syllable Po, seems to countenance this opinion. But as this is foreign to our present purpose, and the above passage, it is hoped, are sufficient to establish what was proposed, it seems high time to take leave of this subject, with an apology for that proximity, which is inseparable from this kind of discussion.

17th June, 1784.

* Ce système est aussi celui des Brames de nos jours ; il fait la base de la religion qu’ils ont aportée dans le sud de la presqu’île de l’Indostan, le Madure, le Tampour, et le Mawsour,

"Il y a vingt ans dans ces parties de l’Inde, & principalement à la Côte de Coromandel & à Ceylan, un culte dont on ignore absolument les Dogmes, le Dieu Baouth, dont on ne connaît aujourd’hui, dans l’Inde, que le Nom, et l’objet de ce Culte, mais il est tout-à-fait aboli, si ce n’est qu’il se trouve encore quelques familles d’Indiens séparés & méprisées des autres Castes, qui sont restées fidèles à Baouth, & qui ne reconnaissent point la religion des Brames.

Je ne pari pas entendu dire qu’il y ait de ces familles aux environs de Pondichery, cependant, une chose très digne de remarque, & à laquelle aucun des Voyageurs qui parlent de la Côte de Coromandel & de Pondichery, n’ont fait attention, est que l’on trouve à une petite heure au sud de cette Ville, dans la plaine de V.ModelAdmin, assez près de la Rivière, une statue de Ganat très-dur & très-beau : cette statue, d’environ trois pieds à trois pieds & demi de hauteur, est enfoncée dans le sable jusqu’à la Cinture, & pese sans doute plusieurs Milleux ; elle est comme abandonnée au milieu de cette vaste plaine ; je ne peux mieux en donner une idée, qu’en disant qu’elle est exactement conforme & ressemblante à Nunnunacumadine des Siamois.

C’est la même forme de Tête, ce sont les mêmes traits dans le Visage, c’est la même attitude dans les Bras, & les Oreilles sont absolument semblables. La forme de cette divinité, qui a été fatale dans le pays, & qui ne ressemble en rien aux divinités actuelles des Siamois, m’avait frappé lorsque je passais dans cette plaine, je fis diverses informations sur cette figure singulière, les Tambouils n’assurèrent pas que c’était Baouth qu’ils ne regardent plus, que son Culte & ses fêtes étaient cessés depuis que les Brames s’étaient rendus les Maîtres de la Croyance du peuple,"
VI.

HINTS RELATIVE TO FRICTION IN MECHANICS.

By Mr. Reuben Burrow.

HYPOTHESIS.

In the following estimation of friction, the weight or force necessary to overcome the resistance, &c. is supposed to be proportional to the pressure.

OF FRICTION IN THE INCLINED PLANE.

Let \( AB \) be an inclined plane\(^*\), and let \( PR \) represent a weight sustained on it by any force \( Rm \), acting in the direction \( Rm \); and draw \( PD \) perpendicular to \( AB \), and let \( Rm \) meet \( PD \) in \( n \). Now as \( Rn \) represents the force that would be necessary to sustain the body, exclusive of friction, and \( Pn \) represents the pressure against the plane, if \( mt \) be drawn perpendicular to \( PD \) meeting it in \( t \), then will \( nm \) be the force necessary to overcome the friction in that direction, and \( Pt \) the real pressure against the plane \( AB \), when the whole force \( Rm \), necessary to overcome both the weight and the friction, acts in the direction \( Rm \); and as the force \( nm \) is equivalent to \( nt \) and \( tm \); and \( nt \) has no other effect than to alter the pressure, therefore \( tm \) is the only force which overcomes the resistance of friction; and as this force is as the pressure, therefore \( tm \) is proportional to \( Pt \), and hence the Locus of all the points \( m \), is a right line.

Again, suppose the body, instead of being drawn along, to be sustained at rest only upon the plane; this, it is evident, will require a less force than the other, because the friction prevents the body in part from descending\(^+\). Let \( Rm \) be the force required, and let the same construction be made as before; then because \( Rn \) is the force that would be necessary if there was no friction; \( mn \) is the effect of the friction itself; but \( mn' \) is equivalent to the

\(^*\) Fig. 1.

\(^+\) Fig. 2.
forces \( m \) and \( n \); and as \( Pn \) would be the pressure, exclusive of friction, \( Pt \) is the pressure inclusive; and as the force lost is as the friction, and \( m \) is as the force lost, therefore \( m \) is as \( Pt \), for the friction is as the pressure; consequently the Locus of all the points \( m \) is a right line passing through \( P \), and making the same angle as \( DPQ \) in the former case, and only differing by being drawn on the contrary side of \( PD \).

**SCHOLIUM.**

In what follows, the force requisite to sustain any body is considered under three different distinctions; first, when it is just barely sufficient to overcome the weight and resistance arising from friction, and the body is considered as just beginning to move in the direction of the force applied, and the force in this case is called the *moving force*: secondly, when this force is diminished till the body would begin to move or descend in a contrary direction, if the force was diminished farther; this last I called the *suspending force*; and it is plain that whatever force is applied to the body less than the moving, and greater than the suspending force, the body will remain at rest: lastly, it is manifest that there is an intermediate state in which such a degree of force may be applied, that the friction will have no effect either way; and this force is the same as would keep the body in equilibrio if there was no friction, because the effect or tendency of friction is to keep the body at rest, or prevent it from moving either way; this being premised, there will be little difficulty in the following.

**PROBLEM I.**

Having given the weight of the body to be sustained; the inclination of the plane and the ratio of the friction to the pressure; to find the force requisite to sustain the weight in a given direction.

In the foregoing figures, draw \( PR \) and \( PD \) at right angles to the horizon and plane respectively, \( PR \) representing the weight; take \( PD \) to \( DQ \) as the pressure to the friction, and let \( DQ \) be taken upwards or downwards as the requisite force is motive or suspensive; join \( PQ \) and draw the line \( Rm \) in the given direction meeting \( PQ \) in \( m \); then \( Rm \) is the force required.

**COROLLARY I.** If the friction be the \( n \) part of the pressure,
and \( W \) be the weight, \( s \) and \( c \) the sine and cosine of the plane's elevation, then the moving force parallel to the plane will be \( W \left( s + c : n \right) \) and the suspending force \( W \left( s - c : n \right) \).

**Corollary 2.** If the direction of the force be parallel to the horizon, and \( t \) be the tangent of the plane's elevation, then \( W \left( tn + 1 \right) : \left( n - t \right) \) will be the moving force, and \( W \left( tn - 1 \right) : \left( n + t \right) \) the suspending force, and \( Wt \) the force excluding friction.

**Example.** If the weight be a ton, the friction \( \frac{1}{3} \) of the pressure; \( AB = 5 \), \( BC = 3 \), and \( AC = 4 \), then the moving force will be 3235 pounds; the suspending force 747 pounds, and the force, excluding friction, 1680 pounds; nearly.

**Problem II.**

Given the weight of the body, the inclination of the plane, and the ratio of the friction to the pressure; to find the direction so that the sustaining force may be a given quantity, or the least possible.

Draw \( DQ \) and \( QP \) as before, and let \( PR \) be to \( Rm \) as the weight to the given force; then from the center \( R \) with a distance equal to \( Rm \), intersect \( PQ \) in \( m \); then \( Rm \) is the required direction when the force is given; but to have it the least possible, draw \( Rm \) at right angles to \( PQ \), then \( Rm \) is the direction required.

**Corollary 1.** An expression for the sustaining force, when the least possible, may be found as follows: In the triangles \( PDQ \), \( RQm \), the angle \( Q \) is common, therefore \( PQ : PD :: RQ : Rm \); but \( PD \) is a fourth proportional to \( AB \), \( AC \), and \( PR \), and \( DQ \) is to \( PD \) as \( 1 \) to \( n \), supposing this the given ratio; also \( RD \) is a fourth proportional to \( AB \), \( BC \), and \( PR \), consequently \( RQ \) is equal to \( DQ \) either added to, or subtracted from, \( DR \), as it is the first, or second case; and because \( PQ : PD :: \sqrt{nu + 1} : n :: RQ : Rm \), therefore \( Rm = PR \left( n \cdot BC + AC \right) : AB \sqrt{nu + 1} \) or \( nu + c \) \( W : \sqrt{nu + 1} \), by substituting \( s \) and \( c \) for the natural sine and cosine of the plane's elevation, and using the negative or affirmative sign as the force required, is the moving or suspending one respectively.

**Example.** If \( AB = 5 \), \( BC = 3 \), and \( AC = 4 \), and the weight
1 ton, then the least moving and sustaining forces will be 1825 and 702 pounds respectively.

Corollary 2. Because the triangles PDQ and RQm are similar, and the ratio of PD to DQ constant to each fixed value of n, therefore the angle QRm being equal to DPQ, will also be constant, whether the inclination of the plane be variable or not; and hence the angles of the direction with the plane for the draught to be made with the greatest advantage, are found for different values of n as follows:

<table>
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<tr>
<th>n</th>
<th>QRm</th>
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<tr>
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<td>2.4</td>
<td>23.38</td>
<td>3.4</td>
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<td>5.4</td>
<td>10.47</td>
<td>6.5</td>
<td>7.8</td>
</tr>
<tr>
<td>1\tfrac{1}{4}</td>
<td>33.41</td>
<td>2.4</td>
<td>21.48</td>
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<td>12.34</td>
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</tr>
<tr>
<td>1\tfrac{1}{2}</td>
<td>29.45</td>
<td>2.4</td>
<td>19.59</td>
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<td>5.4</td>
<td>9.52</td>
<td>6.5</td>
<td>6.20</td>
</tr>
</tbody>
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N. B. The direction, or angle QRm, is to be taken below the plane for the suspending, and above the plane for the moving, force.

Scholium. Though at first sight, the former part of the above problem, which shews the best method of applying an active force, seems superior to the other, yet, on further consideration, the other appears of equal consequence, and particularly in building and fastening walls, banks of earth and fortifications, &c. and the application of what are called land-ties, &c. Thus if a weight, for instance, is to be drawn along the plane RB, and the friction be \( \frac{1}{2} \) of the pressure, the best direction is when Rm makes an angle of 18° 26’ above the plane; but if the weight is a quantity of earth or stone, or any thing to be suspended, as in the case of land-ties, the best angle (on the foregoing supposition) must be 18° 26’ below the plane.

Scholium.

In those propositions the friction is estimated according to the most generally received opinion, that the resistance is proportional
to the whole pressure compounded of the weight of the body, and
the additional force necessary to overcome the friction; but it has
been asserted, that there may be cases where the friction is not
proportional to the whole pressure, but to that which would arise
if the body was sustained in a given direction, exclusive of friction;
and that there might also be cases, where the resistance arising
from tenacity or cohesion might be as the relative pressure against
the plane, and the force to overcome it the same in every direction;
something similar to a globe stuck fast in wet tenacious clay; I
shall therefore give solutions to both cases.

In the first case*, the force requisite to sustain the body in
direction RV, exclusive of friction, is \( R_n \); and as \( R_n \) is equivalent
to \( R_D \) and \( D_n \), therefore \( P_n \) is the pressure exclusive of friction:
and as the friction is the \( n \) part of the pressure, the force acting
parallel to \( A_B \) to overcome it, is the \( n \) part of \( P_n \); but the force
which acting in direction \( R_n \) will be equivalent to the \( n \) part of \( P_n \) in
the direction \( R_n \), is a fourth proportional to \( n \) times \( R_D, P_n, \) and
\( R_n \); but because \( D_Q \) is the \( n \) part of \( D_P \), therefore \( f_n \) is the \( n \) part
of \( P_n \), and the fourth proportional aforesaid will be \( n_z \); consequently
the sum or difference of \( R_n \) and \( n_z \) must be a given quantity or
the least possible: the problem therefore is reduced† to drawing
a line \( R_n \) from the given point \( R \), meeting the two lines \( P_D \) and \( P_Q \)
given in position in \( n \) and \( z \), so that \( n_z \) added to or taken from \( R_n \),
the sum or difference may be a given quantity, or the least pos-
sible. To do this, let \( D_S \) be taken equal to \( D_R \), and draw \( S_r \)
parallel to \( P_D \) meeting \( P_Q \) in \( M \); then because \( R_n \) is equal to \( R_n \),
the sum or difference of the quantities aforesaid is \( R_z \); and when
\( R_z \) is required to be a given quantity, the question is reduced to
that particular case of the inclinations of Appollonius, in solids,
which has been resolved by Newton and Barrow; the limits of the
Problem, or the mode of drawing the line \( R_r \), so that the intercept-
ed part \( R_z \) may be the least possible, may be investigated as
follows:

‡ Suppose it done, and \( R_{rz} \) the position required, and let \( R_{nm} \)
be indefinitely near to \( R_z \), and \( M_h \) perpendicular to \( R_z \); then by
applying the analysis of the ancients to the Newtonian doctrine of

* Fig. 3. † Fig. 4. ‡ Fig. 6.
prime and ultimate ratios, $mn$ is equal to $zr$; and if from the
centre $R$, with the distances $Rz$ and $Rn$, the arcs $zv$ and $nt$ be
supposed to be described, $vn$ is equal to $zt$, and consequently $tr$
equal to $mv$; but $rt : tn :: rh : Mh$, and $tn : zv :: Rr : Rz$, and $zv ::
Mh : hz$, whence by compounding the proportions, $tr : vmn ::
Rr$. $rh : Rz$. $zh$, and as the two first terms are equal, the two last
are equal, and consequently $Rr : Rz :: zh : rh$, and dividing $Rr : rz ::
zh : rz$, therefore $Rr$ is equal to $zh$, and consequently the point $h$ is in
an hyperbola, whose asymptotes are $QM$ and $SM$ produced: but
because the angle $MhR$ is a right angle, the point $h$ is also in the
circumference of a circle; therefore a line drawn from $K$ to $h$, the
point where the hyperbola and circle intersect, is the position
required.

In the other case, where the resistance arising from tenacity
or cohesion is supposed to be as the relative pressure against the
plane, and the force to overcome it the same in each direction, we
have $Rn$ for the sustaining force, exclusive of friction; and the
part of $Pn$ for the friction; and consequently the sum or dif-
ference of these is the expression for the whole force; and the
Problem may be thus constructed. Take $PD$ to $DQ$ as the pres-
sure to the friction, and join $PQ$; on $PD$ describe a circle, in which

• take $Dv$ equal to $DQ$; join $PV$, and draw $RV$ perpendicular to
it: then $RV$ will represent the direction and measure of the whole
force when it is the least possible.

For $DQ$ and $Dv$ are equal, and consequently $nf$ is equal to
$Vn$; but $DQ$ is the part of $DP$, therefore $nf$ or $Vn$ is the part
of $Pn$, and consequently $RV$ is equal to the sum or difference of
$Rn$, and the part of $Pn$; but $RV$ is the least possible by con-
struction, and therefore the other is a minimum also. For draw
any other line $Rk$ meeting $RV$ in $k$ and $PD$ in $m$; and draw
$mq$, $mt$, parallel to $DQ$ and $Dv$; then the sum or difference of
$Rm$ and $mt$ is equal to the sum or difference of $Rm$ and $mq$, but
the sum of difference of $Rm$ and $mt$ is greater than $RV$, and there-
fore the sum or difference of $Rn$ and the part of $Pn$ is the least
possible.

PROBLEM III.

Given the weight of the body, the inclination of the plane,
and the force sustaining the body in a given direction; to find the ratio of the friction to the pressure.

Take PR as before, (see Fig. 1. 2.) draw Rm in the given direction, and take PR to Rm as the weight of the body to the force sustaining it; draw Pm meeting AB in Q, and PD perpendicular to AB; then PD is to DQ as the pressure to the friction.

**PROBLEM IV.**

If AhqN be the segment of an equilateral triangle, which, by moving parallel to itself and the horizon, generates a solid, upon which a figure hmGEHKpqh moves, touching the former in hm and qp, required the effect of the friction; still supposing it the n part of the pressure.

Let P be the centre of gravity of half the body*, and PR its weight as before; then the body by means of its inflexibility is kept together in the same manner as if it was actuated by a force parallel to the horizon; but if PDn be perpendicular to Ah, and Rn parallel to the horizontal line AC, meeting PD in n, Pn will be the pressure against the side Ah, and the friction is the n part of Pn; but PR : Pn :: AC : AB; therefore if AC represent the weight of half the body, the n part of AB will express the weight requisite to overcome the friction for that half; and by doubling the expressions they serve for the whole. Wherefore let W represent the weight of the body, s the secant of the angle BAC; then IVs will be the pressure against the plane AD; and the n part of Ws the force necessary to overcome the friction; and as this last is the force necessary to draw the body along a horizontal plane, therefore the force necessary to draw the body along a horizontal plane is to that necessary to draw it along the body whose section is AhqN, as AC to AB or as 1 to s.

Because when the angle CAB is given, the ratio of PR to Pn is constant; therefore when the solid whose section is AhqN is elevated, making an angle with the horizon, so that its base forms an inclined plane; PR in that case represents the pressure in a normal direction to that plane, and Pn the pressure against the solid; and as the friction is increased in the ratio of the pressure, there-

* Fig. 7.
fore if the pressure which the body would have on the inclined plane be increased in the ratio of AC to AB, or radius to the secant of the angle CAB, then the pressure on the angular plane or body, whose perpendicular section is AbqN, will be had, and consequently its n part, or the friction. Hence this construction; let PR represent the weight; then PD at right angles to AB represents the pressure that the body would exert against the common inclined plane; take DK to DP as AB in the foregoing figure to AC, or as the secant of the inclination of the angular plane with its base to radius; let Dq be the n part of DK, and join Kq; then RM drawn any how to meet Kq in M, gives RM for the measure of the whole force in that direction; and it is the moving or suspending force according as Dq is taken upwards or downwards in the line AB.

It is evident that Kq is parallel to PQ, and therefore though the least force (which is perpendicular to Kq) differ from that in the former cases, yet the directions for having the greatest effect are still the same as in the foregoing table: the demonstration is in effect the same as the first.

Corollary. By supposing s to be the secant of the angle, that the sides of the angular plane make with the base, proceeding as Corollary 2d of Problem 1st, and putting $t$ for the natural tangent of the plane's inclination, and W for PR the weight, we have $W (tu + s): (u - t)$ for the moving; and $W (tu - s): (u + t)$ for the suspending force, necessary to draw the body along the angular inclined plane by a force acting parallel to the base of the plane.

Example. Let AB, BC, and AC, be 5, 3, and 4 respectively, and let the inclination of the sides be 45°; the weight of a ton and the friction one third of the pressure; then 3648 pounds is the moving, and 499 the suspending force.

Scholium.

In this proposition, those parts of the plane on which the body moves, are supposed rectilineal, as mostly happens in practice; but the friction is easily estimated in curvilinear surfaces, and may be found generally as follows:

* Fig. 5.  
† Fig. 8.
Let AMP* be half the section perpendicular to the horizon, and to the axis of the solid which forms the curvilinear plane on which the body is moved; AP the axis; PM the ordinate, and MS a tangent to the curve at the point M; also let RM represent the weight or pressure in a direction perpendicular to the horizon at the point M; and let RF be perpendicular to MS meeting MP in F; also let PN be taken equal to MR, and PQ equal to RF; and suppose the same construction to be made for every point of the curve, and let HN be the locus of all the points N, and GQ the locus of all the points Q; then will the friction, when drawn along the horizontal plane, be to the friction of the same body when drawn along the curvilinear plane in the same direction, as the area APNH to the area APQG.

For the friction on the horizontal plane being as the sum of the pressures, is as the sum of all the elementary lines MR or PN; that is, as the area AHNP; and the friction on the curvilinear plane is for the same reason as the sum of all the RF or PQ, namely, as the area APQG; hence the truth of the proposition is manifest.

**Corollary 1.** Because Mn or the fluxion of y is to Mn the fluxion of the curve, as MR or PN to RF or PQ, therefore if PM be a function of AP, PQ will be a fourth proportional to the fluxion of the ordinate, the fluxion of the curve AM, and this function; wherefore if the curves HN and AM be given; the nature of the curve GQ will be known, and its area may be found by the common methods of quadratures.

**Corollary 2.** It is evident that when the planes are inclined to the horizon, the frictions of the right and curvilinear planes are still in the same ratio as in the preceding cases, and consequently may be found by the same mode of proceeding.

**Corollary 3.** It is also evident, that the above method holds good whether the parts of the body are connected together or not, with respect to their motion in the direction RM, so long as each elementary part MR may be considered as sustained at the point M by a force parallel to MP; but when the body is rigid or

* Fig 9.
inflexible, the case becomes more simple, for MR is then constant, and APNH becomes a parallelogram.

Corollary 4. By supposing given properties to exist in any two of the curves AM, HN, or GQ, the nature of the third will be known; and hence a number of problems relative to friction may be proposed and resolved by a proper application of the direct and inverse methods of fluxions.

Proposition 5. Theorem.

In the application of forces to overcome friction, the same allowances must be made for the forces acting to advantage or disadvantage, by means of levers or other mechanical powers, as are made in the common doctrine; for instance, if a weight of two pounds, by acting, at the distance of one foot from the fulcrum of a lever, be sufficient to overcome the friction, then one pound at two feet distance will have the same effect, &c.

This is too evident to need a demonstration.

Of Friction in the Screw.

As any force acting perpendicular to the direction of a moving body does not affect the motion of the body in that direction, so the force acting perpendicular to the axis of the screw has no effect on the motion of a body raised thereby exclusive of friction; it therefore requires the same force to raise a body by means of a screw, as to raise the same body in equal time along an inclined plane of the same elevation, as the threads of the screw by means of a force acting parallel to the base of the inclined plane: now, if we suppose the weight so contracted or condensed as to be capable of being placed on one of the threads of the screw, and fastened to an imaginary lever always perpendicular to its axis, then it is evident, this lever will have no effect but to change the direction of the weight, and keep it in the midst of the thread of the screw; and if a force be applied at the weight always perpendicular to this lever, so as to sustain or draw it along, this force will be determined exactly the same as was done before in the inclined plane, but the rigidity of the parts of the "female screw" serves exactly the same purpose as this imaginary lever, and makes the weight act upon the threads like a body sustained
on an inclined plane by a force parallel to its base; and as the force to overcome both the weight and the friction is reciprocally as the distance from the centre of the axis, therefore the distance of the power from the centre of the axis, is to the distance from the same centre to the middle of the threads of the screw, as the force necessary to sustain the body on the inclined plane, to the same force in the screw at the distance of the power. The same proposition holds good whether the threads be cut perpendicular to the axis or in an angle; for in the first, the common plane is to be taken; and in the second, the inclined or angular one considered in the fourth proposition: Wherefore if \( d \) be the distance from the centre of the axis to the middle of the threads of the screw; \( D \) the distance of the same centre to the point where the force is applied, the force to overcome the weight and friction is \( Wd \left( \tan \theta + s \right) \): \( (n + t) \) \( D \), where the letters express the same things as before, and the upper sign is for the moving, and the lower for the suspending force. N.B. \( t \) is the natural tangent of the angle made by a line touching one of the threads, and a plane at right angles to the axis of the screw; or it is equal to the distance of the respective edges of two threads, divided by the circumference of the cylinder, out of which the screw is cut.

**Corollary 1.** When lines drawn from the centre of the axis of the screw to coincide with the threads, are at right angles to the axis, the above expression becomes \( Wd \left( \tan \theta + 1 \right) : (n + t) \) \( D \), for \( s \) becomes radius or unity.

**Corollary 2.** When \( n \) is equal to \( t \), the moving force will be infinite; also the suspending force will be nothing when \( t \) is the \( n \) part of \( s \); and when \( Wd \left( \tan \theta - s \right) : (n + t) \) \( D \), becomes negative, it expresses the quantity of force, which must act in a contrary direction to reduce the body just to a state of suspension.

**Scholium.**

It would be needless to make any allowance for the curvilinear surfaces of the threads of screws, as they seldom differ much from the two foregoing forms; neither is it of much consequence to allow for their parts being at different distances from the axis, as their breadth seldom bears any considerable ratio to the length
of the levers by which they act; but the case is different when large bodies revolve on each other, and therefore it will be necessary to shew the mode of proceeding in such cases.

*Let \( \text{MinAQ} \) be a convex solid, generated by the revolution of the curve \( \text{MAQ} \), about its axis perpendicular to the horizon; and \( \text{MRSQ} \) a concave body exactly fitting it; then if this last body be revolved about the axis \( \text{AP} \) by means of the lever \( \text{Pf} \), the force necessary to overcome the friction of one body turning upon the other may be found as follows: suppose the revolving body divided into an infinite number of concentric tubes, that may descend independent of each other, and press freely against the body on which they revolve, and yet be so connected that the lever \( \text{Pf} \), may give the same angular velocity at the same time to each; also let the ordinates \( \text{PN} \) of the curve \( \text{HN} \) represent the weight or pressure (in a direction perpendicular to the horizon) of each of the indefinitely small parts \( \text{Mk} \), or elementary lines of the body at the distance \( \text{PM} \) from the axis, and let \( c \) be the circumference of a circle whose radius is unity: then because the friction of each of the elementary tubes \( \text{MRSQ} \) is as its pressure, and the pressure is as the number of lines \( \text{Mk} \), and the pressure of each; therefore as this number is as \( \text{PM.Mn.c} \), we have the \( n \) part of this expression for the force which, acting at \( M \), would overcome the friction of the cylindrical tube, if moved round upon a horizontal plane; but as the pressure of each elementary part is increased in the ratio of \( \text{Mn} \) to \( \text{Mm} \), when moved on the solid \( \text{MAQ} \), the real force will be \( (\text{PM.c.Mm.PN}) : n \); also \( \text{Pf} : \text{PM} :: (\text{PM.c.Mm.PN}) : n \) to the small elementary force which will overcome the last force when acting at \( f \); consequently the whole force will be equal to the fluent of \( \text{PM}^2 \text{PN.Mm.c} \): \( (n.\text{Pf}) \).

**COROLLARY.** By means of the curves \( \text{AM, IIN} \), &c. conclusions may be drawn similar to those in the Corollaries to the Scholium of the fourth proposition.

**OF FRICTION IN THE LEVER.**

It has been already observed, that a force acting perpendicular to the direction of a body, in motion, does not alter the body's motion in that direction; therefore if \( \dagger \) we suppose \( \text{DB} \) to be an
HINTS RELATIVE TO

upright cylinder, and $AB$ a body touching it in a line as in the figure, and retained close to it by an imaginary force, drawing it perpendicular towards the axis; then if a force $CP$ be applied to $C$, the centre of gravity of $AB$, and be always supposed to act perpendicularly to the radius $CN$, drawn from the centre of the axis to the point $C$, the friction will be the same in drawing the body round the cylinder, as in drawing it along a horizontal plane with an equal pressure; and if it be moved round by a force acting at a greater distance, the force will be reciprocally as the distance: on the contrary, if the body $AB$ be fixed, and the cylinder turned round about its axis, the friction will be the same as if the cylinder was fixed, and the body drawn round it by $CP$, as before: Likewise the friction is the same whether the cylinder be fixed, and the body $AB$ moved round the axis $MR$ by a force $Qc$ applied at $c$, or whether the point $c$ be fixed with $AB$ fastened to $CQ$, and the cylinder be revolved in a circle, whose centre is $c$, so as always to retain its parallelism with respect to any fixed object; and as this last case obtains in the axletrees of carriages, since every point of the wheel's contact with the ground may be considered as the centre of motion for that instant, therefore the effect of the resistance arising from the friction of the concave part of the nave upon the axletree, is to the effect that would arise from drawing the same weight over a horizontal plane of the same kind as the parts that rub each other, as the radius of the axis to the radius of the wheel. It must be observed, that this is not the only friction to which carriages are subject, for there is another part, arising from the cohesion of the wheel and the ground at their contact, which is to be found and allowed for by the three first Propositions.

In the above, the pressure and friction have been supposed to be as the weight, as it is on a horizontal plane; but by the Scholium to the fourth Proposition, it is plain that the pressure is greater than the weight, and may be so in any proportion; however, as it appears by calculation, that the pressure on an arc of ninety degrees is to that on its chord, only as $1.183$ to $1$, when both the concave and convex parts have exactly the same curvature, the difference will be so trifling, when the cylinders have different curvatures as usual, as to require very seldom to be allowed for.
This being premised, let $M^*$ be a weight placed at the point $A$ of a lever, moveable about an axis whose centre is $d$ and radius $dn$; and let $N$ be the sustaining force acting at $B$: now it is evident that the pressure on the axis $d$ differs so little from the weight, that it may be safely taken for it without any considerable error, except in some remarkable cases, which may be allowed for from what has been said already; and therefore the friction which ought in strictness to be taken as the $n$ part of the pressure, will here be taken as the $n$ part of the weight upon the axis. Now if $N$ be taken for the force which, acting at $B$, would be just sufficient to keep the weight $M$ at $A$ in equilibrio, exclusive of friction, and if $W$ be the additional force to be added to $N$ so as to overcome the friction, then will $M + P$, $M - P$, and $P - M$, be the weight upon the axis at $d$ in the first, second, and third figures respectively, (supposing the sum of $M$ and $N$ to be equal to $P$;) now as the friction is the $n$ part of each of these quantities, and its effect is to keep the lever in a state of rest, therefore in whatever direction the force at $N$ endeavours to draw the lever by acting at $B$, the friction tends to counteract that force by keeping the lever steady, or acting in a contrary direction at $n$; and as the effect of the friction, and the additional force $W$, are in equilibrio, and the friction acts by means of the lever $dn$, and the force $W$ by the lever $dB$; therefore $Bd_{\text{is}}$ to $dn$ as the sum or difference of the $n$ part of $N + W$ and $M$ is to $W$; consequently $W = dn (M + N): (n.Bd - dn,)$ in the first figure; $W = dn (M - N): (n.Bd + dn)$, in the second figure; and in the third figure, $W = dn (N - M): (n.Bd - dn)$: all these are the expressions for the moving forces.

To find the suspending forces, or the forces which acting at $N$, shall be just sufficient to prevent the weight $M$ from descending: let $M$ and $N$ be the same as before, and let $w$ be the force which, taken from $N$, will leave a force just sufficient to prevent $M$ from descending; then the weight upon $d$ in the first figure will be $M + N - w$; in the second figure, the weight will be $M - N + w$; and in the third figure, $N - M - w$; and by proceeding as before, the values of $w$ in the suspending forces are $dn (M - N): (n.Bd + dn)$; $dn (M - N): (n.Bd - dn)$, and $dn (N - M): (n.Bd + dn)$, in the first, second, and third figures, respectively.

* Fig. 12, 13, 14.
Because \( Bd : dA : : M : N \), therefore if this value of \( N \) be substituted in each of the above expressions for the friction, the whole force capable of sustaining the friction and weight \( M \) will be had: thus for example, the moving force to overcome the friction and weight \( M \) in the first figure, will be \( M(n.dA + du) : (n.Bd - du,) \) and the suspending force \( M(n.dA - du) : (n.Bd + du ;) \) in the second figure, the moving force will be \( M(n.dA + du) : (n.Bd + du,) \) and the suspending force \( M(n.dA - du) : (n.Bd - du ;) \) and in the third figure, the moving force will be \( M(n.dA - du) : (n.Bd - du,) \) and the suspending force will be \( M(n.dA + du) : (n.Bd + du,) \).

The method of finding \( u \) from each of the above equations is evident, and consequently the ratio of the friction to the pressure by experiments.

OF FRICTION IN THE WEDGE.

Let \( AC^* \) be the force necessary to sustain the wedge QPB in the direction AB perpendicular to QP, friction included; and let AB be the force exclusive of friction: draw AN and AH perpendicular to the BQ and BP; CG parallel to AN, and CF parallel to AIH: Now GA and AF, the forces of the wood against the sides of the wedge, in those directions, compound a force equivalent to the diagonal CA in the direction CA, and therefore a force represented by \( AC^* \) in that direction, must be applied to the head of the wedge at \( a \) to overcome these forces: Let \( gr \) be the \( n \) part of Ag, and let the lines Ar be drawn, and also GK and FZ perpendicular to AG and AF meeting the lines Ar in K and Z; then will GK and FZ represent the friction against the sides BP and BQ, being each the \( n \) part of AG and AF, the pressure against each side, respectively; wherefore if Be be taken in PB, and Bn in BQ equal to GK and FZ respectively, the forces Be and Bn in those directions must compound a force to which the force BC in the direction BC must be equivalent; and consequently if Bm be the force compounded of Be and Bn, and Cm be joined, Cm must be perpendicular to mB; since Be or GK is the force of friction arising from the pressure against BP, which tends to prevent the wedge from moving either in the direction BP or PB; and Bn or FZ has a similar effect with respect to the direction in the line BQ; and by hy-

* Fig. 15.
pothesis BC is just sufficient to balance these forces. It is also evident from what was said concerning the inclined plane, that Be and Bn must be taken in the directions PB and QB for the moving force, but in the directions BP and BQ for the suspending force.

The method of calculation is evident; for as aB, AG, and AF, are perpendicular to QP, BP, and BQ, the triangles QPB and CAG are similar, and the parallelogram Bmne similar to FAGC; whence by supposing certain parts given, the rest may be found, &c.

**Corollary.** When the wedge is isosceles the point m falls on C, and Be is equal to Bn, and therefore Be or GK is equal to (AB + BC)PB: (n.QP); but PB: Ba:: 2Be:: BC, and therefore BC = 2Ba (AB + BC): (n.QP) or equal to (2Ba.BA): (n. QP—2Ba,) and therefore AC = (n.QP.BA): (n. QP—2Ba,); and by following the same method for the suspending force, we find BC = (2Ba.AB): (n.QP + 2Ba,) and consequently AC is equal to (n.QP.BA): (n. QP + 2Ba.)

**Scholium.**

By proceeding in a similar method, the forces of the archstones of bridges, &c. may be determined; for let QbbP be a stone sustained by the parts of the arch pressing against Pb, and Qb, and let A be its centre of gravity, and AB perpendicular to the horizon; also let AB and AC be the same as before; then because the body is in equilibrio, the force in direction AC will be equivalent to the force in a contrary direction, arising from the pressures against the body in the directions GA and KA, together with the force of friction; and because the pressures are AG and AK, if Be (the part of AG) be drawn parallel to PB, and Bn (the part of AK) be drawn parallel to Qb; and the parallelogram Bmne be complicated, and Cm joined; Bm will be the force arising from friction, and the angle BmC a right angle. The adjacent figure* is for the moving force; but the method is similar for the suspensive force; and it is evident that the one construction is of use to determine the force which tends to break an arch by pressing it downwards, and the other the force that tends to break it upwards.

But as that excellent mathematician P. Frisi, in his *Institutioni di Meccanica,* has objected to the division of the force AB

* Fig. 16.
in the forces AN and AH, and thence concluded BELIDOR and COUPELT to have been mistaken on that account in their writings upon bridges; I shall, therefore, prove that the common method is really a consequence of what that gentleman himself allows, and that his objections are not well founded. In the first place he allows the force AB to be equivalent to the forces AV and AD or VB; now (excluding friction) if that part of the arch which touches Pb was removed, it is evident QbbP would immediately begin to descend along Qb with a force represented by VB or AD; but this descent is prevented by that part of the arch which touches Pb, and therefore the force of that arch, in the direction HA, must be such as to be equivalent to DA in the direction DA or BV; but no force greater or less than HA will be equivalent to DA in the direction DA, and therefore HA is the real pressure or force against Pb. Again, HD is the pressure in a perpendicular direction to Qb arising from this force; and as AV is the pressure against Qb arising from the force AB, therefore AV, together with HD, is the whole pressure against Qb in the direction AV; but because the body is in equilibrio, and consequently the action or force in the direction AV equal to the reaction in a contrary direction; therefore AV + HD or AN (because NV is equal to HD by the property of the parallelogram) represents the pressure against Qb, and AH the pressure against Pb; which is contrary to what P. FRISI asserts, and agreeable to the usual method.

The same learned author has made another very material mistake, from a similar cause, at page 67 of the aforesaid Treatise, relative to the tension of ropes; which cannot be attributed to haste or inadvertency, as he expressly asserts the holders of the common opinion to be mistaken, in consequence of their using the theory of composition of forces without sufficient precaution: I shall, therefore, after giving his own words, take the liberty of shewing where I apprehend he is mistaken.

"Parleremo più a lungo delle altre recerche matematiche, alle quali ha dato occasione la controversia insorta intorno alla cupola di S Pietro. Coll' occasione che si è discorso in Milano di munire la fabbrica del Duomo di un Conduttore elettrico, che dalla cima
dell'aguglia si dirimasse, e scendesse per differenti parti del tempio, si è ancora parlato dell'azione, che i fili del Conduttore potrebbero esercitare contro l'aguglia, e si sono proposti vari Problemi intorno alle tensioni delle funi. Io qui aggiungerò le soluzioni, che ho ritrovato, e incommincierò dalla prima risoluzione delle forze tendenti, la quale siccome è interamente differente da quella, che hanno seguito altri Autori, così non sarà meraviglia che porti dei risultati interamente differenti da quelli che sono stati sinora pubblicati.

Penda il filo QVR, dai punti Q, ed R, e vi si attacchi in V il peso P, si produca la verticale PV in A; si esprimà il peso P colla retta AV, e dal punto A; si tirino sopra QV, RV le perpendicolari AM, AN. Sara MV l'intera forza esercitata secondo QV, ed NV sarà quella che si eserciterà secondo RV.

"La stessa cosa si dedurrebbe risolvendo la forza AV nelle due Aq, Ar parallele ai fili QV, RV, e poi risolvendo di nuovo la forza Aq nelle due AN, Nq, e similmente la Ar in due altre AM, Mr. Mentre queste risoluzioni è manifesto che la forza totale esercitata nel tendere il filo QV dev'essere Aq—Mr = rV—Mr = MV, e la tensione del filo RV = Vq—Nq = NV.

"S'ingannerebbe chi misurasse separatamente la tensione del filo QV dalla forza Aq, ossia rV e la tensione di RV da Ar, oppure da qV. Egli è vero, che le due tensioni equivalgono insieme, come alla sola forza AN, così ancora alle due Ar, Aq, oppure alle quattro insieme AN, Nq, AM, Mr. ma nel prendere le tensioni separate bisogna in oltre avvertire, che quando l'angolo QVR non è retto, una porzione di Aq agisce secondo RV, ed una porzione di Ar secondo QV: e separando le azioni sara MV, la tensione del filo QV, ed NV quella di RV."

In the first place, I shall demonstrate the truth of the established method from principles that FRISt has himself allowed; and, secondly, point out the absurdity of his conclusions.

1. Let Vn and Sr be parallel to AN; then because NVn is a right angle, and the force VA may be resolved into VN and Vn, in those directions, therefore if RV and VP were to remain in the same position, and the force which now keeps the body suspended by acting in the direction VQ, was to act in the direction Vn with a force expressed by Vn; it is then granted that the

* Fig 17.
equilibrium would still be maintained, and the tensions would be as \( Vn \) and \( VN \); and therefore, as no force \( VS \) whatever, acting at \( V \) in the direction \( RV \), can have any effect in the direction \( Vn \) perpendicular to \( RV \), it necessarily follows, that the force in any other direction \( VQ \) must be such as to be equivalent to \( Vn \) in the direction \( Vn \); but it is likewise granted, that no other force but \( Vr \) in the direction \( VQ \) can be equivalent to \( Vn \) in the direction \( Vn \); and as the force \( Vr \) is equivalent to \( Vn \) and \( VS \); and as \( VS \), or its equal \( qN \), only gives an additional tension to \( NV \), the tension which the cord \( RV \) was supposed to have before, which whole tension is equal to the reaction of the tack \( R \); therefore \( qV \) is the tension of the cord \( RV \), and \( Vr \) that of \( Qv \).

2. Let the points \( Q \) and \( R \), coincide, and \( RV \), \( QV \), and \( VP \), will then be perpendicular to the horizon; and if \( VQ \) or \( VR \) be assumed to express the weight \( P \), then will the points \( A, R, Q, M \), and \( N \) coincide; and according to Frisi's principle, the tensions of \( RV, VQ, \) and \( VP \), will be equal; but, from the well known principle of the pulley, each cord \( VQ \) and \( VR \) bears but half the weight \( P \), and therefore this absurdity follows, that a cord is as much stretched with half the weight as it would with the whole.

Again, if the points \( R, V, \) and \( Q \), be supposed horizontal, it follows, from the common theory, that the tension of the rope \( RVQ \) would be infinite; but \( VN \) and \( VM \) vanish when \( RVQ \) is horizontal, and therefore, by Frisi's principle, the tension in that case would be nothing at all; but it is well known from the most common experiments to be very considerable, even when \( RQV \) is but nearly horizontal; and therefore the new theory of this great mathematician is indefensible.

REMARK. All the foregoing, except the last Scholium, was written in 1775, before the author had seen any thing to speak of on the subject; he had designed and executed great part of an extensive treatise on friction according to different hypotheses; but as no body would be at the risk of publishing it, and he could not afford it himself, the most of it was accidentally lost. What is here given is an extract only of some of the first part, where velocity was not taken into the account, and where there were no complicated algebraic or fluxional expressions, which would be difficult to print in this country.
TO THE HONOURABLE

SIR WILLIAM JONES,

PRESIDENT OF THE ASIATIC SOCIETY.

SIR,

I HAVE the honour to obey the orders of the Honourable the Governor General and Council, in transmitting to you, for the information of the Asiatic Society, an Extract of a Letter addressed to the Governor General, on the 2d of last month, by Lieutenant SAMUEL TURNER, who was appointed on an embassy to Tibet, and a Copy of an Account inclosed in it, of Mr. Turner’s interview with TEBHOO LAMA, at the Monastery of Terpaling.

I have the Honour to be, with great respect,

SIR,

Your most obedient and most humble Servant,

E. Hay, Secretary.

COUNCIL CHAMBER,

Political Department, April 13, 1784.
[ 170 ]

EXTRACT OF A LETTER FROM MR. SAMUEL TURNER

TO THE HONOURABLE THE GOVERNOR GENERAL,

DATED PATNA, 2d March, 1784.

DURING my residence in Tibet, it was an object I had much at heart, to obtain an interview of the infant TEESHOO LAMA; but the Emperor of China's general orders, restricting his guardians to keep him in the strictest privacy, and prohibiting indiscriminately the admission of all persons to his presence, even his votaries, who should come from a distance, appeared to me an obstacle almost insurmountable; yet, however, the Rajah, mindful of the amity subsisting between the Governor and him, and unwilling, I believe, by any act to hazard its interruption, at length consented to grant me that indulgence. As the meeting was attended with very singular and striking circumstances, I could not help noting them with most particular attention; and though the repetition of such facts, interwoven and blended as they are with superstition, may expose me to the imputation of extravagance and exaggeration, yet I should think myself reprehensible to suppress them; and while I divest myself of all prejudice, and assume the part of a faithful narrator, I hope, however tedious the detail I propose to enter into may be found, it will be received with candour, and merit the attention of those for whose perusal and information it is intended, were it only to mark a strong feature in the national character of implicit homage to the great religious sovereign, and to instance the very uncommon, I may say almost unheard of, effects of early tuition.

I shall, perhaps, be still more justified in making this relation, by attending to that very extraordinary assurance the Rajah of Teeshoo Loomboo made me but a few days before my departure from his court, which, without further introduction, I will beg leave literally to recite.

At an interview he allowed me, after having given me my audience of leave, he said, "I had yesterday a vision of our tutelary deity, and to me it was a day replete with much interesting and
"important matter. This guardian power, who inspires us with his "illuminations on every momentous and great occasion, indulged "me with a divination, from which I have collected that every thing "will be well; set your heart at rest, for though a separation is "about to take place between us, yet our friendship will not cease "to exist: but, through the favour of interposing Providence, "you may rest assured it will increase, and terminate eventually "in that which will be for the best."

I should have paid less regard to so strange an observation, but for this reason, that, however dissonant from other doctrines their positions may be found, yet I judge they are the best foundation to build our reliances upon, and superstition combining with inclination to implant such friendly sentiments in their minds, will ever constitute, the opinion having once obtained, the strongest barrier to their preservation. Opposed to the prejudices of a people, no plan can reasonably be expected to take place: agreeing with them, success must be the result.

E. HAY, Secretary to the Governor General and Council. A true Extract.
VII.

COPY of an Account given by Mr. TURNER, of his INTERVIEW with TEE SHOO LAMA

At the Monastery of Terpaling, enclosed in Mr. TURNER's Letter to the Honourable the Governor General, dated Patna, 2d March, 1784.

On the 3d of December, 1783, I arrived at Terpaling, situated on the summit of a high hill; and it was about noon when I entered the gates of the Monastery, which was not long since erected for the reception and education of TEE SHOO LAMA. He resides in a palace in the centre of the Monastery, which occupies about a mile of ground in circumference, and the whole is encompassed by a wall. The several buildings serve for the accommodation of three hundred Gylongs, appointed to perform religious service with TEE SHOO LAMA, until he shall be removed to the Monastery and Musnud of TEE SHOO LOOMBOO. It is unusual to make visits either here or in Bootan on the day of arrival; we therefore rested this day, only receiving and sending messages of compliment.

On the 4th, in the morning, I was allowed to visit TEE SHOO LAMA, and found him placed in great form upon his Musnud; on the left side stood his father and mother, on the other the officer particularly appointed to wait upon his person. The Musnud is a fabric of silk cushions piled one upon the other, until the seat is elevated to the height of four feet from the floor; an embroidered silk covered the top, and the sides were decorated with pieces of silk of various colours, suspended from the upper edge, and hanging down. By the particular request of TEE SHOO LAMA's father, Mr. S. UNDERS and myself wore the English dress.

I advanced, and, as is the custom, presented a white pelong handkerchief; and delivered also into the Lama's hands the Governor's present of a string of pearls and coral, while the other things were set down before him. Having performed the ceremony of the exchange of handkerchiefs with his father and mother, we took our seats on the right of TEE SHOO LAMA.
AN ACCOUNT OF AN INTERVIEW.

A multitude of persons, all those ordered to escort me, were admitted to his presence, and allowed to make their prostrations. The infant LAMA turned towards them, and received them all with a cheerful and significant look of complacency. His father then addressed me in the Tibet language, which was explained to me by the interpreter, that TEESHOO LAMA had been used to remain at rest until this time of the day; but he had awoke very early this morning, and could not be prevailed upon to remain longer in bed; for, added he, "the English Gentlemen were arrived, and he could not sleep." During the time we were in the room, I observed the LAMA’s eyes were scarce ever turned from us, and when our cups were empty of tea, he appeared uneasy, and throwing back his head, and contracting the skin of his brow, he kept making a noise, for he could not speak, until they were filled again. He took out of a golden cup, containing confects, some burnt sugar, and stretching out his arm, made a motion to his attendants to give them to me. He then sent some in like manner to Mr. SAUNDERS, who was with me. I found myself, though visiting an infant, under the necessity of saying something, for it was hinted to me, that, notwithstanding he is unable to reply, it is not to be inferred that he cannot understand. However, his incapacity of answering excused me many words; and I just briefly said, That the Governor General, on receiving the news of his decease in China, was overwhelmed with grief and sorrow, and continued to lament his absence from the world, until the cloud that had overcast the happiness of this nation, by his re-appearance, was dispelled; and then, if possible, a greater degree of joy had taken place than he had experienced of grief on receiving the first mournful news. The Governor wished he might long continue to illumine the world with his presence; and was hopeful that the friendship which had formerly subsisted between them would not be diminished, but rather that it might become still greater than before; and that, by his continuing to shew kindness to my countrymen, there might be an extensive communication between his votaries and the dependants of the British nation. The little creature turned, looking steadfastly towards me with the appearance of much attention while I spoke, and nodded with repeated, but slow movements of the head, as though he understood and approved every
word, but could not utter a reply. The parents, who stood by all the time, eyed their son with a look of affection, and a smile expressive of heartfelt joy at the propriety of the young Lama's conduct. His whole regard was turned to us; he was silent and sedate, never once looking towards his parents, as if under their influence at the time; and with whatever pains his manners may have been formed so correct, yet I must own his behaviour on this occasion appeared perfectly natural and spontaneous, and not directed by any action or sign of authority.

The scene in which I was here brought to take a part was too new and extraordinary, however trivial, if not absurd, as it may appear to some, not to claim from me great attention, and consequently minute remark.

Teeshoo Lama is at this time about 18 months of age. He did not speak a word, but made most expressive signs, and conducted himself with astonishing dignity and decorum. His complexion is of that hue which in England we should term rather brown, but not without colour. His features good, small black eyes, an animated expression of countenance; and altogether I thought him one of the handsomest children I had ever seen. I had but little conversation with the father. He told me he had directions to entertain me three days on account of Teeshoo Lama; and entreated me with so much earnestness to pass another on his own account, that I could not resist complying with his request. He then invited us for to-morrow to an entertainment he proposed to make at a small distance from the Monastery, which invitation having accepted, we took our leave and retired.

In the course of the afternoon I was visited by two officers of the Lama's household, both of whom are immediately attendant on his person. They sat and conversed with me some time, enquired after Mr. Bogle, whom both of them had seen; and then remarking how extremely fortunate it was the young Lama's having regarded us with very particular notice, observed on the very strong partiality of the former Teeshoo Lama for the English, and that the present one often tried to utter the name of the English. I encouraged the thought, hopeful that they would teach the prejudice to strengthen with his increasing age; and they assured me
that should he, when he begins to speak, have forgot, they would early teach him to repeat the name of Hastings.

On the morning of the 6th, I again waited on Teeshoo Lama, to present some curiosities I had brought for him from Bengal. He was very much struck with a small clock, and had it held to him, watching for a long time the revolutions of the moment hand; he admired it, but with gravity, and without any childish emotion. There was nothing in the ceremony different from the first day's visit. The father and mother were present. I staid about half an hour, and retired, to return and take leave in the afternoon.

The votaries of Teeshoo Lama already begin to flock in numbers to pay their adorations to him. Few are yet admitted to his presence. Those who come esteem it a happiness if he is but shewn to them from the window, and they are able to make their prostrations before he is removed. There came to day a party of Kilmaaks (Calmuc Tartars) for purposes of devotion, and to make their offerings to the Lama. When I returned from visiting him, I saw them standing at the entrance of the square in front of the palace, each with his cap off, his hands being placed together elevated, and held even with his face. They remained upwards of half an hour in this attitude, their eyes fixed upon the apartment of the Lama, and anxiety very visibly depicted in their countenances. At length, I imagine, he appeared to them; for they began altogether by lifting their hands, still closed, above their heads, then bringing them even with their faces, and after lowering them to their breasts, then separating them: to assist them in sinking and rising, they dropt upon their knees, and struck their heads against the ground. This with the same motions was repeated nine times. They afterwards advanced to deliver their presents, consisting of talents of gold and silver, with the products of their country, to the proper officer, who having received them, they retired apparently with much satisfaction.

Upon enquiry, I learnt that offerings made in this manner are by no means unfrequent, and in reality constitute one of the most copious sources from which the Lamas of Tibet derive their wealth.

No one thinks himself degraded by performing these humiliations. The persons I allude to, who came for this devout purpose,
were attendant on a man of superior rank, that seemed to be more engrossed than the rest in the performance of the ceremony. He wore a rich satin garment, lined with fox skins; and a cap with a tossel of scarlet silk flowing from the centre of the crown upon the sides all round, and edged with a broad band of Siberian fur.

According to appointment, I went in the afternoon to make my last visit to Teeshoo Lama. I received his dispatches for the Governor General, and from his parents two pieces of satin for the Governor, with many complements.

They presented me with a vest, lined with lambskins, making many assurances of a long remembrance, and observing that at this time Teeshoo Lama is an infant, and incapable of conversing, but they hoped to see me again when he shall have become of age. I replied, that, by favour of the Lama, I might again visit this country: I looked forward with anxiety to the time when he should mount the Musnud, and should then be extremely happy in the opportunity of paying my respects. After some expressions and protestations of mutual regard, my visit was concluded: I received the handkerchiefs, and took my leave: and am to pursue my journey towards Bengal to-morrow at the dawn of day.

(Signed) Samuel Turner.

A true Copy,

E. Hay, Secretary to the Governor General and Council.
To Sir William Jones, Knight,

President of the Asiatic Society.

Sir,

The Honourable the Governor General having received and laid before the Board a Letter addressed to him by Lieutenant Samuel Turner, containing the Account of a Journey made to Teshoo Loomboo by a Gosseyn, named Poorungeer, and the circumstances of his reception by Teeshoo Lama; and the Board deeming it worthy of the Attention of the Asiatic Society, I have the Honour, in Obedience to their Directions, to transmit to you a Copy of it.

I have the Honour to be,

SIR,

Your most obedient humble Servant,

E. Hay, Secretary.

Fort William,

Secret Department, Feb. 22, 1786.
VIII.

AN ACCOUNT OF A JOURNEY TO TIBET.

TO THE HONOURABLE

JOHN MACPHERSON, ESQ.
GOVERNOR GENERAL, &c. &c. &c.

FORT WILLIAM.

HAVING, in obedience to the instructions with which you were pleased to honour me, examined Poorungeer, the Gosseyn, who has at different times been employed in deputations to the late Teeshoo Lama, formerly accompanied him to the court of Pekin, and who is lately again returned from Tibet, and having collected from him such an account of the journey he has just performed, and other information, as he could give me relative to the countries he has left, I beg leave to submit it to you in the following narrative.

In the beginning of last year Poorungeer, having received dispatches from Mr. Hastings, a short time previous to his departure from Bengal, for Teeshoo Lama and the Regent of Teeshoo Loomboo, immediately set about preparing for the distant journey he had engaged to undertake, which employed him until the beginning of the following month of March, when I beg leave to recall to your remembrance I had the honour to present him to you for his dismissal. He then commenced his journey from Calcutta, and early in the month of April had passed, as he relates, the limits of the Company’s Provinces, and entered the mountains that constitute the kingdom of Bootan, where, in the prosecution of his journey, he received from the subjects of the Daib Raja the most ample and voluntary assistance to the frontier of his territory; nor met with any impediment to oppose his progress until he came upon the borders of Tibet. Here he was compelled to halt for near a fortnight by a heavy fall of snow, that commenced upon his arrival, and continued incessantly for the space of six days, covering the face of the country to so great a depth, as totally to put a stop to all travelling, and render it impracticable for him to pro-
ceed until a thaw succeeded to open the communication. During the time of his confinement at Phari, he says, such was the severity of the cold, and the injurious effect so rapid a transition from a temperate climate had on the health of himself and his companions, that it left him little room to doubt, if an early change had not fortunately taken place, and permitted his advance, that they must all have fallen victims to the inclemency of the weather.

However, as early as it was possible for him to leave Phari, he proceeded by long stages on his journey, and, without encountering any further difficulty, on the 8th of May following, reached Teeshtoo Loomboo, the capital of Tibet. Immediately upon entering the Monastery, he went to the Durbar of the Regent Punjur Intinnee Nemohein to announce his arrival, and the purpose of his commission. Quarters were then allotted for his residence, and an hour fixed for him to wait upon Teeshtoo Lama; who, he was informed the following morning, intended to leave the palace to occupy one of his gardens, situated on the plain within sight of the monastery, where it was visible a considerable encampment had been formed. The Lama quitted his apartment at the first dawn of day, and was lodged in the tents pitched for his accommodation before the sun had risen.

In the course of the morning, at the hour appointed for his admission, Poorungeer went down to the Lama's tents. He heard, on entering the gates of the enclosure, that the young Lama was taking his recreation in the garden, ranging about, which became with him a very favourite amusement. As it was at this time in Tibet the warmest part of the year, that he might enjoy the benefit of the air, his attendants had chosen a spot where the trees afforded a complete shade, to place an elevated seat of cushions for the young Lama, after his exercise, to rest upon. In this situation Poorungeer found him, when summoned to his presence, attended by the Regent, his Parents, Soopoon Choombo, the cup bearer, and the principal officers of the court. After making three obeisances at as remote a distance as it was possible, Poorungeer approached, and presented to the Lama, according to the custom of Tibet, a piece of white pelong, and then delivered the letters and presents with which he had been charged. The packages were all immediately opened before the Lama, who had every article brought
near to him, and viewed them separately one by one. The letter he took into his own hand, himself broke the seal, and taking from under the cover a string of pearls, which it enclosed, ran them over between his fingers, as they read their rosaries, and then with an arch air placed them by his side, nor would, while the narrator was in his presence, permit any one to take them up. Poorunjeeer says the young Lama regarded him with a very kind and significant look, spoke to him in the Tibet language, and asked him if he had had a fatiguing journey. The interview lasted more than an hour, during all which time the Lama sat with the utmost composure, not once attempting to quit his seat, nor discovering the least forward uneasiness at his confinement. Tea was twice brought in, and the Lama drank a cup each time. When ordered to accept his dismission, Poorunjeeer approached the Lama, and bowing before him, presented his head uncovered to receive his blessing, which the young Lama gave, by stretching out his hand, and laying it upon his head. He then ordered him, for as long as he resided at Teeshoo Loomboo, to come to him once every day.

The following morning Poorunjeeer waited upon the regent at his apartments in the palace, to whom, after observing the customary forms of introduction, he delivered his dispatches. After this he visited Soopoon Choomboo, the Lama's parents, and others, to whom he was before known, and says he experienced from all quarters the most cordial and kind reception; for they had been long used to consider him as an agent of the government of Bengal. He found no change whatever to have ensued in the administration since his attendance upon me in Tibet. The country enjoyed perfect tranquillity; and the only event that had taken place of importance in their annals, was the inauguration of the infant Lama, which happened the preceding year; and as this constitutes a concern of the highest moment, whether considered in a political or religious point of view, being no less than the recognizance in an infant form of their re-generated Immortal Sovereign and Ecclesiastical Supreme, I was induced to bestow more than common pains to trace the ceremonies that attended the celebration of such a great event, conceiving that the novelty of the subject might render the account curious, if even it should be found to contain no information of real utility. I shall therefore, without further apology, subjoin the result
of my enquiries, premising only that my authority for the description is derived principally from Poorungeer, and confirmed with some additional particulars, by the concurring reports of a Gosseyn who was at the time himself present on the spot.

The Emperor of China appears, on this occasion, to have assumed a very conspicuous part, in giving testimony of his respect and zeal for the great religious Father of his Faith. Early in the year 1784 he dispatched ambassadors from the court of Pekin to Teeshoo Loomboo, to represent their sovereign in supporting the dignity of the High Priest, and do honour to the occasion of the assumption of his office. Dalai Lama and the Viceroy of Lassa, accompanied by all the court, one of the Chinese generals stationed at Lassa with a part of the troops under his command, two of the four magistrates of the city, the heads of every monastery throughout Tibet, and the emperor's ambassadors, appeared at Teeshoo Loomboo to celebrate this epocha in their theological institutions. The 28th day of the seventh moon, corresponding nearly, as their year commences with the vernal equinox, to the middle of October 1784, was chosen as the most auspicious for the ceremony of inauguration; a few days previous to which the Lama was conducted from Terpaling, the monastery in which he had passed his infancy, with every mark of pomp and homage that could be paid by an enthusiastic people. So great a concourse, as assembled either from curiosity or devotion, was never seen before; for not a person of any condition in Tibet was absent who could join the suite. The procession was hence necessarily constrained to move so slow, that though Terpaling is situated at the distance of twenty miles only from Teeshoo Loomboo, three days expired in the performance of this short march. The first halt was made at Tsondue; the second at Summaar; about six miles off whence the most splendid parade was reserved for the Lama's entry on the third day; the account of which is given me by a person who was present in the procession. The road, he says, was previously prepared by being whitened with a wash, and having piles of stones heaped up, with small intervals between, on either side. The retinue passed between a double row of priests, who formed a street extending all the way from Summaar to the gates of the palace. Some of the priests held lighted rods of a perfumed composition, that burn like decayed wood, and
emit an aromatic smoke; the rest were furnished with the different musical instruments they use at their devotions, such as the gong, the cymbal, the hautboy, trumpets, drums, and sea shells, which were all sounded in union with the hymn they chanted. The crowd of spectators were kept without the street, and none admitted on the high road but such as properly belonged to, or had a prescribed place in, the procession, which was arranged in the following order.

The van was led by three military commandants, or governors of districts, at the head of 6 or 7000 horsemen, armed with quivers, bows, and matchlocks. In their rear followed the ambassador, with his suite, carrying his diploma, as is the custom of China, made up in the form of a large tube, and fastened on his back. Next the Chinese general advanced with the troops under his command, mounted and accoutred after their way with fire arms and sabres; then came a very numerous group, bearing the various standards and insignia of state. Next to them moved a full band of wind and other sonorous instruments; after which were led two horses, richly caparisoned, each carrying two large circular stoves, disposed like panniers, across the horse's back, and filled with burning aromatic woods. These were followed by a senior priest, called a Lama, who bore a box, containing books of their form of prayer and some favourite idols. Next nine sumptuary horses were led, loaded with the Lama's apparel; after which came the priests immediately attached to the Lama's person for the performance of daily offices in the temple, amounting to about 700; following them were two men, each carrying on his shoulder a large cylindrical gold, insignium, embossed with emblematical figures, (a gift from the Emperor of China.) The Duhuniers and Sootbons, who were employed in communicating addresses, and distributing alms, immediately preceded the Lama's bier, which was covered with a gaudy canopy, and borne by eight of the sixteen Chinese appointed for this service. On one side of the bier attended the Regent, on the other the Lama's Father. It was followed by the heads of the different monasteries; and as the procession advanced, the priests who formed the street fell in the rear, and brought up the suite, which moved at an extremely slow pace, and about noon was received within the confines of the monastery, amidst an amazing display of colours, the acclamations of the crowd, solemn music, and the chanting of their priests.
The Lama being safely lodged in the palace, the Regent and Soopoon Choomboo went out, as is a customary compliment paid to visitors of high rank on their near approach, to meet and conduct Dalai Lama and the Viceroy of Lassa, who were on the way to Teeshoo Loomboo. Their retinues encountered the following morning at the foot of Painom castle, and the next day together entered the monastery of Teeshoo Loomboo, in which both Dalai Lama and the Viceroy were accommodated during their stay.

The following morning, which was the third after Teeshoo Lama's arrival, he was carried to the great temple, and about noon seated upon the throne of his progenitors; at which time the Emperor's ambassador delivered his diploma, and placed the presents with which he had been charged at the Lama's feet.

The three next ensuing days Dalai Lama met Teeshoo Lama in the temple, where they were assisted by all the priests in the invocation and public worship of their Gods. The rites then performed completed, as I understand, the business of inauguration. During this interval all who were at the capital were entertained at the public expense, and alms were distributed without reserve. In conformity likewise to previous notice circulated everywhere for the same space of time, universal rejoicings prevailed throughout Tibet. Banners were unfurled on all their fortresses, the peasantry filled up the day with music and festivity, and the night was celebrated by general illuminations. A long period was afterwards employed in making presents and public entertainments to the newly inducted Lama, who, at the time of his accession to the Musnud, or (if I may use the term) pontificate, of Teeshoo Loomboo, was not three years of age. The ceremony was begun by Dalai Lama, whose offerings are said to have amounted to a greater value, and his public entertainments to have been more splendid, than the rest. The second day was dedicated to the Viceroy of Lassa. The third to the Chinese General. Then followed the Culloong, or Magistrates of Lassa, and the rest of the principal persons who had accompanied Dalai Lama. After which the Regent of Teeshoo Loomboo, and all that were dependent on that government, were severally admitted, according to pre-eminence of rank, to pay their tributes of obeisance and respect. As soon as the acknowledgements of all those were received who were admissible to the privilege, Teeshoo Lama
made, in the same order, suitable returns to each, and the consumption lasted forty days.

Many importunities were used with Dalai Lama to prolong his stay at Teeshoo Loomboo, but he excused himself from encumbering the capital any longer with so numerous a concourse of people as attended on his movements, and deeming it expedient to make his absence as short as possible from the seat of his authority, at the expiration of forty days he withdrew with all his suite to Lassa, and the Emperor's ambassador received his dismissal to return to China; and thus terminated this famous festival.

With respect to the lately-established commercial intercourse, Poorungeer informs me, that though so early, he found himself not the first person who had arrived at Teeshoo Loomboo from Bengal. Many merchants had already brought their commodities to market, and others followed before he left it. He heard from no quarter any complaint of impediment or loss, and concludes, therefore, that all adventurers met the same easy access and ready aid as he himself had everywhere experienced. The markets were well-stocked with English and Indian articles, yet not in so great a degree as to lower the value of commodities below the prices of the two or three last preceding years. Bullion was somewhat reduced in worth in comparison with the year 1783. A pootree, or bülse of gold dust, the same quantity that then sold for twenty-one indermilles, was procurable of a purer quality for nineteen and twenty indermilles. A talent of silver, which was then 500, was 450 indermilles; so that the exchange was much in favour of the trader.

Poorungeer, during his residence at Teeshoo Loomboo, had very frequent interviews with the Regent and the Ministers, and assures me, he found the heartiest dispositions in them to encourage the commercial intercourse established under the auspices of the late Governor General, whose departure, however, the Regent regretted, as the loss of the first friend and ally he became connected with, of, I believe it may be said, any foreign nation; in whom was acknowledged also the original means of opening the communication, and of commencing a correspondence, between the Governments of Bengal and Tibet; and although it may be observed that, in consequence of his having from the beginning, been used exclusively to address himself to, and acknowledge alone the agents of,
Mr. Hastings, his attachments to the English nation had grown
not without a great degree of personality; yet, free from an unworthy
capriciousness of temper, he descended not to take advantage of
the opening offered by his friend’s departure to close the new
connection. For such was the respect he had learnt to entertain
for our national integrity of character, that, under the apparent
conviction our views tended to no scheme of ambition, but were
confined merely to objects of utility and curiosity, Poorunggeer
assures me, he expressed an anxious desire for continuing with the
succeeding Governor General the exercise of those offices of friend-
ship so long supported by his predecessor; and in the hope that
his would be met with equal wishes, determined to invite you to
join him in preserving the same intercourse of commerce and
 correspondence, so essentially calculated for the benefit of both
countries. In consequence of which the Lama and the Regent
addressed the letters Poorunggeer had the honour to deliver to
you, translations of which having, in obedience to your directions,
been applied for to your Persian translator, I now subjoin them.

Copy of a Letter from Teeshoo Lama.

"God be praised that the situation of these countries is in
peace and happiness, and I am always praying at the altar of the
Almighty for your health and preservation. This is not unknown:
you are certainly employed in protecting and assisting the whole
world, and you promote the good and happiness of mankind.
We have made no deviation from the union and unanimity which
existed during the time of the first of nobles Mr. Hastings
and the deceased Lama; and may you also grant friendship to
these countries, and always make me happy with the news of your
health, which will be the cause of ease to my heart, and confirma-
tion to my soul. At this time, as friendly offerings of union and
unanimity, I send one handkerchief, one ketoo of silver, and one
piece of cochin. Let them be accepted."

From the Rajah of Teeshoo Loomboo.

"God be praised that the situation of these countries is in
peace and happiness, and I am always praying at the altar of
the Almighty for your health and preservation. This is not un-
known: I am constantly employed in promoting the advantage of
the subjects and the service of the newly seated Lama, because the
"newly seated Lama is not distinct from the deceased Lama, and
the light of his countenance is exalted. Grant your friendship to
Poorungeer Gosseyn.

"Maintain union, and unanimity, and affection, like the first of
nobles, and every day make me happy with the news of your
health and prosperity; and bestow favours like the first of nobles,
and make me happy with letters, which are causes of consolation.
"At this time, as friendly offerings of union, and affection, and
unanimity, I send one handkerchief, three tolah of gold, and one
piece of cochin. Let them be accepted."

Poorungeer, having received these dispatches in the beginning
of October, after a residence of five months at Teeshoo Loomboo,
took leave of the Lama and the regent, and set out on his return,
by the same route, he came to Bengal. The weather at this season
of the year being most extremely favourable for travelling, he
experienced no delay or interruption in the course of his journey
through Tibet and Bootan, but arrived at Rungpore early in Decem-
ber, whence he proceeded as expeditiously as possible to the Presi-
dency; where, to his great mortification and concern, he finds, upon
his arrival, his affairs involved in great distress; the little territory
his adopted Chela was left in charge of; having, during his absence,
been violently invaded by Raaj Chund, a neighbouring Zemeendar,
and to the amount of fifty begas forcibly taken out of his hands.
Prevailed on by his earnest repeated solicitations, I am induced to
say for him, that in your justice and favour are his only hopes of
relief from his embarrassments; and he humbly supplicates your
protection in restoring and securing him in the possession of his
invaded right. The liberty of this intercession, I am confident to
think, would be forgiven, were it not in favour of one who has
rendered to this Government various useful services; but as, though of
trivial importance, it affords an authentic instance of the encroach-
ing disposition of inferior Zemeendars. Yet another circumstance
it may not be improper to point out. The ground alluded to is a
part of the land situated upon the western bank of the river
opposite Calcutta, that was formerly granted under a Sunnid of
this Government to Teeshoo Lama, for the foundation of a temple
of worship, and as a resort for such pilgrims of their nation, as
might occasionally make visits to the consecrated Ganges.
Having, in conformity to your desires, done my best endeavours literally to translate all the information Poorungeer could give me, I have now only to apologize for the proximity of the account, which I have been induced to be particularly minute in, as I conceived every circumstance, however trivial, might be in some degree interesting, that tends to illustrate any trait in the national character of a people we are but recently become acquainted with, and with whom in its extended views it has been an object of this Government to obtain a closer alliance.

I will not now presume to intrude longer on your time, by adding any observations on conjectures deducible from the elevated importance your young ally seems rising to, in consequence of the signal respect paid him by the most exalted political characters known to his nation; but beg leave to repeat, that it is with infinite satisfaction I learn from the reports of Poorungeer the flourishing state of the lately projected scheme of trade, to promote which he assures me, not any thing had been wanting in facility of intercourse: that the adventurers, who had invested their property, had experienced perfect security in conducting their commerce, carried their articles to an exceeding good market, and found the rate of exchange materially in their favour.

Those advantages authorize the inference, that it will no doubt encourage more extensive enterprize; and permit me to add, I derive a confidence from the success of this infant essay, that inspires me with the strongest hopes, that the commission which your Honourable Board was pleased to commit to my charge, will eventually be productive of essential benefits to the political and commercial interests of the Company.

I have the honour to be,

HONOURABLE SIR,

With the greatest respect,

Your most obedient, faithful,

And most humble Servant,

SAMUEL TURNER.

Calcutta, February 8, 1786.
IX.

ON THE GODS OF GREECE, ITALY, AND INDIA.

WRITTEN IN 1784, AND SINCE REVISED,
BY THE PRESIDENT.

We cannot justly conclude, by arguments preceding the proof of facts, that one idolatrous people must have borrowed their deities, rites, and tenets from another; since Gods of all shapes and dimensions may be framed by the boundless powers of imagination, or by the frauds and follies of men, in countries never connected; but, when features of resemblance, too strong to have been accidental, are observable in different systems of polytheism, without fancy or prejudice to colour them and improve the likeness, we can scarce help believing, that some connection has immemorially subsisted between the several nations, who have adopted them: it is my design, in this Essay, to point out such a resemblance between the popular worship of the old Greeks and Italians, and that of the Hindus; nor can there be room to doubt of a great similarity between their strange religions and that of Egypt, China, Persia, Phrygia, Phænix, Syria; to which perhaps, we may safely add some of the southern kingdoms, and even islands, of America: while the Gothick system, which prevailed in the northern regions of Europe, was not merely similar to those of Greece and Italy, but almost the same in another dress, with an embroidery of images apparently Asiatic. From all this, if it be satisfactorily proved, we may infer a general union or affinity between the most distinguished inhabitants of the primitive world, at the time when they deviated, as they did too early deviate, from the rational adoration of the only true God.

There seem to have been four principal sources of all mythology. I. Historical or natural truth has been perverted into fable by ignorance, imagination, flattery, or stupidity: as a king of Crete, whose tomb had been discovered in that island, was conceived to have been the God of Olympus; and Minos, a legislator of that country, to have been his son, and to hold a supreme appellate jurisdiction over departed souls; hence too probably flowed the tale of Cadmus, as Bochart learnedly tarces it; hence beacons or volcanos became one-
eyed giants, and monsters vomiting flames; and two rocks, from their appearance to mariners in certain positions, were supposed to crush all vessels attempting to pass between them; of which idle fictions many other instances might be collected from the *Odyssey* and the various *Argonautick* poems. The less we say of *Julian* stars, deifications of princes or warriors, altars raised, with those of Apollo, to the basest of men, and divine titles bestowed on such wretches as CAJUS OCTAVIANUS, the less we shall expose the infamy of grave senators and fine poets, or the brutal folly of the low multitude: but we may be assured, that the mad apotheosis of truly great men, or of little men falsely called great, has been the origin of gross idolatrous errors in every part of the Pagan world. II. The next source of them appears to have been a wild admiration of the heavenly bodies, and, after a time, the systems and calculations of astronomers; hence came a considerable portion of *Egyptian* and *Grecian* fable; the *Sabian* worship in *Arabia*; the *Persian* types and emblems of *Mihr*, or the Sun; and the far extended adoration of the elements and the powers of nature; and hence, perhaps, all the artificial Chronology of the *Chinese* and *Indians*, with the invention of demi-gods and heroes to fill the vacant niches in their extravagant and imaginary periods.

III. Numberless Divinities have been created solely by the magic of poetry, whose essential business it is to personify the most abstract nations, and to place a Nymph or a Genius in every grove, and almost in every flower; hence *Hygieia* and *Jaso*, health and remedy, are the poetical daughters of *Æsculapius*, who was either a distinguished physician, or medical skill personified; and hence *Chloris*, or verdure, is married to the *Zephyr*. IV. The metaphors and allegories of moralists and metaphysicians have been also very fertile in Deities; of which a thousand examples might be adduced from *Plato*, *Cicero*, and the inventive commentators on *Homer*, in their pedigrees of the Gods, and their fabulous lessons of morality: the riches and noblest stream from this abundant fountain is the charming philosophical tale of *Psyche*, or the *Progress of the Soul*; than which, to my taste, a more beautiful, sublime, and well supported allegory was never produced by the wisdom and ingenuity of man. Hence also the *Indian* MA'YA, or, as the word is explained by some *Hindu* scholars, "the first inclination of the Godhead to diversify himself (such is their phrase) by creating worlds," is feigned to be
the Mother of universal Nature, and of all the inferior Gods; as a Cashmirian informed me, when I asked him, why Ca'ma, or Love, was represented as her son; but the word Ma'ya', or Delusion, has a more subtile and recondite sense in the Védánta philosophy, where it signifies the system of perceptions, whether of secondary or of primary qualities, which the Deity was believed by Epicharmus, Plato, and many truly pious men, to raise by his omnipresent spirit in the minds of his creatures; but which had not, in their opinion, any existence independent of mind.

In drawing a parallel between the Gods of the Indian and European Heathens, from whatever source they were derived, I shall remember, that nothing is less favourable to inquiries after truth than a systematical spirit, and shall call to mind the saying of a Hindu writer, "that whoever obstinately adheres to any set of opinions, may bring himself to believe that the freshest sandalwood is a flame of fire:" this will effectually prevent me from insisting, that such a God of India was the Jupiter of Greece, such, the Apollo; such, the Mercury. In fact, since all the causes of polytheism contributed largely to the assemblage of Grecian Divinities, (though Bacon reduces them all to refined allegories, and Newton to a poetical disguise of true history,) we find many Joves, many Apollos, many Mercuries, with distinct attributes and capacities: nor shall I presume to suggest more than that, in one capacity or another, there exists a striking similitude between the chief objects of worship in ancient Greece or Italy and in the very interesting country which we now inhabit.

The comparison, which I proceed to lay before you, must needs be very superficial; partly from my short residence in Hindustan, and partly from my want of complete leisure for literary amusements; but principally because I have no European book, to refresh my memory of old fables, except the concealed, though not unlearned, work of Pomey, entitle the Pantheon, and that so miserably translated, that it can hardly be read with patience. A thousand more strokes of resemblance might, I am sure, be collected by any who should with that view peruse Hesiod, Hyginus, Cornutus, and the other mythologists; or, which would be a shorter and a pleasanter way, should be satisfied with the very elegant Syntagma of Lilius Giraldus.
Disquisitions concerning the manners and conduct of our species in early times, or indeed at any time, are always curious at least and amusing; but they are highly interesting to such as can say of themselves with CHREMES in the play, "We are men, and take an interest in all that relates to mankind." They may even be of solid importance in an age, when some intelligent and virtuous persons are inclined to doubt the authenticity of the accounts, delivered by MOSES, concerning the primitive world; since no modes or sources of reasoning can be unimportant, which have a tendency to remove such doubts. Either the first eleven chapters of Genesis, all due allowances being made for a figurative Eastern style, are true, or the whole fabric of our national religion is false; a conclusion, which none of us, I trust, would wish to be drawn. I, who cannot help believing the divinity of the MESSIAH, from the undisputed antiquity and manifest completion of many prophecies, especially those of ISAIAH, in the only person recorded by history, to whom they are applicable, am obliged of course to believe the sanctity of the venerable books, to which that sacred person refers as genuine; but it is not the truth of our national religion, as such, that I have at heart: it is truth itself; and, if any cool unbiased reasoner will clearly convince me, that MOSES drew his narrative through Egyptian conduits from the primeval fountains of Indian literature, I shall esteem him as a friend for having weeded my mind from a capital error, and promise to stand among the foremost in assisting to circulate the truth, which he has ascertained. After such a declaration, I cannot but persuade myself, that no candid man will be displeased, if, in the course of my work, I make as free with any arguments, that he may have advanced, as I should really desire him to do with any of mine, that he may be disposed to controvert. Having no system of my own to maintain, I shall not pursue a very regular method, but shall take all the Gods, of whom I discourse, as they happen to present themselves; beginning, however, like the Romans and the Hindus, with JANUS or GANE’SÁ.

The titles and attributes of this old Italian deity are fully comprised in two choriambic verses of SULPITIUS; and a farther account of him from OVID would here be superfluous:

Jane pater, Jane tuens, dive biceps, biformis,
O cate rerum sator, O principium deorum!
"Father Janus, all-beholding Janus, thou divinity with two heads, and with two forms; O sagacious planter of all things, and leader of deities!"

He was the God, we see, of Wisdom; whence he is represented on coins with two, and on the Etruscan image found at Falisci, with four, faces; emblems of prudence and circumspection: thus is Gan-esa, the God of Wisdom in Hindustan, painted with an elephant's head, the symbol of sagacious discernment, and attended by a favourite rat, which the Indians consider as a wise and provident animal. His next great character (the plentiful source of many superstitious usages) was that, from which he is emphatically styled the father, and which the second verse before-cited more fully expresses, the origin and founder of all things: whence this notion arose, unless from a tradition that he first built shrines, raised altars, and instituted sacrifices, it is not easy to conjecture; hence it came however, that his name was invoked before any other God; that, in the old sacred rites, corn and wine, and, in later times, incense also, were first offered to Janus; that the doors or entrances to private houses were called Januae, and any pervious passage or thorough-fare, in the plural number, Jani, or with two beginnings; that he was represented holding a
rod, as guardian of ways, and a key, as opening, not gates only, but all important works and affairs of mankind; that he was thought to preside over the morning, or beginning of day; that, although the Roman year began regularly with March, yet the eleventh month, named Januaritus, was considered as first of the twelve, whence the whole year was supposed to be under his guidance, and opened with great solemnity by the consuls inaugurated in his fane, where his statue was decorated on that occasion with fresh laurel; and, for the same reason, a solemn denunciation of war, than which there can hardly be a more momentous national act, was made by the military consul’s opening the gates of his temple, with all the pomp of his magistracy. The twelve altars and twelve chapels of Janus might either denote, according to the general opinion, that he leads and governs twelve months; or that, as he says of himself in Ovid, all entrance and access must be made through him to the principal Gods, who were, to a proverb, of the same number. We may add, that Janus was imagined to preside over infants at their birth, or the beginning of life.

The Indian divinity has precisely the same character: all sacrifices and religious ceremonies, all addresses even to superior Gods, all serious compositions in writing, and all worldly affairs of moment, are begun by pious Hindus with an invocation of Ganeša; a word composed of Sa, the governor or leader, and gan’a, or a company of deities, nine of which companies are enumerated in the Amardash. Instances of opening business auspiciously by an ejaculation to the Janus of India (if the lines of resemblance here traced will justify me in so calling him) might be multiplied with ease. Few books are begun without the words “salutation to Gane’s,” and he is first invoked by the Brāhmans, who conduct the trial by ordeal, or perform the ceremony of the homa, or sacrifice to fire: M. Sonnerat represents him as highly revered on the Coast of Coromandel; “where the Indi ans, he says, would not on any account build a house, without having placed on the ground an image of this deity, which they sprinkle with oil and adorn every day with flowers; they set up his figure in all their temples, in the streets, in the high roads, and in open plains at the foot of some tree; so that persons of all ranks may invoke him, before they undertake any business, and travellers worship him, before they proceed on their journey.” To this I may
add, from my own observation, that in the commodious and useful town, which now rises at Dharmandarya or Gayā, under the auspices of the active and benevolent Thomas Law, Esq. collector of Rotas, every new-built house, agreeably to an immemorial usage of the Hindus, has the name of Ganeśa, superscribed on its door; and, in the old town, his image is placed over the gates of the temples.

We come now to Saturn, the oldest of the pagan Gods, of whose office and actions much is recorded. The jargon of his being the son of Earth and of Heaven, who was the son of the Sky and the Day, is purely a confession of ignorance, who were his parents or who his predecessors; and there appears more sense in the tradition said to be mentioned by the inquisitive and well-informed Plato, "that "both Saturn or time, and his consort Cybele, or the Earth, together with their attendants, were the children of Ocean and Thetis, "or, in less poetical language, sprang from the waters of the great "deep." Ceres, the goddess of harvests, was, it seems, their daughter; and Virgil describes "the mother and nurse of all as crowned "with turrets, in a car drawn by lions, and exulting in her hundred "grand-sons, all divine, all inhabiting splendid celestial mansions." As the God of time, or rather as time itself personified, Saturn was usually painted by the heathens holding a scythe in one hand, and, in the other, a snake with its tail in its mouth, the symbol of perpetual cycles and revolutions of ages: he was often represented in the act of devouring years, in the form of children, and, sometimes, encircled by the seasons appearing like boys and girls. By the Latins he was named Saturnus; and the most ingenious etymology of that word is given by Festus the grammarian, who traces it, by learned analogy to many similar names, in satu, from planting, because, when he reigned in Italy, he introduced and improved agriculture: but his distinguishing character, which explains, indeed, all his other titles and functions, was expressed allegorically by the stern of a ship or galley on the reverse of his ancient coins; for which Ovid assigns a very unsatisfactory reason, "because the divine stranger arrived in a "ship on the Italian coast," as if he could have been expected on horse-back or hovering through the air.

The account, quoted by Pomey from Alexander Polyhistor, casts a clearer light, if it really came from genuine antiquity, on the whole tale of Saturn; "that he predicted an extraordinary fall of rain,
and ordered the construction of a vessel, in which it was necessary to secure men, beasts, birds, and reptiles from a general inundation.

Now it seems not easy to take a cool review of all these testimonies concerning the birth, kindred, offspring, character, occupations, and entire life of Saturn, without assenting to the opinion of Bochart, or admitting it at least to be highly probable, that the fable was raised on the true history of Noah; from whose flood a new period of time was computed, and a new series of ages may be said to have sprung; who rose fresh, and, as it were, newly born from the waves; whose wife was in fact the universal mother, and, that the earth might soon be repopulated, was early blessed with numerous and flourishing descendants: if we produce, therefore, an Indian king of divine birth, eminent for his piety and beneficence, whose story seems evidently to be that of Noah disguised by Asiatic fiction, we may safely offer a conjecture, that he was also the same personage with Saturn. This was Menu, or Satyavrata, whose patronymic name was Vaivashwata, or Child of the Sun; and whom the Indians not only believe to have reigned over the whole world in the earliest age of their chronology, but to have resided in the country of Dravira, on the coast of the Eastern Indian Peninsula: the following narrative of the principal event in his life I have literally translated from the Bhagavat; and it is the subject of the first Purana, entitled that of the Madsya, or Fish.

Desiring the preservation of herds, and of Brahmas, of genii and virtuous men, of the Vedas, of law, and of precious things, the lord of the universe assumes many bodily shapes; but, though he pervades, like the air, a variety of beings, yet he is himself unvaried, since he has no quality subject to change. At the close of the last Calpa, there was a general destruction occasioned by the sleep of Brahqua; whence his creatures in different worlds were drowned in a vast ocean. Brahqua, being inclined to slumber, desiring repose after a lapse of ages, the strong demon Hayagriva came near him, and stole the Vedas, which had flowed from his lips. When the preserver of the universe, discovered this deed of the Prince of Danavas, he took the shape of a minute fish, called Saphari. A holy king, named Satyavrata, then reigned; a servant of the spirit, which moved on the waves, and so devout, that water was his only sustenance. He was the child of the Sun, and, in the present Calpa, is invested by Narayan in the office of Menu, by the name
of Sra'/ddhade'va, or the God of Obsequies. One day, as he was making a libation in the river Crtamalita, and held water in the palm of his hand, he perceived a small fish moving in it. The king of Dravira immediately dropped the fish into the river together with the water, which he had taken from it; when the sap'hari thus pathetically addressed the benevolent monarch: How canst thou, O king, whoshowest affection to the oppressed, leave me in this river-water, where I am too weak to resist the monsters of the stream, who fill me with dread?" He, not knowing who had assumed the form of a fish, applied his mind to the preservation of the sap'hari, both from good nature and from regard to his own soul; and, having heard its very suppliant address, he kindly placed it under his protection in a small vase full of water; but, in a single night, its bulk was so increased, that it could not be contained in the jar, and thus again addressed the illustrious Prince: "I am not pleased with living miserably in this little vase; make me a large mansion, where I may dwell in comfort." The king, removing it thence, placed it in the water of a cistern; but it grew three cubits in less than fifty minutes, and said: "O king, it pleases me not to stay vainly in this narrow cistern: since thou hast granted me an asylum, give me a spacious habitation." He then removed it, and placed it in a pool, where, having ample space around its body, it became a fish of considerable size. "This abode, O king, is not convenient for me, who must swim at large in the waters: exert thyself for my safety; and remove me to a deep lake:" Thus addressed, the pious monarch threw the suppliant into a lake, and, when it grew of equal bulk with that piece of water, he cast the vast fish into the sea. When the fish was thrown into the waves, he thus again spoke to Satyavrata: "here the horned sharks, and other monsters of great strength will devour me; thou shouldst not, O valiant man, leave me in this ocean." Thus repeatedly deluded by the fish, who had addressed him with gentle words, the king said: "who art thou, that beguilest me in that assumed shape? Never before have I seen or heard of so prodigious an inhabitant of the waters, who, like thee, has filled up, in a single day, a lake an hundred leagues in circumference. Surely, thou art Bhagavat, who appearest before me; the great Heri, whose dwelling was on the waves; and who now, in compassion to thy servants, bearest the form of the natives of the deep. Saluta-
tion and praise to thee, O first male, the lord of creation, of preservation, of destruction! "Thou art the highest object, O supreme ruler, of us thy adorers, who piously seek thee. All thy delusive descents in this world give existence to various beings: yet I am anxious to know, for what cause that shape has been assumed by thee. Let me not, O lotos-eyed, approach in vain the feet of a deity, whose perfect benevolence has been extended to all; when thou hast shown us, to our amazement, the appearance of other bodies, not in reality existing, but successively exhibited." The lord of the universe, loving the pious man, who thus implored him, and intending to preserve him from the sea of destruction, caused by the depravity of the age, thus told him how he was to act. "In seven days from the present time, O thou tamer of enemies, the three worlds will be plunged in an ocean of death; but, in the midst of the destroying waves, a large vessel, sent by me for thy use, shall stand before thee. "Then shalt thou take all medicinal herbs, all the variety of seeds; and, accompanied by seven Saints, encircled by pairs of all brute animals, thou shalt enter the spacious ark and continue in it, secure from the flood on one immense ocean without light, except the radiance of thy holy companions. When the ship shall be agitated by an impetuous wind, thou shalt fasten it with a large sea-serpent on my horn; for I will be near thee: drawing the vessel, with thee and thy attendants, I will remain on the ocean, O chief of men, until a night of Brahma shall be completely ended. "Thou shalt then know my true greatness, rightly named the supreme Godhead; by my favour, all thy questions shall be answered, and thy mind abundantly instructed." 'HERI, having thus directed the monarch, disappeared; and SATYAVRATA humbly waited for the time, which the ruler of our senses had appointed. The pious king, having scattered toward the east the pointed blades of the grass darbha, and turning his face toward the north, sat meditating on the feet of the God, who had borne the form of a fish. The sea, overwhelming its shores, deluged the whole earth; and it was soon perceived to be augmented by showers from immense clouds. He, still meditating on the command of BHAGAVAT, saw the vessel advancing, and entered it with the chiefs of Brahmanas, having carried into it the medicinal creepers, and conformed to the directions of HERI. The saints thus addressed him: "O king, meditate on Ce'-
"Sava; who will surely deliver us from this danger, and grant us prosperity." The God, being invoked by the monarch, appeared again distinctly on the vast ocean in the form of a fish, blazing like a gold, extending a million of leagues, with one stupendous horn; on which the king, as he had before been commanded by Heri, tied the ship with a cable made of a vast serpent, and happy in his preservation, stood praising the destroyer of Madhu. When the monarch had finished his hymn, the primeval male, Bhagavat, who watched for his safety on the great expanse of water, spoke aloud to his own divine essence, pronouncing a sacred Purana, which contained the rules of the Sanchya philosophy: but it was an infinite mystery to be concealed within the breast of Satyavrata; who, sitting in the vessel with the saints, heard the principle of the soul, the Eternal Being, proclaimed by the preserving power. Then Heri, rising together with Brahma, from the destructive deluge, which was abated, slew the demon Hayagriva, and recovered the sacred books. Satyavrata, instructed in all divine and human knowledge, was appointed in the present Calpa, by the favour of Vishnu, the seventh Menu, surnamed Vaivasvata: but the appearance of a horned fish to the religious monarch was Maya, or delusion; and he who shall devoutly hear this important allegorical narrative, will be delivered from the bondage of sin.

This epitome of the first Indian History, that is now extant, appears to me very curious and very important; for the story, though whimsically dressed up in the form of an allegory, seems to prove a primeval tradition in this country of the universal deluge described by Moses, and fixes consequently the time when the genuine Hindu Chronology actually begins. We find, it is true, in the Purana, from which the narrative is extracted, another deluge, which happened towards the close of the third age, when Yudhisthir was labouring under the persecution of his inyeterate foe Durvodhan, and when Krishna, who had recently become incarnate for the purpose of succouring the pious, and of destroying the wicked, was performing wonders in the country of Mathura; but the second flood was merely local, and intended only to affect the people of Vraja: they, it seems had offended Indra, the God of the firmament, by their enthusiastic adoration of the wonderful child, "who lifted up the mountain Gouverdhana, as if it had been a flower, and, by sheltering all the
"herdsmen and shepherdesses from the storm, convinced Indra of "his supremacy." That the Satya, or (if we may venture so to call it) the Saturnian, age was, in truth, the age of the general flood, will appear from a close examination of the ten Avatārs, or descents, of the deity in his capacity of preserver; since of the four, which are declared to have happened in the Satya yug, the three first apparently relate to some stupendous convulsion of our globe from the fountains of the deep, and the fourth exhibits the miraculous punishment of pride and impiety: First, as we have shown, there was, in the opinion of the Hindus, an interposition of Providence to preserve a devout person and his family (for all the Pandits agree, that his wife, though not named, must be understood to have been saved with him) from an inundation, by which all the wicked were destroyed: next, the power of the deity descends in the form of a Boar, the symbol of strength, to draw up and support on his tusks the whole earth, which had been sunk beneath the ocean: thirdly, the same power is represented as a tortoise sustaining the globe, which had been convulsed by the violent assaults of demons, while the Gods churned the sea with the mountain Mandar, and forced it to disgorge the sacred things and animals, together with the water of life, which it had swallowed. These three stories relate, I think, to the same event, shadowed by a moral, a metaphysical, and an astronomical, allegory; and all three seem connected with the hieroglyphical sculptures of the old Egyptians. The fourth Avatār was a lion issuing from a bursting column of marble to devour a blaspheming monarch, who would otherwise have slain his religious son; and of the remaining six, not one has the least relation to a deluge. The three which are ascribed to the Tretayug, when tyranny and irreligion are said to have been introduced, were ordained for the overthrow of tyrants, or, their natural types, giants with a thousand arms, formed for the most extensive oppression: and, in the Dwāparyug, the incarnation of Crishna was partly for a similar purpose, and partly with a view to thin the world of unjust and impious men, who had multiplied in that age, and began to swarm on the approach of the Caliyug, or the age of contention and baseness. As to Buddha, he seems to have been a reformer of the doctrines contained in the Védas; and, though his good nature led him to censure those ancient books, because they enjoined sacrifices of cattle, yet he is admitted as the ninth Avatār even by the Brahmā...
mans of Casi, and his praises are sung by the poet Jayade'va: his character is in many respects very extraordinary; but, as an account of it belongs rather to history than to mythology, it is reserved for another dissertation. The tenth Avatar, we are told, is yet to come, and is expected to appear mounted (like the crowned conqueror in the Apocalypse) on a white horse, with a cimeter blazing like a comet, to mow down all incorrigible and impenitent offenders who shall then be on earth.

These four Yugs have so apparent an affinity with the Grecian and Roman ages, that one origin may be naturally assigned to both systems: the first in both is distinguished as abounding in gold, though Satya mean truth and probity, which were found, if ever, in the times immediately following so tremendous an exertion of the divine power as the destruction of mankind by a general deluge; the next is characterized by silver; and the third, by copper; though their usual names allude to proportions imagined in each between vice and virtue: the present, or earthen, age, seems more properly discriminated than by iron, as in ancient Europe; since that metal is not baser or less useful, though more common, in our times, and consequently less precious, than copper; while mere earth conveys an idea of the lowest degradation. We may here observe, that the true History of the World seems obviously divisible into four ages or periods; which may be called, first, the Diluvian, or purest age; namely, the times preceding the deluge, and those succeeding it till the mad introduction of idolatry at Babel; next, the Patriarchal, or pure, age; in which, indeed, there were mighty hunters of beasts and of men, from the rise of patriarchs in the family of Sem, to the simultaneous establishment of great empires by the descendants of his brother Ham; thirdly, the Mosaic, or less pure, age; from the legation of Moses, and during the time when his ordinances were comparatively well-observed and uncorrupted; lastly, the prophetic, or impure, age, beginning with the vehement warnings given by the prophets to apostate kings and degenerate nations, but still subsisting, and to subsist, until all genuine prophecies shall be fully accomplished. The duration of the historical ages must needs be very unequal and disproportionate; while that of the Indian Yugs is disposed so regularly and artificially, that it cannot be admitted as natural or probable. Men do not become reprobate in a geometrical progression, or at the termina-
tion of regular periods; yet so well-proportioned are the Yugs, that even the length of human life is diminished, as they advance, from an hundred thousand years in a subdecuple ratio; and, as the number of principal Avatârs in each decreases arithmetically from four, so the number of years in each decreases geometrically, and altogether constitute the extravagant sum of four million three hundred and twenty thousand years, which aggregate, multiplied by seventy-one, is the period in which every Menu is believed to preside over the world. Such a period, one might conceive, would have satisfied Archytas, the measurer of sea and earth, and the numberer of their sands, or Archimedes, who invented a notation that was capable of expressing the number of them; but the comprehensive mind of an Indian chronologist has no limits; and the reigns of fourteen Menus are only a single day of Brahma, fifty of which days have elapsed, according to the Hindus, from the time of the creation. That all this puerility, as it seems at first view, may be only an astronomical riddle, and allude to the apparent revolution of the fixed stars, of which the Brâhmans made a mystery, I readily admit, and am even inclined to believe; but so technical an arrangement excludes all idea of serious history. I am sensible how much these remarks will offend the warm advocates for Indian antiquity; but we must not sacrifice truth to a base fear of giving offence. That the Védas were actually written before the flood, I shall never believe; nor can we infer, from the preceding story, that the learned Hindus believe it; for the allegorical slumber of Brahma, and the theft of the sacred books, mean only, in simpler language, that the human race was become corrupt; but that the Védas are very ancient, and far older than other Sanscrit compositions, I will venture to assert from my own examination of them, and a comparison of their style with that of the Purâns and the Dharma Sâstra. A similar comparison justifies me in pronouncing, that the excellent law-book ascribed to Swayambuva Menu, though not even pretended to have been written by him, is more ancient than the Bha'gavat; but that it was composed in the first age of the world, the Brâhmans would find it hard to persuade me; and the date, which has been assigned to it, does not appear in either of the two copies, which I possess, or in any other that has been collated for me: in fact, the supposed date is comprised in a verse, which flatly contradicts the work itself; for it was not
Menu who composed the system of law, by the command of his father Brahma', but a holy personage, or demigod, named Bhrigu, who revealed to men what Menu had delivered at the request of him and other saints or patriarchs. In the Māṇava Śāstra, to conclude this digression, the measure is so uniform and melodious, and the style so perfectly Sanscrit, or polished, that the book must be more modern than the scriptures of Mōses, in which the simplicity, or rather nakedness, of the Hebrew dialect, metre, and style, must convince every unbiassed man of their superior antiquity.

I leave etymologists, who decide every thing, to decide whether the word Menu, or, in the nominative case, Menus, has any connexion with Minos, the lawgiver, and supposed son of Jove. The Cretans, according to Diodorus of Sicily, used to feign, that most of the great men, who had been deified in return for the benefits which they had conferred on mankind, were born in their island; and hence a doubt may be raised, whether Minos was really a Cretan. The Indian legislator was the first, not the seventh, Menu, or Satyavrata, whom I suppose to be the Saturn of Italy: part of Saturn's character, indeed, was that of a great lawgiver;

Qui genus indocile ac dispersum, montibus altis
Composuit, legesque dedit;

and we may suspect that all the fourteen Menus are reducible to one, who was called Nu̇h by the Arabs, and probably by the Hebrews; though we have disguised his name by an improper pronunciation of it. Some near relation between the seventh Menu and the Grecian Minos may be inferred from the singular character of the Hindu god, Yama, who was also a child of the Sun, and thence named Vaivasvata: he had too the same title with his brother, Sra'adhade'va. Another of his titles was Dharmarāja, or King of Justice; and a third, P'ripeti, or Lord of the Patriarchs; but he is chiefly distinguished as judge of departed souls; for the Hindus believe, that when a soul leaves its body, it immediately Repair to Yamapur, or the city of Yama, where it receives a just sentence from him, and either ascends to Swerga, or the first heaven; or is driven down to Narac, the region of serpents; or assumes on earth the form of some animal, unless its offence had been such, that it ought to be condemned to a
vegetable, or even to a mineral, prison. Another of his names is very remarkable; I mean that of CA'LA, or time, the idea of which is intimately blended with the characters of SATURN and of NOAH; for the name CRONOS has a manifest affinity with the word chronos, and a learned follower of ZERA'TUSHT assures me, that, in the books which the the Behdins hold sacred, mention is made of an universal inundation, there named the deluge of TIME.

It having been occasionally observed, that CERES was the poetical daughter of SATURN, we cannot close this head without adding, that the Hindus also have their Goddess of Abundance, whom they usually call LACSHMI', and whom they consider as the daughter (not of MENU, but) of BHRIGU, by whom the first code of sacred Ordinances was promulgated. She is also named PEDMA' and CAMALA', from the sacred lotos, or Nymphaea; but her most remarkable name is SRI', or, in the first case, SRI'S, which has a resemblance to the Latin, and means fortune or prosperity. It may be contended, that, although LACSHMI' may be figuratively called the CERES of Hindustan, yet any two or more idolatrous nations, who subsisted by agriculture, might naturally conceive a Deity to preside over their labours, without having the least intercourse with each other; but no reason appears why two nations should concur in supposing that Deity to be a female: one, at least, of them would be more likely to imagine, that the Earth was a Goddess, and that the God of Abundance rendered her fertile. Besides, in every ancient temples near Gaya, we see images of LACSHMI', with full breasts, and a cord twisted under her arm like a horn of plenty, which look very much like the old Grecian and Roman figures of GES.

The fable of SATURN having been thus analysed, let us proceed to his descendants; and begin, as the Poet advises, with JUPITER, whose supremacy, thunder, and libertinism every boy learns from OVID; while his great offices of Creator, Preserver, and Destroyer, are not generally considered in the systems of European mythology. The Romans had, as we have before observed, many JUPITERS, one of whom was only the Firmament personified, as ENNIUS clearly expresses it:

Aspice hoc sublime candens, quem invocant omnes Jovem.
This JUPITER or DIESPITER is the Indian God of the visible heavens, called INDRA, or the King, and DIVESPETIR, or Lord of the Sky, who has also the character of the Roman GENIUS, or Chief of the good spirits; but most of his epithets in Sanscrit are the same with those of the Ennian JOVE. His consort is named SACHI; his celestial city, Amardvatī; his palace, Vaijayanta; his garden Vandana; his chief elephant Airdvat; his charioteer, Matali; and his weapon, Vajra, or the thunderbolt: he is the regent of winds and showers, and, though the East is peculiarly under his care, yet his Olympus is Méru or the north pole allegorically represented as a mountain of gold and gems. With all his power he is considered as a subordinate Deity, and far inferior to the Indian Triad, BAHMA', VISHNU, and MAHA’-DEVA or SIVA, who are three forms of one and the same Godhead: thus the principal divinity of the Greeks and Latians, whom they called ZEUS and JUPITER with irregular inflexions DIOS and JOVIS, was not merely Fulminator, the Thunderer, but, like the destroying power of INDIA, MAGNUS DIVUS, ULTOR, GENITOR; like the preserving power, CONSERVATOR, SOTER, OPITULUS, ALTOR, RUMINUS, and, like the creating power, the Giver of Life; an attribute, which I mention here on the authority of CORNUTUS, a consummate master of mythological learning. We are advised by PLATO himself to search for the roots of Greek words in some barbarous, that is, foreign, soil;
but, since I look upon etymological conjectures as a weak basis for historical inquiries, I hardly dare suggest, that Zeus, Siv, and Jov, are the same syllable differently pronounced: it must, however be admitted, that the Greeks, having no palatal sigma, like that of the Indians, might have expressed it by their sēa, and that the initial letters of zugon and jugum are (as the instance proves) easily interchangeable.

Let us now descend, from these general and introductory remarks, to some particular observations on the resemblance of Zeus or Jupiter to the triple divinity Vishnu, Siva, Brahma; for that is the order, in which they are expressed by the letters A, U, and M, which coalesce and form the mystical word O'M; a word, which never escapes the lips of a pious Hindu, who meditates on it in silence: whether the Egyptian ON, which is commonly supposed to mean the Sun, be the Sanscrit monosyllable, I leave others to determine. It must always be remembered, that the learned Indians, as they are instructed by their own books, in truth acknowledge only One Supreme Being, whom they call Brahma, or the Great One in the neuter gender: they believe his Essence to be infinitely removed from the comprehension of any mind but his own; and they suppose him to manifest his power by the operation of his divine spirit, whom
they name Vishnu, the Pervader, and Na'ra'yan, or Moving on the waters, both in the masculine gender, whence he is often denominat-
ed the First Male; and by this power they believe, that the whole
order of nature is preserved and supported; but the Vedantis, un-
able to form a distinct idea of brute matter independent of mind, or
to conceive that the work of Supreme Goodness was left a moment
to itself, imagine that the Deity is ever present to his work, and con-
stantly supports a series of perceptions, which, in one sense, they
call illusory, though they cannot but admit the reality of all created
forms, as far as the happiness of creatures can be affected by them.
When they consider the divine power exerted in creating, or in giv-
ing existence to that which existed not before, they call the Deity
Brahma' in the masculine gender also; and, when they view him in
the light of Destroyer, or rather Changer of forms, they give him a thou-
sand names, of which Siva, Isa or Iswara, Rudra, Hara, Sambhu,
and Mahade'va or Mahe'sa, are the most common. The first opera-
tions of these three Powers are variously described in the different
Puranas by a number of allegories, and from them we may deduce
the Ionian Philosophy of primeval water, the doctrine of the Mundane
Egg, and the veneration paid to the Nymphae, or Lotos, which was
anciently revered in Egypt, as it is at present in Hindustan, Tibet, and
Népal: the Tibetians are said to embellish their temples and altars
with it, and a native Népal made prostrations before it on entering
my study, where the fine plant and beautiful flowers lay for examina-
tion. Mr. Holwel, in explaining his first plate, supposes Brahma'
to be floating on a leaf of betel in the midst of the abyss; but it was
manifestly intended by a bad painter for a lotos-leaf, or for that of
the Indian fig-tree; nor is the species of pepper, known in Bengal by
the name of Tambula, and on the Coast of Malabar by that of betel,
held sacred, as he asserts, by the Hindus, or necessarily cultivated
under the inspection of Brahmins; though, as the vines are tender,
all the plantations of them are carefully secured, and ought to be cul-
tivated by a particular tribe of Sudras, who are thence called
Tambuli's.

That water was the primitive element and first work of the Crea-
tive Power, is the uniform opinion of the Indian Philosophers; but,
as they give so particular an account of the general deluge and of the
Creation, it can never be admitted, that their whole system arose
from traditions concerning the flood only, and must appear indubitable, that their doctrine is in part borrowed from the opening of *Birāsit* or *Genesis*, than which a sublimier passage, from the first word to the last, never flowed or will flow from any human pen: "In the beginning *Gḍ* created the heavens and the earth.—And the earth was void and waste, and darkness was on the face of the deep, and the Spirit of *Gḍ* moved upon the face of the waters; and *Gḍ* said: "Let Light be—and Light was." The sublimity of this passage is considerably diminished by the *Indian* paraphrase of it, with which *Mṇu*, the son of *Bṛhaṇa*, begins his address to the sages, who consulted him on the formation of the universe: "This world, says he, was all darkness, undiscernible, undistinguishable, altogether as in a profound sleep; till the self-existent invisible *Gḍ*, making it manifest with five elements and other glorious forms, perfectly dispelled the gloom. He, desiring to raise up various creatures by an emanation from his own glory, first created the *waters*, and impressed them with a power of motion: by that power was produced a golden Egg, blazing like a thousand suns, in which was born *Bṛhaṇa*, self-existing, the great parent of all rational beings. The "waters are called *ṇārā", since they are the offspring of *Nṛṇa* (or *Īśvara*); and thence was *Nāraṇya* named, because his first "ayana, or moving, was on them."
"That which is, the invisible cause, enternal; self-existing, but unperceived, becoming masculine from neuter, is celebrated among all creatures by the name of Brahma'. That God, having dwelled in the Egg, through revolving years, Himself meditating on Himself, divided it into two equal parts; and from those halves formed the heavens and the earth, placing in the midst the subtil ether, the eight points of the world, and the permanent receptacle of waters."

To this curious description, with which the Manava Sāstra begins, I cannot refrain from subjoining the four verses, which are the text of the Bhagavat, and are believed to have been pronounced by the Supreme Being to Brahma': the following version is most scrupulously literal.*

"Even I was even at first, not any other thing; that, which exists, unperceived; supreme: afterwards 'I am that which is'; and he, who must remain, am I."

"Except the First Cause, whatever may appear, and may not appear, in the mind, know that to be the mind's Maya, (or Delusion) as light, as darkness."

"As the great elements are in various beings, entering, yet not entering, (that is, pervading, not destroying) thus am I in them, yet not in them."

"Even thus far may inquiry be made by him, who seeks to know the principle of mind, in union and separation, which must be Every where always."

Wild and obscure as these ancient verses must appear in a naked verbal translation, it will perhaps be thought by many, that the poetry or mythology of Greece or Italy afford no conceptions more awfully magnificent: yet the brevity and simplicity of the Mosaiack diction are unequalled.

As to the creation of the world, in the opinion of the Romans, Ovid, who might naturally have been expected to describe it with learning and elegance, leaves us wholly in the dark, which of the Gods was the actor in it: other mythologists are more explicit; and we may rely on the authority of Cornutus, that the old European heathens considered Jove (not the son of Saturn, but of the Ether, that is of an unknown parent) as the great Life-giver, and Father of

* See the Original, p. 33. Plate IV.
Gods and men; to which may be added the Orphean doctrine, preserved by Proclus, that “the abyss and empyreum, the earth and sea, the Gods and Goddesses, were produced by Zeus or Jupiter.” In this character he corresponds with Brahma; and, perhaps, with that god of the Babylonians, (if we can rely on the accounts of their ancient religion) who, like Brahma, reduced the universe to order, and, like Brahma, lost his head, with the blood of which new animals were instantly formed: I allude to the common story, the meaning of which I cannot discover, that Brahma had five heads, till one of them was cut off by Narayana.

That, in another capacity, Jove was the Helper and Supporter of all, we may collect from his old Latin epithets, and from Cicero, who informs us, that his usual name is a contraction of Juvans Pater; an etymology, which shows the idea entertained of his character, though we may have some doubt of its accuracy. Callimachus, we know, addresses him as the bestower of all good, and of security from grief; and, since neither wealth without virtue, nor virtue without wealth, give complete happiness, he prays, like a wise poet, for both. An Indian prayer for riches would be directed to Lacsam, the wife of Vishnu, since the Hindu goddesses are believed to be the powers of their respective lords: as to Cuvêra, the Indian Plutus,
one of whose names is *Paulastya*, he is revered, indeed, as a magnificent Deity, residing in the palace of *Alae*, or borne through the sky in a splendid car, named *Pushpaca*, but is manifestly subordinate, like the other seven genii, to the three principal Gods, or rather to the principal God considered in three capacities. As the soul of the world, or the pervading mind, so finely described by Virgil, we see Jove represented by several Roman poets; and with great sublimity by Lucan in the known speech of Cato concerning the Ammonian oracle, "Jupiter is, wherever we look, wherever we move." This is precisely the Indian idea of Vishnu, according to the four verses above exhibited, not that the Brāhmans imagine their male divinity to be the divine Essence of the great one, which they declare to be wholly incomprehensible; but, since the power of preserving created things by a superintending providence, belongs eminently to the Godhead, they hold that power to exist transcendentally in the preserving member of the Triad, whom they suppose to be EVERY WHERE ALWAYS, not in substance, but in spirit and energy: here, however, I speak of the Vaishnava's; for the Saiva's ascribe a sort of pre-eminence to Siva, whose attributes are now to be concisely examined.

**ISWARA**

It was in the capacity of Avenger and Destroyer, that Jove encountered and overthrew the Titans and Giants, whom Typhon,
Briarues Titvus, and the rest of their fraternity, led against the god of Olympus; to whom an eagle brought lightning and thunderbolts during the warfare: thus, in a similar contest between Siva and the Daityas, or children of Diti, who frequently rebelled against heaven; Brahma is believed to have presented the god of destruction with fiery shafts. One of the many poems, entitled Rámdáyan, the last book of which has been translated into Italian, contains an extraordinary dialogue between the crow Bhushunda, and a rational Eagle, named Garuda, who is often painted with the face of a beautiful youth, and the body of an imaginary bird; and one of the eighteen Puránas bears his name and composites his whole history. M. Sonnerat informs us, that Vishnu is represented in some places riding on the Garuda, which he supposes to be the Pondicheri Eagle of Brisson, especially as the Brahmans of the Coast highly venerate that class of birds, and provide food for numbers of them at stated hours: I rather conceive the Garuda to be a fabulous bird, but agree with him, that the Hindu god, who rides on it, resembles the ancient Jupiter. In the old temples at Gayá, Vishnu is either mounted on this poetical bird or attended by it together with a little page; but, lest an etymologist should find Ganymed in Garud, I must observe that the Sanscrit word is pronounced Garura; though I admit, that the Grecian and Indian stories of the celestial bird and the page appear to have some resemblance. As the Olympian Jupiter fixed his court and held his councils on a lofty and brilliant mountain, so the appropriated seat of Maha Déva, whom the Saiva's consider as the Chief of the Deities, was mount Čaúlaśa, every splinter of whose rocks was an inestimable gem: his terrestrial haunts are the snowy hills of Himalaya, or that branch of them to the East of the Brahma-putra, which has the name of Chandrasichárâ, or the Mountain of the Moon. When, after all these circumstances, we learn that Siva is believed to have three eyes, whence he is named also Trilo'Chan, and know from Pausanias, not only that Triophthalmos was an epithet of Zeus, but that a statue of him had been found, so early as the taking of Troy, with a third eye in his forehead, as we see him represented by the Hindus, we must conclude, that the identity of the two Gods falls little short of being demonstrated.

In the character of Destroyer also we may look upon this Indian Deity as corresponding with the Stygian Jove, or Pluto; especially
since Ca'Li' or Time, in the feminine gender, is a name of his consort, who will appear hereafter to be Proserpine: indeed, if we can rely on a Persian translation of the Bhāgavat, (for the original is not yet in my possession) the sovereign of Pātalā, or the Infernal Regions, is the King of Serpents, named Se'shāna'ga; for Cṛihsna is there said to have descended with his favourite Arjun to the seat of that formidable divinity, from whom he instantly obtained the favour, which he requested, that the souls of a Brāhman's six sons, who had been slain in battle, might reanimate their respective bodies; and Se'shāna'ga is thus described: "He had a gorgeous appearance, with a thousand sand heads, and, on each of them, a crown set with resplendent gems, one of which was larger and brighter than the rest; his eyes gleamed like flaming torches; but his neck, his tongues, and his body were black; the skirts of his habiliment were yellow, and a sparkling jewel hung in every one of his ears; his arms were extended, and adorned with rich bracelets, and his hands bore the holy shell, the radiated weapon, the mace for war, and the lotos." Thus Pluto was often exhibited in painting and sculpture with a diadem and sceptre; but himself and his equipage were of the blackest shade.

There is yet another attribute of Maha'de'va, by which he is too visibly distinguished in the drawings and temples of Bengal. To destroy, according the Vedānti's of India, the Sūfī's of Persia, and many philosophers of our European schools, is only to generate and reproduce in another form: hence the god of Destruction is holden in this country to preside over Generation; as a symbol of which he rides on a white bull. Can we doubt, that the loves and feats of Jupi- ter Genitor (not forgetting the white bull of Europa) and his extraordinary title of Lapīs, for which no satisfactory reason is commonly given, have a connexion with the Indian phylosophy and mythology? As to the deity of Lumpsacus, he was originally a mere Sea-crow, and ought not to have a place in any mythological system; and, in regard to BACCHUS, the God of Vintage, (between whose acts and those of Jupiter we find, as Bacon observes, a wonderfull affinity) his Ithyphallic images, measures, and ceremonies alluded probably to the supposed relation of Love and Wine; unless we believe them to have belonged originally to Siva, one of whose names is Va'jīs, or Ba'gi's, and to have been afterwards improperly applied. Though, in an essay on the gods of India, where the Brāhmanas are
positively forbidden to taste fermented liquors, we can have little to do with Bacchus, as God of Wine, who was probably no more than the imaginary president over the vintage in Italy, Greece, and the lower Asia; yet we must not omit Sura'de'vi', the Goddess of Wine, who arose, say the Hindus, from the ocean, when it was churned with the mountain Mandar: and this fable seems to indicate, that the Indians came from a country, in which wine was anciently made and considered as a blessing; though the dangerous effects of intemperance induced their early legislators to prohibit the use of all spirituous liquors; and it were much to be wished, that so wise a law had never been violated.

VARUNA

Here may be introduced the Jupiter Marinus, or Neptune, of the Romans, as resembling Mahade'va in his generative character; especially as the Hindu god is the husband of Bhava'ni', whose relation to the waters is evidently marked by her image being restored to them at the conclusion of her great festival called Durgotsava: she is known also to have attributes exactly similar to those of Venus Marina, whose birth from the sea-foam and splendid rise from the Conch, in which she had been cradled, have afforded so many charming subjects to ancient and modern artists; and it is very remarkable, that the
REMBHA' of INDRA'S court, who seems to correspond with the popular VENUS, or Goddess of Beauty, was produced, according to the Indian fabulists, from the froth of the churned ocean. The identity of the triśūla and the trident, the weapon of SIVA and of NEPTUNE, seems to establish this analogy; and the veneration paid all over India to the large buccinum, especially when it can be found with the spiral line and mouth turned from left to right, brings instantly to our mind the music of TRITON. The genius of water is VARUNA; but he, like the rest, is far inferior to MAHE'S'A, and even to INDRA, who is the prince of the beneficent genii.

This way of considering the gods as individual substances, but as distinct persons in distinct characters, is common to the European and Indian systems; as well as the custom of giving the highest of them the greatest number of names: hence, not to repeat what has been said of JUPITER, came the triple capacity of DIANA; and hence her petition in CALLIMACHUS, that she might be polyonymous or many-titled. The consort of SIVA is more eminently marked by these distinctions than those of BRAHMA' or VISHNU: she resembles the ISIS Myrionymos, to whom an ancient marble, described by GRUTER, is dedicated; but her leading names and characters are PA'RVATI, DURGA, BHAVA'NI, CARGICEYA.
As the Mountain-born Goddess, or Parvati, she has many properties of the Olympian Juno: her majestic deportment, high spirit, and general attributes are the same; and we find her both on Mount Cailasa, and at the banquets of the deities, uniformly the companion of her husband. One circumstance in the parallel is extremely singular: she is usually attended by her son Kartikeya, who rides on a peacock; and, in some drawings, his own robe seems to be spangled with eyes; to which must be added that, in some of her temples, a peacock, without a rider, stands near her image. Though Kartikeya, with his six faces and numerous eyes, bears some resemblance to Argus, whom Juno employed as her principal wardour, yet, as he is a deity of the second class, and the commander of celestial armies, he seems clearly to be the Orus of Egypt and the Mars of Italy: his name Scanda, by which he is celebrated in one of the Puranas, has a connexion, I am persuaded, with the old Secander of Persia, whom the poets ridiculously confound with the Macedonian.

The attributes of Durga, or Difficult of access, are also conspicuous in the festival above-mentioned, which is called by her name, and in this character she resembles Minerva, not the peaceful inventress of the fine and useful arts, but Pallas, armed with a helmet and spear: both represent heroic Virtue, or Valour united with Wisdom; both slew demons and giants with their own hands, and both protected the wise and virtuous, who paid them due adoration. As Pallas, they say, takes her name from vibrating a lance, and usually appears in complete armour, thus Curis, the old Latian word for a spear, was one of Juno's titles; and so, if Giralda be correct, was Hoplosmia, which at Elis, it seems, meant a female dressed in panoply, or complete accoutrements. The unarmed Minerva of the Romans apparently corresponds, as patroness of Science and Genius, with Sereswati, the wife of Brahma, and the emblem of his principal Creative Power: both goddesses have given their names to celebrated grammatical works; but the Sareswati of Sarupchaarya is far more concise as well as more useful and agreeable than the Minerva of Sanctius. The Minerva of Italy invented the flute, and Sereswati presides over melody; the protectress of Athens was even, on the same account, surnamed Musice.

Many learned mythologists, with Giralda at their head, consider the peaceful Minerva, as the Isis of Egypt; from whose temple at
Sais a wonderful inscription is quoted by Plutarch, which has a resemblance to the four Sanscrit verses above exhibited as the text of the Bhagavat: "I am all, that hath been, and is, and shall be; and my "veil no mortal hath ever removed." For my part I have no doubt, that the Iswara and Is of the Hindus are the Osiris and Isis of the Egyptians; though a distinct essay in the manner of Plutarch would be requisite in order to demonstrate their identity: they mean, I conceive, the Powers of Nature considered as Male and Female; and Isis, like the other goddesses, represents the active power of her lord, whose eight forms, under which he becomes visible to man, were thus enumerated by Calida's near two thousand years ago: "Water "was the first work of the Creator; and Fire receives the oblation of "clarified butter, as the law ordains; the Sacrifice is performed with "solemnity; the two Lights of heaven distinguish time; the subtil "Ether, which is the vehicle of sound, pervades the universe; the "Earth is the natural parent of all increase; and by Air all things "breathing are animated: may Isa, the Power propitiiously apparent "in these eight forms, bless and sustain you!" The five elements, therefore, as well as the Sun and Moon, are considered as Isa or the "Ruler, from which word Isa may be regularly formed, though Isa'ny be the usual name of his active Power, adored as the Goddess of Nature. I have not yet found in Sanscrit the wild, though poetical, tale of Io; but am persuaded, that, by means of the Purduas, we
shall in time discover all the learning of the Egyptians without decipherings their hieroglyphicks: the bull of ISWARA seems to be APIS, or AP, as he is more correctly named in the true reading of a passage in JEREMIAH; and, if the veneration shown both in Tibet and India to so amiable and useful a quadruped as the cow, together with the regeneration of the LAMA himself, have not some affinity with the religion of Egypt and the idolatry of Israel, we must at least allow that circumstances have wonderfully coincided. BHAVA’NI now demands our attention; and in this character I suppose the wife of MAHA’DE’VA to be as well the JUNO CINXIA or LUCINA of the Romans (called also by them DIANA SOLIDAZONA, and by the Greeks ILITHYIA) as VENUS herself; not the Italian queen of laughter and jollity, who, with her nymphs and graces, was the beautiful child of poetical imagination, and answers to the Indian RGM-BHA’ with her celestial train of APSARD’S, or damsels of paradise; but VENUS URANIA, so luxuriantly painted by LUCRETIUS, and so properly invoked by him at the opening of a poem on nature; VENUS, presiding over generation, and, on that account, exhibited sometimes of both sexes, (an union very common in the Indian sculptures) as in her bearded statue at Rome, in the images perhaps called HERMATIENA, and in those figures of her, which had the form of a conical marble; “for the reason of which figure we are left, says TACITUS, in the dark:” the reason appears too clearly in the temples and paintings of Hindustan; where it never seems to have entered the heads of the legislators or people that any thing natural could be offensive-ly obscene; a singularity which pervades all their writings and conversation, but is no proof of depravity in their morals. Both PLATO and CICERO speak of EROS, or the Heavenly CUPID, as the son of VENUS and JUPITER; which proves, that the monarch of OLYMPS and the Goddess of Fecundity were connected as MAHA’DE’VA and BHAVA’NI: the God CA’MA, indeed, had MA’YA’ and CASYAPA, or URANUS, for his parents, at least according to the mythologists of CASHMIR; but, in most respects, he seems the twin-brother of CUPID with richer and more lively appendages. One of his many epithets is DIPACA, the INFLAMER, which is erroneously written DIPUC; and I am now convinced, that the sort of resemblance, which has been observed between his LATIN and Sanscrit names, is accidental: in each name the three first letters are the root, and between them there is no affi-
nity. Whether any mythological connexion subsisted between the amaracus, with the fragrant leaves of which HYMEN bound his terples, and the tulast of India, must be left undetermined: the botanical relation of the two plants (if amaracus be properly translated marforam) is extremely near.

One of the most remarkable ceremonies, in the festival of the Indian Goddess, is that before-mentioned of casting her image in the river: the Pandits, of whom I inquired concerning its origin and import, answered, "that it was prescribed by the Veda, they know not why;" but this custom has, I conceive, a relation to the doctrine that water is a form of t'swara, and consequently of i'sa'ni, while even represented by some as the patroness of that element, which her figure is restored, after having received all due honours earth, which is considered as another form of the God of Nature, though subsequent, in the order of Creation, to the primeval fluid. There seems no decisive proof of one original system among idocious nations in the worship of river-gods and river-goddesses, nor the homage paid to their streams, and the ideas of purificati annexed to them: since Greeks, Italians, Egyptians, and Hina
might (without any communication with each other) have adored the several divinities of their great rivers, from which they derived pleasure, health, and abundance. The notion of Doctor Musgrave, that large rivers were supposed, from their strength and rapidity, to be conducted by Gods, while rivulets only were protected by female deities, is, like most other notions of grammarians on the genders of nouns, overthrown by facts. Most of the great Indian rivers are feminine; and the three goddesses of the waters, whom the Hindus chiefly venerate, are Ganga, who sprang, like armed Pallais, from the head of the Indian Jove; Yamuna, daughter of the Sun, and Sereswati: all three meet at Prayaga, thence called Trevéni, or the three plaited locks; but Sereswati, according to the popular belief, sinks under ground, and rises at another Trevéni near Hugli, where she rejoins her beloved Ganga. The Brahmaputra is, indeed, a male river; and, as his name signifies the Son of Brahma, I thence took occasion to seign that he was married to Ganga, though I have not yet seen any mention of him, as a God, in the Sanscrit books.

Two incarnate deities of the first rank, Râma and Crishna, must now be introduced, and their several attributes distinctly explained. The first of them, I believe, was the Dionysos of the Greeks, whom
they named BROMIUS, without knowing why, and BUGENES, when they represented him horned, as well as LYAIOS and ELEUTHERIOS, the Deliverer, and TRIAMBOS or DITHYRAMBOS, the Triumphant: most of those titles were adopted by the Romans, by whom he was called BRUMA, TAURIFORMIS, LIBER, TRIUMPHUS; and both nations had records or traditionary accounts of his giving laws to men and deciding their contests, of his improving navigation and commerce, and, what may appear yet more observable, of his conquering India and other countries with an army of Satyrs, commanded by no less a personage than PAN; whom LILIUS GIRALDUS, on what authority I know not, asserts to have resided in Iberia. "when he had returned, "says the learned mythologist, from the Indian war, in which he ac- "compaied, BACCHUS." It were superfluous in a mere essay, to run any length in the parallel between this European God and, the sover- eig of Ayodhya, whom the Hindus believe to have been an appearance on earth of Preserving Power; to have been a Conqueror of the highest renown, and the Deliverer of nations from tyrants, as well as of his consort SITA from the giant RA'VAN, king of Lanks, and to have commanded in chief a numerous and intrepid race of those large Monkeys, which our naturalists, or some of them, have denominated Indian Satyrs: his General, the Prince of Satyrs, was named HANUMAT, or with high cheek-bones; and, with workmen of such agility, he soon raised a bridge of rocks over the sea, part of which, say the Hindus, yet remains; and it is, probably, the series of rocks, to which the Muselmans or the Portugese have given the foolish name of ADAM'S (it should be called RA'MA'S) bridge. Might not this army of Satyrs have been only a race of mountaineers, whom RA'MA, if such a monarch ever existed, had civilized? However that may be, the large breed of Indian Apes is at this moment held in high veneration by the Hindus, and fed with devotion by the Brahmans, who seem, in two or three places on the banks of the Ganges, to have a regular endowment for the support of them: they live in tribes of three or four hundred, are wanderfully gentle, (I speak as an eye-witness) and appear to have some kind of order and subordination in their little sylvan polity. We must not omit, that the father of Hanumat was the God of Wind, named PAVAN, one of the eight Genii; and, as PAN improved the pipe by adding six reeds, and "played exquisitely on the cithern a "few moments after his birth," so one of the four systems of Indian
music bears the name of HANUMAT, or HANUMA'N in the nominative, as its inventor, and is now in general estimation.

The war of Lankâ is dramatically represented at the festival of RA'MA on the ninth day of the new moon of Chaitra; and the drama concludes (says HOLWEL, who had often seen it) with an exhibition of the fire-ordeal, by which the victor's wife Sî'Tâ' gave proof of her connubial fidelity: "the dialogue, he adds, is taken from one "of the Eighteen holy books," meaning, I suppose, the Purânas; but the Hindus have a great number of regular dramas at least two thousands years old, and among them are several very fine ones on the story of RA'MA. The first poet of the Hindus was the great VA'LMI'C, and his RAMâyan is an Epick Poem on the same subject, which, in unity of action, magnificence of imagery, and elegance of style, far surpasses the learned and elaborate work of NONNUS, entitled Dionysiax, half of which, or twenty-four books, I perused with great eagerness, when I was very young, and should have travelled to the conclusion of it, if other pursuits had not engaged me: I shall never have leisure to compare the Dionysiacs with the RAMâyan, but am confident, that an accurate comparison of the two poems would prove DIONYSOS AND RA'MA to have been the same person; and I incline to think, that he was RA'MA, the son of CU'SH, who might have established the first regular government in this part of Asia. I had almost forgotten, that MEROS is said by the GREEKS to have been a mountain of INDIA, on which their DIONYSOS was born, and that MERU, though it generally means the north pole in the Indian geography, is also a mountain near the city of NAISHADA or NYSÂ, called by the Grecian geographers Dionysopolis, and universally celebrated in the Sanscrit poems; though the birth-place of RA'MA is supposed to have been AYÔDHYA or AUDH. That ancient city extended, if we believe the Brâhmans, over a line of ten yojans, or about forty miles, and the present city of LAC'HNAU, pronounced LACNOW, was only a lodge for one of its gates, called Lacshmanadwâra, or the gate of LACSHMAN, a brother of RA'MA: M. SONNERAT supposes AYÔDHYA to have been SIAM; a most erroneous and unfounded supposition! which would have been of little consequence, if he had not grounded an argument on it, that RA'MA was the same person with BUDDHA, who must have appeared many centuries after the conquest of Lâncâ.
The second great divinity, CRISHNA, passed a life, according to the Indians, of a most extraordinary and incomprehensible nature. He was the son of DE'VACI' by VASUDE'VA; but his birth was concealed through fear of the tyrant CANSA, to whom it had been predicted, that a child born at that time in that family would destroy him: he was fostered, therefore, in Mat'kura by an honest herdsman, surnamed ANANDA, or Happy, and his amiable wife YASODA', who, like another PALES, was constantly occupied in her pastures and her dairy. In their family were a multitude of young Gópás, or Cowherds, and beautiful Gópt's, or Milkmaids, who were his play-fellows during his infancy; and, in his early youth, he selected nine damsels as his favourites, with whom he passed his gay hours in dancing, sporting, and playing on his flute. For the remarkable number of his Gópt's I have no authority but a whimsical picture, where nine girls are grouped in the form of an elephant, on which he sits and pipes; and unfortunately, the word nava signifies both nine and new, or young; so that, in the following stanza, it may admit of two interpretations:

\[
\text{taranijdplin\text{\textipa{n}}} \text{ navaballav}
\text{perisadd saha \text{\textipa{c}}} \text{elicutihi}\text{l\textipa{t}}
\text{drutavilamwitachdruvihthinam}
\text{herimaham hridayena sadd vah\text{\textipa{t}}}
\]

"I bear in my bosom continually that God, who, for sportive re-
"creation with a train of nine (young) dairy-maids, dances gracefully, "now quick now slow, on the sands just left by the Daughter of the Sun."

Both he and the three RA'MA'S are described as youths of perfect beauty; but the princesses of Hindustan, as well as the damsels of NANDA'S farm, were passionately in love with CRISHNA, who continues to this hour the darling God of the Indian women. The sect of Hindus, who adore him with enthusiastic, and almost exclusive, devotion, have broached a doctrine, which they maintain with eagerness, and which seems general in these provinces; that he was distinct from all the Avatars, who had only an ansa, or portion, of his divinity; while CRISHNA was the person of VISHNU himself in a human form: hence they consider the third RA'MA, his elder brother, as the eighth Avatar invested with an emanation of his divine radiance; and, in the principal Sanscrit dictionary, compiled about two thousand years ago, CRISHNA, VA'SADE'VA, GO'VINDA, and other names of Shepherd God, are intermixed with epithets of NA'RA'YAN, or the Divine Spirit. All the Avatars are painted with gemed Ethiopian, or Parthian, coronets; with rays encircling their heads; jewels in their ears; two necklaces, one straight, and one pendant on their bosoms with dropping gems; garlands of well-disposed many-coloured flowers, or collars of pearls, hanging down below their waists; loose mantles of golden tissue or dyed silk, embroidered on their hems with flowers, elegantly thrown over one shoulder, and folded, like ribands, across the breast; with bracelets too on one arm, and on each wrist: they are naked to the waists, and uniformly with dark asure flesh, in allusion, probably, to the tint of that primordial fluid, on which NA'-RA'YAN moved in the beginning of time; but their skirts are bright yellow, the colour of the curious pericarpium in the centre of the water-lily, where Nature, as Dr. MURRAY observes, in some degree discloses her secrets, each seed containing before it germinates, a few perfect leaves: they are sometimes drawn with that flower in one hand; a radiated elliptical ring, used as a missile weapon, in a second; the sacred shell, or left-handed buccinum, in a third; and a mace or battle-ax, in a fourth; but CRISHNA, when he appears, as he sometimes does appear, among the Avatar's, is more splendidly decorated than any, and wears a rich garland of sylvan flowers, whence he is named VANA-MA'LI, as low as his ankles, which are adorned with strings of pearls.
Dark blue, approaching to black, which is the meaning of the word Krishna, is believed to have been his complexion; and hence the large bee of that colour is consecrated to him, and is often drawn fluttering over his head: that azure tint, which approaches to blackness, is peculiar, as we have already remarked, to Vishnu; and hence, in the great reservoir or cistern at Cátmandú the capital of Népal, there is placed in a recumbent posture a large well-proportioned image of blue marble, representing Na’rá’yan floating on the waters. But let us return to the actions of Krishna; who was not less heroic, than lovely, and, when a boy, slew the terrible serpent Cāliya with a number of giants and monsters: at a more advanced age, he put to death his cruel enemy Cànṣa; and, having taken under his protection the king Yudhishthir and the other Pândus, who had been grievously oppressed by the Cûrus, and their tyrannical chief, he kindled the war described in the great epic poem, entitled the Mahâ-bhârata, at the prosperous conclusion of which he returned to his heavenly seat in Vaiṣṇava, having left the instructions comprized in the Gîtâ with his disconsolate friend Arjuna, whose grandson became sovereign of India.

SURYA

In this picture it is impossible not to discover, at the first glance, the features of Apollo, surnamed Nomios, or the Pastoral, in Greece,
and OPIFER in Italy; who fed the herds of ADMETUS, and slew the serpent Python; a God amorous, beautiful, and warlike: the word Gvinda may be literally translated Nomios, as Citava is Crinitus, or with fine hair; but whether Gopala, or the herdsman, has any relation to Apollo, let our Etymologists determine. Colonel VALLANCY, whose learned inquiries into the ancient literature of Ireland are highly interesting, assures me, that Krishna in Irish means the Sun; and we find APOLLO and SOL considered by the Roman poets as the same deity: I am inclined, indeed, to believe, that not only CRISHNA or VISHNU, but even BRAHMA and SIVA, when united, and expressed by the mystical word O'M, were designed by the first idolaters to represent the Solar fire; but PHOEBUS, or the orb of the Sun personified, is adored by the Indians as the God SU'RYA, whence the sect, who pay him particular adoration, are called Sauras: their poets and painters describe his car as drawn by seven green horses, preceded by ARUN, or the Dawn, who acts as his charioteer, and followed by thousands of Genii worshipping him and modulating his praises. He has a multitude of names, and among them twelve epithets or titles, which denote his distinct powers in each of the twelve months: those powers are called Adityas, or sons of ADITI by CASYAPA, the Indian URANUS; and one of them has, according to some authorities, the name of VISHNU or Pervader. SU'RYA is believed to have descended frequently from his car in a human shape, and to have left a race on earth, who are equally renowned in the Indian stories with the HELIADAI of Greece: it is very singular, that his two sons called ASWINAOU or ASWINICUM'RAU, in the dual, should be considered as twin-brothers, and painted like CASTOR and POLLUX, but they have each the character of AESCULAPIUS among the Gods, and are believed to have been born of a nymph, who, in the form of a mare, was impregnated with sun-beams. I suspect the whole fable of CASYAPA and his progeny to be astronomical; and cannot but imagine, that the Greek name CASSIOPEIA has a relation to it. Another great Indian family are called the Children of the Moon, or CHANDRA; who is a male Deity, and consequently not to be compared with ARTEMIS or DIANA; nor have I yet found a parallel in India for the Goddess of the Chase, who seems to have been the daughter of an European fancy, and very naturally created by the invention of Bucolic an Georgic poets: yet, since the Moon is a form of SWARA, the God of Nature,
according to the verse of ḪaʼliDaˈsa, and since ṣaˈni has been shown to be his consort or power, we may consider her, in one of her characters, as Luna; especially as we shall soon be convinced that, in the shades below, she corresponds with the Hecate of Europe.

The worship of Solar, or Vestal, Fire may be ascribed, like that of Osiris and Isis, to the second source of mythology, or an enthusiastic admiration of nature's wonderful powers; and it seems, as far as I can yet understand the Vedas, to be the principal worship recommended in them. We have seen, that Mahāˈdeˈva himself is personated by Fire; but, subordinate to him, is the God Agni, often called Paˈvaka, or the Purusha, who answers to the Vulcan of Egypt, where he was a Deity of high rank; and his wife Swaˈha̰ resembles the younger Vesta, or Vestia, as the Eolians pronounced the Greek work for a hearth: Bhavaˈni, or Venus, is the consort of the Supreme Destructive and Generative Power; but the Greeks and Romans, whose system is less regular than that of the Indians, married her to their divine artist, whom they also named Hephaistos and Vulcan, and who seems to be the Indian Viswacarman, the forger of arms for the Gods, and inventor of the agnystra, or fiery shaft, in the war between them and the Dattyas or Titans. It is not easy here to refrain from observing (and, if the observation give offence in England, it is contrary to my intention) that the newly discovered planet should unquestionably be named Vulcan; since the confusion of analogy in the names of the planets is inelegant, un scholarly, and unphilosophical: the name Uranus is appropriated to the firmament; but Vulcan, the slowest of the Gods, and, according to the Egyptian priests, the oldest of them, agrees admirably with an orb, which must perform its revolution in a very long period; and, by giving it this denomination, we shall have seven primary planets with the names of as many Roman Deities, Mercury, Venus, Telus, Mars, Jupiter, Saturn, Vulcan.

I have already been intimated, that the Muses and Nymphs are the Goˈpya of Mathurā, and of Go̱verdhan, the Parnassus of the Hindus; and the lyric poems of Jayadeˈva will fully justify this opinion; but the Nymphs of music are the thirty Rāˈgini's or Female Passions, whose various functions and properties are so richly delineated by the Indian painters and so finely described by the poets; but I will not anticipate what will require a separate Essay, by en-
larging here on the beautiful allegories of the Hindus in their system of musical modes, which they called Ra'gas, or Passions, and supposed to be Genii or Demigods. A very distinguished son of Brahma' named Na'Red, whose actions are the subject of a Purana, bears a strong resemblance to Hermes or Mercury: he was a wise sophist, great in arts and in arms, an eloquent messenger of the Gods either to one another or to favoured mortals, and a musician of exquisite skill; his invention of the Vina, or Indian lute, is thus described in the poem entitled Magha: "Na'Red sat watching from time to time his large Vina, which, by the impulse of the breeze, yielded notes, that pierced successively the regions of his ear, and proceeded by musical intervals." The law tract, supposed to have been revealed by Na'Red, is at this hour cited by the Pandits; and we cannot, therefore, believe him to have been the patron of Thieves; though an innocent theft of Krishna's cattle, by way of putting his divinity to a proof, be strangely imputed, in the Bhagavat, to his father Brahma'.

The last of the Greek or Italian divinities, for whom we find a parallel in the Pantheon of India is the Stygian or Tauric Diana, otherwise named Hecate, and often confounded with Proserpine; and there can be no doubt of her identity with Ca'li, or the wife of Siva in his character of the Stygian Jove. To this black Goddess with a collar of golden skulls, as we see her exhibited in all her prin-
principal temples, human sacrifices were ancienfly offered, as the Védas enjoined; but, in the present age, they are absolutely prohibited, as are also the sacrifices of bulls and horses: kids are still offered to her; and, to palliate the cruelty of the slaughter, which gave such offence to Buddha, the Brahmins inculcate a belief, that the poor victims rise in the heaven of Indra, where they become the musicians of his band. Instead of the obsolete, and now illegal, sacrifices of a man, a bull, and a horse, called Neramédha, Gbmédha, and Ašwamédha, the powers of nature are thought to be propitiated by the less bloody ceremonies at the end of autumn, when the festivals of CA’LI’ and LACSIIMI’ are solemnized nearly at the same time: now, if it be asked, how the Goddess of Death came to be united with the mild patroness of Abundance, I must propose another question, “How came Proserpine to be represented in the European system as the daughter of Ceres?” Perhaps both questions may be answered by the proposition of natural philosophers, that “the apparent destruction of a substance is the production of it in a different form.” The wild music of CA’LI’s priests at one of her festivals brought instantly to my recollection the Scythian measures of Diana’s adorers in the splendid opera of Iphigenia in Tauris, which Gluck exhibited at Paris with less genius, indeed, than art, but with every advantage that an orchestra could supply.

That we may not dismiss this assemblage of European and Asiatic divinities with a subject so horrid as the altars of HECATE and CA’LI’, let us conclude with two remarks, which properly, indeed, belong to the Indian Philosophy, with which we are not at present concerned. First; Elysium (not the place, but the bliss enjoyed there, in which sense Milton uses the word) cannot but appear, as described by the poets, a very tedious and insipid kind of enjoyment: it is, however, more exalted than the temporary Elysium in the court of Indra, where the pleasures, as in Mahammed’s paradise, are wholly sensül; but the Mucti, or Elysian happiness of the Védánta School is far more sublime; for they represent it as a total absorption, though not such as to destroy consciousness, in the divine essence; but, for the reason before suggested, I say no more of this idea of beautitude, and forbear touching on the doctrine of transmigration and the similarity of the Védánta to the Sicilian, Italic, and old Academic Schools.
Secondly; in the mystical and elevated character of Pan, as a
personification of the Universe, according to the notion of lord Bacon,
there arises a sort of similitude between him and Krishna considered
as Nara\'van. The Grecian god plays divinely on his reed, to express,
we are told, ethereal harmony; he has his attendant Nymphs of the
pastures and the dairy; his face is as radiant as the sky, and his
head illumined with the horns of a crescent; whilst his lower extremi-
ities are deformed and shaggy, as a symbol of the vegetables, which
the earth produces, and of the beasts, who roam over the face of it:
now we may compare this portrait, partly with the general character
of Krishna, the Shepherd God, and partly with the description in the
Bhagavat of the divine spirit exhibited in the form of this Universal
World; to which we may add the following story from the same ex-
traordinary poem. The Nymphs had complained to Yaso\'da, that the
child Krishna had been drinking their curds and milk: on being re-
proved by his foster-mother for this indiscretion, he requested her to
examine his mouth; in which, to her just amazement, she beheld the
whole universe in all its plenitude of magnificence.

We must not be surprized at finding, on a close examination,
that the characters of all the pagan deities, male and female, melt in-
to each other, and at last into one or two; for it seems a well-founded
opinion, that the whole crowd of gods and goddesses in ancient Rome,
and modern Varanes, mean only the powers of nature, and principali-
ly those of the Sun, expressed in a variety of ways and by a multi-
tude of fanciful names.

Thus have I attempted to trace, imperfectly at present for want of
ampler materials, but with a confidence continually increasing as I
advanced, a parallel between the Gods adored in three very different
nations, Greece, Italy, and India; but, which was the original system
and which the copy, I will not presume to decide; nor are we likely, I
believe, to be soon furnished with sufficient grounds for a decision: the
fundamental rule, that natural, and most human, operations proceed
from the simple to the compound, will afford no assistance on this point;
since neither the Asiatic nor European system has any simplicity in
it; and both are so complex, not to say absurd, however intermixed
with the beautiful and the sublime, that the honor, such as it is, of the
invention cannot be allotted to either with tolerable certainty.

Since Egypt appears to have been the grand source of knowledge
for the western, and India for the more eastern, parts of the globe, it may seem a material question, whether the Egyptians communicated their Mythology and Philosophy to the Hindus, or conversely; but what the learned of Memphis wrote or said concerning India, no mortal knows; and what the learned of Várânes have asserted, if any thing, concerning Egypt, can give us little satisfaction: such circumstantial evidence on this question as I have been able to collect, shall nevertheless be stated; because, unsatisfactory as it is, there may be something in it not wholly unworthy of notice; though after all, whatever colonies may have come from the Nile to Ganges, we shall, perhaps, agree at last with Mr. Bryant, that Egyptians, Indians, Greeks, and Italians, proceeded originally from one central place, and that the same people carried their religion and sciences into China and Japan: may we not add, even to Mexico and Peru?

Every one knows, that the true name of Egypt is Misr, spelled with a palatal sibilant both in Hebrew and Arabic: it seems in Hebrew to have been the proper name of the first settler in it; and, when the Arabs use the word for a great city, they probably mean a city like the capital of Egypt. Father Marco, Roman Missionary, who, though not a scholar of the first rate, is incapable, I am persuaded, of deliberate falsehood, lent me the last book of a Râmâyana, which he had translated through the Hindi into his native language, and with it a short vocabulary of Mythological and Historical names, which had been explained to him by the Pandits of Bettyâ, where he had long resided: one of the articles in his little dictionary was, "Tirita, a town and province, in which the priests from Egypt settled;" and, when I asked him, what name Egypt bore among the Hindus, he said Misr, but observed, that they sometimes confounded it with Abyssinia. I perceived, that his memory of what he had written was correct; for Misr, was another word in his index, "from which country, he said, came the Egyptian priests, who settled in Tirita." I suspected immediately, that his intelligence flowed from the Muselmans, who call sugar-candy Misr or Egyptian; but, when I examined him closely, and earnestly desired him to recollect from whom he had received his information, he repeatedly and positively declared, that "it had been given him by several Hindus, and particularly by a Brâhman, his intimate friend, who was reputed a considerable Pandit, and had lived three years near his house." We then conceiv-
ed, that the seat of his Egyptian colony must have been Tiróhit,
commonly pronounced Tirít, and anciently called Mithilà, the prin-
cipal town of Janacades'a, or north Bahár; but MAHÉ SA Pandít,
who was born in that very district, and who submitted patiently to
a long examination concerning Mísr, overset all our conclusions:
he denied, that the Bráhmans of his country were generally sur-
named Mísr, as we had been informed; and said, that the addition
of Mísa to the name of Va'Chiespetí, and other learned authors,
was a title formerly conferred on the writers of miscellanea, or com-
pilers of various tracts on religion or science, the word being deriv-
ed from a root signifying to mix. Being asked, where the country of
Mísr was, "There are two, he answered, of that name; one of them
in the west under the dominion of Muselmans, and another, which
all the Sástras and Puránas mention, in a mountainous region to
the north of Ayodhyâ:" it is evident, that by the first he meant
Egypt, but what he meant by the second, it is not easy to ascertain.
A country, called Tiruhut by our geographers, appears in the maps
between the north-eastern frontier of Audh and the mountains of
Népal; but whether that was the Tirít mentioned to father Marco
by his friend of Betly, I cannot decide. This only I know with cer-
tainty, that Misra is an epithet of two Bráhmans in the drama of
Sacontala', which was written near a century before the birth of
Christ; that some of the greatest lawyers, and two of the finest
dramatic poets, of India have the same tittle; that we hear it fre-
quently in court added to the names of Hindús parties; and that none
of the Pandits, whom I have since consulted, pretend to know the
true meaning of the word, as a proper name, or to give any other
explanation of it than that it is a surname of Bráhmans in the west. On
the account given to Colonel KYD by the old Rájà of Crishnanagar,
"concerning traditions, "Among the Hindus, that some Egyptians had
"settled in this country," I cannot rely; because I am credibly inform-
ed by some of the Rájà's own family, that he was not a man of solid
learning, though he possessed curious books, and had been attentive
to the conversation of learned men: besides, I know that his son and
most of his kinsmen have been dabblers in Persian literature, and
believe them very likely, by confounding one source of information
with another, to puzzle themselves and mislead those, with whom they
converse. The word Mísr, spelled also in Sanscrit with a palatial sibi-
lant, is very remarkable; and, as far as Etymology can help us, we may safely derive Nilus from the Sanskrit word nila, or blue; since DIONYSIUS expressly calls the waters of that river "an azure stream;" and, if we can depend on MARCO'S Italian version of the Rāmdāyan, the name of Nīla is given to a lofty and sacred mountain with a summit of pure gold, from which flowed a river of clear, sweet, and fresh water. M. Sonnerat refers to a dissertation by Mr. Schmit, which gained a prize at the Academy of Inscriptions, "On an Egyptian Colony established in India:" it would be worth while to examine his authorities, and either to overturn or verify them by such higher authorities, as are now accessible in these provinces. I strongly incline to think him right, and to believe that Egyptian priests have actually come from the Nile to the Ganges and Yamuna, which the Brāhmans most assuredly would never have left: they might indeed have come either to be instructed or to instruct; but it seems more probable, that they visited the Sarmans of India, as the sages of Greece visited them, rather to acquire than to impart knowledge; nor is it likely, that the self-sufficient Brāhmans would have received them as their preceptors.

Be all this as it may, I am persuaded, that a connexion subsisted between the old idolatrous nations of Egypt, India, Greece, and Italy, long before they migrated to their several settlements, and consequently before the birth of Moses; but the proof of this proposition will in no degree affect the truth and sanctity of the Mosaic History, which, if confirmation were necessary, it would rather tend to confirm. The Divine Legate, educated by the daughter of a king, and in all respects highly accomplished, could not but know the mythological system of Egypt; but he must have condemned the superstitions of that people, and despised the speculative absurdities of their priests; though some of their traditions concerning the creation and the flood were grounded on truth. Who was better acquainted with the mythology of Athens than Socrates? Who more accurately versed in the Rabbinical doctrines than Paul? Who possessed clearer ideas of all ancient astronomical systems than Newton, or of scholastic metaphysics than Locke? In whom could the Romish Church have had a more formidable opponent than in Chillingworth, whose deep knowledge of its tenets rendered him so competent to dispute them? In a word, who more exactly
knew the abominable rites and shocking idolatry of Canaan than Moses himself? Yet the learning of those great men only incited them to seek other sources of truth, piety, and virtue, than those in which they had long been immersed. There is no shadow then of a foundation for an opinion, that Moses borrowed the first nine or ten chapters of Genesis from the literature of Egypt: still less can the adamantine pillars of our Christian faith be moved by the result of any debates on the comparative antiquity of the Hindus and Egyptians, or of any inquiries into the Indian Theology. Very respectable natives have assured me, that one or two missionaries have been absurd enough, in their zeal for the conversion of the Gentiles, to urge, “that the Hindus were even now almost Christians, because their Brahma, Vishnu, and Mahesha, were no other than the Christians Trinity;” a sentence, in which we can only doubt, whether folly, ignorance, or impiety predominates. The three powers, creative, preservative, and destructive, which the Hindus express by the trilateral word O’m, were grossly ascribed by the first idolaters to the heat, light, and flame of their mistaken divinity, the Sun; and their wiser successors in the east, who perceived that the sun was only a created thing, applied those powers to its Creator; but the Indian Triad, and that of Plato, which he calls the Supreme Good, the Reason, and the Soul, are infinitely removed from the holiness and sublimity of the doctrine, which pious Christians have deduced from texts in the Gospel, though other Cristians, as pious, openly profess their dissent from them. Each sect must be justified by its own faith and good intentions. This only I mean to inculcate, that the tenet of our Church cannot, without profaneness, be compared with that of the Hindus, which has only an apparent resemblance to it, but a very different meaning. One singular fact, however, must not be suffered to pass unnoticed. That the name of Crishna, and the general outline of his story, were long anterior to the birth of our Saviour, and probably to the time of Homer we know very certainly; yet the celebrated poem, entitled Bhagavat, which contains a prolix account of his life, is filled with narratives of a most extraordinary kind, but strangely variegated and intermixed with poetical decorations: the incarnate deity of the Sanscrit romance was cradled, as it informs us, among herdsmen; but it adds, that he was educated among them, and passed his youth in playing with a party of milkmaids; a tyrant
at the time of his birth, ordered all new-born males to be slain, yet this wonderful babe was preserved by biting the breast, instead of sucking the poisoned nipple, of a nurse commissioned to kill him. He performed amazing, but ridiculous, miracles in his infancy, and, at the age of seven years, held up a mountain on the tip of his little finger. He saved multitudes, partly by his arms, and partly by his miraculous powers. He raised the dead, by descending for that purpose to the lowest regions. He was the meekest and best-tempered of beings, washed the feet of the Brāhmans, and preached very nobly, indeed, and sublimely, but always in their favour. He was pure and chaste in reality, but exhibited an appearance of excessive libertinism, and had wives or mistresses too numerous to be counted; lastly, he was benevolent and tender, yet fomented and conducted a terrible war. This motley story must induce an opinion, that the spurious Gospels, which abounded in the first age of Christianity, had been brought to India, and the wildest parts of them repeated to the Hindus, who ingrained them on the old fable of Cesáva, the Apollo of Greece.

As to the general extension of our pure faith in Hindustán, there are at present many sad obstacles to it. The Muselmáns are already a sort of heterodox Christians. They are Christians, if Locke reasons justly, because they firmly believe the immaculate conception, divine character, and miracles of the Messiah; but they are heterodox, in denying vehemently his character of Son, and his quality, as God, with the Father, of whose unity and attributes they entertain and express the most awful ideas; while they consider our doctrine as perfect blasphemy, and insist, that our copies of the Scriptures have been corrupted both by Jews and Christians. It will be inexpressibly difficult to undeceive them, and scarce possible to diminish their veneration for Mohammed and Ali, who were both very extraordinary men, and the second, a man of unexceptionable morals: the Korán shines, indeed, with a borrowed light, since most of its beauties are taken from our Scriptures; but it has great beauties, and the Muselmáns will not be convinced that they were borrowed. The Hindus, on the other hand, would readily admit the truth of the Gospel; but they contend, that it is perfectly consistent with their Sástras. The deity, they say, has appeared innumerable times, in many parts of this world and of all worlds, for the salvation of his
creatures; and though we adore him in one appearance, and they in others, yet we adore, they say, the same God, to whom our several worships, though different in form, are equally acceptable, if they be sincere in substance. We may assure ourselves, that neither Muselmans nor Hindus will ever be converted by any mission from the church of Rome, or from any other church; and the only human mode, perhaps, of causing so great a revolution, will be to translate into Sanscrit and Persian such chapters of the Prophets, particularly of Isaiah, as are indisputably evangelical, together with one of the gospels, and a plain prefatory discourse, containing full evidence of the very-distant ages, in which the predictions themselves, and the history of the Divine Person predicted, were severally made public; and then quietly to disperse the work among the well-educated natives; with whom, if in due time, it failed of producing very salutary fruit by its natural influence, we could only lament more than ever the strength of prejudice and the weakness of unassisted reason.
X.

A DESCRIPTION OF A CAVE NEAR GYA'.

By John Herbert Harington Esq.

A KNOWLEDGE of the antiquities of Hindustan forming one of the several objects proposed by the institution of our Society, with the hope of communicating something acceptable on this head, I took the opportunity of a late excursion up the country to see the Cave which Mr. Hodgekis a few years since attempted to visit, at the desire, I believe, of the late Governor General, but was assassinated in his way to it by the followers of one of the rebellious allies of Chyt Sing. On my describing it to the President, whom I had the pleasure to accompany, I was encouraged by him to think that a particular account of it would be curious and useful; and in consequence made a second visit to it from Gya, when I took the following measurements, and, by the means of my Moonshee, a copy of the inscription on it, which I had despaired of presenting to you, but in its original language, (a Pundit at Benaris having attempted in vain to get it read during these last three months,) till the kind assistance of Mr. Wilkins enabled me to add the accompanying translation, and remarks to what would otherwise have given little satisfaction.

The hill, or rather rock, from which the cavern is dug, lies about fourteen miles north of the ancient city of Gya, and seems to be one of the south-eastern hills of the chain of mountains called by Renel Caramshah, both being a short distance to the west of the Phulgô.

It is now distinguished by the name of Nagurjenee; but this may perhaps be a modern appellation; no mention of it being made in the inscription. Its texture is a kind of granite, called by the Mohammedan natives Sung Khareh, which composes the whole rock, of a moderate height, very craggy and uneven, and steep in its ascent.

The cave is situated on the southern declivity, about two thirds from the summit: a tree immediately before it prevents its being seen from the bottom. It has only one narrow entrance, from the south, two feet and a half in breadth, six feet high, and of thickness exactly equal. This leads to a room of an oval form, with a vaulted roof, which I measured twice, and found to be forty-four feet in length from east to west, eighteen feet and a half in breadth, and
ten feet and a quarter in height at the centre. This immense cavity is
dug entirely out of the solid rock, and is exceedingly well polished,
but without any ornament. The same stone extends much farther
than the excavated part, on each side of it, and is altogether, I ima-
gine, full a hundred feet in length. The inhabitants near know no-	hing of its history or age; but I learnt from the chief of a neigh-
bouring village, that a tradition is extant of a MOHAMMEDAN, named
MINHAJ-U-DEEN, having performed his cheelah, or forty days devo-
tion, in this caverns; and that he was cotemporary with MUKHDoom
SHERF-U-DEEN, a venerated suleee, who died in Behar in the 590th
year of the Hijree; and he even went so far as to aver that he him-
self was descended from MINHAJ-U-DEEN, and had records at Patna
of his family's genealogy to the present time. What credit is due to
this I will not pretend to say, but the room is certainly now frequent-
ed by MOHAMMEDANS, and has been for some time, as there are the
remains of an old mosque close before it; and within a raised terrace,
such as the MOHAMMEDAN, devotees are used to construct for their re-
ligious retirement. There are two inscriptions, one on each side of the
interior part of the entrance; impressions of both which my Mooshee
took off in the course of three days, with much trouble, and sufficient
accuracy to enable Mr. Wilkins to understand and explain the
whole of one, though many Pundits, I was informed, who had seen
the original engraving, had attempted in vain to decipher it. The
other, which consists of one line only, is unfortunately of a different
character, and remains still unintelligible.

The following letter and remarks, which Mr. Wilkins has fa-
voured me with, make it unnecessary for me to say anything of the
contents of the inscription. I can only regret with him that the date
is yet undiscovered; as what is now but a gratification of curiosity,
might then have been a valuable clue to the illustration of obscure
events in ancient history. There are, however, several other caves in
the adjoining hills, which I likewise visited, but had not time to take
the inscriptions: and from these, I hope, a date will be discovered.

Were any other testimony, besides the inscription, wanted, to shew
that these caves were religious temples, the remains of three defaced
images near another, which I visited, called Curram Chossar, would be
sufficient proof of it. A third, the name of which I could not learn, has
its entrance very curiously wrought with elephants and other orna-
ments, of which I hope in a short time to present a drawing to the
Society.
वो यह सुधर दिखाई देता रहा है कि यह वास्तव में है और सिद्धि के लिए नृत्य हुआ है। रिसाला है कि नारद जी ने दिया रखा है।

यह भी दिखाई देता है कि यह उनके स्वतंत्र रूप से निर्माण करने वाला था। उन्होंने दृष्टि से निर्माण किया था।

मेरे दिशा में देखते हैं, यह स्पष्ट रूप से निर्माण का हिस्सा था। उन्होंने दृष्टि के साथ दिखाया है।

इसलिए, यह स्पष्ट है कि वह उनके जीवन में महत्वपूर्ण भूमिका निभाता रहा है। उनके द्वारा निर्माण के बारे में खुद की सहायता करते रहे।

आमतौर पर जीवन में महत्वपूर्ण भूमिका निभाता रहे। उन्होंने दृष्टि के साथ दिखाया है।

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A LETTER FROM CHARLES WILKINS, ESQ.

TO THE SECRETARY.

DEAR SIR,

HAVING been so fortunate as to make out the whole of the very curious inscription you were so obliging as to lend me, I hereby return it, accompanied by an exact copy, in a reduced size, interlined with each corresponding letter in the modern Dëwnágár character; and also a copy of my translation, which is as literal as the idioms would admit, it to be.

The character is undoubtedly the most ancient of any that have hitherto come under my inspection. It is not only dissimilar to that which is now in use, but even very materially different from that we find in inscriptions of eighteen hundred years ago. But though the writing be not modern, the language is pure Samskreet, written in a long verse, called Sárdöölâ-sëkkô牢记使命, and consists of four stanzas of nineteen syllables each, in this form:

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  1  2  3  4  5  6  7  8  9  10  11  12  13  14  15  16  17  18  19
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The metre was no small help in deciphering the vowels.

The first lines of the first verse allude to the story of Bhâwânee's killing the evil spirit Mâhêšhâsöôr, who, in the disguise of a buffalo, as the name imports, had sought with Eendrâ, and his celestial bands, for a hundred years, defeated him and usurped his throne. The story is to be found at large in a little book called Chandee. The vanquished spirits, being banished the heavens, and doomed to wander the earth, after a while assemble, with their chief Eendrâ at their head, and resolve to lay their grievances before Vâsshândô and Sêev. Conducted by Brâhma, they repair into the presence of those Deities, who hear their complaints with compassion; and their anger was so violent against Mâhêšhâsöôr, that a kind of flame issued from their mouths, and from the mouths of the rest of the principal Gods, of which was formed a Goddess of inexpressible beauty with ten arms, and each hand holding a different weapon. This was transfiguration of Bhâwânee the consort of Sêev, under which she is generally called Döorgâ. She is sent against the usurper. She mounts her lion, the gift
of the mountain Hāmālāy, (snowy) and attacks the Monster, who shifts his form repeatedly; till at length the goddess planteth her foot upon his head, and cuts it off with a single stroke of her sword. Immediately the upper part of a human body issues through the neck of the headless Buffalo and aims a stroke, which being warded off by the lion with his right paw, Dāūrgā puts an end to the combat, by piercing him through the heart with a spear. I have in my possession a statue of the Goddess with one foot on her lion, and the other on the Monster, in the attitude here lastly described.

The want of a date disappointed my expectations. I had some hopes that it was contained in the single line, which you informed me was taken from another part of the cave; but, although I have not yet succeeded in making out the whole, I have discovered enough to convince me that it contains nothing but an invocation. If you should be so fortunate as to obtain correct copies of the rest of the inscriptions that are to be found in the caves of those mountains, I make no doubt but that we shall meet with some circumstance or other that will guide us to a discovery of their antiquity.

I have the pleasure to subscribe myself,

DEAR SIR,

Your very sincere Friend,
And obedient humble Servant,
CHARLES WILKINS.

Calcutta, 17th March, 1785.
A TRANSLATION OF A SANSCRIT INSCRIPTION.

WHEN the foot of the Goddess (a,) was, with its tinkling ornaments, planted upon the head of Māheśhāśānr, (b,) all the bloom of the new-blown flower of the fountain (c,) was dispersed, with disgrace, by its superior beauty. May that foot, radiant with a fringe of refulgent beams issuing from its pure bright nails, endue you with a steady and an unexampled, devotion, offered up with fruits, and shew you the way to dignity and wealth!

The illustrious Vagnā Varmā was a prince whose greatness consisted in free-will offerings. His reputation was as unsullied as the Moon. He was renowned amongst the Martial Tribes; and, although he was, by descent, by wisdom, courage, charity and other qualities, the fore-leader of the royal line; yet, from the natural humility of his temper, he disturbed not the powerful ocean.

His auspicious son, Sārdoolā Varmā, a prince whose magnificence flowed, as it were, from the tree of imagination, (d,) displayed the ensign of royalty in sacrifices, and the world was subdued by his infinite renown. He gratified the hopes of relations, friends, and dependants; and honour was achieved from the deed of death (e,) near the uprising ocean.

By his pious son, called Āṇāṇē Varmā because of his infinite renown, the holy abode of us contemplative men, who are always studious for his good, and employed in his service, hath been increased, and rendered famous, as long as the earth, the sun, and moon, and starry heaven, shall endure; and Kātyāyānē. (f,) having taken sanctuary, and being placed, in this cavern of the wonderful Veen'dyā (g,) mountains.

The holy prince gave unto Bhāwānē, in perpetuity, the village ——— (h,) and its hilly lands, by whose lofty mountain-tops the sunny beams are cast in shade: Its filth and impurities are washed away by the precious stores of the Māhānīdā (i,) and it is refreshed by the breezes from the waving Prēyāngoās (k,) and Bākoōlās (l,) of its groves.

(a,) Bhāwānē, the wife of Serv.
(b,) The name of an evil spirit.
(c,) Epithet of the lotus
(d,) In the original Kāpit-trāvā, a fabulous tree which yielded every thing that was demanded.
(e,) He was probably carried to Māngā-Sāgār to die.
(f,) One of the names of Dīrghā or Būvānē.
(g,) The name of the chain of mountains which commences at Chunar.
(h,) The name, which consisted of two long syllables, is wanting in the original.
(i,) Probably the river called the Mahonā in KENNEL's Map of South Bahar.
(k,) Probably the Champa.
(l,) Moulsera.
XI.

TRANSLATION OF A SANSKRIT INSCRIPTION,

*COPIED FROM A STONE AT BÖÖD-DHÄ-GĀYĀ,*

BY MR. WILMOT, 1785.

TRANSLATED BY CHARLES WILKINS, ESQ.

In the midst of a wild and dreadful forest, flourishing with
trees of sweet-scented flowers, and abounding in fruits and roots; in-
fested with Lions and Tigers; destitute of human Society, and fre-
quented by the Moonees, resided Bööd-dhā the Author of Happiness,
and a portion of Narayan. This Deity Hārēśa, who is the Lord Hā-
reēśa, the possessor of all, appeared in this ocean of natural beings at
the close of the Devśpārā, and beginning of the Kālē Yoog: he who
is omnipresent and everlastingly to be contemplated, the Supreme
Being the Eternal one, the Divinity worthy to be adored by the most
praise-worthy of mankind appeared here with a portion of his divine
nature.

Once upon a time the illustrious Āmārā, renowned amongst men,
coming here, discovered the place of the Supreme Being, Bööd-dhā,
in the great forest. The wise Āmārā endeavoured to render the God
Bööd-dhā propitious by superior service; and he remained in the
forest for the space of twelve years, feeding upon roots and fruits,
and sleeping upon the bare earth; and he performed the vow of a
Moonee, and was without transgression. He performed acts of severe
mortification, for he was a man of infinite resolution, with a com-
passionate heart. One night he had a vision, and heard a voice, saying,

"Name whatever boon thou wantest." Āmārā Déwā, having heard this,
was astonished, and with due reverence replied, "First, give me a vi-
"sitation, and then grant me such a boon." He had another dream in
the night, and the voice said, "How can there be an apparition in the
"Kālē Yoog? The same reward may be obtained from the sight of
"an image, or from the worship of an image, as may be derived from
"the immediate visitation of a deity." Having heard this, he caused an
image of the Supreme Spirit Bööd-dhā to be made, and he worshipped
it, according to the law, with perfumes, incenses, and the like; and he
thus glorified the name of that Supreme Being, the incarnation of a
portion of Veeshna; "Reverence be unto thee in the form of Bööd-
"dhā! Reverence be unto the Lord of the Earth! Reverence be unto
"thee, an incarnation of the Deity and the Eternal One! Reverence be
"unto thee, O God, in the form of the God of Mercy; --- the dispeller of
"pain and trouble, the Lord of all things, the Deity who overcometh
"the sins of the Kālē Yoog, the Guardian of the Universe, the Em-
blem of mercy towards those who serve the—ōm! the possessor of all things in vital form! Thou art Brāhmā, Veeshno, and Māhāśa!
Thou art Lord of the Universe! Thou art, under the proper form of all things moveable and immovable, the possessor of the whole! and thus I adore thee. Reverence be unto the bestower of salvation, and, "Resheekēsā, the ruler of the faculties! Reverence be unto thee (Kēśā-"vā) the Destroyer of the Evil Spirit Kēsee! O, Dāmōrdārā, shew me favour! Thou art he who resteth upon the face of the milky ocean, and who lyeth upon theserpent Sēsā! Thou art Trēṭēvēkērāmā, (who at three strides encompassed the Earth!) I adore thee, who art celebrated by a thousand names, and under various forms in the shape of Bōōd-dhā the God of Mercy! Be propitious, O Must High God!"

Having thus worshipped the guardian of mankind, he became like one of the just. He joyfully caused a holy temple to be built, of a wonderful construction, and therein were set up the divine foot of Veeshno, for ever purifier of the sins of mankind, the images of the Pāndōōs, and of the descents of Veeshnoo, and in like manner of Brāmāh, and the rest of the divinities.

This place is renowned; and it is celebrated by the name of Bōōd-dhā Gāyā. The forefathers of him who shall perform the ceremony of the Sraddha at this place shall obtain salvation. The great virtue of the Sraddha performed here, is to be found in the book called Vāyū-pōōrānā; an epitome of which hath by me been engraved upon stone.

Vēkēmāđēntyā was certainly a king renowned in the world. So in his court there were nine learned men, celebrated under the epithet of the Nāvā-ratnānā or nine jewels; one of whom was Āmārā Dēvā who was the king's chief counsellor, a man of great genius and profound learning, and the greatest favourite of his prince. He, it certainly was, who built the holy temple which destroyeth sin, in a place in Jamboodweep, where, the mind being steady, it obtains its wishes, and in a place where it may obtain salvation, reputation, and enjoyment, even in the country of Bhārātā, and the province of Kēēkātā, where the place of Bōōd-dhā, purifier of the sinful, is renowned. A crime of an hundred fold shall undoubtedly be expiated from a sight thereof, of a thousand fold from a touch thereof, and of a hundred thousand fold from worshipping thereof. But where is the use of saying so much of the great virtues of this place? Even the hosts of heaven worship with joyful service both day and night.

That it may be known to learned men, that he verily erected the house of Bōōd-dhā, I have recorded, upon a stone, the authority of the place, as a self-evident testimony, on Friday, the fourth day of the new moon, in the month of Madhnoo, when in the seventh or mansion of Gānisā, and in the year of the Era of Vēkēmāđēntyā 1005.
XII.

To

SECRETARY TO THE ASIATIC SOCIETY.

SIR,

Before I left Calcutta, a gentleman, with whom I chanced to be discoursing of that sect of people who are distinguished from the worshippers of Brähm, and the followers of Mahomed by the appellation Sêek, informed me that there was a considerable number of them settled in the city of Patna, where they had a college for teaching the tenets of their philosophy. As Patna was in my way to Banaris, I no sooner arrived there than I inquired after the college, and I was presently conducted to it; and I now request you will please to lay before the society the few observations and inquiries which a single visit of about two hours would admit of my making.

If, such as they are, they should hereafter be found useful, either as a clew to guide another in his researches in the same path, or to add to some future account to render it more complete, my end in troubling you to lay it before the society is fully answered.

I have the honour to subscribe myself,

SIR,

Your most obedient humble servant,

CHARLES WILKINS.

Banaris, 1st March, 1781.
FOUND the College of the Seeks situated in one of the narrow streets of Patna, at no very considerable distance from the Custom-house. I was permitted to enter the outward gate; but as soon as I came to the steps which led up into the Chapel, or public hall, I was civilly accosted by two of the Society. I asked them if I might ascend into the hall. They said it was a place of worship open to me and to all men; but, at the same time, intimated that I must take off my shoes. As I consider this ceremony in the same light as uncovering my head upon entering any of our temples dedicated to the Deity, I did not hesitate to comply, and I was then politely conducted into the hall, and seated upon a carpet, in the midst of the assembly, which was so numerous as almost to fill the room. The whole building forms a square of about forty feet, raised from the ground about six or eight steps. The hall is in the centre, divided from four other apartments by wooden arches, upon pillars of the same materials, all neatly carved. This room is rather longer than it is broad. The floor was covered with a neat carpet, and furnished with six or seven low desks, on which stood as many of the books of their law; and the walls, above the arches, were hung with European looking-glasses in gold frames, and pictures of Mussulman Princes and Hindu Deities. A little room, which, as you enter, is situated at the left-hand end of the hall, is the chancel, and is furnished with an altar covered with a cloth of gold, upon which was laid a round black shield over a long broad sword, and on either side a thowry of peacock’s feathers, mounted in a silver handle. The altar was raised a little above the ground, in a declining position. Before it stood a low kind of throne plated with silver; but rather too small to be useful: about it were several silver dower-pots and rose-water bottles; and on the left hand stood three small urns, which appeared to be copper, furnished with notches to receive the donations of the charitable. There stood also near the altar, on a low desk, a great book, of a folio size, from which some portions are daily read in their divine service. It was covered over with a blue mantle, on which were printed, in silver letters, some select passages of their law.

After I had had a long conversation with two of the congregation, who had politely seated themselves, on each side of me, on the
carpet, and whom I found very intelligent, notice was given, that it was noon and the hour of divine service. The congregation arranged themselves upon the carpet, on each side of the hall, so as to leave a space before the altar from end to end. The great book, desk, and all, was brought, with some little ceremony from the altar, and placed at the opposite extremity of the hall. An old man, with a reverend silver beard, kneeled down before the desk with his face towards the altar; and on one side of him sat a man with a small drum, and two or three with cymbals. The book was now opened, and the old man began to chant to the time of the drum and the cymbals; and, at the conclusion of every verse, most of the congregation joined chorus in a response, with countenances exhibiting great marks of joy. Their tones were by no means harsh; the time was quick; and I learnt that the subject was a Hymn in praise of the unity, the omnipresence, and the omnipotence, of the Deity. I was singularly delighted with the gestures of the old man: I never saw a countenance so expressive of infelt joy, whilst he turned about from one to another, as it were, bespeaking their assents to those truths which his very soul seemed to be engaged in chanting forth. The Hymn being concluded, which consisted of about twenty verses, the whole congregation got up, and presented their faces with joined hands towards the altar, in the attitude of prayer. A young man now stood forth; and, with a loud voice and distinct accent, solemnly pronounced a long prayer, or kind of liturgy, at certain periods of which all the people joined in a general response, saying Wa Gooroo! They prayed against temptation; for grace to do good; for the general good of mankind; and a particular blessing to the Seeks; and for the safety of those who at that time were on their travels. This prayer was followed by a short blessing from the old man, and an invitation to the assembly to partake of a friendly feast. The book was then closed and restored to its place at the altar, and the people being seated as before, two men entered bearing a large iron caldron, called a cur-ray, just taken from the fire, and placed it in the centre of the hall upon a low stool. These were followed by others with five or six dishes, some of which were of silver, and a large pile of leaves sewed together with fibres, in the form of plates. One of these plates was given to each of the company without distinction; and the dishes being filled from the caldron, their contents were served out till every one
had got his share. Myself was not forgotten; and, as I was resolved not to give them the smallest occasion for offence, I ate up my portion. It was a kind of sweetmeat; of the consistence of soft brown sugar, composed of flower and sugar mixed up with clarified butter, which is called ghee. Had not the ghee been rancid, I should have relished it better. We were next served with a few sugar plums: and here ended the feast and the ceremonies of the day. They told me the religious part of the ceremony was daily repeated five times. I now took my leave, inviting some of the principal men amongst them, who were about to return to their own country through Banaris, to pay me a visit.

In the course of the conversation I was engaged in with the two Seekhs before the service, I was able to gather the following circumstances. That the founder of their faith was called Naneek Sah, who flourished about four hundred years ago at Punjab, and, who, before his apostasy, was a Hindoo of the Kshetry, or military tribe; and that his body disappeared as the Hindoos and the Mussulmans were disputing for it; for upon their removing the cloth which covered it, it was gone; that he left behind him a book, composed by himself, in verse, and the language of Punjab (but a character partly of his own invention;) which teaches the doctrines of the faith he had established. That they call this character, in honor of their founder, Gooroo-Mookhee: "from the mouth of the preceptor; that this book, of which that standing near the altar, and several others in the hall, were copies, teaches that there is but one God, omnipotent and omnipresent; filling all space, and pervading all matter; and that he is to be worshipped and invoked. That there will be a day of retribution, when virtue will be rewarded and vice punished; (I forgot to ask in what manner.) That it not only commands universal toleration, but forbids disputes with those of another persuasion. That it forbids murder, theft, and such other deeds as are, by the majority of mankind, esteemed crimes against society; and inculcates the practice of all the virtues, but particularly an universal philanthropy, and a general hospitality to strangers and travellers. This is all my short visit would permit me to learn of this book. It is a folio volume, containing about four or five hundred pages.

They told me further, that some years after this book of Naneek Sah had been promulgated, another made its appearance, now held
in almost as much esteem as the former. The name of the author has escaped my memory; but they favored me with an extract from the book itself in praise of the Deity. The passage had struck my ear on my first entering the hall, when the students were all engaged in reading. From the similarity of the language to the Hindooee, and many Sanscrit words, I was able to understand a good deal of it; and I hope, at some future period, to have the honor of laying a translation of it before the Society. They told me I might have copies of both their books, if I would be at the expense of transcribing them.

I next inquired why they were called Seeks, and they told me it was a word borrowed from one of the commandments of their founder, which signifies "Learn thou;" and that it was adopted to distinguish the sect soon after he disappeared. The word, as is well known, has the same import in the Hindooee.

I asked them what were the ceremonies used in admitting a proselyte. A person having shewn a sincere inclination to renounce his former opinions, to any five or more Seeks assembled together, in any place, as well on the highway as in a house of worship, they send to the first shop where sweetmeats are sold, and procure a small quantity of a particular sort, which is very common, and, as I recollect, they call Bātāsā; and having diluted it in pure water, they sprinkle some of it on the body, and into the eyes of the convert; whilst one of the best instructed repeats to him, in any language with which he is conversant, the chief canons of their faith, exacting from him a solemn promise to abide by them the rest of his life. This is the whole of the ceremony. The new convert may then choose a Gooroo, or preceptor, to teach him the language of their scriptures, who first gives him the alphabet to learn, and so leads him on, by slow degrees, until he wants no further instruction. They offered to admit me into their Society, but I declined the honor; contenting myself with the alphabet, which they told me to guard as the apple of my eye, as it was a sacred character. I find it differs but little from the Dewnagur: The number, order, and powers, of the letters are exactly the same. The language itself is a mixture of Persian, Arabic, and some Sanscrit, grafted upon the provincial dialect of Punjab, which is a kind of Hindooee, or, as it is vulgarly called by us, Moors.
XIII.

An EXTRACT of a LETTER from FRANCIS FOWKE, Esq.

TO THE PRESIDENT.

THE drawings of JEHWUN SHAH and the Been, will be dispatched in a small boat to-morrow. You wished to have had the two attendant musicians in the same drawing with JEHWUN SHAH; but the draftsman was not equal to the perspective of this: he would have run all the figures one into the other: and as he has succeeded tolerably well with the principal figures, I thought it was better to be sure of that, especially as the other figures can easily be added by an European artist. I have a double pleasure in sending you the enclosed account of the Been. In obliging you, I look forward to the instructive amusement I shall share with the public at large in the result of your researches into this subject of Indian music; and I am exceedingly happy, by furnishing you with facts, highly necessary indeed, but the mere work of care and observation, to give you greater leisure for the contemplation of the whole. You may absolutely depend upon the accuracy of all that I have said respecting the construction and scale of this instrument. It has all been done by measurement: and with regard to the intervals, I would not depend upon my ear, but had the Been tuned to the harpsichord, and compared the instrument carefully, note by note, more than once. What I myself am aware of, will certainly not escape your penetration, that there may be a little of the bias of hypothesis, or an opinion pretty strongly established, in what I have said of the confined modulation of the Indian music. But it is easy to separate my experiments and conjectures; and my prejudices cannot mislead you, though they may possibly suggest an useful hint, as half errors often do.

THE Been is a fretted instrument of the guitar kind. The finger-board is 21 5/8ths inches long. A little beyond each end of the finger-board are two large gourds, and beyond these are the pegs and tail piece which hold the wires. The whole length of the instrument is three feet seven inches. The first gourd is fixed at ten inches
from the top, and the second at about two feet 1 1/2. The gourds are very large, about fourteen inches diameter, and have a round piece cut out of the bottom, about five inches in diameter. The fingerboard is about two inches wide. The wires are seven in number, and consist of two steel ones very close together, in the right side; four brass ones on the finger-board; and one brass one on the left side. They are tuned in the following manner:

The great singularity of this instrument is the height of the frets; that nearest the nut is one inch 3/8, and that at the other extremity about 3/8ths of an inch, and the decrease is pretty gradual. By this means the finger never touches the finger-board itself. The frets are fixed on with wax by the performer himself, which he does entirely by ear. This was asserted by PEAR CAWN, the brother of JEEWUN SHAII, who was ill at the time; but PEAR CAWN is a performer very little, if at all, inferior to JEEWUN SHAII. The frets of PEAR CAWN's instrument were tolerably exact: any little difference is easily corrected by the pressure of the finger. Indeed, the performers are fond, on any note that is at all long, of pressing the string very hard, and letting it return immediately to its natural tension, which produces a sound something like the close shake on the violin; but not with so agreeable an effect, for it appears sometimes to alter the sound half a tone.
THE VEENA.
The frets are nineteen in number. The notes that they give will appear on the following scale. I have added below the names which the performer himself gives to the notes in his own language. It is very observable, that the semitones change their names on the same semitone as in the European scale.
On the wires R and S, which are those principally used, there is an extent of two octaves, a whole note with all the half notes, complete in the first octave, but the g♯ and b♭ wanting in the second. The performer’s apology for this was, that he could easily get those notes by pressing the string a little hard upon the frets f♯ and a♯, which is very true from the height of the frets; but he asserted that this was no defect in his particular instrument, but that all Beens were made so. The wires TU are seldom used except open.

The Been is held over the left shoulder, the upper gourd resting on that shoulder, and the lower one on the right knee.

The frets are stopped with the left hand, the first and second fingers are principally used. The little finger of the hand is sometimes used to strike the note V. The third finger is seldom used, the hand shifting up and down the finger-board with great rapidity. The fingers of the right hand are used to strike the strings of this hand; the third finger is never used. The two first fingers strike the wires on the finger-board, and the little finger strikes the two wires. The two first fingers of this hand are defended by a piece of wire put on the tops of them in the manner of a thimble when the performer plays strong, this causes a very jarring disagreeable sound; whereas, when he plays softly, the tone of the instrument is remarkably pleasing.

The style of music on this instrument is in general that of great execution. I could hardly ever discover any regular air or subject. The music seems to consist of a number of detached passages, some very regular in their ascent and descent: and those that are played softly, are most of them both uncommon and pleasing.

The open wires are struck, from time to time, in a manner that, I think, prepares the ear for a change of modulation, to which the uncommonly full and fine tones of these notes greatly contribute; but the ear is, I think, always disappointed: and, if there is ever any transition from the principal key, I am inclined to think it is very short. Were there any other circumstances respecting the Indian music, which led to suppose that it has, at some period, been much superior to the present practice, the style, scale, and antiquity of this instrument, would, I think, greatly confirm the supposition.
XIV.

A DESCRIPTION OF THE MAHWAH TREE.

By LIEUTENANT CHARLES HAMILTON.

HERE is a very curious and useful tree called by the Natives of Bahar, and the neighbouring countries, the Mahwah or Māvee; its name, as written by them, being; but the Sanscrit name is Madhūca or Madhudrūna.

It is of the class of the Polyandria Monogynia, of Linnaeus, but of a genus not described by him.

The calyx is monophyllous, quadrifid, half divided, and imbricated in its divided part; the two opposite and outer covering, in part, the two opposite and inner, parts.

The corolla is monopetalous, having an inflated tube for its lower part of near an inch long, thick, fleshy, and of a cream colour: from this arise nine small leaves, as it were, like petals, from a calyx, that are imbricated and twisted, one over the other, from right to left, clasping the lower part of the style in a point; by which they seem to serve, in some respect, like a forceps, to detach the whole corolla at the season of its dropping.

There are no filaments; but the antherae, which are in number most commonly twenty-six, long, scabrous, and spear-headed, are inserted in rows, on the inside and upper part of the tube of the corolla.

The style is long, round, and tapering, and projects about an inch beyond the corolla. It is succeeded by a drupe, with a thick pericarpium, bilocular, containing two seeds or kernels covered with a dark brown skin. There are often, however, three of these in three separate divisions.

The flowers rise in bunches from the extremities of the smaller branches; and have each a pedicle of about an inch and a half long. These are mostly turned downwards, whence the corollas more easily drop off.

The tree, when full grown, is about the size of a common mango-tree, with a bushy head, and oval leaves, a little pointed. Its roots
A DESCRIPTION OF THE MAHWAH TREE. 257

spreading horizontally, are sunk but little in the earth. The trunk, which is often of a considerable thickness, rises seldom to any great height, without giving off branches; it is, however, not uncommon to see it shoot up clear to the length of eight or ten feet. The wood itself is moderately hard, fine grained, and of a reddish colour.

By incision, the tree affords a resinous gum from the bark.

The flowers are of a nature very extraordinary, differing essentially from those of any other plant with which I am acquainted, as they have not, in any respect the usual appearance of such, but rather resemble berries, and I, like many others, had long conceived them to be the fruit of the Mahwah. The tree drops its leaves in the month of February; and early in March these flowers begin to come out in clusters of thirty, forty, or fifty, from the extremity of every small branch; and, from this period till the latter end of April, as the flowers come to maturity, (for they never open or expand), they continue falling off, with their anthera, in the mornings, a little after sunrise, when they are gathered; and afterwards dried by an exposure of a few days in the sun: when thus prepared, they very much resemble a dried grape, both in taste and flavour.

Immediately after the flowers drop off fresh shoots are made for the new leaves, which soon make their appearance; coming presently to their full growth.

The fruit (properly so called) is of two sorts in shape; the one resembling a small walnut; the other somewhat larger, and pointed. It is ripe towards the middle of May, and continues dropping from the tree till the whole fall; which is generally about the beginning or towards the middle of June. The outer covering, or Pericarpium, which is of a soft texture, commonly bursts in the fall, so that the seeds are very easily squeezed out of it. The seeds are somewhat of the shape, but longer than an olive.

These seeds are replete with a thick oil, of the consistence of butter or ghee, which is obtained by expression.

From this description it may easily be conceived that the Mahwah tree, and its productions, are of singular and general use, especially in those dry and barren countries which, from the nature of their situation, are not so well calculated for producing in plenty or perfection the other necessaries of life.

The corolla, or flowers, after being dried as before described, are
A DESCRIPTION OF THE

eaten by the natives raw, or dressed with their curries; and, when even simply boiled with rice, they afford a strengthening and wholesome nourishment. They are, indeed, often applied to a less laudable purpose; for being fermented, they yield, by distillation, a strong spirit, which the people here sell so very cheap, that, for one pice, (about a half-penny), may be purchased no less than a cutchaseer, (above a pint English), with which any man may get completely drunk. These flowers make an article of trade; being exported from this country to Patna, and elsewhere, in no considerable quantities.

The oil yielded by the fruit, as before mentioned, resembles ghee so much, that, being cheaper, the natives often mix it with that commodity. They use it, the same as ghee, in their victuals, and in the composition of some sorts of sweetmeats; and burn it in their lamps. It is also regarded as a salutary remedy, applied exteriorly, to wounds, and all cutaneous eruptions. It is, at first, of the consistence of common oil, but soon coagulates. After being kept for some time, it acquires a bitterish taste and rancid smell, which renders it somewhat less agreeable as an article of food: but this is an inconvenience which, by the oil being properly clarified, and prepared at first, might be perhaps avoided. This oil is also exported, both in its adulterated and original state, to Patna, and other parts of the low country.

I do not know any purpose to which the gum has ever been applied; but if found, upon trial, to be of use, it might be collected in large quantities. The best season for this would be in the months of March and April, about the time the flowers come out, when the tree seems to be most replete with it. Such an operation, indeed, would probably diminish its produce in the fruit and flower; but where it was sufficiently cultivated, the loss in those could be but little felt.

The wood, from what has been already said of it, cannot be expected to be often had in beams of any considerable length, so as to make it so very useful in building, as it would otherwise be, from its not being liable to be eaten by the white ants. Mr. Kier, however, tells me that, when he was at Chowsee, (a village upon the Caramnassa, near Buxar), he had beams of it, which were, to the best of his remembrance, above twenty feet long. But, in many other respects it is a most useful wood; and, as it is tough, and of a
strong texture, it might, perhaps, be employed to advantage in ship building, in which case, if properly cultivated in many grounds that seem well adapted for it, and fit for little else, it might thus in time become a valuable article in that branch at Calcutta, whether it could easily be transported during the rainy season, from almost any part of these countries, by several rivers that are then sufficiently full to float it down.

The tree, I am told, will grow in the most barren ground, even amongst stones and gravel, where there is the least appearance of a soil; and it seems to destroy all the smaller trees and brushwood about it: yet it does not refuse a rich soil either. Mr. Keir having observed to me, that the few he had seen about Buxar, where it is certainly very good, were both taller, and seemed to thrive much better than any he had ever met with in Ramgur. It does not require much moisture, seeming to produce nearly as well in the driest as in most favourable years; and in every situation; and is therefore admirably fitted for the convenience of the inhabitants of these hilly countries, which are peculiarly subject to long and severe droughts during the hot months.

Yet, notwithstanding its utility, and the immense quantity of ground that seems so well adapted to the growth of it, both here, and in the neighbouring provinces of Catak, Pacheet, Rotas, &c. (the greatest part of which, indeed, seems fit for no other useful production, I have myself never observed, nor can I find any of my acquaintance who ever have remarked, one single tree in its infant state: we can see, every where, full-grown trees in great abundance; but never meeting with any young plants, both I, and all whom I have spoken to on the subject, are at some loss to conceive how they should have come here. Neither can the country people themselves, of whom I have inquired, give any rational account of this; although it appears pretty evident that numbers of them must have been cultivated some time or other, every village having many of them growing about it.

This is a circumstance which sufficiently marks the true character of the lower order of natives in their most supine indolence and sloth; owing chiefly, perhaps, to the ignorant and stupid rapacity of their Rajahs, Zemeendars, and other Landholders, and their total inattention to the welfare of those dejected wretches, from whom they
derive their consequence and power: of their base indifference to
the interests of those whom they thus affect to hold beneath their
regard, many striking instances occurred to me in the course of my
inquiries upon this very subject; and it was not long ago that, ask-
ing some questions concerning the Mâhwah of a Zemeendar in this
neighbourhood, he answered, that "it was the food of the poor peo-
ple, and how should he know any thing about it!"

It was this strange neglect of the culture of it, and a knowledge
of its usefulness, which first led me to inquire into the nature of this
tree, from which the bulk of the people hereabouts already draw
such great benefit; in order to know whether they might not in-
crease it without any great trouble to themselves; and whether
thereby the revenue might not also be increased, and a certain
provision be made against famines, from which the natives often
suffer severely in these higher districts.

To effect this, it would be necessary to give the ryots every pos-
sible encouragement to raise the tree from the seeds; but as the tor-
pid apathy of these people, whether natural or acquired, will ever
prevent their being moved to any exertion by a prospect, however
alluring, of distant advantage, I apprehend the only way of bring-
ing this about, would be making the planting and raising of a cer-
tain number of Mâhwahs (in proportion to the value of the tenure)
an article in their Kaboolieats, or agreements.

The tree, as has been already observed, will grow almost any
where. It ought to be sown about the beginning of the rains, either
in beds (to be afterwards transplanted) or at about thirty or forty
feet distance, in the ground designed for it. It is said that, in seven
years, the trees will give flowers and fruit; in ten, they will yield
about half their common produce; and that in twenty years they
come to their full growth; after which, if my information be good,
they will last near one hundred years. This account, I acknow-
ledge, must necessarily be very vague and uncertain; as I never
have met with a single person who appeared to have had either op-
portunity or inclination to observe its progress. Such, however, is
what the country people say of it.

I am told that a good tree will easily give four puckha maunds
(about three hundred weight avoirdupois) of dried flowers, which
will sell here for about two rupees; and of seeds it will afford about
two maunds; and this, of oil, will yield twenty-six seers puckha weight (near 60lb.) which, in a year like this, when oil is cheap, will sell at this place for two rupees more. It is to be observed, however, that every tree will not give so much, neither are the flowers and oil so clear in any part of the hills as at Chatra; but, allowing only a half of this, or less, to be the product of each tree, (though it might be rendered still much greater by the very least care and industry in the cultivation of it), within the space of twenty years, a subsistence might be raised to the inhabitants, and a considerable revenue to the proprietors of the lands, throughout an immense tract of country; the greatest part of which, in its present state, is little better than a barren waste, and can not pay one single anna to the Zemeendar or the Government. That such an advantage might be derived from it, may be proved by the most moderate calculation; for, supposing the trees to be sown at forty feet distance from each other, on each beegah (about the third of an acre) might stand eight trees; and, supposing the product of each tree to be only half a rupee, there would be four rupees of annual value on a beegah of ground; half of which going to the proprietor; it would thus give a far better rent than the generality of the best grounds in these parts; and the labourer would have a produce without any other trouble than that of sowing the seed; and fencing the ground whilst the trees were young; and that of annually gathering the flowers, and preparing the oil, when they arrive at their proper size; and they would probably begin to give a produce within less than ten years after the sowing.

As this tree will yield nearly its usual quantity of flowers and fruit in seasons when, for want of rain, every other crop fails; if thus cultivated, it would afford the inhabitants a sure and certain resource; under the most dreadful, and what has hitherto been, to them, the most destructive of all calamities, famine. It is well known that the rice, and other sorts of grain, which from the chief part of their sustenance, require a considerable degree of moisture to bring them to perfection. An unusually dry season destroys the harvest in those articles, and reduces the ryots in general to the utmost misery; a predicament into which they could hardly fall, even in the severest dearth of grain, whilst they had plenty of the flowers and fruit of the Mahwah to depend upon.

It may be here not improper to observe, that Mr. Keir is now sowing a few acres with the seed of this useful tree, and means to fence it; which may, perhaps in time, tempt others to follow so good an example.

Chatra, Ramgur, July 6, 1785.
XV.

OF THE METHOD OF DISTILLING,

As practised by the Natives at Chatra in Ramgur, and in the other
Provinces, perhaps, with but little Variation.

BY ARCHIBALD KEIR, ESQ.

The body of the still they use is a common, large, unglazed,
earthen water jar, nearly globular, of about twenty-five inches di-
dmeter at the widest part of it, and twenty-two inches deep to the
neck, which neck rises two inches more, and is eleven inches wide
in the opening. Such, at least, was the size of the one I measured;
which they filled about a half with fomented Māhwah-flowers, that
swam in the liquor to be distilled.

The jar they placed in a furnace, not the most artificial, though
seemingly not ill adapted to give a great heat with but a very little
fuel. This they made by digging a round hole in the ground, about
twenty inches wide, and full three feet deep; cutting an opening in
the front, sloping down to the bottom, on the sides perpendicular,
of about nine inches wide, and fifteen long, reckoning from the cir-
cle where the jar was to come, to serve to throw in the wood at, and
for a passage to the ajr. On the side too they cut another small
opening, of about four inches by three; the jar, when placed, form-
ing one side of it, to serve as a chimney for the smoke to go out at.
The bottom of the earth was rounded up like a cup. Having then
placed the jar in this, as far as it would go down, they covered it
above, all round, with clay; except at the two openings, till within
about a fifth of its height; when their furnace was completed.

In this way, I reckon there was a full third of the surface of the
body of the still, or jar, exposed to the flame, when the fire came to
be lighted; and its bottom, not reaching to within two feet of where
the fuel was, left a capacious hollow between them, whence the wood,
that was short and dry, when lighted, being mostly converted into
flame, and circulating on so great a surface of the still, gave a much
stronger heat than could else have been produced from so very lit-
tle fuel; a consideration well worth the attention of a manufacturer,
in our country more especially, where firing is so dear. There in-
METHOD OF DISTILLING, AT Chatra in Ramgur. 263
deed, and particularly as coal is used, it would be better, no doubt, to have a grate; and that the air should enter from below. As to the benefit resulting from the body of the still being of earthen-ware, I am not quite so clear in it. Yet, as lighter substances are well known to transmit heat more gradually and slowly than the more solid, such as metals, may not earthen vessels, on this account, be less apt to burn their contents, so as to communicate an empyreumatic taste and smell to the liquor that is distilled, so often, and so justly complained of, with us. At any rate, in this country, where pots are made so cheap, I should think them greatly preferable, as, at least, much less expensive than those which the gentlemen engaged in this manufacture most commonly employ: though of this they are best able to judge.

Having thus made their furnace, and placed the body of the still in it, as above described, they to this luted on, with moistened clay, to its neck, at the opening, what they here call an adkur; forming with it, at once, a cover for the body of the still, with a suitable perforation in it to let the vapour rise through, and the under part of the alembic. The adkur was made with two earthen pans, having round holes in their middles, of about four inches diameter; and, their bottoms being turned opposite the one to the other, they were cemented together with clay; forming a neck of junction thus of about three inches, with the small rising on the upper pan. The lowermost of these was more shallow, and about eleven inches wide, so as to cover exactly the opening at the neck of the jar, to which they luted it on with clay. The upper and opposite of these was about four inches deep, and fourteen inches wide, with a ledge round its perforation in the middle, rising, as is already said, from the inner side of the neck, of about half an inch high, by which a gutter was formed to collect the condensed spirit as it fell down; and from this there was a hole in the pan to let it run off by; to which hole they occasionally luted on a small hollow bamboo, of about two feet and a half in length, to convey it to the receiver below. The upper pan had also another hole in it, of about an inch square, at near a quarter of its circumference from the one below just spoken of, that served to let off the water employed in cooling, as shall be mentioned presently.

Their adkur being thus fitted to the jar, they completed the
alembic by taking a copper-pot, such as we use in our kitchens, of about five inches deep, eight wide at the mouth, and ten at the bottom, which was rather flattish; and turning its mouth downward, over the opening in the adkur, luted it down on the inside of the jar with clay.

For their cooler they raised a seat, close upon, and at the back part of, the furnace, about a foot higher than the bottom of the copper-pot. On this they placed a two or three gallon pot, with a round hole, of about half an inch in the side of it; and to this hole, before they lighted their fire, they luted on a short tube of a like bore; placing the pot, and, directing its spout so as that, when filled with water, it threw a constant and uniform stream of it, from about a foot high, or near the centre of the bottom of the copper-pot, where it was diffused pretty completely over its whole surface; and the water falling down into the upper part of the pan of the adkur, it thence was conveyed through the square hole, already mentioned, by a trough luted on to it for that purpose, to a cooling recevoir a few feet from the furnace; from which they took it up again to supply the upper pot, as occasion required.

As their stock of water, however, in this sort of circulation, was much smaller than it seemingly ought to have been, being scarcely more than six or eight gallons, it too soon became hot; yet, in spite of this disadvantage, that so easily might have been remedied, and the shortness of the conducting tube, which had nothing but the common air to cool it, there ran a stream of liquor from the still; and but very little vapour rising from it; beyond any thing I had ever seen from stills of a much larger size, fitted with a worm and cooler. In about three hours' time, indeed, from their lighting of the fire, they drew off full fifteen bottles of spirit; which is more, by a great deal, I believe, than could have been done in our way from a still of twice the dimensions.

The conveniences of a worm and cooler, which are no small expence either, I have myself often experienced; and if these could be avoided in so simple a way, that might easily be improved, the hints that are here offered may be of some use. The thin metal head is certainly well adapted, I think, to transmit the heat to the water, which is constantly renewed; and which, if cold, as it ought to be, must absorb the fastest possible: whereas, in our way, the water
being confined in a tub, that, from the nature of its porous
substance, in a great degree rather retains than lets the heats pass away,
it soon accumulates in it, and becomes very hot; and though renewed
pretty often, never answers the purpose of cooling the vapour in the
worm so expeditiously and effectually as is done by their more simple
and less expensive apparatus. In this country more specially, where
labour and earthen-wares are so cheap, for as many rupees, and less,
twenty furnaces with stills, and everything belonging to them, in-
dependent of the copperpots, might very well be erected, that would
yield above a hundred gallons of spirits a day, allowing each still to
be worked only twice. So very cheap, indeed is arrack here, to the
great comfort of my miners, and of many thoughtless people beside,
that for one single peysa, (not two farthings sterling), they can get a
whole cuthe-seer of it in the bazaar, or above a full English pint, and
enough to make them completely intoxicated; objects often painful
to be seen.

Of the superior excellence of metal in giving out heat from it-
self, and from vapour contained in it, we have a very clear proof, in
what is daily performed on the cylinder of the steam engine: for
cold water being thrown on it when loaded, the contained vapour is
constantly condensed; whence, on a vacuum being thus formed, and
the weight of the atmosphere acting on the surface of the piston, at-
tached to the arm of the balance, it is made to descend, and to raise
the other arm that is fixed to the pump; while this being somewhat
heavier, immediately sinks again, which carries up the piston, while
the cylinder is again filled: and thus alternately by cooling and fil-
ing it, is the machine kept in motion; the power exerted in raising
the pump-arm being always in proportion to the diameter of the
cylinder, or to the surface of the piston, which is exactly fitted to it,
and on which the pressure acts.

The contrivance too, of having the under part of the alembic,
where the condensed vapour is collected, or upper part of what they
call the adkur, of earthen-ware, of so great a thickness, and of course
at so great a distance from the heat in the body of the still, is well
imagined to keep the spirits the coolest possible, when collected and
running off.

By thus cooling and condensing the vapour, likewise, so sud-
denly as it rises, there is in a great measure a constant vacuum
made, or as much as possible can be; but that both steam rises faster, and that water boils with much less heat, when the pressure is taken away from its surface, is an axiom in chymistry too well known to need any illustration; it boiling in vacuum, when the heat is only ninety or ninety-five by Farenheit's Thermometer, whereas in the open air, under the pressure of the atmosphere, it requires no less than that of two hundred and twelve ere it can be brought to the boiling point.

I must further observe, that the superior excellence of condensing the vapour so effectually and speedily in the alembic to our method of doing it on a worm and cooler, is greatly on the side of the former; both from the reasons I have already adduced, and because of the small stream of vapour that can be only forced into the worm, where it is condensed gradually as it descends; but above all, from the nature of vapour itself, with respect to the heat contained in it, which of late has been proved, by the very ingenious Dr. Black, to be greater by far than, before his discoveries, was imagined. For vapour he has shown to be in the state of a new fluid, where water is dissolved by heat; with the assistance, perhaps, if I may be allowed a conjecture, of the air which it contains: and all fluids, as he has clearly demonstrated, on their becoming such, absorb a certain quantity of heat, which becomes what he very properly calls latent heat, it being heat not appearing either to the senses or to the thermometer while they remain in that liquid state; but showing itself immediately by its effects on whatever is near it, upon their changing their form from fluid to solid; as on water becoming ice or metals fixing and the like. In the solution of salts, also there is an absorption of heat, as we daily experience in the cooling of our liquors by dissolving salt-petre in water; and this he has found to be the case with water itself, and other fluids, when passing into the state of vapour by boiling. From the most accurate and judicious experiments, indeed, he infers, and with the greatest appearance of truth, that the heat thus concealed in vapour raised by boiling, from any given bulk of water, would be fully sufficient, if collected in, piece of iron of the like size, to make it perfectly red hot. Which then must be the effect of so much heat, communicated in our way of distilling to the worm, and to the water in the tub, will be sufficiently evident from what has been said, to prove, I think, that w
have hitherto employed a worse and more defective method than we might have done with respect to cooling at least, both in the making of spirits, and in other distillations of the like kind, where a similar mode is adopted.

The poor ignorant Indian, indeed, while he with wonder surveys the vast apparatus of European distillers, in their immense large stills, worms, tubs, and expensive furnaces, and finds that spirits thus made by them are more valued, and sell much dearer than his own, may very naturally conclude, and will have his competitors join with him in opinion, that this must alone surely be owing to their better and more judicious manner of distilling with all those ingenious and expensive contrivances, which he can no wise emulate; but in this, it would appear, they are both equally mistaken; imputing the effects, which need not be controverted, perhaps, to a cause from which they by no means proceed; the superiority of their spirits, not at all arising from the superior excellence of these stills and furnaces, nor from their better mode of conducting the distillation in any respect; but chiefly rather from their greater skill and care in the right choice, and proper management, of the materials they employ in fermentation; and above all, as I apprehend, from the vast convenience they have in casks, by which, and from their abilities in point of stock, they are enabled, and do, in fact, in general, keep their spirits for a certain time, whence they are mellowed, and improved surprisingly both in taste and salubrity.

With respect to the latter improvement, I mention it more particularly here; and the more willingly also, as in general it seems to have been but too little attended to where a due attention to it might be of the greatest use. For of all things that have been found grateful to the human palate, there was none ever used, I believe, more hurtful to the body, and to the nerves especially, than fresh drawn ardent spirits; and this owing evidently to the principle of inflammability, of which, with water, they are mostly made up, being then in a more loose and detached state, less assimilated with the other principles than it afterwards becomes with time. By time, indeed, it is gradually not only more assimilated, but at length changes its nature altogether; so as to become, what was at first so pernicious, a benign, cooling liquor: when the spirit is strong, the
METHOD OF DISTILLING,

change, it is true, goes on more slow and imperceptibly; yet as a partial alteration is only wanted to mellow it for use, a few years keeping would be sufficient to answer the purpose here: and whether or not it could be possible to prevent any other from being sold than that which had been kept a certain time, is well worth the consideration of the Legislature.

That the great noxious quality of fresh drawn spirits is chiefly owing to the cause I have assigned, a little attention, and comparing of the effects that are uniformly produced by the principle of inflammability, wherever it is met with in a loose and weakly combined state, as it is in them, will easily convince us of: whereas, when fully assimilated either in spirits, or with any other body, it becomes entirely inert, and useful, more or less, either for food or physic, according to what it happens to be united with. Thus we find it in putrid animal substances, where it lately formed part of a healthy body, being now detached, or but weakly united with air, exhibiting a most offensive and pernicious poison: though this absorbed again by a living plant, is presently changed into good and wholesome nourishment; to the vegetable immediately, and to any animal who may afterwards choose to eat it. In like manner sulphur, which is a compound of this principle alone, united to a pure acid, the most destructive to all animal and vegetable substances, yet, it being here perfectly inert also, may be taken into the body with safety; when if loosened either by heat or by an alkaline salt uniting with the acid, its noxious quality is presently made perceivable to whoever comes within its reach.

Many other instances of a like nature might easily be added and some too more apposite, perhaps, than those I have here mentioned; but every one’s own experience, with what I have already said, will sufficiently evince the propriety and utility of putting an entire stop, if possible, to the sale of what ought to be so justly prohibited; and this, in its consequences, may even help to lead to other more effectual means of correcting, in a great measure, the abuse of spirits in general, that has been long so loudly and so justly complained of, amongst the soldiers, lower Europeans, and our servants in this country; where the very worst, and, indeed, poisonous sort of them, is daily sold at so very cheap a rate.

All I need further add with respect to distillation, and on th
superior advantages in the mode of conducting it here, to that we have been in use to employ for the raising of spirits, simple waters, and the like, is only to observe, I have no sort of doubt but that the intelligent chymical operators at home, if ever they should get a hint of it, will make no manner of scruple to use it also, and to improve upon it greatly by a few ingenious contrivances, which their knowledge and experience will so easily suggest. The principles on which it seems founded, indeed, especially with regard to their way of cooling, are so striking and just, that in many other distillations besides those of spirits and waters, they may be employed, I apprehend, with very great profit and advantage. I shall now, however, confine myself to mention only the benefit that may result from a like process in the raising of the finer aromatics, while the heat contrived, as in our way, besides impeding the distillation, must, from its long action on such subtile bodies, probably injure them greatly in the essential quality on which their excellence depends; and upon this very account I am apt to imagine that the greater quantity obtained, and the superior quality of the Oil of Roses made in this country, to that made from roses with us, is owing chiefly, if not entirely, to their better and more judicious manner of extracting it here. For, with us, the still being made of metal, may, in the first instance, impart too great and too sudden a degree of heat; and next, the oil continuing so long in the vapour, and that much compressed, may, in so delicate a subject, not only entirely almost unite it with the water, so as to render the separation impracticable, but may at the same time alter its essence so completely, as that it can no longer appear in the state it otherwise might have been found in, had the operation been better conducted, or in the way they do here. A very few trials, however, would much better certify this than all I can possibly say on the subject, or, in fact, than all the reasoning in the world. Therefore, as to my own particular opinion of the flavour and quality of the roses at home being equal, if not superior, to that of those in this country, I may be entirely silent. The rules and reasoning in chymistry, though serving greatly to enlarge and improve our understanding, being what of themselves can never be depended upon till confirmed by facts and experiments; where many things often turn out very different from what, from our best and most plausible arguments, we had the
greatest reason to expect. Or, if it should be found to be really true, what I have often heard asserted, by those, however, who had it only from others, but not of their own particular knowledge, that, in distilling their Oil of Roses at the places where they make it the best, they use also, with their roses, sandal-wood, and some other aromatics, no roses whatsoever, it is plain, could ever of themselves be made to afford a like oil, nor without such an addition as they employ. A circumstance, by the bye, that might possibly easily be certified by some one of the many ingenious correspondents of the Society, who may happen to reside where it is made: and a knowledge of the real truth of it would certainly be of use.

Chatra, December 24, 1786.
A METHOD OF CALCULATING THE MOON'S PARALLAXES

IN LATITUDE AND LONGITUDE.

BY MR. REUBEN BURROW.

In the Nautical Almanac for 1781, among other problems published by authority of the Board of Longitude, there is one for calculating the place of the Nonagesimal Degree; which is expressly recommended to Astronomers as "superior to all other methods for calculating eclipses of the Sun and occultations of the Stars." Now, as a considerable part of that method is erroneous, and particularly in south latitudes, and between the Tropics, (which include the most of India), the error may therefore be of consequence; and the more so, as it is published under the sanction of Dr. Maskelyne, the Astronomer Royal. I have, therefore, taken the liberty of giving the following rule to supply its place; and, in imitation of the methods of the Hindus, have endeavoured to express it so plainly, that any person may calculate by it without knowing much of the subject.

PROBLEM.

Given the apparent time at any given place; to find the longitude and altitude of the nonagesimal degree, and also the parallaxes in latitude and longitude.

1. Turn the difference of longitude from Greenwich into time, and add it to the apparent time, if the place be to the west of Greenwich; but subtract if the place be to the east, and the sum, or remainder, will be the apparent time at Greenwich.

2. To this time calculate the sun's right ascension in time, and add it to the apparent time at the given place; the sum is the right ascension of the meridian in time.

3. From the latitude of the place by observation, subtract the correction taken from page LXXV of Mayer's Tables; the remainder is the latitude in the spheroid.
4. Call the right ascension of the meridian in degrees AR; and, if the right ascension of the meridian

Be between \( \{ \infty \) and \( 90^\circ \) \} then, in \( \begin{cases} AR + 90^\circ \text{ is an} & \text{Arc A.} \\ 270^\circ - AR \text{ is the} & \text{Arc A.} \\ \text{but in} & \text{South} \\ \text{Latitude} & 450^\circ - AR \text{ is the} \\ \text{Lat.} & \text{Arc A.} \end{cases} \)

5. Let half the sum of the colatitude of the place and the obliquity of the ecliptic be called C; and half their difference D; then add the secant of C, the cosine of D, and the cotangent of half A, together; the sum (rejecting twice radius) is the tangent of an arc M; then add the cosecant of C, the sine of D, and the cotangent of half A, together; the sum (rejecting twice radius) is the tangent of an arc N; then if the colatitude of the place be greater than the obliquity of the ecliptic, the sum of M and N is an angle, whose complement call B; but, if the colatitude be less than the obliquity, let the complement of the difference of M and N be called B.

6. Add the secant of B, the sine of A, and the cosine of the latitude of the place, together; the sum (rejecting twice radius) is the sine of the altitude of the nonagesimal degree.

7. Add the tangent of the latitude to the tangent of the obliquity of the ecliptic; the sum is the sine of an angle, which call X.

8. When the right ascension of the meridian is

\[
\begin{align*}
\text{Between} & \quad \begin{cases} 360^\circ - X \quad \text{and} \quad 90^\circ \\ 90^\circ \quad \text{and} \quad 180^\circ + X \\ 180^\circ + X \quad \text{and} \quad 270^\circ \\ 270^\circ \quad \text{and} \quad 360^\circ - X \\ \text{Lat.} & \quad \text{Lat.} \end{cases} \\
\text{in} & \quad \begin{cases} X \quad \text{and} \quad 90^\circ \\ 90^\circ \quad \text{and} \quad 180^\circ - X \\ 180^\circ - X \quad \text{and} \quad 270^\circ \\ 270^\circ \quad \text{and} \quad X \\ \text{S.} & \quad \text{S.} \end{cases} \\
\text{then} & \quad \begin{cases} B \quad \text{is the} \\ \text{Longitude} \end{cases} \\
\text{of the nonagesimal degree.} & \quad \begin{cases} 180^\circ - B \\ 180^\circ + B \\ 360^\circ - B \end{cases}
\end{align*}
\]

9. Add the moon's latitude to \( 90^\circ \) when it is of a contrary name to the latitude of the place; but subtract it from \( 90^\circ \) when it is of the same name; the sum, or remainder, is the moon's polar distance: also take the difference between the moon's longitude and the longitude of the nonagesimal degree; which difference call P; also let half the sum of the moon's polar distance and altitude of the nonagesimal degree be called Q; and half their difference, R.

10. Add the secant of Q, the cosine of R, and the cotangent of half P, together; the sum is the tangent of an arc \( n \); also add the cosecant of Q, the sine of R, and the cotangent of half P, together; the sum is the tangent of an arc \( n \).

11. If the altitude of the nonagesimal degree be greater than
the moon's polar distance, take the sum of the arcs \( m \) and \( n \) for the
parallactic angle; but if it be less, take their difference.

12. Add the cosecant of the parallactic angle, the sine of \( P \),
and the sine of the altitude of the nonagesimal degree, together; the
sum (rejecting twice radius) is the sine of the moon's true zenith
distance.

13. To the sine of the moon's true zenith distance add the
logarithm of the horizontal parallax; the sum (rejecting radius) is
the logarithm of the parallax in altitude nearly; add the parallax,
thus found, to the true zenith distance, and the sum will be the
corrected zenith distance.

14. Add the sine of the corrected zenith distance, the cosine
of the parallactic angle, and the logarithm of the horizontal parallax,
together; the sum (rejecting twice radius) is the logarithm of the
parallax in latitude.

15. Add the logarithm of the parallax in latitude, the tangent of
the parallactic angle, and the secant of the moon's latitude, together;
the sum (rejecting twice radius) is the logarithm of the parallax in
longitude.

**EXAMPLE.**

"What is the altitude and longitude of the nonagesimal degree
at Ludlow, whose lat. is 52° 23' north, and longitude oh. 11m. west
of Greenwich, 7th February, 1778, at 10h. 56' 11" app. time, being the
time of an occultation of \( \mu \) geminorum."

Not having the Almanac for 1778, I shall assume the moon's
latitude to be 0°. 51' S. and her longitude 91°. 57'.

\[
\begin{array}{cc}
10 & 56 \\
11 & \text{ap. time}
\end{array}
\quad
\begin{array}{cc}
21 & 27 \\
14 & \text{AR}
\end{array}
\quad
\begin{array}{cc}
10 & 56 \\
11 & \text{diff. long.}
\end{array}
\]

\[
\begin{array}{cc}
11 & 7 \\
11 & \text{ap. t. Greenwich}
\end{array}
\quad
\begin{array}{cc}
8 & 23 \\
25 & \text{AR of meridian}
\end{array}
\]
A METHOD OF CALCULATING

52° 23' latitude. 125° 51' 15" = AR
0° 14' correction.

52° 9' reduced lat. 144° 8' 45" = A
37° 51' colat.

18° 55' half colat. tang. of latitude 10.11319
tang. of obliquity 9.63761
11° 44' half obliq.

Sine of 34°.18'=X 9.75080

| C = 30° 39' | secant | 10.06535 | cosecant | 10.29261 |
| D = 7° 11' | cosine | 9.99658 | sine | 9.09706 |
| 1/2 A = 72° 4' | cotan. | 9.51005 | cotan. | 9.51005 |
| N = 4° 32' |

25° 0
B = 65° 0
180° 0

A = 144° 9' sin. 9.76765
Lat. 52° 9' cos. 9.78788
B = 65° 0 sec. 10.37405

115° 0 long. nonagesimal degree.
Altitude of do. 58° 15' S. 9.92958

half D's polar dist. = 45° 26'
half alt. non. deg. = 29° 8'

Q = 74° 34' secant 10.57493 cosecant 10.01595
R = 16° 18' cosine 9.98218 sine 9.44819
1/2 P = 11° 32' cotan. 10.69025 cotan. 10.69025

m = 86° 46' tan. m 11.24736 tan. n 10.15439
n = 54° 58'

parallactic angle = 31° 48' cosecant 10.27823
alt. non. degree 58° 15' ... sine 9.92958
P = 23° 3' ... sine 9.59277

moon's true zen. d. 39° 11' ... sine 9.80058
horizon. parallax 3488' ... log. 3.54258

par. in alt. nearly 2204' ... log. 3.34316

corrected zen. dist. 39° 47' 44' sine 9.80628
hor. par. log. 3.54258
parallactic angle cosine 9.92936
parallax in latitude = 1898' ... log. 3.27822
parallactic angle ... tangent 9.79241
moon's latitude 0° 51' ... secant 10.00023
parallax in long. 1177' ... log. 3.07860
When the moon is very near the ecliptic, as in eclipses, the following method will be nearly exact:

1. Add the cosine of the altitude of the nonagesimal degree to the logarithm of the horizontal parallax; the sum (rejecting radius) is the logarithm of the parallax of latitude nearly: Add this parallax to the complement of the altitude of the nonagesimal degree, and call the sum the complement of the altitude of the nonagesimal degree corrected.

2. Add the cosecant of the complement of the altitude of the nonagesimal degree; the sine of the complement of the altitude of the nonagesimal degree corrected, and the logarithm of the parallax of latitude nearly, together; the sum (rejecting twice radius) is the logarithm of the parallax in latitude corrected.

3. Add the logarithm of the parallax in latitude corrected; the sine of P, and the tangent of the altitude of the nonagesimal degree, together; the sum (rejecting twice radius) is the logarithm of the parallax in longitude.

Scholium. The method of applying the parallaxes usually given requires no other correction than the following. When the pole of the ecliptic of the same name as the latitude is under the horizon, to the cotangent of the altitude of the nonagesimal degree, add the cotangent of the moon's latitude; the sum is the cosine of an angle; which added to, and, subtracted from, the longitude of nonagesimal degree, gives two longitudes, between which the moon's latitude of a contrary name to the elevated pole is to be increased for the apparent latitude; but beyond those longitudes the moon's true latitude is to be increased by the parallax in latitude to have the apparent latitude.
REMARKS ON THE ARTIFICIAL HORIZONS; &c.

BY MR. REUBEN BURROW.

The utility of a perfect horizon, and the liaibleness of quicksilver to be disturbed by the least wind, have induced numbers of people to invent artificial horizons of different kinds, and many of them very complicated. Some time ago having occasion to determine the situation of several places by astronomical observations, and there being no astronomical quadrant belonging to the company in the settlement, I was under a necessity of determining the latitudes by a sextant; and that at a time when the sun passed so near the zenith as to make it impossible to get meridian altitudes: I therefore collected all the different artificial horizons and glass roofs, and other contrivances, for that purpose I could meet with; but, though they appeared correct, the results were very erroneous. I examined them by bringing the two limbs of the sun, seen by direct vision, to touch apparently in the telescope of a sextant, and then observed the reflected images in quicksilver, which still appeared to touch as before; but, on examining the reflected images in the rest of the artificial horizons, none of them appeared to touch; and the error in many was very considerable. I tried a number of other methods with little success, as they were mostly combinations of glasses. At last, accidentally hearing some officers speaking of "Tents that would neither turn sun nor rain," I considered that the rays of the sun would pass through cloth unrefracted, and in consequence of this idea I applied some thin mosquito* curtain as a covering to the quicksilver, and found it effectually excluded the wind and admitted the sun; and what is of equal consequence in this country it totally kept away those minute insects that disturb the surface of the quicksilver in observing: in short, it formed so complete a horizon, that I could not before have hoped for any thing so perfect: and it is equally applicable to the sun and stars.

For taking very great or very small elevations of the sun, (which with the common horizon sextants are impracticable in the direct method), a polished metallic instrument might be made in the

* A kind of silk gauze, as close as book-muslin, and perfectly transparent. It is to be stretched over a hoop, which stands without touching the vessel containing the mercury.
form of part of a hollow obtuse cone: this might have its axis set perpendicular to the horizon at any time by means of screws in a variety of methods; and observations might be made by it with great exactness.

In finding the latitude, when meridian observations cannot be taken, either there is an opportunity of taking altitudes on both sides of the meridian, or not: when there is not, the best method is to calculate the latitude from two altitudes and the time between, exactly by spherical trigonometry, (first correcting the declination to the beginning and end of each interval) as the approximating methods of Dowes, and others, are totally insufficient. When observations can be taken both before and after noon, it is best to take a number of altitudes in both, and then make out the equal altitudes by proportion; then having found the true time of noon by the usual method, correct the two intervals and the declination to each time, and the latitude may be found as follows:

Add the cosine of the angle from noon, to the cotangent of the declination; the sum is the cotangent of an arc $A$.

Add the sine of $A$, the sine of the altitude, and the arithmetical complement of the sine of the declination, together; the sum is the cosine of an arc $B$.

Then the sum or difference of $A$ and $B$ is the latitude.

As every altitude gives an independent latitude, it is evident the latitude may be thus found to great exactness.

An instrument might easily be contrived to measure the sun's angle of position to great exactness, from whence the latitude might readily be deduced; a small addition to the common theodolite would be sufficient. The variation of the azimuth near the meridian may also be advantageously applied for the same purpose.
DEMONSTRATION of a THEOREM concerning the INTERSECTIONS of CURVES.—By REUBEN BURROW, Esq.

In Stone's Mathematical Dictionary is the following paragraph: "Two geometrical lines of any order will cut one another in as many points as the number expresses, which is produced by the multiplication of the two numbers expressing those orders." And Mr. Braikonridge in the preface to his Exercitatio Geometrica de descriptione Curvarum says: "Mr. George Campbell, now Clerk of the Stores at Woolwich, has got a neat demonstration of the "same, which he hopes he will publish." As it does not appear that Campbell ever published any thing, except a paper on the roots of equations, and a small treatise on the plagiarisms of Maclaurin, it is very probable his demonstration is lost, and therefore it may not be improper to publish the following:

The equation of a line of the first order has one root, or function of the absciss, for the ordinate; of the second order, two; and so on.

In equations for two right lines, the roots may so vary and accommodate themselves to each other, that the quantities expressing the ordinates may be equal; and as there is only one case where this can happen, therefore two right lines can only intersect in one point.

If a line of the first order be compared with a line of the second, or an equation of one root with an equation of two; the root of the first, and a single root of the second, may so vary as to become equal to each other, or to form an intersection. By the same reason, the single root of the first, and the remaining root of the second, may each so vary as to become equal, or to form another intersection; and therefore a right line cuts a line of the second order in two points.

If a line of the first order be compared with a line of the \( n \) order, it is also evident that the single root of the first line may in the same manner be so varied with each of the \( n \) roots of the second line as to become equal; and therefore a right line may cut a line of the \( n \) order in \( n \) points.
Let a line of the \( m \) order be now compared with a line of the order \( n \); then as each single root of the first line may become equal, in the same manner, to every root in the second, it therefore follows, that for every unit in \( m \) there may be \( n \) intersections; and, as there are \( m \) units, there consequently will be \( mn \) intersections.

The same method may be applied to the determination of the points, line, and surfaces, that arise from the intersections of lines, surfaces, and solids; by considering that the number of times that \( p \) may be taken from \( m \), and \( q \) at the same time from \( n \) will be equal to \( \frac{m \cdot m - 1 \ldots p \times n \cdot n - 1 \ldots q}{1 \cdot 2 \cdot 3 \ldots p \times 1 \cdot 2 \cdot 3 \ldots q} \).
THE PROCESS OF MAKING ATTAR,

OR ESSENTIAL OIL OF ROSES.

BY LIEUTENANT COLONEL POLIER.

The attar is obtained from the roses by simple distillation, and the following is the mode in which I have made it. A quantity of fresh roses (for example, forty pounds) are put in a still with sixty pounds of water, the roses being left as they are with their calyces, but with the stems cut close. The mass is then well mixed together with the hands, and a gentle fire is made under the still. When the water begins to grow hot, and fumes to rise, the cap of the still is put on, and the pipe fixed: the chinks are then well luted with paste, and cold water put on the refrigeratory at top. The receiver is also adapted at the end of the pipe; and the fire is continued under the still, neither too violent nor too weak. When the impregnated water begins to come over, and the still is very hot, the fire is lessened by gentle degrees, and the distillation continued till thirty pounds of water are come over, which is generally done in about four or five hours. This rose-water is to be poured again on a fresh quantity (forty pounds) of roses, and from fifteen to twenty pounds of water are to be drawn by distillation, following the same process as before. The rose-water thus made and cohubated, will be found, if the roses were good and fresh, and the distillation carefully performed, highly scented with the roses. It is then poured into pans either of eartken-ware or of tinned metal, and left exposed to the fresh air for the night. The attar or essence will be found in the morning congealed, and swimming on the top of the water. This is to be carefully separated, and collected, either with a thin shell or a skimmer, and poured into a vial. When a certain quantity has thus been obtained, the water and feces must be separated from the clear essence, which, with respect to the first, will not be difficult to do, as the essence congeals with a slight cold and the water may then be made to run off. If, after that, the essence is
kept fluid by heat, the feces will subside, and may be separated; but, if the operation has been neatly performed these will be little or none. The feces are as highly perfumed as the essence, and must be kept, after as much of the essence has been skimmed from the rose-water as could be. The remaining water should be used for fresh distillations, instead of common water; at least as far as it will go.

The above is the whole process of making genuine attar of roses. But, as the roses of this country give but a very small quantity of essence, and it is in high esteem, various ways have been thought of to augment the quantity, though at the expense of the quality. In this country it is usual to add to the roses, when put in the still, a quantity of sandal-wood raspings, some more, some less, (from one to five tolahs, or half ounces). The sandal contains a deal of essential oil, which comes over freely in the common distillation, and mixing with the rose-water and essence, becomes strongly impregnated with their perfume. The imposition, however, cannot be concealed; the essential oil of sandal will not congeal in common cold; and its smell cannot be kept under, but will be apparent and predominate, in spite of every art. In Cashemire they seldom use sandal to adulterate the attar, but I have been informed, to increase the quantity, they distill with the roses a sweet-scented grass, which does not communicate any unpleasant scent, and gives the attar a high clear green colour. This essence also does not congeal in a slight cold as that of roses.

Many other ways of adulteration have been practised, but all so gross and palpable that I shall say nothing of them.

The quantity of essential oil to be obtained from the roses, is very precarious and uncertain, as it depends not only on the skill of the distiller, but also on the quality of the roses, and the favourableness of the season. Even in Europe, where the chemists are so perfect in their business, some, as TACHENIUS, obtained only half an ounce of oil from one hundred pounds of roses. HAMBERG obtained one ounce from the same quantity; and HOFFMAN above two ounces. (N. B. the roses in those instances were stripped of their calyxes, and only the leaves used). In this country nothing like either can be had; and to obtain four masha (about one drachm and a half) from eighty pounds, which deducting the calyxes,
comes to something less than three drachms per hundred pounds of rose-leaves, the season must be very favourable, and the operation carefully performed.

In the present year, 1787, I had only sixteen tolahs of attar from fifty-four maunds, twenty-three seers, of roses, produced from a field of thirty-three bigghas, or eleven English acres; which comes to about two drachms per hundred pounds. The colour of the attar of roses is no criterion of its goodness, quality, or country. I have had, this year, attar of a fine emerald green, of a bright yellow, and of a reddish hue, from the same ground, and obtained by the same process, only of roses collected at different days.

The calyces do not in any shape diminish the quality of the attar, nor impart any green colour to it; though, perhaps they may augment the quantity: but the trouble necessary to strip them must, and ought to, prevent its being ever put in practice.

_Lucknow, May, 1787._
By Mr. MACDONALD, with a Specimen of GOLD.

THE country of Limong, on the Island of Sumatra, immediately contiguous to the presidency of Fort Marlborough, and between seventy and eighty miles inland, produces the finest gold and gold-dust on that island. The Limong gold merchants repair annually to Marlborough, for the purchase of opium, and such other articles as they may be in want of; in exchange for which they give gold of so pure a nature as to contain little or no alloy. The gold is found sometimes in dust, and often lodged in a very hard stone. It is of a whitish colour, and resembles that in which the veins run in the gold mines of Tiltit in Chili. The gold is extracted by beating the compound mass in order to disengage it from the stone, which flies off in splinters, and leaves the gold cleared of it. This is the mode used by a rude people; by which a part of the gold must be lost in the splinters of the stone, which fly off in beating the mass. They are totally ignorant of the advantage of grinding it to a gross powder, mixing it with quicksilver, and separating the earthen and stony particles from those of the gold, by the action of a stream of water on this paste, carrying off the former, and leaving the latter precipitated to the bottom by their greater weight. They are almost entirely ignorant of the principles of assaying and amalgamation, but are extremely expert in separating particles of foreign metals from gold-dust, by a very superior acuteness of vision, no doubt arising from experience, and not a peculiar gift. They have people among them who are gold-cleaners by occupation. The gold is found in a species of earth composed of a clayish-red loam. On digging the earth, it is found to consist of strata (under the loam of the surface, commonly called soil) of irregular-shaped stones of a mouldering nature, mixed with red clay, and hard pebbles mixed with a pale red clay, of a more dense consistency than that of the first stratum. The first stratum extends to a depth of three feet and a half, and the second to somewhat less. The consistency under these strata is formed of either hard rock, or of gravel nearly approaching to it. The gold is found mixed with a stone of a hard nature, and capable of sustaining a polish. It is found near the surface, and generally in a soil freest from solid rock.

The merchants, who bring the gold for sale, are not themselves
the finders or gatherers of it, but receive it, for merchandise, from the Malays inhabiting the interior parts of the country. The native indolence of the Malay disposition prevents them from collecting more than is sufficient to supply the few and simple wants of a race of men, as yet, unenlightened by civilization and science, and ignorant of the full extent of the advantages of the country inhabited by them. We have not, to this hour, explored a country, which, we have reason to suppose, produces more, or as much gold as either Peru or Mexico. This may be attributed partly to the difficulties incident to the undertaking, and partly to a want of curiosity, that, indulged, might have been productive of great national and private advantages. The roads leading to this golden country are almost impervious; affording only a scanty path to a single traveller, where whole nights must be passed in the open air, exposed to the malignant influence of a hostile climate, in a country infested by the most ferocious wild beasts. These are circumstances that have hitherto checked curiosity; but perseverance and contrived precaution will surmount the obstacles they furnish, and such discoveries might be made, as would amply compensate for the difficulties leading to them. The gold-merchants who come from the neighbouring and less rich countries, give us such accounts of the facility of procuring gold as border nearly on the marvellous, and would be altogether incredible, if great quantities of that metal produced by them did not, in a great measure, evince the certainty of their accounts. I have seen an imperfect chart of a part of the interior country, made by an intelligent native, on the scale of the rate of his walking, and from the respective situations of the sun in regard to his position. It contained a chain of what he called Gold Mines, extending in latitude, nearly, not much less than three degrees. This chart is in the possession of Mr. Miller of the council of Fort Marlborough, who did me the favour of explaining it. After making allowances for the licence of a traveller, some credit may be given to this chart, more especially, as we are well assured, that that part of Sumatra produces large quantities of fine gold. The result of the whole is, that it would be a very laudable object to explore those rich countries, and to establish the working of gold-mines in them, as it could be done under a certain prospect of advantage. The expense arising from clearing the country, procuring intelligence, making roads, es-
ON THE ISLAND OF SUMATRA.

establishing and forming posts of communication, and of employing professional men, would, undoubtedly, be at first very considerable, but the resulting advantages would defray these, and render it a matter of surprise, that a measure attended with such obvious utility, had not been adopted at an earlier period.

It is more than probable, that Sumatra must have been the Ophir of Solomon's time. This conjecture derives no small force from the word ophir's being really a Malay substantive of a compound sense, signifying a mountain containing gold. The natives have no oral or written tradition on the subject, excepting, that the island has in former times afforded gold for exportation: whether to the eastward or westward remains an uncertainty. We have certain accounts that the vessels that imported this article were long detained, or did not return in much less than a year. It is therefore probable that they wintered, during the violence of the S.W. monsoon, either at Ceylon, or on the N.E. coast, and completed their voyages during the moderate part of the other monsoon.
XVIII.

ON THE LITERATURE OF THE HINDUS,

FROM THE SANSKRIT,

COMMUNICATED BY GOVERNOR CAUL,

With a short Commentary.

THE TEXT.

THERE are eighteen Védas or parts of true knowledge, and some branches of knowledge falsely so called; of both which a short account shall here be exhibited.

The first four are the immortal Védas, evidently revealed by God; which are entitled, in one compound word, Rigv díaḥsámd-tharva, or, in separate words, Rick, Yajush, Sáman, and Atharvan. The Rigv éda consists of five sections; the Yajuv éda, of eighty-six; the Sánav éda, of a thousand; and the Atharvav éda, of nine; with eleven hundred śádas or branches, in various divisions and subdivisions. The Védas in truth are infinite; but were reduced by Vyāśa to this number and order: the principal part of them is that which explains the duties of man in a methodical arrangement; and in the fourth is a system of divine ordinances.

From these are deduced the four Upav édas, namely, Ayush, Gandharva, Dhanush, and Sthápattyà; the first of which, or Ayurvéda, was delivered to mankind by Brahma, Indra, Dhanwan-tari, and five other deities; and comprises the theory of disorders and medicines, with the practical methods of curing diseases. The second, or music, was invented and explained by Bharata: it is chiefly useful in raising the mind by devotion to the felicity of the Divine Nature. The third Upav éda was composed by Visīwamitra, on the fabrication and use of arms and implements handled in war by the tribe of Cshāriyas. Visīwacarman revealed the fourth in various treatises on sixty-four mechanical arts, for the improvement of such as exercise them.

Six Angas, or bodies of learning, are also derived from the same source: their names are Sushà, Calpa, Vyācarana, Chhandas, Jyotish,
and Niructi. The first was written by Pa'Nini, an inspired saint, on the pronunciation of vocal sounds; the second contains a detail of religious acts and ceremonies from the first to the last; and from the branches of these works a variety of rules have been framed by A's'wala'yana, and others. The third, or the grammar, entitled Pan'inya, consisting of eight lectures or chapters, (Vriddhiradaij, and so forth), was the production of three Rishis, or holy men, and teaches the proper discriminations of words in construction; but other less abstruse grammars, compiled merely for popular use, are not considered as Angas. The fourth, or prosody, was taught by a Muni, named Pingala, and treats of charms and incantations in verses aptly framed and variously measured; such as the Gāyatri, and a thousand others. Astronomy is the fifth of the Vedāngas, as it was delivered by Su'rya, and other divine persons: it is necessary in calculations of time. The sixth, or Niructi, was composed by Ya'sca (so is the manuscript; but, perhaps, it should be Vya'sa) on the signification of difficult words and phrases in the Vedas.

Lastly, there are four Upāngas, called Purāna, Nyāya, Mīmāṃsā, and Dharma sāstra. Eighteen Purānas, that of Brahma', and the rest, were composed by Vya'sa for the instruction and entertainment of mankind in general. Nyāya is derived from the root ni, to acquire or apprehend; and, in this sense, the books on apprehension, reasoning, and judgment, are called Nyāya. The principal of these are the work of Gautama, in five chapters, and that of Cana'da, in ten; both teaching the meaning of sacred texts, the difference between just and unjust, right and wrong, and the principles of knowledge, all arranged under twenty-three heads. Mīmāṃsā is also twofold; both showing what acts are pure or impure, what objects are to be desired or avoided, and by what means the soul may ascend to the First Principle. The former, or Carma Mīmāṃsā, comprised in twelve chapters, was written by Jaimini, and discusses questions of moral duties and law. Next follows the Upāsand Canda in four lectures. (Sancarshana and the rest), containing a survey of Religious Duties; to which part belong the rules of Sa'ṃdilya, and others, on devotion and duty to God. Such are the contents of the Pūrva, or former, Mīmāṃsā. The Uttara, or latter, abounding in questions on the Divine Nature and other sublime speculations, was composed by Vya'sa, in four chapters and
sixteen sections: it may be considered as the brain and spring of all the Angas; it exposeth the heretical opinions of Râmañujâ, Ma'dhwa, Vallabha, and other sophists; and, in a manner suited to the comprehension of adepts, it treats on the true nature of Gâneśa, Bhâscarâ, or the Sun, Nîlacanta, Lacshmi', and other forms of One Divine Being. A similar work was written by Sri'-sâncara, demonstrating the supreme power, goodness, and eternity of GOD.

The Body of Law, called Smrti, consists of eighteen books, each divided under three general heads, the duties of religion, the administration of justice, and the punishment or expiation of crimes. They were delivered, for the instruction of the human species, by Menu, and other sacred personages.

As to ethics, the Védas contain all that relates to the duties of kings; the Purânas what belongs to the relation of husband and wife; and the duties of friendship and society (which complete the triple division) are taught succinctly in both: this double division of Angas and Upângas may be considered as denoting the double benefit arising from them in theory and practice.

The Bhadrata Râmdâyana, which are both epic and poems, comprise the most valuable part of ancient history.

For the information of the lower classes in religious knowledge, the Pâsûpata, the Pancharatra, and other works, fit for nightly meditation, were composed by Siva, and others, in an hundred and ninety-two parts on different subjects.

What follow are not really divine, but contain infinite contradictions. Sâńchya is twofold, that with Is'wara and that without Is'wara. The former is entitled Pâtnjala in one chapter of four sections, and is useful in removing doubts by pious contemplation; the second, or Cápila, is in six chapters on the production of all things by the union of Pracriti, or nature, and Purusha, or the first make: it comprises also, in eight parts, rules for devotion, thoughts on the invisible power, and other topics. Both these works contain a studied and accurate enumeration of natural bodies and their principles; whence this philosophy is named Sâńchya. Others hold, that it was so called from its reckoning three sorts of pain.

The Mímânsâ, therefore, is in two parts; the Nyâya, in two;
and the Sa'ńchya, in two; and these six schools comprehend all the doctrine of the Theists.

Last of all appears a work written by Buddha; and there are also six atheistical systems of philosophy, entitled Yogyachara, Saudhanta, Vaisheshika, Madhyamika, Digambara, and Charvaka; all full of indeterminate phrases, errors in sense, confusion between distinct qualities, incomprehensible notions, opinions not duly weighed, tenets destructive of natural equality, containing a jumble of atheism and ethics; distributed, like our orthodox books, into a number of sections, which omit what ought to be expressed, and express what ought to be omitted; abounding in false propositions, idle propositions, inaptent propositions. Some assert, that the heterodox schools have no Upangas; others, that they have six Angas, and as many Sargas, or bodies, and other appendices.

Such is the analysis of universal knowledge, practical and speculative.

THE COMMENTARY.

This first chapter of a rare Sanscrit book, entitled Vidyadoresa, or a View of Learning, is written in so close and concise a style, that some parts of it are very obscure, and the whole requires an explanation. From the beginning of it we learn, that the Vedas are considered by the Hindus as the fountain of all knowledge, human and divine; whence the verses of them are said in the Gita to be the leaves of that holy tree, to which the Almighty himself is compared:

उङ्ग्नवा न्द्राम अधाम सच्च वाच्यष्टम प्राप्तविद्यायम्
तं हन्दांशि यस्य यस्मि वैदाः सा वेदविदि

"The wise have called the Incorruptible One an Aswatttha, "with its roots above and its branches below; the leaves of which "are the sacred measures. He, who knows this tree, knows the "Vedas."

All the Pandits insist, that Aswatttha means the Pippala, or Religious Fig-tree, with heart-shaped pointed, and tremulous leaves; but the comparison of heavenly knowledge, descending and taking root on earth, to the Va'ta, or great Indian fig-tree, which has most conspicuously its roots on high, or at least has radicating branches, would have been far more exact and striking.

The Vedas consist of three Cān'ḍas, or General Heads; namely,
Carma, jñāna, Upāsanā; or Works, Faith, and Worship: to the first of which the author of the Vidyādêsa wisely gives the preference, as Menu himself prefers universal benevolence to the ceremonies of religion:

Japēṇainā v tv sansiddhyēdbrāhma no nātra sansayaḥ:
Curyādanyatra v curyānmaitrī brahmaṇa uchyatē.

That is, "By silent adoration undoubtedly a Brāhmaṇ attains holiness; but every benevolent man, whether he perform or omit that ceremony, is justly styled a Brāhmaṇ." This triple division of the Vēdas may seem at first to throw light on a very obscure line in the Gītā:

Traigunyavishayah vēdē nistraigunya bhavārjuna;
Or, "The Vēdas are attended with three qualities: be not thou a man of three qualities, O Arjuna."

But several Pandits are of opinion, that the phrase must relate to the three Gīnas, or qualities of the mind, that of excellence, that of passion, and that of darkness; from the last of which a Hero should be wholly exempt, though examples of it occur in the Vēdas, where animals are ordered to be sacrificed, and where horrid incantations are inserted for the destruction of enemies.

It is extremely singular, as Mr. Wilkins has already observed, that, notwithstanding the fable of Brāhma’s fourmouths, each of which uttered a Vēda, yet most ancient writers mention only three Vēdas; in order as they occur in the compound word Rigyajujusāma; whence it is inferred, that the Atharvan was written or collected after the three first; and the two following arguments, which are entirely new, will strongly confirm this inference. In the eleventh book of Menu, a work ascribed to the first age of mankind, and certainly of high antiquity, the Atharvan is mentioned by name, and styled the Vēda of Vēdas; a phrase which countenances the notion of Dā'kā Shecu'H, who asserts, in the preface to his Upanishat, that "the three first Vēdas are named separately, because the Atharvan is a corollary from them all, and contains the quintessence of them."

But this verse of Menu, which occurs in a modern copy of the work brought from Bāndras, and which would support the antiquity and excellence of the fourth Vēda, is entirely omitted in the best copies, and particularly in a very fine one written at Gayā, where it was accurately collated by a learned Brāhmaṇ; so that, as
OF THE HINDUS.

MENU himself, in other places, names only three Védas, we must believe this line to be an interpolation by some admirer of the Atharvan; and such an artifice overthrows the very doctrine, which it was intended to sustain.

The next argument is yet stronger, since it arises from internal evidence; and of this we are now enabled to judge by the noble zeal of Colonel POLIER in collecting Indian curiosities; which has been so judiciously applied and so happily exerted, that he now possesses a complete copy of the four Védas in eleven large volumes.

On a cursory inspection of those books it appears, that even a learner of Sanscrit may read a considerable part of the Atharvana-veda without a dictionary; but that the style of the other three is so obsolete, as to seem almost a different dialect. When we are informed, therefore, that few Brähmans at Bénaras can understand any part of the Védas, we must presume, that none are meant, but the Ríck, Yajush, and Sáman, with an exception of the Atharvan, the language of which is comparatively modern; as the learned will perceive from the following specimen:

Yatra brahmanavidyā yanti dīcchayā tapasā saha agnirmāṇa tatra nayatwagnirmāṇdhā dedhātmē, aghayē swādhā, vāyurman tatra nayatu vāyuh prā'ān dedhātu mē, vāyuvē swādhā, sūryā mē nātra nayatu shacshuh sūryā dedhātu mē, sūryāya swādhā; chandrō mān tatra nayatu manaschandrod dedhātu mē, chandrdya swādhā, sōmō mān tatra nayatu payuh sōmō dedhātu mē, sōmyāya swādhā. Indrō mān tatra nayatu balamindrod dedhātu mē, indrāya swādhā. dpō mān tatra nayatvair-taunmāpatishtatu, adbhuh swādhā. yatra brahmanavidyā yanti dīchayā tapasā saha, brahnā mān tatra nayatu brahma brahmā dedhātu mē, brahmāna swāhā.

That is, "Where they, who know the Great One, go, through holy rites and through piety, this may fire raise me! May fire receive my sacrifices! Mysterious praise to fire! May air waft me there! May air increase my spirits! Mysterious praise to air! May the Sun draw me thither! May the sun enlighten my eye! Mysterious praise to the sun! May the Moon bear me thither! May the moon receive my mind! Mysterious praise to the moon! May the plant Soma lead me thither! May Soma bestow on me its hallowed milk! Mysterious praise to Soma! May Indra, or the firmament, carry me thither! May Indra give me strength! Mysterious praise to Indra! May water bear me thither! May water bring me the stream of immortality!"
Mysterious praise to the waters! Where they, who know the
Great One, go, through holy rites and through piety, thither may
BRAHMA conduct me! May BRAHMA lead me to the Great One!
Mysterious praise to BRAHMA!

Several other passages might have been cited from the first book
of the Atharvan, particularly a tremendous incantation with conse-
crated grass, called Dūrbha, and a sublime hymn to Cāla, or time;
but a single passage will suffice to show the style and language of
this extraordinary work. It would not be so easy to produce a gen-
uine extract from the other Vīdas. Indeed, in a book, entitled
Sīvavedānta, written in Sanscrit, but in Cashmirian letters, a stanza
from the Yajurveda is introduced; which deserves for its sublimity
to be quoted here; though the regular cadence of the verses, and
the polished elegance of the language, cannot but induce a suspi-
cion, that it is a more modern paraphrase of some text in the anci-
ent Scripture:

natatrasūryabhātinachandratāraka, nēma vidyutbhānticuta
ēva valnah: tamēvabhāntam anubhāti servam, tasya bhadra
svadhāvmidam vībhāti.

That is, "There the sun shines not, nor the moon and stars:
These lightnings flash not in that place; how should even fire
blaze there? God irradiates all this bright substance; and by
its effulgence the universe is enlightened.

After all, the books on divine knowledge, called Veda, or what is
known, and Sruti, or what has been heard, from revelation, are still
supposed to be very numerous; and the four here mentioned are
thought to have been selected, as containing all the information
necessary for man. Mohsani Fa'ni, the very candid and ingenious
author of the Dābistān, describes in his first chapter a race of old
Persian sages, who appear from the whole of his account to have
been Hindus; and we cannot doubt, that the book of Māha'ba'd, or
Menu, which was written, he says, in a celestial dialect, means the
Veda; so that, as Zera'tush was only a reformer, we find in India
the true source of the ancient Persian religion. To this head
belong the numerous Tāntra, Mantra, Agama, and Nigama,
Sāstra s, which consist of incantations and other texts of the Vēdas,
with remarks on the occasions, on which they may be successfully
applied. It must not be omitted, that the Commentaries on the
Hindu Scriptures, among which that of Vāsishtha seems to be reputed the most excellent, are innumerable; but, while we have access to the fountains, we need not waste our time in tracing the rivulets.

From the Vēdas are immediately deduced the practical arts of Chirurgy and Medicine, Music and Dancing; Archery, which comprises the whole art of war, and Architecture, under which the system of mechanical arts is included. According to the Pandits, who instructed Abūl Fazl, each of the four Scriptures gave rise to one of the Upavēdas or Sub-scriptures, in the order in which they have been mentioned; but this exactness of analogy seems to favour of refinement.

Infinite advantage may be derived by Europeans from the various medical books in Sanscrit, which contain the names and descriptions of Indian plants and minerals, with their uses, discovered by experience, in curing disorders. There is a vast collection of them from the Characa, which is considered as a work of Siva, to the Rkagirirāpana and the Nidāna, which are comparatively modern. A number of books, in prose and verse, have been written on Music, with specimens of Hindu airs in a very elegant notation; but the Silpa sāstra, or Body of Treatises on Mechanical Arts, is believed to be lost.

Next in order to these are the six Vēdāngas, three of which belong to Grammar. One relates to religious ceremonies; a fifth to the whole compass of Mathematics, in which the author of Līttuvatī was esteemed the most skilful man of his time; and the sixth, to the explanation of obscure words or phrases in the Vēdas. The grammatical work of Pā'ṇīnī, a writer supposed to have been inspired, is entitled Siddhānta Caumudi, and is so abstruse as to require the lucubrations of many years before it can be perfectly understood. When Cā'ṇātha Sērman, who attended Mr. Wilkins, was asked what he thought of the Pā'ṇīnyā, he answered very expressively, that "it was a forest;" but, since grammar is only an instrument, not the end, of true knowledge, there can be little occasion to travel over so rough and gloomy a path; which contains, however, probably some acute speculations in Metaphysics. The Sanscrit Prosody is easy and beautiful: the learned will find in it almost all the measures of the Greeks; and it is remarkable, that the
language of the Brāhmaṇs runs very naturally into Sapphics, Alcaics, and Iambics. Astronomical works in this language are exceedingly numerous: seventy-nine of them are specified in one list; and, if they contain the names of the principal stars visible in India, with observations on their positions in different ages, what discoveries may be made in Science, and what certainty attained in ancient Chronology?

Subordinate to these Angas (though the reason of the arrangement is not obvious) are the series of Sacred Poems, the Body of Law, and the six Philosophical Astras; which the author of four text reduces to two, each consisting of two parts, and rejects a third, in two parts also, as not perfectly orthodox; that is, not strictly conformable to his own principles.

The first Indian Poet was VA'LMI'CI, author of the Rāmāyana, a complete epic poem on one, continued, interesting, and heroic action; and the next in celebrity, if it be not superior in reputation for holiness, was the Māhābhārata of Vyā'SA. To him are ascribed the sacred Purānas, which are called, for their excellence, the Eighteen, and which have the following titles: BRAHME, or the Great One; PEDMA, or the Lotos; BRA'HMA'ND'A, or the Mundane Egg; and AGNI, or Fire; (these four relate to the Creation;) VISHNU, or the Pervader; GARUD'A, or his Eagle; the Transformations of BRAHMA', SIVA, LINGA; NA'REDA, son of BRAHMA; SCANDA, son of SIVA; MARCANDeya, or the Immortal Man; and BHAVISHYA, or the Prediction of Futurity; (these nine belong to the attributes and powers of the Deity;) and four others, MASTYA, VARA'H'A, CURMA, VA'MENA, or as many incarnations of the Great One in his character of Preserver; all containing ancient traditions embellished by poetry or disguised by fable. The eighteenth is the BHA'GAWATA, or Life of CRISHNA, with which the same Poet is by some imagined to have crowned the whole series; though others, with more reason, assign them different composers.

The system of Hindu Law, besides the fine work, called Menu-smṛti, or "what is remembered from Menu," that of VA'JNYAVACYA, and those of sixteen other Munts, with Commentaries on them all, consists of many tracts in high estimation, among which those current in Bengal are an excellent treatise on Inheritances by JI'MU'TA VA'HANA, and a complete Digest, in twenty-seven volumes, compiled
a few centuries ago by Raghunandan, the Tribonian of India, whose work is the grand repository of all that can be known on a subject so curious in itself, and so interesting to the British Government.

Of the philosophical schools it will be sufficient here to remark, that the first Nyāya seems analogous to the Peripatetic; the second, sometimes called Vīśeṣhika, to the Iönic; the two Mimamsās, of which the second is often distinguished by the name of Védánta, to the Platonick; the first Sāṁkhyā to the Italick; and the second, or Pātanjala, to the Stoic, Philosophy: so that Gautama corresponds with Aristotle; Cananda with Thales; Jaimini with Socrates; Vyasā with Plato; Capila with Pythagoras; and Patanjali with Zeno; but an accurate comparison between the Greecian and Indian schools would require a considerable volume. The original works of those Philosophers are very succinct; but, like all the other Sāstras, they are explained, or obscured, by the Upadarsana or Commentaries, without end. One of the finest compositions on the philosophy of the Védánta is entitled Yóga Vášishta, and contains the instructions of the great Vášishta to his pupil, Ráma, king of Ayódhyā.

It results from this analysis of Hindu Literature, that the Veda Upavéda, Védāṅga, Puráṇa, Dharma, and Dersāna are the six great Sástras, in which all knowledge, divine and human, is supposed to be comprehended; and here we must not forget, that the word Sástra, derived from a root signifying to ordain, means generally an ordinance, and particularly a sacred ordinance delivered by inspiration. Properly, therefore, this word is applied only to sacred literature, of which the text exhibits an accurate sketch.

The Sástras, or fourth class of Hindus, are not permitted to study the six proper Sástras before enumerated; but an ample field remains for them in the study of profane literature, comprised in a multitude of popular books, which correspond with the several Sástras, and abound with beauties of every kind. All the tracts on medicine must, indeed, be studied by the Vaidyas, or those who are born Physicians; and they have often more learning, with far less pride, than any of the Brāhmans. They are usually poets, grammarians, rhetoricians, moralists; and may be esteemed in general the most virtuous and amiable of the Hindus. Instead of the Vedas they study the Rājput, or Instruction of Princes; and, instead of
Law, the *Nitisāstra*, or general system of *Ethics*. Their *Sahitya*, or *Cāvya Sāstra* consists of innumerable poems, written chiefly by the medical tribe, and supplying the place of the *Purānas*, since they contain all the stories of the *Rāmāyana*, *Bharata*, and *Bhāgavata*. They have access to many treatises of *Alandra*, or Rhetoric, with a variety of works in modulated Prose. To *Upāchyāna*, or Civil History, called also *Rājatarangini*; to the *Nātaka*, which answers to the *Gāndharvavṛtta*, consisting of regular *Dramatic* pieces in *Sanskrit* and *Prācīrit*; besides which they commonly get by heart some entire dictionary and grammar. The best *Lexicon* or *Vocabulary* was composed in verse, for the assistance of the memory, by the illustrious *Amarsinha*; but there are seventeen others in great repute: the best Grammar is the *Mūgdhabodha*, or the *Beauty of Knowledge*, written by a *Goswami*, named *VopaDeva*, and comprehending, in two hundred short pages, all that a learner of the language can have occasion to know. To the *Cīshas*, or dictionaries, are usually annexed very ample *Tīkās*, or etymological commentaries.

We need say no more of the heterodox writings, than that those on the religion and philosophy of *Buddha* seem to be connected with some of the most curious parts of *Asiatic* history, and contain, perhaps, all that could be found in the *Pāli*, or *sacred language* of the eastern *Indian* peninsula. It is asserted in Bengal, that *Amarsinha* himself was a *Bauddha*; but he seems to have been a theist of tolerant principles, and, like *Abulfażl*, desirous of reconciling the different religions of *India*.

Wherever we direct our attention to *Hindu* Literature, the notion of *infinity* presents itself; and the longest life would not be sufficient for the perusal of near five hundred thousand stanzas in the *Purānas*, with a million more perhaps in the other works before mentioned. We may, however, select the best from each *Sāstra*, and gather the fruits of science, without loading ourselves with the leaves and branches; while we have the pleasure to find, that the learned *Hindūs*, encouraged by the mildness of our government and manners, are at least as eager to communicate their knowledge of all kinds as we can be to receive it. Since *Europeans* are indebted to the *Dutch* for almost all they know of *Arabic*, and to the *French* for all they know of *Chinese*, let them now receive from our nation the first accurate knowledge of *Sanskrit*, and of the valuable works composed in it; but, if they wish to form a correct idea of *Indian* religion and literature, let them begin with forgetting all that has been written on the subject, by ancients or moderns, before the publication of the *Gītā*.
TO THE PRESIDENT.

MY DEAR SIR,

HEREWITH send you six ancient Copper Plates, fastened together by a ring in two parcels, each containing three. They were found in digging foundations for some new works at the Fort of Tanna, the capital of Salset. The Governor of Bombay informed me none of the Gujerat Brahmins could explain the Inscriptions. I obtained permission to bring them round with me, being desirous of submitting them to the investigation of the Asiatic Society, under the promise of restoring them to the proprietor.

I have the honour to be with great respect,

DEAR SIR WILLIAM,

Your most faithful humble Servant,

J. CARNAC.

February, 15, 1787.
XIX.

An INDIAN GRANT of LAND, in Y. C. 1018,

Literally translated from the Sanscrit, as explained by
RA'MÁLO'CHAN PANDIT,
COMMUNICATED by GENERAL CARNAC.
O'M. VICTORY AND ELEVATION!

STANZAS.

 MAY He, who in all affairs claims precedence in adoration;
may that Gómánáyaca, averting calamity, preserve you from danger!

2. May that SÍVA constantly preserve you, on whose head
shines (GÁNGA’) the daughter of JÁHNU resembling-the-pure-crescent-rising-from the-summit-of-SÚME’RU! (a compound word of sixteen syllables.)

3. May that God, the cause of success, the cause of felicity,
who keeps, placed even by himself on his forehead a section of the
moon—with cool-beams, drawn-in-the-form-of-a-line-resembling-
that-in-the-infinity-bright spike-of-a-fresh-blown CÉTACA (who is)
adorned-with-a-grove-of-thick-red locks-tied-with-the-Prince-of-
Serpents, be always present and favourable to you!

4. The son of JI’MÚTACÉ’TU ever affectionate, named JI’MÚ-
TAVA’HANA, who, surely, preserved (the Serpent) SÁNGHACHU’D’Á
from Garu’d’a, (the Eagle of VISHNU) was famed in the three worlds,
having neglected his own body, as if it had been grass, for the sake
of others.

5. (Two couplets in rhyme) In his family was a monarch
(named) CAPARDIN, (or, with thick hair, a title of MAHÁ’DE’VA) chief
of the race of SÍLÁ’RA, repressing the insolence of his foes; and
from him came a son, named PULAS’ACTI, equal in increasing glory
to the sun’s bright circle.

6. When that son of CAPARDIN was a new-born infant, through
fear of him, homage was paid by all his collected enemies, with
water held aloft in their hands, to the delight of his realm.

7. From him came a son, the only warrior on earth, named
SRI VÁPPUVANNA, a hero in the theatre of battle.
8. His son, called Śrī Jhanjha, was highly celebrated, and the preserver of his country; he afterwards became the Sovereign of Gògni: he had a beautiful form.

8. From him came a son, whose renown was far extended and who confounded the mind with his wonderful acts, the fortunate Bajjada De'va. He was a monarch, a gem in the diadem of the world's circumference; who used only the forcible weapon of his two arms readily on the plain of combat; and in whose bosom the Fortune of Kings herself amorously played, as in the bosom of the foe of Mura, (or Vishnû.)

9. Like Jayanta, son to the foe of Vritra, (or Indra,) like Shanmucha, (or Caktice'va,) son to Purâ'ri, (or Mahade'va,) then sprang from him a fortunate son, with a true heart, invincible;

10. Who in liberality was Carna before our eyes in truth even Yudhishtira, in glory a blazing Sun, and the rod of Câ'la (or Yama, judge of the infernal regions) to his enemies.

11. By whom the great counsellors, who were under his protection, and others near him, are preserved in this world: he is a conqueror, named with propriety Sárana'gata Vajrapanjara-de'va.

12. By whom when this world was over-shadowed with continual presents of gold, for his liberality he was named Jagadarthi (or Enriching the World) in the midst of the three regions of the universe.

13. Those Kings assuredly, whoever they may be, who are endowed with minds capable of ruling their respective dominions, praise him for the greatness of his veracity, generosity, and valour; and to those Princes, who are deprived of their domains, and seek his protection, he allotts a firm settlement. May he, the grandfather of the Ra'ya, be victorious! He is the spiritual guide of his counsellors, and they are his pupils. Yet farther.

14. He, by whom the title of Gó'mma'ya was conferred on a person who attained the object of his desire; by whom the realm, shaken by a man named E'yapa'de'va, was even made firm; and by whom, being the Prince of Mamalambuva, (I suppose, Mambeti, or Bombay,) security from fear was given to me broken with affliction. He was the King, named Śrī Virudanca. How can he be other-
wise painted? *Here six syllables are effaced in one of the Grants; and this verse is not in the other.*

15. His son was named BAJJADADE'VA, a gem on the forehead of monarchs, eminently skilled in morality; whose deep thoughts all the people, clad in horrid armour, praise even to this day.

16. Then was born his brother the Prince ARICE'SARI, (a lion among his foes,) the best of good men; who, by overthrowing the strong mountain of his proud enemies, did the act of a thunderbolt; having formed great designs even in his childhood, and having seen the Lord of the Moon (M.AHA'DE'VA) standing before him, he marched by his father's order, attended by his troops, and by valour subdued the world.

*Yet more—*

17. Having raised up his slain foe on his sharp sword, he so afflicted the women in the hostile palaces, that their forelocks fell disordered, their garlands of bright flowers dropped from their necks on the vases of their breasts, and the black lustre of their eyes disappeared.

18. A warrior, the plant of whose fame grows up over the temple of BRAHMA'S Egg, (the universe,) from the repeated-watering-of-it-with-the-drops-that-fell-from-the-eyes-of-the-wives-of-his-slaughtered-foe.

thought concerning this domain. The Chief-Minister śR̄I VA'SA-PAYA and the very-religiously-purified śR̄I VA'RDHIYAPAYA being at this time present, he, the fortunate ARICEŚARIDE'VARA'JA, Sovereign of the great circle, thus addresses even all who inhabit-the-city-śR̄I STA'NACA, (or the Mansion of LACSHMI,) his-own-kinsmen-and-others-there-assembled, princes-counsellors-priests-ministers-superiors-inferiors-subject-to-his.commands, also the-lords-of-districts,-the-Governors-of-towns-chiefs - of - villages - the-masters-of-families-employed-or-unemployed-servants-of-the-King-and-his-countrymen. Thus he greets all-the-holy-men-and-others-inhabiting-the-city-of HAMYAMANA. Reverence be to you, as it is becoming, with all the marks of respect, salutation, and praise!

STANZA.

Wealth is inconstant; youth, destroyed in an instant; and life, placed between the teeth of CRITANTA, (or YAMA before mentioned.)

Nevertheless, neglect is shown to the felicity of departed ancestors. Oh! how astonishing are the efforts of men!

And thus,—Youth is publicly swallowed-up-by-the-giantess Old-Age admitted-into-its-inner mansion; and the bodily-frame-is-equal-obnoxious-to-the-assault-of-death-of-age-and-the-misery-born-with-man-of-separation—between-united-friends-like-falling-from-heaven-into-the-lower regions. Riches and life are two things more-moveable-than-a-drop-of-water—trembling-on-the-leaf-of-a-lotus-shaken—by-the-wind; and the world is like-the-first delicate-foliage-of-a-plantain-tree. Considering this in secret with a firm dispassionate understanding, and also the fruit of liberal donations mentioned by the wise, I called to mind these

STANZAS.

1. In the SATYA, TRT̄A, and DVĀPAERA ages, great piety was celebrated: but in this CALIYUGA the Munis have nothing to commend but liberality.

2. Not so productive of fruit is learning, not so productive of piety, as liberality, say the Munis in this Gali age. And thus was it said by the Divine VYASA:

3. Gold was the first offspring of Fire; the Earth is the daughter of VISHNU, and kine are the children of the Sun: the
three worlds, *therefore*, are assuredly given by him, who makes a gift of gold, earth, and cattle.

4. Our deceased fathers clap their hands, *our* grandfathers *exult*: *saying*, "a donor of land is born in our family: he will re-deem us."

5. A donation of land to good persons, for holy pilgrimages, and on the (five) solemn days of the moon, is the means of passing over the deep boundless ocean of the world.

6. White parasols, and elephants mad with pride, *(the insignia of royalty,)* _are_ the flowers of a grant of land: the fruit is *Indra* in heaven.

Thus, confirming the declarations of the ancient* Munis*-learn-ed-in-the distinction-between-justice-and-injustice, for the sake of benefit to my mother, my father, and myself, on the fifteenth of the bright moon of Cártica, in the middle of the year *Pingala*, *(perhaps of the *Serpent,*)* when nine hundred and forty years, save one, are reckoned as past from the time of King *Śāca*, or, in figures, the year 939, of the bright moon of Cártica 15; *(that is, 1708—939 = 769 years ago from Y. C. 1787.*) The moon being then full and eclipsed, I having bathed in the opposite sea resembling-the-girdles-round-the-waist-of-the-female-Earth, tinged-with-a-variety-of-rays-like-many-exceedingly-bright-rubies,-pearls-and-other-gems, with water-whose-mud - was - become - musk - through-the-frequent-bathing-of-the-fragrant-bosom-of-beautiful-Goddesses-rising-up after - having - dived-in-it; - and having offered to the sun, the divine luminary, the gem-of-one-circle-of-heaven, eye-of-the-three-worlds, Lord of-the-lotos, a dish embellished-with-flowers-of-various sorts, *(this dish is filled with the plant *Darbha*, rice in the husk, different flowers, and sandal,)* have granted to him, who has viewed the preceptor of the Gods and of Demons, who has adored the Sovereign Deity the husband-of-Ambica; *(or *Durga,*)* has sacrificed-caused-others-to-sacrifice, has read - caused - others - to-read-and-has-performed-the-rest-of-the-six *(sacerdotal) functions; who-is-eminent-skilled-in-the-whole-business-of-performing-sacrifices, who-has-held-up the root-and-stalk-of-the-sacred-lotos; who-inhabits-the-city-Sri Śt'ha'na'ca, *(or abode of Fortune,)* descended from Jamadagni; who-performs-due-rites-in-the-holy-stream; who-distinctly-knows-the-mysterious-branches, *(of the *Védas,*) the domestic priest, the reader, Sri Ticcapaiya, son
of Sṛī Chchhipntapaiya the astronomer, for-the-purpose-of-sacrificing-causing-others to-sacrifice-reading-causing-others-to-read-and-discharging-the-rest-of-the-six-(sacerdotal-) duties, of performing-the (daily service of) Vatsāwadēva with offerings of rice, milk, and materials of sacrifice, and-of-completing-with due-solemnity the sacrifice-of-fire-of doing-such-acts-ās-must-continually-be-done, and such-as-must-occasionally-be-performed, of paying-due-honours to guests and strangers, and-of-supporting his-own-family, the village of Chāvinādra- standing-at-the-extremity of the-territory of Vatsaraṇa, and the boundaries of which are, to the east the village of Pūgambā and a water-fall-from a mountain; to the south the villages of Nāgambā and Mūlādongarica; to the west the river Sambarapallicā; to the north the villages of Sāmbivē and Cāliydraca; and besides this the full (district) of Tocabalā Pallicā, the boundaries of which are to the east, Siddābali; to the south the river Mōt hala; to the west, Cācadēva, Hallapallicā, and Bad’āviraca; to the north, Talavālā Pallicā; and also the village of Aulaciya, the boundaries of which (are) to the east, Tadāga; to the south, Gēvini; to the west, Charicā; to the north, Cālibalā-yachōli: (that land) thus surveyed-on-the-four-quarters-and limited-to-its-proper-bounds, with-its-herbage-wood-and-water, and with-power-of-punishing-for-the-ten-crimes, except that before given as the portion of Dēva, or of Brahmat, I have hereby released, and limited-by-the-duration-of-the-sun-the-moon-and-mountains, confirmed with-the-ceremony-of adoration, with a copious effusion of water, and with the highest acts-of-worship; and the same land shall be enjoyed by his lineal- and-collateral-heirs, or caused-to-be-enjoyed, nor shall disturbance be given by any person whatever: since it is thus declared by great Munis.

STANZAS.

1. The earth is enjoyed by many kings, by Saṅgar, and by others: to whomsoever the soil at any time belongs, to him at that time belong the fruits of it.

2. A speedy gift is attended with no fatigue, a continued support, with great trouble; therefore, even the Rishis declare, that a continuance of support is better than a single gift.

3. Exalted Emperor’s of good dispositions have given land,
as Ra'abhadra advises, again and again: this is the true bridge of justice for sovereigns: from time to time (O kings) that bridge must be repaired by you.

4. Those possessions here below, which have been granted in former times by sovereigns, given for-the-sake-of-religion-increase-of-wealth-or-of-same, are exactly equal to flowers, which have been offered to a Deity: what good man would resume such gifts?

Thus, confirming the precepts of ancient Munis, all future kings must gather the fruit-of-observing-religious-duties; and let not the stain-of-the-crime-of-destroying-this grant be borne henceforth by any-one: since, whatever prince, being supplicated, shall, through avarice, having his mind-wholly-surrounded-with-the-gloom-of-ignorance-contemptuously-dismiss-the injured-suppliant, he, being guilty of five great and five small crimes, shall long in darkness inhabit Raurava, Mahdraurava, Aydha, Tanusra, and the other places of punishment. And thus it is declared by the divine Vya'sa:

STANZAS.

1. He, who seizes land, given-by-himself or by-another (sovereign), will rot among worms, himself a worm, in the midst of ordure.

2. They, who seize granted-land, are born again, living with great fear, in dry cavities of trees in the unwatered forests on the Vinddhian (mountains).

3. By seizing one cow, one vesture, or even one nail's breadth of ground, a king continues in hell till an universal destruction of the world has happened.

4. By a thousand gardens, and by (a gift of) a hundred pools of water, by (giving) a hundred lac of oxen, a disseisor of (granted) land is not cleared from offence.

5. A grantor of land remains in heaven sixty thousand years; a disseisor, and he, who refuses to do justice, continues as many years in hell.

And, agreeably to this, in what is written by the hand of the Secretary, (the King) having ordered it, declares his own intention; as it is written by the command of me, Sovereign of the Great Circle, the fortunate Abice'sari De'vara'ja, son of the Sovereign of the Great Circle, the Fortunate, invincible, De'vara'ja.

And this is written, by order of the Fortunate King, by me Jo'-uba, the brother's-son of t'ri Na'galaiya., the great-Bard-dwelling-in-the royal palace; engraved-on-plates-of-copper by Ve'dapaiya's son Mana Dha'ra Paiya. Thus (it ends).

Whatever herein (may be) defective in-one-syllable, or have-one-syllable-redundant, all that is (nevertheless) complete evidence (of the grant.) Thus (ends the whole).
DEAR SIR,

I do myself the honor to send you a few Remarks on Tāgara, and beg leave to submit them to your judgment: inquiries of that kind are generally very dry; and unluckily I have no talent for amplification. I have collected all I could find in the ancient authors, and endeavoured, by bringing the whole together, to elucidate a subject, which must be interesting to the Asiatic Society; and this, I hope, will secure me their indulgence. I have been as sparing as possible of Greek quotations: I am not fond of them; however, I have ventured a few, which I thought absolutely necessary. With respect to the historical part, you will find I am not conversant with the Hindu antiquities: indeed, I have no time to study languages.

I am,

DEAR SIR,

Your most obedient humble Servant,

F. WILFORD.

Russapuglia, June 10, 1787.
REMARKS ON THE CITY OF TAGARA.

By LIEUTENANT FRANCIS WILFORD.

The expedition of Alexander having made the Greeks acquainted with the riches of India, they soon discovered the way by sea into that country, and, having entered into a commercial correspondence with the natives, they found it so beneficial, that they attempted a trade thither.

PTOLEMY PHILADELPHUS, king of Egypt, in order to render the means easy to merchants, sent one Dionysius into the Southern parts of India, to inquire into the nature of that country, its produce, and manufactures.

It was then Tagara began to be known to the Greeks, about 2050 years ago.

Arrian, in his Periplus Maris Erythraei, says it was a very large city, and that the produce of the country, at that early period, consisted chiefly of coarse Dungarees (Othonium vulgare), of which vast quantities were exported; muslins of all sorts, (Sindones omnis generis), and a kind of cotton stuff, dyed of a whitish purple, and very much of the colour of the flowers of mallows, whence called Molochyna.

All kinds of mercantile goods throughout the Deccan, were brought to Tagara, and from thence conveyed on carts to Baroach, (Barygaza).

Arrian informs us, that Tagara was about ten days’ journey to the eastward of another famous mart, called Plithana, or Plithana.

That Plithana was twenty days’ journey to the southward of Baroach; Also,

That the road was through the Balagaut mountains.

And here we must observe, that the Latin translation of the Periplus* by Stuckius is very inaccurate and often erroneous; as in the following passage, where Arrian, speaking of Tagara, says

"Kataγαπαί ἐὰν αὐτῶν πορείας ἐματίζων ταὶ ἀνοίγασιν μηνίγασιν ἐν τῇ Βαγύατῳ, which STUCKIUS translates thus,

"Ex his autem emporiis, per loca invia et difficillima, res Barygazam "plaustris convehuntur."

But it should be,

"Ex his autem emporiis, per maximos ascensus, res Barygazam "deorsum feruntur."

Kataγαπαί signifies deorsum ferre, (to bring down,) not convehere.

Ἀνοίγαι μηνίγαι should be translated per maximos ascensus. Ἀνοίγαι, or ἀνοίγος, in this place, signifies an ascens, a road over hills; and this meaning is plainly pointed out by the words ἀναγατα, and μηνίγαι.

In short, ἀνοίγαι μηνίγαι is the true translation of the Hindoo word Bala-gaut, the name of the mountains through which the goods from Tagara to Baroach used to be conveyed.

This passage in ARRIAN is the more interesting, as it fixes the time when the Bala-gaut mountains were first heard of in Europe.

The bearing from Tagara to Pluthana is expressly mentioned by ARRIAN (πορεία δὲ παροντια) but is left out by STUCKIUS.

Pluthana is an important point to be settled, as it regulates the situation of Tagara.

It still exists, and goes nearly by the same name, being called to this day Pultanah. It is situated on the southern bank of the Godavery, about 217 British miles to the southward of Baroach.

These 217 miles, being divided by twenty, the number of days travellers were between Pultanah and Baroach, according to ARRIAN, give nearly eleven miles per day or five coss, which is the usual rate of travelling with heavy loaded carts.

The Onyx, and several other precious stones, are still found in the neighbourhood of Pultanah, as related by ARRIAN; being washed down by torrents from the hills during the rains, according to PLINY.

ARRIAN informs us, that the famous town of Tagara was about ten days' journey to the eastward of Pultanah.

According to the above proportion, these ten days (or rather somewhat less*) are equal to about 100 British miles; and conse-

* Τὸ γὰρ μῆισμὸν δέκα quasi dies decem.
sequently Tagara, by its bearing and distance from Pultanah, falls at Deoghir, a place of great antiquity, and famous through all India on account of the Pagodas of Eloura. It is now called Doulet-abad and about four coss N. W. of Aurungabad.

PTOLEMY agrees very well with ARRIAN, with respect to distances and bearings, if we admit that he has mistaken Baithana or Paithana for Plithana; and this, I am pretty sure, is really the case, and may be easily accounted for, as there is very little difference between ΠΑΙΘΑΝΑ and ΠΑΙΘΑΝΑ in the Greek character.

Paithana, now Pattan* or Putten, is about half way between Tagara and Plithana.

According to PTOLEMY, Tagara and Pattan were situated to the northward of the Band-Ganga (Binda or Bynda river,) commonly called Godavery; and here PTOLEMY is very right.

In Mr. Bussy's marches, Pattan is placed to the southward of the Godavery; but it is a mistake.

It appears from ARRIAN'S Periplus, that, on the arrival of the Greeks into the Deccan, above 2000 years ago, Tagara was the metropolis of a large district called Ariaca, which comprehended the greatest part of Subah Aurangabad and the southern part of Concan; for the northern part of that district, including Damaun, Callian, the Island of Salset, Bombay, &c. belonged to the Rajah of Larikoh or Lar, according to ARRIAN and EBN SAID AL MAGREBI.

It is necessary to observe here, that, though the author of the Periplus is supposed to have lived about the year 160 of the present era, yet the materials, he made use of in compiling his directory, are far more ancient: for, in speaking of Tagara, he says that the Greeks were prohibited from landing at Callign, and other harbours on that coast. Now it is well known, that, after the conquest of Egypt, the Romans had monopolised the whole trade to India, and would allow no foreigner to enter the Red Sea; and consequently this passage has reference to an earlier period, previous to the conquest of Egypt by the Romans.

About the middle of the first century, Tagara was no longer the capital of Ariaca, Rajah Salbahan having removed the seat of the empire to Pattan.

PTOLEMY informs us, that Paithana, or Pattan, had been the residence of a prince of that country, whose name the Greeks have strangely disfigured: we find it variously spelt, in different MSS. of PTOLEMY, Siripolemus, Siroplemus, Siroptolemus, &c.

Yet, when we consider that, whenever Pattan is mentioned by the Hindoos, they generally add, it was the residence of Rajah Salbahan*, who, in the dialect of the Deccan, is called Salivanam, or Salibanam, I cannot help thinking that the Greeks have disfigured this last word Salibanam into Saripalam, from which they have made Siripolemus, Siroplemus, &c.

BICKRAMAJIT ruled for some time over the northern parts of the Deccan; but the Rajahs, headed by Salbahan, having revolted, they gave him battle, and he was slain. Tagara became again the Metropolis of Ariaca; at least it was so towards the latter end of the eleventh century, from a grant of some lands in Concana, made by a Rajah of Tagara: this grant still exists, and was communicated to the Asiatic Society by General Carnac.

When the Mussulmans carried their arms into the Deccan about the year 1293, Tagara or Deoghir was still the residence of a powerful Rajah, and remained so till the time of Shah-Jehan, when the district belonging to it became a Subah of the Mogul Empire. Then Tagara was deserted; and Kerki, four coss to the south-east of it, became the capital. This place is now called Aurungabad.

Thus was destroyed the ancient kingdom or Rajaship of Tagara, after it had existed with little interruption above 2000 years; that is to say, as far as we can trace back its antiquity.

It may appear astonishing, that, though the Rajah of Tagara was possessed of a large tract on the sea coast, yet all the trade was carried on by land.

Formerly it was not so. On the arrival of the Greeks into the Deccan, goods were brought to Callian, near Bombay, and then shipped off. However, a Rajah of Lariketh or Lar, called Sandoys, according to Arrian, would no longer allow the Greeks to trade either at Callian or at the harbours belonging to him on that coast, except Baroach; and whenever any of them were found at Callian, or in

* Making use of the very words of Ptolemy.
the neighbourhood, they were confined, and sent to Baroach under a strong guard. Arrian, being a Greek himself, has not thought proper to inform us, what could induce the Rajah to behave in this manner to the Greeks; but his silence is a convincing proof that they had behaved amiss; and it is likely enough, they had attempted to make a settlement in the Island of Salset, in order to make themselves independent and facilitate their conquests into the Deccan.

The fears of the Rajah were not groundless; for the Greek kings of Bactriana were possessed of the Punjab, Cabul, &c. in the north of India.

There were other harbours, to the south of Callian, belonging to the Rajah of Tagara, but they were not frequented, on account of pirates, who, according to Pliny, Arrian and Ptolemy, infested these countries, in the very same manner they do now.
THE singular animal, which M. BUFFON describes by the name of *Pangolin*, is well known in Europe since the publication of his Natural History, and GOLDSMITH’s elegant abridgment of it; but, if the figure exhibited by BUFFON was accurately delineated from the three animals, the spoils of which he had examined, we must consider that, which has been lately brought from Caracdiah to Chitra, and sent thence to the Presidency, as a remarkable variety, if not a different species, of the *Pangoliq*. Ours has hardly any neck, and, though some filaments are discernible between the scales, they can scarce be called bristles; but the principal difference is in the tail; that of BUFFON’s animal being long, and tapering almost to a point, while that of ours is much shorter, ends obtusely, and resembles in form and flexibility the tail of a lobster. In other respects, as far as we can judge from the dead subject, it has all the characters of BUFFON’s *Pangolin*; a name derived from that by which the animal is distinguished in Java, and consequently preferable to *Manis* or *Pholidotus*, or any other appellation deduced from an European language. As to the scaly lizard, the scaled armadillo, and the five-nailed ant-eater, they are manifestly improper designations of this animal; which is neither a lizard, nor an armadillo, in the common acceptation; and, though it be an ant-eater, yet it essentially differs from the hairy quadruped usually known by that general description. We are told that the Malabar name of this animal is *Alungu*. The natives of Bahar call it *Vajra-kit*, or, as they explain the word, stone-vernine; and in the stomach of the animal before us was found about a teacupful of small stones, which had probably been swallowed for the purpose of facilitating digestion; but the name alludes, I believe, to the hardness of the scales; for *vajrakit’a* means, in Sanscrit, the diamond, or thunderbolt reptile; and *vajra* is a common figure in the Indian poetry for any thing excessively hard. The *vajrakit’a* is believed by the Pandits to be the animal which gnaws their sacred stone, called *Salgramas’ila*;
but the pangolin has apparently no teeth, and the salgärás, many of which look as if they had been worm-eaten, are perhaps only decayed in part by exposure to the air.

This animal had a long tongue shaped like that of a ca-meleon; and, if it was nearly adult, as we may conclude from the young one found in it, the dimensions of it were much less than those which Buffon assigns generally to his pangolin; for he describes its length as six, seven, or eight feet, including the tail, which is almost, he says, as long as the body, when it has attained its full growth; whereas ours is but thirty-four inches long from the extremity of the tail to the point of the snout, and the length of the tail is fourteen inches: but, exclusively of the head, which is five inches long, the tail and body are, indeed, nearly of the same length; and the small difference between them may show, if Buffon be correct in this point, that the animal was young. The circumference of its body in the thickest part is twenty inches, and that of the tail only twelve.

We cannot venture to say more of this extraordinary creature, which seems to constitute the first step from the quadruped to the reptile, until we have examined it alive, and observed its different instincts; but as we are assured that it is common in the country round Khánpur, and at Châtigárm, where the native Muselmans call
it the *land-carp*, we shall possibly be able to give on some future occasion a fuller account of it. There are in our *Indian* provinces many animals, and many hundreds of medicinal plants, which have either not been described at all, or, what is worse, ill described by the naturalists of *Europe*; and, to procure perfect descriptions of them from actual examination, with accounts of their several uses in medicine, diet, or manufactures, appears to be one of the most important objects of our institution.

THE STAFF OF FÍRÚZ SHÁH.
XXI.

INSCRIPTIONS ON THE STAFF OF F'RU'Z SHAH.

Translated from the Sanscrit, as explained by RA'DHA'CA'NTA SARMAN.

On a very singular monument near Delhi, an outline of which is here exhibited, and which the natives call the Staff of F'ru'z Shah, are several old inscriptions partly in ancient Nagari letters, and partly in a character yet unknown; and Lieutenant Colonel Polier, having procured exact impressions of them, presents the Society with an accurate Copy of all the Inscriptions. Five of them are in Sanscrit, and, for the most part, intelligible; but it will require great attention and leisure to decipher the others. If the language be Sanscrit, the powers of the unknown letters may, perhaps, hereafter be discovered by the usual mode of deciphering; and that mode, carefully applied even at first, may lead to a discovery of the language. In the mean time, a literal version of the legible Inscriptions is laid before you. They are, on the whole, sufficiently clear; but the sense of one or two passages is at present inexplicable.

I.

The first, on the southwest side of the pillar, is perfectly detached from the rest: it is about seventeen feet from the base, and two feet higher than the other inscriptions.

O'M.

In the year 1230, on the first day of the bright half of the month Vaisc'ch (a monument) of the Fortunate-Visala-De'va-sou-of-the-Fortunate-Amilla-De'va-King-of-Sacambhari

II.

The next, which is engraved as a specimen of the character, consists of two stanzas in four lines; but each hemistich is imperfect at the end, the two first wanting seven, and the two last five, syllables. The word Sacambhari in the former inscription enables us to supply the close of the third hemistich.

O'M.

As far as Vindhya, as far as Himâdri, (the Mountain of Snow,) he was not deficient in celebrity ...... making Aryaderva (the Land of Virtue, or India) even once more what its name signifies ...... He having departed, Prativa'Hama'na Tilaca (is) king of Sacambhari: (Sâcam only remains on the monument.) By us (the region between) Himawat and Vindhya has been made tributary.

In the year from Sri Vicrama'ditya 123, in the bright half of
the month Vaisāch . . . at that time the Rājaputra Srl SALLACA
was Prime Minister.

The second stanza, supplied partly from the last inscription,
and partly by conjecture, will run thus:

vṛtāḥ sa prativedhamāna tīlacak sādambhārtāhānapatiḥ
asūbhāḥ ca rādhām vyaḍhiḥ dharmavindrāntavālmaṇḍalām.
The date 123 is here perfectly clear; at least it is clear that only
three figures are written, without even room for a cypher after them;
whence we may guess that the double circle in the former inscription
was only an ornament, or the neutral termination am: if so, the date
of both is the year of Christ sixty-seven; but if the double circle be a
Zero, the monument of Vīsāla Deva is as modern as the year 1174,
or nineteen years before the conquest of Delhi by Shiha'bud'dîn.

III and IV.
The two next inscriptions were in the same words, but the
stanzas, which in the fourth are extremely mutilated, are tolerably
perfect in the third, wanting only a few syllables at the beginning
of the hemistichs:

yah cshívëshu prahartá nīrpatishu vīnāmatcandharëshu prasannah
—vah sambp purīndrah jagatij vijayatē vīsāla cshónipālah
... da sājnīta ēsha vijayl santānjānātmajah
... pūnān cshemāstu bruvatamudygōgas'unyanmanah

He who is resentful to kings intoxicated with pride, indulgent to
those whose necks are humbled, an Indra in the city of Causambi,
(I suspect Causambi, a city near Hastinapura, to be the true reading,)
who is victorious in the world, Vīsala, sovereign of the earth: he
gives... his commands being obeyed, he is a conqueror, the
son of Sānta'na'ja'na, whose mind, when his foes say, 'Let there
be mercy,' is free from further hostility.

This inscription was engraved, in the presence of Sri Tilaka
• Ra'ja, by Sri'pati, the son of Mahava, a Cêyast'ha, of a family
in Gauda, or Bengal.

V.
The fifth seems to be an elegy on the death of a king named
Vigraha, who is represented as only slumbering. The last hemis-
tich is hardly legible, and very obscure; but the sense of both
stanzas appears to be this.

1. An offence to the eyes of (thy) enemy's consort (thou) by-
whom-fortune-was-given-to-every suppliant, thy fame, joined to
extensive dominion, shines, as we desire, before us. The heart of
(thy) foes was vacant, even as a path in a desert, where men are
hindered from passing, O fortunate Vigraha Rajadeva, in the
jubilee occasioned by thy march.

2. May thy abode, O Vigraha, sovereign of the world, be fixed,
as in reason, (it ought) in the bosoms, embellished with love's allure-
ments, and full of dignity, of the women with beautiful eyebrows, who
were married to thy enemies! Whether thou art Indra, or Vishnu,
or Siva, there is even no deciding: thy foes (are) fallen, like descend-
ing water. Oh! why dost thou through delusion, continue sleeping?
XXII.

A CONVERSATION WITH ABRAM, AN ABYSSINIAN

Concerning the CITY of GWENDER
AND THE SOURCES OF THE NILE.

BY THE PRESIDENT.

HAVING been informed, that a native of Abyssinia was in Calcutta, who spoke Arabic with tolerable fluency, I sent for and examined him attentively on several subjects, with which he seemed likely to be acquainted. His answers were so simple and precise, and his whole demeanour so remote from any suspicion of falsehood, that I made a minute of his examination, which may not perhaps be unacceptable to the Society. Gwender, which Bernier had long ago pronounced a capital city, though Ludolf asserted it to be only a military station, and conjectured, that in a few years it would wholly disappear, is certainly, according to Abram, the Metropolis of Abyssinia. He says, that it is nearly as large and as populous as Misr, or Kâhēra, which he saw on his pilgrimage to Jerusalem; that it lies between two broad and deep rivers, named Caha and Ancrid, both which flow into the Nile at the distance of about fifteen days' journey; that all the walls of the houses are of a red stone, and the roofs of thatch; that the streets are like those of Calcutta, but that the ways, by which the king passes, are very spacious; that the palace, which has a plastered roof, resembles a fortress, and stands in the heart of the city; that the markets of the town abound in pulse, and have also wheat and barley, but no rice; that sheep and goats are in plenty among them, and that the inhabitants are extremelỹ fond of milk, cheese, and whey; but that the country people and soldiery make no scruple of drinking the blood, and eating the raw flesh, of an ox, which they cut without caring whether he is dead or alive; that this savage diet is, however, by no means general, Almonds, he says, and dates are not found in his country; but grapes and peaches ripen there; and in some of the distant provinces, especially at Cârûddâr, wine is made in abundance; but a kind of mead is the common inebriating liquor of the Abyssinians. The late king was Tilca Mahût, (the first of which
words means root or origin;) and the present, his brother, Tilsa Jerjis. He represents the royal forces at Gwender as considerable; and asserts, perhaps at random, that near forty thousand horse are in that station. The troops are armed, he says, with muskets, lances, bows and arrows, cimeters, and hangers. The council of state consists, by his account, of about forty ministers, to whom almost all the executive part of government is committed. He was once in the service of a Vazir, in whose train he went to see the fountains of the Nile or Abey, usually called Alwey, about eight days' journey from Gwender. He saw three springs, one of which rises from the ground with a great noise, that may be heard at the distance of five or six miles. I showed him the description of the Nile by Gregory of Amhara, which Ludolf has printed in Ethiopic. He both read and explained it with great facility; whilst I compared his explanation with the Latin version, and found it perfectly exact. He asserted of his own accord, that the description was conformable to all that he had seen and heard in Ethiopia; and for that reason I annex it. When I interrogated him on the languages and learning of his country, he answered, that six or seven tongues at least were spoken there; that the most elegant idiom, which the king used, was the Amharic; that the Ethiopic contained, as is well known, many Arabic words; that, besides, their sacred books, as the prophecy of Enoch, and others, they had Histories of Abyssinia, and various literary compositions; that their language was taught in schools and colleges, of which there were several in the metropolis. He said, that no Abyssinian doubted the existence of the royal prison called Wahinin, situated on a very lofty mountain, in which the sons and daughters of their kings were confined; but that, from the nature of the thing, a particular description of it could not be obtained. "All these matters, said 'he, are explained, I suppose, in the writings of Ya'ku'B, whom I "saw thirteen years ago in Gwender. He was a physician, and "had attended the king's brother, who was also a Vazir, in his last "illness. The prince died; yet the king loved Ya'ku'B, and, in-"deed, all the court and people loved him. The king received "him in his palace as a guest, supplied him with every thing, that "he could want; and, when he went to see the sources of the "Nile and other curiosities. (for he was extremely curious,) he re-
ceived every possible assistance and accommodation from the "royal favour. He understood the languages, and wrote and collected many books, which he carried with him." It was impossible for me to doubt, (especially when he described the person of Ya'ku'B,) that he meant James Bruce, Esq. who travelled in the dress of a Syrian physician, and probably assumed with judgment a name well known in Abyssinia. He is still revered on Mount Sinai for his sagacity in discovering a spring, of which the monastery was in great need; he was known at Jedda by Mir Mohammed Hussain, one of the most intelligent Mahomedans in India; and I have seen him mentioned with great regard in a letter from an Arabian merchant at Mokha. It is probable that he entered Abyssinia by the way of Musuvwa, a town in the possession of the Muselmans, and returned through the desert mentioned by Gregory in his description of the Nilt. We may hope that Mr. Bruce will publish an account of his interesting travels, with a version of the book of Enoch, which no man but himself can give us with fidelity. By the help of Abyssinian records, great light may be thrown on the History of Yemen before the time of Muhammed; since it is generally known, that four Ethio kings successively reigned in that country, having been invited over by the natives to oppose the tyrant Dhu Nawas; and that they were, in their turn, expelled by the arms of the Himyaric Princes, with the aid of Anushirvan, king of Persia, who did not fail, as it usually happens, to keep in subjection the people whom he had consented to relieve. If the annals of this period can be restored, it must be through the histories of Abyssinia, which will also correct the many errors of the best Asiatic writers on the Nile, and the countries which it fertilizes.
ON THE COURSE OF THE NILE.

The Nile, which the Abyssinians know by the names of Abéy and Alawy, or the Giant, gushes from several springs at a place called Suchit, lying on the highest part of Dengalé, near Gojjám, to the west of Bajemdîr, and the lake of Dara or Wed; into which it runs with so strong and rapid a current, that it mixes not with the other waters, but rides or swims, as it were, above them.

All the rains that fall in Abyssinia and descend in torrents from the hills, all streams and rivers, small and great, except the Hânasb, which washes the plains of Hengôt, and the Hawash, which flows by Dewâr and Fêtgar, are collected by this king of waters, and, like vassals, attend his march. Thus enforced, he rushes, like a hero exulting in his strength, and hastens to fertilize the land of Egypt, on which no rain falls. We must except also those Ethiopian rivers, which rise in countries bordering on the ocean, as the kingdoms of Cambat, Gurâjy, Wâsy, Nâriyâh, Gasy, Wêj, and Zinjîro, whose waters are disembogued into the sea.

When the Alawy has passed the Lake, it proceeds between Gojjám and Bajemdîr, and, leaving them to the west and east, pursues a direct course towards Amhârâ, the skirts of which it bathes, and then turns again to the west, touching the borders of Walaka; whence it rolls along Mûgôr and Shawai, and, passing Basâwâ and Gôgô, descends into the lowlands of Shankila, the country of the Blacks: thus it forms a sort of spiral round the province of Gojjám, which it keeps for the most part on its right.

Here it bends a little to the east, from which quarter, before it reaches the districts of Sennâr, it receives two large rivers, one called Tacaszy, which runs from Tegri; and the other, Gwangan, which comes from Dembela.

After it has visited Sennâr, it washes the land of Dongolâ, and proceeds thence to Nubia, where it again turns eastward, and reaches a country named Abrim, where no vessels can be navigated, by reason of the rocks and crags which obstruct the channel. The inhabitants of Sennâr and Nubia may constantly drink of its water, which lies to the east of them like a strong bulwark; but the merchants of Abyssinia, who travel to Egypt, leave the Nile on their right, as soon as they have passed Nubia, and are obliged to
traverse a desert of sand and gravel, in which for fifteen days they find neither wood nor water. They meet it again in the country of Retf or Upper Egypt, where they find boats on the river, or ride on its banks, refreshing themselves with its salutary streams.

It is asserted by some travellers, that, when the Alawy has passed Sennar and Dongola, but before it enters Nubia, it divides itself; that the great body of water flows entire into Egypt, where the smaller branch (the Niger) runs westward, not so as to reach Barbary, but towards the country of Alwah, whence it rushes into the great sea. The truth of this fact I have verified, partly by my own observation, and partly by my inquiries among intelligent men; whose answers seemed the more credible, because, if so prodigious a mass of water were to roll over Egypt with all its wintry increase, not the land only, but the houses and towns, of the Egyptians must be overflowed.
THE modes of trying offenders, by an appeal to the Deity, which are described at large in the Mitâcheshrâ, or comment on the Dherma Sâstra, in the Chapter of Oaths; and other ancient books of Hindu law, are here sufficiently explained, according to the interpretation of learned Pandits, by the well-wisher to mankind, Ali Ibra'hîm Khan.

The word Divya, in Sanscrit, signifies the same with Parâśkâ, or Parikhyâ in Bhâshâ, Kasam in Arabic, and Saucand in Persian; that is, an oath; or the form of invoking the Supreme Being to attest the truth of an allegation; but it is generally understood to mean the trial by ordeal, or the form of appealing to the immediate interposition of the Divine Power.

Now this trial may be conducted in nine ways. First, by the balance; secondly, by fire; thirdly, by water; fourthly, by poison; fifthly, by the Cûsha, or water in which an idol has been washed; sixthly, by rice; seventhly, by boiling oil; eighthly, by red-hot iron; ninthly, by images.

I. Ordeal by the balance is thus performed. The beam having been previously adjusted, the cord fixed, and both scales made perfectly even, the person accused and a Pandit fast a whole day; then, after the accused has been bathed in sacred water, the hóma, or oblation, presented to fire, and the deities worshipped, he is carefully weighed; and, when he is taken out of the scale, the Pandits prostrate themselves before it, pronounce a certain mantra, or incantation, agreeably to the Sâstras, and, having written the substance of the accusation on a piece of paper, bind it on his head. Six minutes after they place him again in the scale; and if he weigh more than before, he is held guilty; if less, innocent; if exactly the same, he must be weighed a third time; when, as it is written in the Mitâcheshrâ, there will certainly be a difference in his weight.
Should the balance, though well fixed, break down, this would be considered as a proof of his guilt.

II. For the fire-ordeal an excavation, nine hands long, two spans broad, and one span deep, is made in the ground, and filled with a fire of pippal wood: into this the person accused must walk bare-footed; and if his foot be unhurt, they hold him blameless; if burned, guilty.

III. Water-ordeal is performed by causing the person accused to stand in a sufficient depth of water, either flowing or stagnant, to reach his navel; but care should be taken that no ravenous animal be in it, and that it be not moved by much air: a Brāhmaṇa is then directed to go into the water, holding a staff in his hand; and a soldier shoots three arrows on dry ground from a bow of cane: a man is next dispatched to bring the arrow which has been shot farthest; and, after he has taken it up, another is ordered to run from the edge of the water; at which instant the person accused is told to grasp the foot or the staff of the Brāhmaṇa, who stands near him in the water, and immediately to dive into it. He must remain under water till the two men who went to fetch the arrows are returned; for if he raise his head or body above the surface, before the arrows are brought back, his guilt is considered as fully proved. In the villages near Benarşes, it is the practice for the person, who is to be tried by this kind of ordeal, to stand in water up to his navel, and then, holding the foot of a Brāhmaṇa, to dive under it as long as a man can walk fifty paces very gently. If before the man has walked thus far the accused rise above the water, he is condemned; if not, acquitted.

IV. There are two sorts of trial by poison. First, the Pandits having performed their hōma, and the person accused his ablution, two rettis and a half, or seven barley-corns, of vishanāga, a poisonous root, or of sanchyā, (that is, white arsenic,) are mixed in eight māshas, or sixty-four rettis, of clarified butter, which the accused must eat from the hand of a Brāhmaṇa: if the poison produce no visible effect, he is absolved; otherwise, condemned. Secondly, the hooded snake, called nāga, is thrown into a deep earthen pot, into which is dropped a ring, a seal, or a coin: this the person accused is ordered to take out with his hand; and if the serpent bite him, he is pronounced guilty; if not, innocent.
V. Trial by the Čōśa is as follows. The accused is made to drink three draughts of the water in which the images of the Sun, of Dēvī, and other Deities, have been washed for that purpose; and if within fourteen days he has any sickness or indisposition, his crime is considered as proved.

VI. When several persons are suspected of theft, some dry rice is weighed with the sacred stone, called salgrām; or certain sličas are read over it; after which the suspected persons are severally ordered to chew a quantity of it: as soon as they have chewed it, they are to throw it on some leaves of pippal, or, if none be at hand, on some bhūrja patra, or bark of a tree from Nēpāl or Cashmīr. The man from whose mouth the rice comes dry, or stained with blood, is held guilty; the rest are acquitted.

VII. The ordeal by hot oil is very simple: when it is heated sufficiently, the accused thrusts his hand into it; and if he be not burned, is held innocent.

VIII. In the same manner, they make an iron ball, or the head of a lance, red-hot, and place it in the hands of the person accused; who, if it burn him not, is judged guiltless.

IX. To perform the ordeal by dharmārčh, which is the name of the sliča appropriated to this mode of trial, either an image, named Dharma, or the Genius of Justice, is made of silver, and another, called Adharma, of clay or iron, both of which are thrown into a large earthen jar, and the accused, having thrust his hand into it, is acquitted if he bring out the silver image, but condemned if he draw forth the iron. Or, the figure of a deity is painted on white cloth, and another on black; the first of which they named Dharma, and the second Adharma: these are severally rolled up in cow-dung, and thrown into a large jar, without having ever been shown to the accused; who must put his hand into the jar, and is acquitted or convicted, as he draws out the figure on white or on black cloth.

It is written in the comment on the Dherma Sāstra, that each of the four principal casts has a sort of ordeal appropriated to it; that a Brāhmaṇ must be tried by the balance, a Cshatriya by fire, a Vaisya by water, and a Sūdra by poison: but some have decided that any ordeal, except that by poison, may be performed by a Brāhmaṇ, and that a man of any cast may be tried by the balance. It has been determined, that a woman may have any trial except those by poison and by water.
Certain months and days also are limited in the Mitacshera for the different species of ordeal; as Agrahan, Paush, Magh, Phalgun, Sravan, and Bhadra, for that by fire; Aswin, Catic, Jaishta, and Ashad, for that by water; Paush, Magh, and Phalgun, for that by poison; and regularly there should be no water-ordeal on the Ashthami, or eighth, the Cheturdust, or fourteenth, day of the new or full moon, in the intercalary month, in the month of Bhadra, on Sanaischer, or Saturday, and on Mangal, or Tuesday: but, whenever the magistrate decides that there shall be an ordeal, the regular appointment of months and days needs not be regarded.

The Mitacshera contains also the following distinctions: in cases of theft or fraud to the amount of a hundred gold mohrs, the trial by poison is proper; if eighty mohrs be stolen, the suspected person may be tried by fire; if forty, by the balance; if from thirty to ten, by the image-water; if two only, by rice.

An inspired legislator, named Cattydya, was of opinion, that, though a theft or fraud could be proved by witnesses, the party accused might be tried by ordeal. He says too, that, where a thousand panas are stolen or fraudulently withheld, the proper trial is by poison; where seven hundred and fifty, by fire; where six hundred and sixty-six, and a fraction, by water; where five hundred, by the balance; where four hundred, by hot oil; where three hundred, by rice; where an hundred and fifty, by the Cosha; and where one hundred, by the dharmparch, or images of silver and iron.

The mode of conducting the ordeal by red hot balls, or heads of spears, is thus particularly described in the commentary on Yagyavalkya.

At day-break the place where the ceremony is to be performed is cleared and washed in the customary form; and at sunrise, the Pandits having paid their adoration to Ganesha, the God of Wisdom, draw nine circles on the ground with cow-dung, at intervals of sixteen fingers; each circle containing sixteen fingers of earth, but the ninth either smaller or larger than the rest. Then they worship the deities in the mode prescribed by the Sastra, present oblations to the fire, and, having a second time worshipped the Gods, read the appointed mantras. The person to be tried then performs an ablation, puts on moist clothes, and, turning his face to the east, stands in the first ring, with both his hands fixed in his girdle.
After this the presiding magistrate and Pandits order him to rub some rice in the husk between his hands, which they carefully inspect; and, if the scar of a former wound, a mole, or other mark appear on either of them, they stain it with a dye, that, after the trial, it may be distinguished from any new mark. They next order him to hold both his hands open and close together; and, having put into them seven leaves of the trembling tree, or pippal, seven of the sami or jend, seven blades of darbha grass, a little barley moistened with curds, and a few flowers, they fasten the leaves on his hand with seven threads of raw cotton. The Pandits then read the sibcas which are appointed for the occasion; and, having written a state of the case and the point in issue on a Palmyra-leaf, together with the mantra prescribed in the Veda, they tie the leaf on the head of the accused. All being prepared, they heat an iron ball or the head of a lance, weighing two sly and a half, or five pounds, and throw it into water; they heat it again, and again cool it in the same manner: the third time they keep it in the fire till it is red hot; then they make the person accused stand in the first circle; and, having taken the iron from the fire, and read the usual incantation over it, the Pandits place it with tongs in his hands. He must step gradually from circle to circle, his feet being constantly within one of them, and, when he has reached the eighth, he must throw the iron into the ninth, so as to burn some grass, which must be left in it for that purpose. This being performed, the magistrate and Pandits again command him to rub some rice in the husk between both his hands, which they afterwards examine; and if any mark of burning appear on either of them, he is convicted; if not, his innocence is considered as proved. If his hand shake through fear, and by his trembling any other part of his body is burned, his veracity remains unimpeached; but, if he let the iron drop before he reach the eighth circle, and doubt arise in the minds of the spectators, whether it had burned him, he must repeat the whole ceremony from the beginning.

In the year of the Messiah 1783, a man was tried by the hot ball at Bignares, in the presence of me Ali ibrahim Kha'N, on the following occasion. A man had appealed one Sancar of larceny, who pleaded that he was not guilty; and as the theft could not be proved by legal evidence, the trial by fire-ordeal was ten-
dered to the appellee, and accepted by him. This well-wisher to
mankind advised the learned magistrates and Pandits to prevent
the decision of the question by a mode not conformable to the
practice of the Company’s Government, and recommended an oath
by the water of the Ganges and the leaves of tulasi in a little vessel
of brass, or by the book of Herivansa, or the stone Salgrām, or by
the hallowed ponds or basons; all which oaths are used at Benares.
When the parties obstinately refused to try the issue by any one
of the modes recommended, and insisted on a trial by the hot ball, the
magistrates and Pandits of the court were ordered to gratify their
wishes, and, setting aside those forms of trial in which there could
be only a distant fear of death, or loss of property, as the just punish-
ment of perjury by the sure, yes slow, judgment of heaven, to per-
form the ceremony of ordeal agreeably to the Dherma Sāstra; but
it was not till after mature deliberation for four months, that a regu-
lar mandate issued for a trial by the red hot ball; and this was at
length granted for four reasons: first, because there was no other
way of condemning or absolving the person accused; secondly,
because both parties were Hindus, and this mode of trial was spe-
cially appointed in the Dherma Sāstra by the ancient lawgivers;
thirdly, because this ordeal is practised in the dominions of the
Hindu Rājās; and fourthly, because it might be useful to inquire
how it was possible for the heat of fire to be resisted, and for the
hand that held it to avoid being burned. An order was accord-
ingly sent to the Pandits of the court and of Benares to this effect:
“Since the parties accusing and accused are both Hindus, and will
not consent to any trial but that by the hot ball, let the ordeal
desired be duly performed in the manner prescribed by the Mitā-
ceshera, or commentary on Ya’gyavailcya.”

When preparations were made for the trial, this well-wisher to
mankind, attended by all the learned professors, by the officers of
the court, the Sipāhis of Captain Hogan’s battalion, and many in-
habitants of Benares, went to the place prepared, and endeavoured
to dissuade the appellee from requiring the accused to be tried by
fire, adding, “if his hand be not burned, you shall certainly be im-
prisoned.” The accuser, not deterred by this menace, persisted in
demanding the trial. The ceremony, therefore, was thus conduc-
ted in the presence of me Ali Ibrahīm Khan.
The Pandits of the court and the city, having worshipped the God of Knowledge, and presented their oblation of clarified butter to the fire, formed nine circles of cow-dung on the ground; and, having bathed the appellee in the Ganges, brought him with his clothes wet; when to remove all suspicion of deceit, they washed his hands with pure water: then, having written a state of the case and the words of the mantra on a Palmyra leaf, they tied it on his head; and put into his hands, which they opened and joined together, seven leaves of pippal, seven of jend, seven blades of darbha grass, a few flowers, and some barley moistened with curds, which they fastened with seven threads of raw white cotton. After this they made the iron ball red hot, and, taking it up with tongs, placed it in his hands. He walked with it, step by step, through each of the seven intermediate rings, and threw the ball into the ninth, where it burned the grass that had been left in it. He next, to prove his veracity, rubbed some rice in the husk between his hands; which were afterwards examined, and were so far from being burned, that not even a blister was raised on either of them. Since it is the nature of fire to burn, the officers of the court, and people of Bendres, near five hundred of whom attended the ceremony, were astonished at the event; and this well-wisher to mankind was perfectly amazed. It occurred to his weak apprehension, that probably the fresh leaves, and other things, which, as it had been mentioned, were placed on the hands of the accused, had prevented their being burned; besides that the time was but short between his taking the ball and throwing it down; yet it is positively declared in the Dherma Sastra, and in the written opinions of the most respectable Pandits, that the hand of a man who speaks truth cannot be burned; and Ali 'Ibrahim Khan certainly saw with his own eyes, as many others also saw with theirs, that the hands of the appellee in this cause were unhurt by the fire. He was consequently discharged; but, that men might in future be deterred from demanding the trial by ordeal, the appellee was committed for a week. After all, if such a trial could be seen once or twice by several intelligent men, acquainted with natural philosophy, they might be able to assign the true reason why a man's hand may be burned in some cases, and not in others.

Ordeal by the vessel of hot oil, according to the comment on the
Dherma Sāstra, is thus performed. The ground appointed for the trial is cleared and rubbed with cow-dung; and the next day, at sunrise, the Pandit worships Ganeśa presents his obligations, and pays adoration to other deities, conformably to the Sāstra: then, having read the incantation prescribed, he places a round pan of gold, silver, copper, iron, or clay, with a diameter of sixteen fingers, and four fingers deep; and throws into it one sāva, or eighty siccā weight, of clarified butter, or oil of sesamum. After this a ring of gold, or silver, or iron, is cleansed and washed with water, and cast into the oil, which they proceed to heat; and, when it is very hot, put into it a fresh leaf of pippala, or of bilva: when the leaf is burned, the oil is known to be sufficiently hot. Then, having pronounced a mantra over the oil, they order the party accused to take the ring out of the pan; and if he take it out without being burned, or without a blister on his hand, his innocence is considered as proved; if not, his guilt.

A Brāhman, named Rishi'swara Bhatta, accused one Ra'Mdaya'L, a linen painter, of having stolen his goods. Ra'Mdaya'L pleaded not guilty; and, after much altercation, consented to be tried, as it had been proposed, by the vessel of oil. This well-wisher to mankind advised the Pandits of the court to prevent, if possible, that mode of trial; but, since the parties insisted on it, an ordeal by hot oil, according to the Sāstra, was awarded for the same reasons which prevailed in regard to the trial by the ball. The Pandits, who assisted at the ceremony, were Bhīshma Bhatta, Na'napathac, Manira'ma Pat'haca, Menira'ma Bhatta, Siva, Anantara'ma Bhatta, Cripa'rama, Vishnuheri, Crishnachandra, Ra'men'dra, Govindara'ma, Hericrishna Bhatta, Ca'li'dara; the three last were Pandits of the court. When Ganeśa had been worshipped, and the homa presented, according to the Sāstra, they sent for this well-wisher to mankind; who, attended by the two Dārōghas of the Dhudni and Faujdāri courts, the Cotwāl of the town, the other officers of the court, and most of the inhabitants of Bendāres, went to the place of trial; where he laboured to dissuade Ra'Mdaya'L and his father from submitting to the ordeal; and apprized them, that, if the hand of the accused should be burned, he would be compelled to pay the value of the goods stolen, and his character would be disgraced in every company.
RAMDAYA'L would not desist: he thrust his hand into the vessel, and was burned. The opinion of the Pandits was then taken; and they were unanimous, that, by the burning of his hand, his guilt was established, and he bound to pay RISHI'SWARA BHATTA the price of what he had stolen; but if the sum exceeded five hundred ashrafs his hand must be cut off by an express law in the Sāstra; and a mulct also must be imposed on him according to his circumstances.

The chief magistrate, therefore, caused RAMDAYA'L to pay RISHI'SWARA seven hundred rupees, in return for the goods which had been stolen; but, as amercements in such cases are not usual in the courts of judicature at Benares, the mulct was remitted, and the prisoner discharged.

The record of this conviction was transmitted to Calcutta in the year of the Messiah 1783; and in the month of April, 1784, the Governor General, IMADU'DDAULAH JELA'DET JANG BEI'A'DER, having seen the preceding account of trials by ordeal, put many questions concerning the meaning of Sanscrit words, and the cases here reported; to which he received respectful answers. He first desired to know the precise meaning of hōma, and was informed that it meant the oblations made to please the deities, and comprised a variety of things. Thus in the agni hōma, they throw into the fire several sorts of wood and grass, as palas wood, chadira wood, racta chandan or red sandal, pippal-wood sāmi, and cusha grass, together with some sorts of grain, fruit and other ingredients, as black sesame, barley, rice, sugar-cane, clarified butter, almonds, dates, and gūgal or bdellium. To his next question, "how many species of hōma there were," it was answered, that different species were adapted to different occasions: but that, in the ordeals by hot iron, and hot oil, the same sort of oblation was used. When he desired to know the meaning of the word mentra, he was respectfully told, that in the language of the Pandits there were three such words, mentra, yantra, and tantra; that the first meant a passage from one of the Vedas, in which the names of certain deities occurred; the second, a scheme of figures, which they write with a belief that their wishes will be accomplished by it; and the third, a medical preparation, by the use of which all injuries may be avoided: for they are said to rub it on their hands, and afterwards to
touch red hot iron without being burned. He then asked how much barley, moistened with curds, was put into the hands of the accused person; and the answer was, nine grains.

His other questions were thus answered: "That the leaves of pippala were spread about in the hands of the accused, not heaped one above another; that the man, who performed the fire-ordeal, was not much agitated, but seemed in full possession of his faculties; that the person tried by hot oil was at first afraid, but persisted, after he was burned, in denying the theft; nevertheless, as he previously had entered into a written agreement, that, if his hand should be hurt, he would pay the value of the goods, the magistrate for that reason thought himself justified in compelling payment; that, when the before-mentioned ingredients of the hōma were thrown into the fire, the Pandits, sitting round the heath, sung the Sīhcas prescribed in the Sāstra. That the form of the hearth is established in the Vēda and in the Dherma Sāstra; and this fire-place is also called Vēdi; that, for the smaller oblations, they raise a little ground for the heath, and kindle fire on it; for the higher oblations, they sink the ground to receive the fire, where they perform the hōma; and this sacred hearth they call cunda." The governor then asked, why the trials by fire, by the hot ball, and the vessel of oil, if there be no essential difference between them, are not all called fire-ordeals; and it was humbly answered, 'that, according to some Pandits, they were all three different; whilst others insisted, 'that the trial by fire was distinct from that by the vessel, though the trial by the hot ball and the head of a lance were the same; but, that, in the apprehension of his respectful servant, they were all ordeals by fire.
THE INDIAN LAW OF ORDEAL,

Verbally translated from YAGYAWALCYA.

1. The balance, fire, water, poison, the idol—these are the ordeals used here below for the proof of innocence, when the accusations are heavy, and when the accuser offers to hazard a mulct, (if he should fail):

2. One party may be tried, if he please, by ordeal, and the other must then risque an amercement. But the trial may take place even without any wager, if the crime committed be injurious to the prince.

3. The sovereign, having summoned the accused, while his clothes are yet moist from bathing, at sunrise, before he has broken his fast, shall cause all trials by ordeal to be conducted in the presence of Brahmans.

4. The balance is for women, children, old men, the blind, the lame, Brahmans, and the sick; for the Sudra, fire or water, or seven barley-corns of poison.

5. Unless the loss of the accuser amount to a thousand pieces of silver, the accused must not be tried by the red hot ball, nor by poison, nor by the scales; but if the offence be against the king, or if the crime be heinous, he must acquit himself by one of those trials in all cases.

6. He who has recourse to the balance, must be attended by persons experienced in weighing, and go down into one scale, with an equal weight placed in the other, and a groove (with water in it) marked on the beam.

7. "Thou, O balance, art the mansion of truth; thou wast antiently contrived by deities: declare the truth, therefore, O giver of success, and clear me from all suspicion.

8. "If I am guilty, O venerable as my own mother, then sink me down; but if innocent raise me aloft." Thus shall he address the balance.

9. If he sink, he is convicted, or if the scales be broken; but if the string be not broken, and he rise aloft, he must be acquitted.

10. On the trial by fire, let both hands of the accused be rub-
bed with rice in the husk, and well examined: then let seven leaves of the Aswatt'ha (the religious fig-tree) be placed on them, and bound with seven threads.

11. "Thou, O fire, pervadest all beings; O cause of purity, who givest evidence of virtue and of sin, declare the truth in this my hand."

12. When he has pronounced this, the priest shall place in both his hands an iron ball, red hot, and weighing fifty palas.

13. Having taken it, he shall step gradually into seven circles, each with a diameter of sixteen fingers, and separated from the next by the same space.

14. If, having cast away the hot ball, he shall again have his hands rubbed with rice in the husk; and shall show them unburned, he will prove his innocence. Should the iron fall during the trial, or should a doubt arise (on the regularity of the proceedings) he must be tried again.

15. "Preserve me, O Varuna, by declaring the truth." Thus having invoked the god of waters, the accused shall plunge his head into the river or pool, and hold both thighs of a man, who shall stand in it up to his navel:

16. A swift runner shall then haste to fetch an arrow shot at the moment of his plunging; and if, while the runner is gone the priest shall see the head of the accused under water, he must be discharged as innocent.

17. "Thou, O poison, art the child of Brahma, stedfast in justice and in truth: clear me then from this heavy charge, and, if I have spoken truly, become nectar to me."

18. Saying this, he shall swallow the poison Sāringa, from the tree which grows on the mountain Himalaya; and if he digest it without any inflammation, the prince shall pronounce him guiltless.

19. Or the priest shall perform rites to the image of some tremendous deity, and, having bathed the idol, shall make the accused to drink three handfuls of the water, that has dropped from it:

20. If, in fourteen days after, he suffer no dreadful calamity from the act of the deity or of the king, he must indubitably be acquitted.

* A pala is four carsha's, and a carsha, eighty ractica's, or seeds of the Gunja creeper, each weighing above a grain and a quarter or, correctly, 1$\frac{1}{4}$ gr.
XXIV.

THE SECOND

ANNIVERSARY DISCOURSE,

Delivered 24th February, 1785.

BY THE PRESIDENT.

GENTLEMEN,

If the Deity of the Hindus, by whom all their just requests are believed to be granted with singular indulgence, had proposed last year to gratify my warmest wishes, I could have desired nothing more ardently than the success of your institution; because I can desire nothing in preference to the general good, which your plan seems calculated to promote, by bringing to light many useful and interesting tracts, which, being too short for separate publication, might lie many years concealed, or, perhaps, irrecoverably perish. My wishes are accomplished, without an invocation to Ca'Madhenu; and your Society, having already passed its infant state, is advancing to maturity with every mark of a healthy and robust constitution. When I reflect, indeed, on the variety of subjects which have been discussed before you, concerning the history, laws, manners, arts, and antiquities of Asia, I am unable to decide whether my pleasure or my surprise be the greater; for I will not dissemble, that your progress has far exceeded my expectations; and, though we must seriously deplore the loss of those excellent men who have lately departed from this capital, yet, there is a prospect still of large contributions to your stock of Asiatic learning, which, I am persuaded, will continually increase. My late journey to Benares has enabled me to assure you, that many of your members, who reside at a distance, employ a part of their leisure in preparing additions to your archives; and, unless I am too sanguine, you will soon receive light from them on several topics entirely new in the republic of letters.

It was principally with a design to open sources of such information, that I long had meditated an expedition up the Ganges
during the suspension of my business; but although I had the satisfaction of visiting two ancient seats of Hindu superstition and literature, yet, illness having detained me a considerable time in the way, it was not in my power to continue in them long enough to pursue my inquiries; and I left them, as Æneas is feigned to have left the shades, when his guide made him recollect the swift flight of irrevocable time, with a curiosity raised to the height, and a regret not easy to be described.

Whoever travels in Asia, especially if he be conversant with the literature of the countries through which he passes, must naturally remark the superiority of European talents. The observation, indeed, is at least as old as Alexander; and, though we cannot agree with the sage preceptor of that ambitious Prince, that "the Asiatics are born to be slaves," yet the Athenian poet seems perfectly in the right, when he represents Europe as a sovereign Princess, and Asia as her Handmaid; but, if the mistress be transcendently majestic, it cannot be denied that the attendant has many beauties, and some advantages peculiar to herself. The ancients were accustomed to pronounce panegyrics on their own countrymen at the expense of all other nations; with a political view, perhaps, of stimulating them by praise, and exciting them to still greater exertions; but such arts are here unnecessary; nor would they, indeed, become a Society, who seek nothing but truth unadorned by rhetoric: and, although we must be conscious of our superior advancement in all kinds of useful knowledge, yet we ought not therefore to contemn the people of Asia, from whose researches into nature, works of art, and inventions of fancy, many valuable hints may be derived for our own improvement and advantage. If that, indeed, were not the principal object of your institution, little else could arise from it, but the mere gratification of curiosity; and I should not receive so much delight from the humble shade which you have allowed me to take in promoting it.

To form an exact parallel between the works and actions of the Western and Eastern Worlds, would require a tract of no considerable length; but we may decide, on the whole, that reason and taste are the grand prerogatives of European minds, while the Asiatics have soared to loftier heights in the sphere of imagination. The civil history of their vast empires, and of India in particular,
must be highly interesting to our common country: but we have a
still nearer interest in knowing all former modes of ruling these
inestimable provinces, on the prosperity of which so much of our
national welfare, and individual benefit, seems to depend. A
minute geographical knowledge, not only of Bengal and Bahar, but,
for evident reasons, of all the kingdoms bordering on them, is closely
connected with an account of their many revolutions: but the na-
tural productions of these territories, especially in the vegetable and
mineral systems, are momentous objects of research to an imperial,
but, which is a character of equal dignity, a commercial people.

If botany may be described by metaphors drawn from the
science itself, we may justly pronounce a minute acquaintance with
plants, their classes, orders, kinds, and species, to be its flowers,
which can only produce fruit by an application of that knowledge
to the purposes of life, particularly to diet, by which diseases may
be avoided; and to medicine, by which they may be remedied: for
the improvement of the last mentioned art, than which none surely
can be more beneficial to mankind, the virtues of minerals also should
be accurately known. So highly has medical skill been prized by
the ancient Indians, that one of the fourteen Retnas, or precious
things, which their Gods are believed to have produced by churning
the ocean with the mountain Mandara, was a learned physician.
What their old books contain on this subject, we ought certainly to
discover, and that without loss of time; lest the venerable, but ab-
struse, language, in which they are composed, should cease to be
perfectly intelligible, even to the best educated natives, through a
want of powerful invitation to study it. BERNIER, who was himself
of the faculty, mentions approved medical books in Sanscrit,
and cites a few aphorisms which appear judicious and rational; but
we can expect nothing so important from the works of Hindu
or Muselman physicians, as the knowledge, which experience
must have given them, of simple medicines. I have seen an
Indian prescription of fifty-four, and another of sixty-six, ingre-
dients; but such compositions are always to be suspected,
since the effect of one ingredient may destroy that of another,
and it were better to find certain accounts of a single leaf or
berry, than to be acquainted with the most elaborate compounds,
unless they too have been proved by a multitude of successful ex...
periments. The noble, deobstruent oil, extracted from the eranda nut, the whole family of Balsams, the incomparable stomachic root from Columbo, the fine astringent ridicuously called Japan earth, but in truth produced by the decoction of an Indian plant, have long been used in Asia; and who can foretel what glorious discoveries of other oils, roots, and salutary juices, may be made by your Society? If it be doubtful whether the Peruvian bark be always efficacious in this country, its place may, perhaps, be supplied by some indigenous vegetable equally antiseptic, and more congenial to the climate. Whether any treatises on Agriculture have been written by experienced natives of these provinces, I am not yet informed; but since the court of Spain expect to find useful remarks in an Arabic tract preserved in the Escorial, on the cultivation of land in that kingdom, we should inquire for similar compositions, and examine the contents of such as we can procure.

The sublime science of Chemistry, which I was on the point of calling divine, must be added, as a key to the richest treasuries of nature; and it is impossible to foresee how greatly it may improve our manufactures, especially if it can fix those brilliant dyes, which want nothing of perfect beauty but a longer continuance of their splendour; or how far it may lead to new methods of fluxing and compounding metals, which the Indians, as well as the Chinese, are thought to have practised in higher perfection than ourselves.

In those elegant arts, which are called fine and liberal, though of less general utility than the labours of the mechanic; it is really wonderful how much a single nation has excelled the whole world: I mean the ancient Greeks, whose sculpture, of which we have exquisite remains, both on gems and in marble, no modern tool can equal; whose architecture we can only imitate at a servile distance, but are unable to make one addition to it, without destroying its graceful simplicity; whose poetry still delights us in youth, and amuses us at a maturer age; and of whose painting and music we have the concurrent relations of so many grave authors, that it would be strange incredulity to doubt their excellence. Painting, as an art belonging to the powers of the imagination, or what is commonly called Genius, appears to be yet in its infancy among the people of the east: but the Hindu system of music has, I believe,
been formed on truer principles than our own; and all the skill of
the native composers is directed to the great object of their art, the
natural expression of strong passions, to which melody, indeed, is
often sacrificed; though some of their tunes are pleasing even to
an European ear. Nearly the same may be truly asserted of the
Arabian or Persian system; and, by a correct explanation of the
best books on that subject, much of the old Grecian theory may
probably be recovered.

The poetical works of the Arabs and Persians, which differ sur-
prisingly in their style and form, are here pretty generally known;
and, though tastes, concerning which there can be no disputing, are
divided in regard to their merit, yet we may safely say of them,
what ABULFAZL pronounces of the Mahabharat, that, "although
"they abound with extravagant images and descriptions, they are in
"the highest degree entertaining and instructive." Poets of the
greatest genius, Pindar, Aeschylus, Dante, Petrarch, Shakes-
peare, Spenser, have most abounded in images not far from the
brink of absurdity; but, if their luxuriant fancies, or those of
Abulola, Firdausi, Niza’mi, were pruned away at the hazard
of their strength and majesty, we should lose many pleasures by
the amputation. If we may form a just opinion of the Sanscrit
poetry from the specimens already exhibited, (though we can only
judge perfectly by consulting the originals,) we cannot but thirst
for the whole work of Vya’Sa, with which a member of our Society,
whose presence deters me from saying more of him, will in due time
gratify the public. The poetry of Mathura, which is the Parnas-
sian land of the Hindus, has a softer and less elevated strain; but,
since the inhabitants of the districts near Agra, and principally of
the Duab, are said to surpass all other Indians in eloquence,
and to have composed many agreeable tales and love-songs, which
are still extant, the Bhasha, or vernacular idiom of Vrera, in which
they are written, should not be neglected. No specimens of
genuine oratory can be expected from nations, among whom the
form of government precludes even the idea of popular eloquence;
but the art of writing, in elegant and modulated periods, has been
cultivated in Asia from the earliest ages: the Vedas, as well as the
Alkoran, are written in measured prose; and the compositions of
Isocrates are not more highly polished than those of the best
Arabian and Persian authors.
Of the Hindu and Muselman architecture there are yet many noble remains in Bahar, and some in the vicinity of Malda; nor am I unwilling to believe, that even those ruins, of which you will, I trust, be presented with correct delineations, may furnish our own architects with new ideas of beauty and sublimity.

Permit me now to add a few words on the sciences, properly so named; in which it must be admitted, that the Asiatics, if compared with our western nations, are mere children. One of the most sagacious men in this age, who continues, I hope, to improve and adorn it, SAMUEL JOHNSON, remarked in my hearing, that, "if NEWTON had flourished in ancient Greece, he would have "been worshipped as a deity:" how zealously then would he be adored in Hindusthan, if his incomparable writings could be read and comprehended by the Pandits of Cashmir or Benares! I have seen a mathematical book in Sanscrit of the highest antiquity; but soon perceived from the diagrams, that it contained only simple elements: there may, indeed, have been, in the favourable atmosphere of Asia, some diligent observers of the celestial bodies; and such observations as are recorded should indisputably be made public; but let us not expect any new methods, or the analysis of new curves, from the geometricians of Iran, Turkestan, or India. Could the works of ARCHIMEDES, the NEWTON of Sicily, be restored to their genuine purity by the help of Arabic versions, we might then have reason to triumph on the success of our scientifical inquiries; or could the successive improvements and various rules of Algebra be traced through Arabian channels, to which CARDAN boasted that he had access, the modern history of Mathematics would receive considerable illustration.

The Jurisprudence of the Hindus and Muselmans will produce more immediate advantage; and, if some standard law-tracts were accurately translated from the Sanscrit and Arabic, we might hope in time to see so complete a digest of Indian Laws, that all disputes among the natives might be decided without uncertainty, which is, in truth, a disgrace, though satirically called a glory, to the forensic science.

All these objects of inquiry must appear to you, Gentlemen, in so strong a light, that bare intimations of them will be sufficient; nor is it necessary to make use of emulation as an incentive to an...
ardent pursuit of them: yet I cannot forbear expressing a wish, that the activity of the French in the same pursuits may not be superior to ours; and that the researches of M. Sonnerat, whom the court of Versailles employed for seven years in these climates, merely to collect such materials as we are seeking, may kindle, instead, of abating, our own curiosity and zeal. If you assent, as I flatter myself you do, to these opinions, you will also concur in promoting the object of them; and a few ideas having presented themselves to my mind, I presume to lay them before you, with an entire submission to your judgment.

No contributions, except those of the literary kind, will be requisite for the support of the Society; but if each of us were occasionally to contribute a succinct description of such manuscripts as he had perused or inspected, with their dates and the names of their owners, and to propose for solution such questions as had occurred to him concerning Asiatic Art, Science, and History, natural or civil, we should possess without labour, and almost by imperceptible degrees, a fuller catalogue of oriental books, than has hitherto been exhibited; and our correspondents would be apprised of those points to which we chiefly direct our investigations. Much may, I am confident, be expected from the communications of learned natives, whether lawyers, physicians, or private scholars, who would eagerly, on the first invitation, send us their Mekdam and Risalahs on a variety of subjects: some for the sake of advancing general knowledge, but most of them from a desire, neither uncommon nor unreasonable, of attracting notice, and recommending themselves to favour. With a view to avail ourselves of this disposition, and to bring their latent science under our inspection, it might be advisable to print and circulate a short memorial, in Persian and Hindi, setting forth, in a style accommodated to their own habits and prejudices, the design of our institution; nor would it be impossible hereafter, to give a medal annually, with inscriptions, in Persian on one side, and on the reverse in Sanscrit, as the prize of merit, to the writer of the best essay or dissertation. To instruct others is the prescribed duty of learned Brāhmans, and if they be men of substance, without reward; but they would all be flattered with an honorary mark of distinction; and the Mahomedans have not only the permission, but the positive command, of their law-
giver, to search for learning even in the remotest parts of the globe. It were superfluous to suggest, with how much correctness and facility their compositions might be translated for our use, since their languages are now more generally and perfectly understood than they have ever been by any nation of Europe.

I have detained you, I fear, too long by this address, though it has been my endeavour to reconcile comprehensiveness with brevity. The subjects, which I have lightly sketched, would be found, if minutely examined, to be inexhaustible; and, since no limits can be set to your researches but the boundaries of Asia itself, I may not improperly conclude with wishing for your society, what the Commentator on the Laws prays for the constitution of our country, that it 'MAY BE PERPETUAL.'
XXV.
THE THIRD
ANNIVERSARY DISCOURSE,
DELIVERED 25 FEBRUARY, 1786.
BY THE PRESIDENT.

In the former discourses, which I had the honor of addressing to you, Gentlemen, on the institution and objects of our Society, I confined myself purposely to general topics; giving in the first a distant prospect of the vast career on which we were entering; and, in the second, exhibiting a more diffuse, but still superficial, sketch of the various discoveries in History, Science, and Art, which we might justly expect from our inquiries into the Literature of Asia. I now propose to fill up that outline so comprehensively as to omit nothing essential, yet so concisely as to avoid being tedious; and, if the state of my health shall suffer me to continue long enough in this climate, it is my design, with your permission, to prepare for our annual meetings a series of short dissertations, unconnected in their titles and subjects, but all tending to a common point of no small importance in the pursuit of interesting truths.

Of all the works which have been published in our own age, or, perhaps, in any other, on the History of the Ancient World, and the first population of this habitable globe, that of Mr. Jacob Bryant, whom I name with reverence and affection, has the best claim to the praise of deep erudition ingeniously applied, and new theories happily illustrated, by an assemblage of numbers converging from a most extensive circumference: it falls, nevertheless, as every human work must fall, short of perfection; and the least satisfactory part of it seems to be that which relates to the derivation of words from Asiatic languages. Etymology has, no doubt, some use in historical researches; but it is a medium of proof so very fallacious, that, where it elucidates one fact, it obscures a thousand, and more frequently borders on the ridiculous, than leads to any solid conclusion. It rarely carries with it any internal power of conviction from a resemblance of sounds or similarity of
letters; yet often, where it is wholly unassisted by those advantages, it may be indisputably proved by extrinsic evidence. We know à posteriori, that both fitz and hijo, by the nature of two several dialects, are derived from filius; that uncle comes from avus, and stranger from extra; that jour is deducible, through the Italian, from dies; and rossignol from luscinia, or the singer in groves; that sciuro, écureuil, and squirrel are compounded of two Greek words descriptive of the animal; which etymologies, though they could not have been demonstrated à priori, might serve to confirm, if any such confirmation were necessary, the proofs of a connection between the members of one great empire; but, when we derive our hanger, or short pendent sword, from the Persian, because ignorant travellers thus mis-spell the word khunjār, which, in truth, means a different weapon; or sandal-wood from the Greek, because we suppose that sandals were sometimes made of it, we gain no ground in proving the affinity of nations, and only weaken arguments which might otherwise be firmly supported. That Cū’s, then, or, as it certainly is written in one ancient dialect, Cū’r, and in others, probably, Cā’s, enters into the composition of many proper names, we may very reasonably believe; and that Algeziras takes its name from the, Arabic word for an island, cannot be doubted; but, when we are told from Europe, that places and provinces in India were clearly denominated from those words, we cannot but observe, in the first instance, that the town, in which we now are assembled, is properly written and pronounced Čulcud; that both Čud and Čit unquestionably mean places of strength, or, in general, any inclosures; and that Gujārdt is at least as remote from Jesirah in sound, as it is in situation.

Another exception (and a third could hardly be discovered by any candid criticism) to the Analysis of Ancient Mythology, is, that the method of reasoning, and arrangement of topics, adopted in that learned work, are not quite agreeable to the title, but almost wholly synthetical; and, though synthesis may be the better mode in pure science, where the principles are undeniable; yet it seems less calculated to give complete satisfaction in historical disquisitions, where every postulatum will, perhaps, be refused, and every definition controverted. This may seem a slight objection; but the subject is in itself so interesting, and the full conviction of all
reasonable men so desirable, that it may not be lost labour to
discuss the same or a similar theory in a method purely analytical,
and, after beginning with facts of general notoriety, or undisputed
evidence, to investigate such truths as are at first unknown, or
very imperfectly discerned.

The five principal nations who have in different ages divided
among themselves, as a kind of inheritance, the vast continent of
Asia, with the many islands depending on it, are the Indians, the
Chinese, the Tartars, the Arabs and the Persians: who they severally
were, whence and when they came, where they now are settled,
and what advantage a more perfect knowledge of them all may
bring to our European world, will be shown, I trust, in five distinct
essays; the last of which will demonstrate the connexion or diver-
sity between them, and solve the great problem, whether they had
any common origin, and whether that origin was the same which we
generally ascribe to them.

I begin with India; not because I find reason to believe it the
ture centre of population or of knowledge, but because it is the
country which we now inhabit, and from which we may best survey
the regions around us; as, in popular language, we speak of the
rising sun, and of his progress through the Zodiac, although it had
long ago been imagined, and is now demonstrated, that he is him-
self the centre of our planetary system. Let me here premise, that,
in all these inquiries concerning the history of India, I shall confine
my researches downwards to the Mohammedan conquests at the
beginning of the eleventh century, but extend them upwards, as
high as possible, to the earliest authentic records of the human
species.

India then, on its most enlarged scale, in which the ancients
appear to have understood it, comprises an area of near forty de-
grees on each side, including a space almost as large as all Europe;
being divided on the west from Persia by the Arachosian moun-
tains, limited on the east by the Chinese part of the farther peninsula,
confined on the north by the wilds of Tartary, and extending to
the south as far as the isles of Java. This trapezium, therefore,
comprehends the stupendous hills of Potyid or Tibet, the beautiful
valley of Cashmir, and all the domains of the old Indocthyians, the
countries of Népal and Butánt; Camrúp or Asám, together with
Siam, Ava, Racad, and the bordering kingdoms, as far as the China of the Hindus, or Sin of the Arabian Geographers; not to mention the whole western peninsula, with the celebrated island of Sinhala, or Lion-like men, at its southern extremity. By India, in short, I mean that whole extent of country in which the primitive religion and languages of the Hindus prevail at this day with more or less of their ancient purity, and in which the Nâgari letters are still used with more or less deviation from their original form.

The Hindus themselves believe their own country, to which they give the vain epithets of Medhyama, or Central, and Punyabhūmi, or the land of Virtues, to have been the portion of Bharat, one of nine brothers, whose father had the dominion of the whole earth; and they represent the mountains of Himalaya as lying to the north; and to the west, those of Vindhya, called also Vindayan by the Greeks; beyond which the Sindhu runs in several branches to the sea, and meets it nearly opposite to the point of Dwârâcâ, the celebrated seat of their Shepherd God. In the south-east they place the great river Saravatya; by which they probably mean that of Ava, called also Airâvati in part of its course, and giving perhaps its ancient name to the gulf of Sabara. This domain of Bharat they consider as the middle of the Jambudvīpa, which the Tibetans also call the land of Zambu; and the appellation is extremely remarkable; for Jambu is the Sanscrit name of a delicate fruit, called Jâman, by the Muselmans, and by us rose-apple; but the largest and richest sort is named Amrita, or Immortal; and the mythologists of Tibet apply the same word to a celestial tree bearing ambrosial fruit, and adjoining to four vast rocks, from which as many sacred rivers derive their several streams.

The inhabitants of this extensive tract are described by Mr. Lord with great exactness, and with a picturesque elegance peculiar to our ancient language: "A people, (says he,) presented themselves to mine eyes, clothed in linen garments somewhat low descending, of a gesture and garb, as I may say, maidenly and well nigh effeminate, of a countenance shy and somewhat estranged, yet smiling out a glozed and bashful familiarity." Mr. Orme, the Historian of India, who unites an exquisite taste for every fine art with an accurate knowledge of Asiatic manners, observes, in his elegant preliminary Dissertation, that this "country has been
"inhabited from the earliest antiquity by a people who have no resemblance, either in their figure or manners, with any of the nations contiguous to them;" and that, "although conquerors have established themselves at different times in different parts of India, yet the original inhabitants have lost very little of their original character." The ancients, in fact, give a description of them, which our early travellers confirmed, and our own personal knowledge of them nearly verifies; as you will perceive from a passage in the Geographical Poem of Dionysius, which the Analyst of Ancient Mythology has translated with great spirit:

"To th' east a lovely country wide extends,
"India, whose borders the wide ocean bounds;
"On this the sun, new rising from the main,
"Smiles pleas'd, and sheds his early orient beam.
"Th' inhabitants are swart, and in their locks
"Betray the tints of the dark hyacinth.
"Various their functions; some the rock explore,
"And from the mine extract the latent gold;
"Some labour at the woof with cunning skill,
"And manufacture linen; others shape
"And polish iv'ry with the nicest care:
"Many retire to rivers shoal, and plunge
"To seek the beryl flaming in its bed,
"Or glitt'ring diamond. Oft the jasper's found
"Green, but diaphanous; the topaz too
"Of ray serene and pleasing; last of all
"The lovely amethyst, in which combine
"All the mild shades of purple. The rich soil,
"Wash'd by a thousand rivers, from all sides
"Pours on the natives wealth without control."

Their sources of wealth are still abundant, even after so many revolutions and conquests: in their manufactures of cotton they still surpass all the world; and their features have, most probably, remained unaltered since the time of Dionysius; nor can we reasonably doubt, how degenerate and abased soever the Hindus may now appear, that in some early age they were splendid in arts and arms, happy in government, wise in legislation, and eminent in various knowledge: but, since their civil history beyond the middle
of the nineteenth century from the present time, is involved in a cloud of fables, we seem to possess only four general media of satisfying our curiosity concerning it; namely, first, their Languages and Letters; secondly, their Philosophy and Religion; thirdly, the actual remains of their old Sculpture and Architecture; and fourthly, the written memorials of their Sciences and Arts.

I. It is much to be lamented that neither the Greeks, who attended Alexander into India, nor those who were long connected with it under the Bactrian Princes, have left us any means of knowing with accuracy, what vernacular languages they found on their arrival in this Empire. The Mohammedans, we know, heard the people of proper Hindusthan or India, on a limited scale, speaking a Bhāsā, or living tongue, of a very singular construction, the purest dialect of which was current in the districts round Agra, and chiefly on the poetical ground of Mathurā; and this is commonly called the idiom of Vṛāja. Five words in six, perhaps, of this language were derived from the Sanscrit, in which books of religion and science were composed, and which appears to have been formed by an exquisite grammatical arrangement, as the name itself implies, from some unpolished idiom; but the basis of the Hindustāni, particularly the inflexions and regimen of verbs, differed as widely from both those tongues, as Arabic differs from Persian, or German from Greek. Now the general effect of conquest is to leave the current language of the conquered people unchanged, or very little altered, in its groundwork, but to blend, with it a considerable number of exotic names both for things and for actions; as it has happened in every country, that I can recollect, where the conquerors have not preserved their own tongue unmixed with that of the natives, like the Turks in Greece, and the Saxons in Britain; and this analogy might induce us to believe, that the pure Hindi, whether of Tartarian or Chaldean origin, was primeval in Upper Irān, into which the Sanscrit was introduced by conquerors from other kingdoms in some very remote age; for we cannot doubt that the language of the Vēdas was used in the great extent of country, which has before been delineated, as long as the religion of Brahmā has prevailed in it.

The Sanscrit language, whatever be its antiquity, is of a wonderful structure; more perfect than the Greek, more copious
than the *Latin* and more exquisitely refined than either; yet bearing to both of them a stronger affinity, both in the roots of verbs, and in the forms of grammar, than could possibly have been produced by accident; so strong, indeed, that no philologer could examine them all three, without believing them to have sprung from some common source, which, perhaps, no longer exists. There is a similar reason, though not quite so forcible, for supposing that both the *Gothic* and the *Celtic*, though blended with a very different idiom, had the same origin with the *Sanscrit*; and the old *Persian* might be added to the same family, if this were the place for discussing any question concerning the antiquities of *Persia*.

The characters, in which the languages of *India* were originally written, are called *Nāgarī*, from *Nagara*, a city, with the word *Dēva* sometimes prefixed, because they are believed to have been taught by the Divinity himself, who prescribed the artificial order of them in a voice from heaven. These letters, with no greater variation in their form by the change of straight lines to curves, or conversely, than the *Cufic* alphabet has received in its way to *India*, are still adopted in more than twenty kingdoms and states, from the borders of *Cashgar* and *Khoten*, to *Rāma*’s Bridge, and from the *Sindhu* to the river of *Siam*; nor can I help believing, although the polished and elegant *Dēvānagārī* may not be so ancient as the monumental characters in the caverns of *Jarasandha*, that the square *Chaldaic* letters, in which most *Hebrew* books are copied, were originally the same, or derived from the same prototype, both with the *Indian* and *Arabian* characters. That the *Phenician*, from which the *Greek* and *Roman* alphabets were formed by various changes and inversions, had a similar origin, there can be little doubt; and the inscriptions at *Canaráh*, of which you now possess a most accurate copy, seem to be compounded of *Nāgarī* and *Ethiopic* letters, which bear a close relation to each other, both in the mode of writing from the left hand, and in the singular manner of connecting the vowels with the consonants. These remarks may favour an opinion entertained by many, that all the symbols of *sound*, which at first, probably, were only rude outlines of the different organs of speech, had a common origin. The symbols of *ideas*, now used in *China* and *Japan*, and formerly, perhaps, in *Egypt* and *Mexico*, are quite of a distinct nature; but it is very
remarkable, that the order of sounds in the Chinese grammers corresponds nearly with that observed in Tibet, and hardly differs from that which the Hindus consider as the invention of their Gods.

II. Of the Indian Religion and Philosophy I shall here say but little, because a full account of each would require a separate volume. It will be sufficient in this dissertation to assume, what might be proved beyond controversy, that we now live among the adorers of those very Deities who were worshipped under different names in old Greece and Italy; and among the professors of those philosophical tenets, which the Ionic and Attic writers illustrated with all the beauties of their melodious language. On one hand we see the trident of Neptune, the eagle of Jupiter, the satyrs of Bacchus, the bow of Cupid, and the chariot of the Sun; on another we hear the cymbals of Rhea, the songs of the Muses, and the pastoral tales of Apollo Nomius. In more retired scenes, in groves, and in seminaries of learning, we may perceive the Brahmins and the Sarmanes, mentioned by Clemens, disputing in the forms of logic, or discoursing on the vanity of human enjoyments, on the immortality of the soul, her emanation from the eternal mind, her debasement, wanderings, and final union with her source. The six philosophical schools, whose principles are explained in the Dersana Sästra, comprise all the metaphysics of the old Academy, the Stoa, the Lyceum; nor is it possible to read the Védánta, or the many fine compositions in illustration of it, without believing, that Pythagoras and Plato derived their sublime theories from the same fountain with the sages of India. The Scythian and Hyperborean doctrines and mythology may also be traced in every part of these eastern regions; nor can we doubt, that Wod or Odén, whose religion, as the northern historians admit, was introduced into Scandinavia by a foreign race, was the same with Buddha, whose rites were probably imported into India nearly at the same time, though received much later by the Chinese, who soften his name into FO'.

This may be a proper place to ascertain an important point in the Chronology of the Hindus; for the priests of Buddha left in Tibet and China the precise epoch of his appearance, real or imagined, in this Empire; and their information, which had been preserved in writing, was compared by the Christian Missionaries and
scholars with our own era. COUPLET, DE GUIGNES, GIORGI, and BAILLY, differ a little in their accounts of this epoch, but that of COUPLET seems the most correct: on taking, however, the medium of the four several dates, we may fix the time of BUDDHA, or the ninth great incarnation of VISHNU, in the year one thousand and fourteen before the birth of CHRIST, or two thousand seven hundred and ninety-nine years ago. Now the Câshmirians, who boast of his descent in their kingdom, assert that he appeared on earth about two centuries after CRISHNA the Indian APOLLO, who took so decided a part in the war of the Mahâbhârata; and, if an etymologist were to suppose, that the Athenians had embellished their poetical history of PANDION’S expulsion and the restoration of AEGEUS with the Asiatic tale of the PA’âDUS and YUDHISHTIR, neither of which words they could have articulated, I should not hastily deride his conjecture. Certain it is, that Pândumandél is called by the Greeks the country of PANDION. We have, therefore, determined another interesting epoch, by fixing the age of CRISHNA near the three thousandth year from the present time; and, as the three first Avataras, or descents of VISHNU, relate no less clearly to an Universal Deluge, in which eight persons only were saved, than the fourth and fifth do to the punishment of impiety and the humiliation of the proud, we may for the present assume, that the second, or silver, age of the Hindus was subsequent to the dispersion from Babel; so that we have only a dark interval of about a thousand years, which were employed in the settlement of nations, the foundation of states or empires, and the cultivation of civil society. The great incarnate Gods of this intermediate age are both named RA’MA, but with different epithets; one of whom bears a wonderful resemblance to the Indian BACCHUS, and his wars are the subject of several heroic poems. He is represented as a descendant from Sû’RYA, or the SUN; as the husband of SÎTA’, and the son of a princess named CAU’SELYA’. It is very remarkable, that the Peruvians, whose Incas boasted of the same descent, styled their greatest festival Ramasitoa; whence we may suppose that South America was peopled by the same race, who imported into the farthest parts of Asia the rites and fabulous history of RA’MA. These rites and this history are extremely curious, and although I cannot believe, with NEWTON, that ancient mythology was nothing
but historical truth in a poetical dress; nor, with Bacon, that it consisted solely of moral and metaphysical allegories; nor, with Bryant, that all the heathen Divinities are only different attributes and representations of the Sun, or of deceased progenitors; but conceive that the whole system of religious fables rose, like the Nile, from several distinct sources; yet I cannot but agree that one great spring and fountain of all idolatry, in the four quarters of the globe, was the veneration paid by men to the vast body of fire which "looks from his sole domipion like the God of this world;" and another, the immoderate respect shown to the memory of powerful or virtuous ancestors, especially the founders of kingdoms, legislators, and warriors, of whom the Sun or the Moon were wildly supposed to be the parents.

III. The remains of Architecture and Sculpture in India, which I mention here as mere monuments of antiquity, not as specimens of ancient art, seem to prove an early connection between this country and Africa. The pyramids of Egypt, the colossal statues described by Pausanias and others, the Sphinx, and the Hermes Canis, (which last bears a great resemblance to the Varadavatär, or the incarnation of Vishnu in the form of a Boar,) indicate the style and mythology of the same indefatigable workmen who formed the vast excavations of Candrah, the various temples and images of Buddha, and the idols which are continually dug up at Gaya, or in its vicinity. The letters on many of those monuments appear, as I have before intimated, partly of Indian, and partly of Abyssinian or Ethiopian origin; and all these indubitable facts may induce no ill-grounded opinion, that Ethiopia and Hindustan were peopled or colonized by the same extraordinary race; in confirmation of which, it may be added, that the mountaineers of Bengal and Bahar can hardly be distinguished in some of their features, particularly their lips and noses, from the modern Abyssinians, whom the Arabs call the children of Cùsh; and the ancient Hindus, according to Strabo, differed in nothing from the Africans, but in the straightness and smoothness of their hair, while that of the others was crisp or woolly; a difference proceeding chiefly, if not entirely, from the respective humidity or dryness of their atmospheres. Hence the people who received the first light of the rising sun, according to the limited knowledge of the ancients, are said by Apuleius to be
the Ari and Ethiopians, by which he clearly meant certain nations of India; where we frequently see figures of Buddha with curled hair, apparently designed for a representation of it in its natural state.

IV. It is unfortunate that the Silpa Sāstra, or Collection of Treatises on Arts and Manufactures, which must have contained a treasure of useful information on dyeing, painting, and metallurgy, has been so long neglected, that few, if any traces of it are to be found; but the labours of the Indian loom and needle have been universally celebrated; and fine linen is not improbably supposed to have been called Sindon, from the name of the river near which it was wrought in the highest perfection. The people of Colchis were also famed for this manufacture; and the Egyptians yet more, as we learn from several passages in scripture, and particularly from a beautiful chapter in Ezekiel, containing the most authentic delineation of ancient commerce, of which Tyre had been the principal mart. Silk was fabricated immemorially by the Indians, though commonly ascribed to the people of Serica or Tancit, among whom probably the word Sēr, which the Greeks applied to the silk-worm, signified gold; a sense which it now bears in Tibet.

That the Hindus were in early ages a commercial people, we have many reasons to believe; and in the first of their sacred law-tracts, which they suppose to have been revealed by Menu many millions of years ago, we find a curious passage on the legal interest of money, and the limited rate of it in different cases, with an exception in regard to adventures at sea; an exception which the sense of mankind approves, and which commerce absolutely requires; though it was not before the reign of Charles I. that our own jurisprudence fully admitted it in respect of maritime contracts.

We are told by the Grecian writers, that the Indians were the wisest of nations; and in moral wisdom they were certainly eminent. Their Niti Sāstra, or System of Ethics, is yet preserved; and the Fables of Vishnuberaman, whom we ridiculously call Pilpay, are the most beautiful, if not the most ancient, collection of apologues in the world. They were first translated from the Sancrit, in the sixth century, by the order of Buzerchumihr, or Bright as the Sun, the chief physician and afterwards Vestr of the great anu̇
SHIREVA'N, and are extant under various names in more than twenty languages; but their original title is Hitopadësa, or Amicable Instruction; and, as the very existence of Esop, whom the Arabs believe to have been an Abyssinian, appears rather doubtful, I am not disinclined to suppose that the first moral fables which appeared in Europe were of Indian or Ethiopian origin.

The Hindus are said to have boasted of three inventions, all of which, indeed, are admirable; the method of instructing by Apologies; the decimal scale, adopted now by all civilized nations; and the game of Chess, on which they have some curious treatises: but, if their numerous works on Grammar, Logic, Rhetoric, Music, all which are extant and accessible, were explained in some language generally known, it would be found, that they had yet higher pretensions to the praise of a fertile and inventive genius. Their lighter poems are lively and elegant; their epic, magnificent and sublime in the highest degree. Their Purdnas comprise a series of mythological histories, in blank verse, from the Creation to the supposed incarnation of Buddha; and their Védas, as far as we can judge from that compendium of them, which is called Upanishat, abound with noble speculations in metaphysics, and fine discourses on the being and attributes of God. Their most ancient medical book, entitled Chereca, is believed to be the work of Siva; for each of the Divinities in their Triad has at least one sacred composition ascribed to him. But as to mere human works on History and Geography, though they are said to be extant in Caxmtir, it has not been yet in my power to procure them. What their astronomical and mathematical writings contain, will not, I trust, remain long a secret: they are easily procured, and their importance cannot be doubted. The philosopher whose works are said to include a System of the Universe, founded on the principle of Attraction and the central Position of the Sun, is named Yavana Acharya, because he had travelled, we are told, into Ionia. If this be true, he might have been one of those who conversed with Pythagoras. This at least is undeniable, that a book on astronomy in Sanskrit bears the title of Yavana Jatíca, which may signify the Ionic Sect. Nor is it improbable, that the names of the Planets and Zodiacal Stars, which the Arabs borrowed from the Greeks, but which we find in the oldest Indian records, were originally divised by the same ingenious
and enterprizing race, from whom both *Greek* and *India* were peopled; the race, who, as *Dionysius* describes them,

*——* first assayed the deep,

*‘* And wasted merchandise to coasts unknown,

*‘* Those who digested first the starry choir,

*‘* Their motions mark’d, and called them by their names.*

Of these cursory observations on the *Hindus*, which it would require volumes to expand and illustrate, this is the result: that they had an immemorial affinity with the *old Persians, Ethiopians, and Egyptians*; the *Phenicians, Greeks, and Tuscan*; the *Scythians or Goths, and Celts*; the *Chinese, Japanese, and Peruvians*; whence, as no reason appears for believing that they were a colony from any one of those nations, or any of those nations from them, we may fairly conclude that they all proceeded from some central country, to investigate which will be the object of my future discourses; and I have a sanguine hope that your collections, during the present year, will bring to light many useful discoveries; although the departure for *Europe* of a very ingenious member who first opened the inestimable mine of *Sanskrit* literature, will often deprive us of accurate and solid information concerning the languages and antiquities of *India*. 
The intent of the following remarks is to point out an error in the usual practice of making the Lunar Observations, and another in the Method of Computation.

It is well known that a little before and after the conjunction, the whole hemisphere of the moon is visible, and the enlightened crescent seems to extend some distance beyond the dusky part. Now, having determined the longitude of a place from the eclipses of Jupiter's satellites, I took several sets of distances of the moon's limb from a star near the time of the conjunction, both from the bright and the dusky parts of the circumference, and having calculated the results, I found that those taken from the dusky part were much nearer the truth than the others. The nature of the error evidently shewed, that the star had really been at some distance from the limb when it appeared to be in contact with it; and, as the error was a considerable part of a degree, I saw it would be of consequence to discover the cause of it; which, however, was obvious enough from Newton's principles, and may be explained as follows.

Let AD be the diameter of the moon, and A the centre of a
CORRECTIONS OF THE LUNAR METHOD.

star in contact with the moon's limb, now, as the enlightened part of the moon evidently appears to extend beyond the dusky part, let the concentric circle BC represent the moon's limb thus apparently magnified, and suppose the star to be equally magnified; then with the centre A, and the distance DC describe a circle, which consequently will touch the moon's apparent circumference inwardly; now, as this last is a consequence of supposing the centre of the star to touch the circumference of the moon, exclusive of the deception, it follows, that the proper method of taking the distance, is to make the star appear to touch the moon inwardly.

But all the writers on this subject have particularly directed that the star be made to touch outwardly: let B, therefore, be the point of contact, and a the centre: the error then is Aa, or the sum of the apparent increase of the moon's radius and the apparent radius of the star: this quantity, it is evident, will make a considerable error in the result; and errors arising from this source are the more to be attended to, as they are not of a kind to be lessened by increasing the number of observations. The same reasoning is applicable to the sun and moon with very little alteration.

The distance of the moon from the sun or a star, at each three hours, is given in the Nautical Ephemeris, and the method of inferring the time for any intermediate distance, is by simple proportion: this would be just if the moon's motion was uniform: but as that is not the case, the velocity should be taken into the account, as well as the space, in determining the time, taken by the moon to move any given distance; and the proper measure of the velocity is such a quantity, as has the same ratio to the space described, as three hours have to the time that has been actually taken to move the given distance: to find this quantity correctly, would require interpolation, but it will be sufficient in practice to find the time first by the common method, and then to correct the interval for three hours to that time, by taking a proportional part of the second difference of the moon's distance at the beginning of each three hours; supposing the first differences to answer to the middle of each interval.

The last correction, though not so considerable as the first, will often bring the result nearer to the truth by three, four, five, or six miles, and sometimes more, which in geographical determinations
is of consequence; and, by paying attention to those and some other causes of error, which shall be pointed out hereafter, the results in general will be much nearer to the truth than is usually imagined. It is common to throw blame on the imperfections of the Lunar Tables, but it would be much more properly applied to bad instruments and bad observers.

THE END OF THE FIRST VOLUME
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OF THE
ASIATIC SOCIETY

From 15 January 1784 to 15 January 1789.

THOSE MARKED † ARE DECEASED.

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APPENDIX

TO THE

FIRST VOLUME.

OF

ASIATIC RESEARCHES.

A

METEOROLOGICAL JOURNAL,

Kept by Colonel T. D. Pearse, from 1st March, 1785, to 28th February, 1786.
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(a) Last Friday the fog was excessive, and did not begin to clear till nine. Saturday the same. Sunday it began to clear about 7.
(b) The fog is gone off to-day already: it was but slight.
(c) Much lightning in the N.W. and distant thunder.
(d) Much lightning in the N.W. A puff from the N.W. but without rain or thunder.
(e) There was a very small sprinkling of rain just now.
(f) In the morning we had a thick fog, which formed into clouds, and went over to the N and at 12 masses were formed there: from whence at 4.50 we had a storm, which we over in half an hour; and at Dunford, about 10 miles off, they had heavy hail.
(g) Fog so thick that an object at a 100 yards is invisible.
(h) 6 A. Foggy. A storm will come on in the evening. 4 P. Distant thunder. 5 A. We have had a furious storm of hail, with thunder and lightning, and SW to SSE 6. 5.30 A. Loud thunder still continues in the ENE. Where the mass now is.
(i) 6.45 A. Every thing hidden in fog, which will produce a storm at night. 8.25 P. Much lightning, and the expected storm coming on.
(j) 7.40 A. The thunder rolled all night: excessive lightning.
(k) 7.15 A. A storm began to gather about 5 P. and we had much lightning about 11 between 12 and 1 it began, and the wind very violent. The thunder close, and so heavy, that it jarred the whole house like an earthquake. 2.30 P. It has been very gloomy at times all day.
A METEOROLOGICAL JOURNAL.

|------|-------|------------|--------------|-------------|---------|-------|-------|

|     |   |   |     |   |   |       |       |       |              |                 |
| 18  | 6  | A  | 29,915 | 80 | thin | Brought forward, |            |       |                |                 |
| 19  |    | 2.20 P | 29,873 | 84 |  *  |            |       |       |                |                 |
| 20  | 1.30 P | 29,823 | 85 | thin | S        |            |       |       |                |                 |
| 21  | 6.15 A | 29,813 | 81 | thin | S        |            |       |       |                |                 |
| 22  | 6.30 A | 29,825 | 82 | thick & thin | S by S |            |       |       |                |                 |
| 23  | 2. P  | 29,837 | 86 | thick | S by W |            |       |       |                |                 |
| 24  | 7.45   | 29,784 | 85.5 | thick | SW by S |            |       |       |                |                 |
| 25  | 8.    | A  | 29.87 | 81.5 | thick | SW by S |            |       |                |                 |
| 26  | 2. P  | 29,825 | 85 | thick | W by S |            |       |       |                |                 |
| 27  | 1 h   | m  | Full  | 82 | thick | $SE$ |            |       |       |                |                 |

**Total in March.** 554

(m) Great appearance of approaching rain and storms.
(n) 8 A. The morning was very cloudy, and the wind strong, it presaged a storm; and I still expect one before midnight. At sun-set it threatened, and at 7 P. the lightning began to be vivid in the WNW. It rained for about ten minutes. The thunder was very near.
(o) 8 A. The wind began about 11 P. and raged till past 1 o'clock with uncommon violence. 2 P. Excessively gloomy. 9 P. At 7 we had a thunder gust which was soon over, with a sprinkling only.
(p) 6.45 A. The clouds began to collect at 8 last night and are very thick. 2.15 P. The clouds continued very thick till past 10, and were not dispelled till past 1.
(q) 6.45 A. Excessively thick fog. 2.10 P. The true along-shore wind, which disorders the whole frame.
(r) 6.45 A. Foggy. Last night the clouds were thick at 11 P.
(s) 6.45 A. Foggy. It has been extremely gloomy ever since 9 o'clock, and about noon we had a few drops of rain.
(t) 7.15 A. We had a small shower of rain about sunrise, and there has been more at a distance from the feel of air.
### Meteorological Journal

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(a) We had a sprinkling rain to-day of half an hour's duration.

(b) Excessively thick haze.

(c) Last night the clouds were so heavy that they seemed to threaten a storm.

(d) There were flying clouds from 8 till 11 to-day, but all are gone.

(e) Yesterday evening there was a mass over Calcutta, and much lightning and some thunder, and this morning we had a fog.

(f) There will be a storm to-day. 5.30 P. Distant thunder. The bank is not yet formed.

(g) The wind was tempestuous the greatest part of the night, but we had not any rain. It is now loggy, and threatens.

(h) Yesterday there was every reason to expect a violent storm, but it went off from us. Today there was but little expectation, and it now rains steadily, but there has been a great deal of thunder; and all this without any change of wind.

(i) We had a small shower at 1, and another just now. The wind was NE 2 all the afternoon.

(j) The wind changed suddenly just after last observation to the S, and we had a very windy night. 2.30 P. It has been gloomy all day.

(k) A sprinkling rain in very distant drops. The wind of the night was of such a kind, that it prevented the possibility of sleeping.

The morning rain, and a like sprinkling since, could not be measured.
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**Total in April:** 14.308

**(m)** It has been a blowing cold night; wind northerly, and it sprinkles rain. 8.15 A. A heavy shower just over, and drizzling rain still continues. 2.15 P. We have had more sprinkling rain.

**(n)** About 6 yesterday it began to rain in drops; before nine it was smart rain. It has continued all night, and still rains. 2.15 P. It has rained incessantly all day. It still rains hard, and now the clouds begin to break a little. 8.20 P. It still sprinkles.

**(o)** It began to thunder at a great distance about 8, and by 12 it was near us, and this put an end to the rain before 3 A.

**(p)** The morning was foggy.

**(q)** A small shower of rain, and the wind changed from the S. to NNE.

**(r)** At 12 P. a mass formed in the NW, came on, and in a short time we had a storm without thunder. It sprinkles to-day. 2 P. Produce of the sprinkling.

**(s)** Very heavy and foul air.

**(t)** Lightning last night; and very foul air to-day.

**(u)** A regular northwester last night at 8. P. 7 P. Sprinkling rain begun. 8 P. The produce of the storm, which is abated; distant thunder. 9.45 P. A very severe storm just over, which began about 8. 20. It still thunders.

**(v)** This was, with produce of a small shower about 10.30 P.

**(x)** The night very hot, and the air loaded with damp; the morning cool and pleasant.
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*(a)* Much lightning last night, and a mass in N and NW from whence we had a blast of wind at 10. P. 8.45 P. Sprinkling rain begun. 9 P. Very heavy thunder; a smart shower just over.

*(b)* A heavy thunder mass in NW, and much lightning, with distant thunder. 7.47 P. The wind just changed, and the mass reached the zenith. 7.55 P. Small rain begun. 8.25 P. Heavy rain over, small rain continues.

*(c)* A very oppressive heat to-day. The air does not carry off perspiration, and makes the whole body clammy and comfortless.

*(d)* The heat produced thunder all the afternoon till near 10, with squalls of wind from every quarter in turn, but without rain.

*(e)* The wind shifted about a quartet of an hour ago.
## A Meteorological Journal

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TOTAL IN MAY: 0.635

(f) The clouds were 6 about 10, but are all gone.
(g) A small thunder shower at 7 P. yielded the water. It came from ENE. 10.30 A.
(h) We had another storm in the night, with a sprinkling of rain.
(i) We had a mass of thunder clouds from NW. last night without rain. 2.10 P.
(j) The heat very oppressive.
(k) We were almost suffocated last night. I could not close my eyes till past 4.
(l) It rains, and there has been distant thunder. 6.55 P. Thunder close and loud.
(m) Between 11 and 12 the storm came on again heavier than before 2 P. The air does not carry off perspiration, and therefore leaves the body clammy. 8.50 P. At 7 we had a most furious storm from N 8: a torrent of rain, but of short duration; and all has been quiet this hour.
(n) After last observation, it began to rain small rain which continued some time.
(o) We had in town a very violent north wester, and it reached the gardens, where it produced this rain. 1.10 P. The day has been hot, and the sky covered with thin clouds; since 8 they have collected, and we had much lightning in the WNW. and now the storm has reached us.
(p) Much lightning in the NNE. and distant thunder.
(q) It sprinkled rain soon after last observation, but at 5. A we had a tremendous thunder-storm.

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(f) SW by W 4
(g) E by S 3
(h) NW by W 3
(i) NE 3
(j) NW by S 4
(k) NW by W 3
(l) NW by S 4
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(n) NW by S 4
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Total in May: 0.635
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(a) There was a great deal of thunder last night. About 2 it was most oppressively sultry, being a dead calm. 8.40 P. After excessive lightning in the NW. the mass has reached us, and the storm is begun. 9.15 P. It still rains smartly: the thunder now approaches, but we very far off. This looks more like the rains than any thing we have yet had; and if the east wind to the south we may reasonably expect them.

(b) Produce of last night's storm.

(c) Produce of a thunder storm at noon.

(d) Do. and at noon also.

(e) There was a storm at noon, and at dinner time, and the evening was fine.

(f) It has rained this morning with thunder; this water is yesterday's and to-day's.

(g) We had rain yesterday, and twice to-day, and this is the produce of all.

(h) It began to blow and thunder and lighten at 1540, and before 1. A. we had a heavy shower. Ever since it has rained more or less, with much thunder. 1.50 P. It has rained without ceasing, more or less, ever since morning.

(i) We have had a thunder shower from SW.

(j) There was a shower at day-break.

(k) At 6 P. yesterday a heavy shower from NW. gave this water: and there was only a sprinkling in town.

(l) There was a small shower about 3, and another about 9 P. 2.20P. Heavy showers began about 9, and still continue with short intervals.

(m) It has rained ever since last observation at times only sprinkling, at others mostly; and now moderately. 2.15 P. The rain abated gradually, and ceased before noon.

(n) At 9 P. a thunder storm from the W. brought on rain again, and it continued till morning.

(o) It was pouring out through the air-hole. How long it had done so I cannot tell: but it rained all day yesterday: drizzling and at times barely perceptible; heavily about 6 P. and drizzling till near day; then hard again; and now it rains smartly as it did when the water was measured, and there is some in the measure besides. 2.15 P. The rain ceased about 10, and the sun shone at noon.
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* (q) Between 10 and 11 P., there was a heavy shower, that produced 4 of this quantity; the rest fell this morning. 2.20 P. A shower just over.
* (r) This was the end of the last shower. 2.10 P. A heavy shower about 11 o'clock in the forenoon.
* (s) Misty rain. 2.15 P. It cleared soon after last observation.
* (t) A shower about 4 o'clock this morning.
* (u) About 11 it began to rain in torrents At 1 past three inches were measured. At 6 P. this morning a third; the rest fell since, and it still sprinkles. There was excessively heavy thunder, with most vivid lightning, at 9, though but little wind. 2.20 P. Drizzling rain all day.
* (v) Soon after last observation it began to drizzle, and the mercury rose, but in a short time after again. The rain continued till 7 in the morning, and for about two hours was very heavy. 11.45 P. This fell in the course of the day, about 9 and again 2. P.
* (x) A small shower at 7 P. yesterday, and another just over. 2. P. A shower in the forenoon. 6.2 P. A shower about 5 P. and the above produced this water.
* (y) The night was clear, and stars bright.
* (z) A small shower at 7 P. yesterday, and another just over. 2. P. A shower in the forenoon. 6.2 P. A shower about 5 P. and the above produced this water.
* (aa) The morning has been bright.
* (bb) The rain fell about 8 P. last night in a smart shower from SW wind.
* (cc) This rain fell about 6 P. and was heavy for the time it lasted.
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Carried forward, 1.7.077

(a) The night very close and suffocating. After 3 in the morning, thunder and lightning, and a little wind with rain made it possible to sleep. 0.10 P. A heavy storm came on, the wind was NE, the greatest part of the forenoon, now has changed.
(b) It rained all the afternoon, and till near 8 P, and is about to rain again. 2.20 P. Flying showers, five or six since last observation.
(c) The produce of several drizzling flying showers after last observation.
(d) About 6 it began to rain, and there were 1.400 at nine. It rained almost all night, and there were 3.500 drawn off just now; it still drizzles. The lightning fell close to the barracks, that is about 1/4 mile from the house, but did not hurt any body.
(e) Rain in the night with lightning. Heavy rain about day-break and the shower but just over 2.45 P. Showers all the forenoon, and now set in. 7 P. It has been a very rainy, windy afternoon, and it still continues so.
(f) It has been tempestuous at times and rained in flying showers all night.
(g) The 7th in the evening. 186. The 8 to 2 P. when it ceased.
(h) It has thundered at a distance.
(i) There was lightning about 10 P. but not any rain.
(j) This rain fell yesterday about 4 P. it has not rained since.
(k) It has thundered heavily last night, about 11, and it has just begun again gently. 2.30 P.

The rain continued till past one.

(m) The rain fell in the evening about six.
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Over flowing:

**Total in July:** 12.102.

(n) This rain fell the 14th in the night, and not any since.
(o) Rain yesterday evening, and in the night before 3 o'clock.
(p) A very tempestuous night, and rain to-day also.
(q) Sprinkling rain.
(r) .4 fell on the 10th, the rest yesterday. Not any to-day. The weather was foggy and cloudy, very close and hot.
(s) This fell the day before yesterday. 2.20 P. A thunder shower at 11. Excessively high tide to-day.
(t) A shower just come on. 8.25 P. Two very heavy showers since 7 P. about which time it began with very heavy thunder from SE, and varied to NW.
(u) The remainder of last night's storm, which was over when the last observation was entered. 2.20 P. A thunder shower about 12, and a now thunders and more is coming on.
(v) It rains hard. The wind has veered all round the compass at least twice since morning, with flying shower of small rain, and distant thunder, of deep and heavy sound.
(w) The wind increased to S, and blew so far above an hour with rain, of which this is the produce.
(x) Add this for overflowing on the 26th, and it could not be less.
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(1) About one P. it rained very heavily in town; and very little here; the quantity is noted 2 P. Distant thunder.
(2) This fell in a very short time. In town there was only a sprinkling.
(3) It was very gloomy in town all the forenoon; and we had two small showers, but not any at the gardens.
(4) Of the water, 5 fell last night, the rest in the forenoon to-day.
(5) It rained almost the whole day small rain.
(6) Rain in the forenoon. 11 P. And still raining hard.
(7) It has rained almost incessantly all night long; and still rains, though it is going off.
(8) It rains very heavily. The mercury is in a falling state, so that it has been higher.
(9) This fell in the night about 15 P. and we have had a sprinkling about 11 this forenoon besides.
(10) This fell about 2 in the morning with a gust of wind and some lightning. 2.15 P. Two or three thunder showers since 9, and it now thunders.
(11) Yesterday afternoon and in the night it rained.
(12) It rains very heavily. The mercury is in a falling state, so that it has been higher.
(13) This fell in the night about 15 P. and we have had a sprinkling about 11 this forenoon besides.
(14) This fell about 2 in the morning with a gust of wind and some lightning. 2.15 P. Two or three thunder showers since 9, and it now thunders.
(15) Yesterday afternoon and in the night it rained.
(16) Several small showers with thunder.
(17) 2.15 P. Thunder at a distance.
(18) Thunder showers yesterday afternoon and in the night, and rain this morning, -10 P. Showers all the forenoon of very small rain, and short duration.
(19) It has been a very tempestuous night, with frequent showers. It still rains and the wind was in general 6 and 7 in the night.

Carried forward, -5.531
### A METEOROLOGICAL JOURNAL

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**TOTAL IN AUGUST:** - 10,661

(q) Rain about moon yesterday, and after it; and the conclusion of the shower yesterday morning.

(r) 1 P. Thunder at a distance; sprinkling rain began. 2:15 P. Thunder over.

(s) 2:15 P. Rain about S. A.

(t) Thunder showers since last observation. 2:15 P. Several showers of short duration since last observation. Tides high.

(u) 2:15 P. Several small showers with thunder.

(v) Rain with thunder yesterday afternoon. 2:25 P. A small shower just over.

(w) Rain now falling, and some fell in the afternoon yesterday.

(x) Rain yesterday before sun-set.

(y) Rain in the night. 2:35 P. It has thundered this forenoon; and being then dead calm, the heat was almost insupportable. 2:25 P. The gage cistern holds only that quantity; how much fell I know not, but I think as much more.

(aa) The water measured to-day fell in about an hour. To-day I measured the cistern, and it holds only 1,707; and through the hole there runs out one-tenth in 40°. It is impossible, therefore, to ascertain what did fall to-day, but that it had run out was evident; and from circumstances I judge the quantity was as much as was measured.

(bb) Add 1,700 it could not be less, as there was a great deal of water in the garden: and besides, I know from a canal that its water rose 3.4. Yesterday it was 1.5 below the drain; this afternoon the water ran through the drain two inches deep, and yet only three-tenths of rain fell in the afternoon.

(cc) This fell in the afternoon.
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**Total in September:** 7,652

(o) 7. A. A small rain, 2:20 P. Rain in the forenoon, several small showers.
(p) This fell yesterday before sun-set. 2:15 P. Rain in a short sprinkling this forenoon.
(q) Rain yesterday evening, and in the night it still rains scattered large drops 2:2 P.

Rain in the forenoon.
(r) Rain with thunder at 5 P. again in the night twice, and since day also. 2:25 P. Two or three showers since last observation.
(s) Rain in the afternoon yesterday. Rain twice to-day.
(t) 1:30 P. The wind has varied round and round, though hardly perceptible.
(u) The night was dead calm till about an hour before dawn, and then we had a storm from the NE with lightning 2:15 P. A shower just over.
(w) Rain at 4 A. and again at sun-rise. 2 P. Flying showers all the forenoon.
(x) Rain yesterday afternoon. 2:25 P. Several small showers since last observation.
(y) A very stormy night with frequent showers 2:15 P. Two or three showers since morning, but all momentary, and small.
(z) Before 11 o'clock P. we had rain 1:55. Between 12 and 1 there came a violent rain, attended with thunder, lightning, and wind which varied round and round, it produced 1:25, before three 1:20, and the rest since. It still lowers, and threatens.
(za) Several showers yesterday, and one in the night 12 P. A sprinkling to-day.
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(a) 5:30 P. Rain in the North.  
(b) 2:20 P. Very sultry.  
(c) There was much lightning in the North, with distant thunder, and at 4 we had a thunder shower.  
(d) A thunder shower about sun. set. 2:25 P. Rain began at 3, and continued till near 9; it came from the NE. with a very sudden change.  
(e) Whether this was rain or dew I do not know.  
(f) At 6:30 A. The thermometer out of doors 73°.  
(g) Thunder at a distance twice this morning.
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**TOTAL IN OCTOBER:** - 2,865

(h) 2.5 P. Quit the gardens this evening.
(i) First observation in Calcutta.
(k) The clouds began to collect yesterday about 9 A.
(l) Foggy. 1. P. Distant thunder. 1.25 P. Do and rain coming on. 1.40 P. Rain began in large drops.
(m) The rain fell heavily, and continued till about three, and produced the water above the gardens. It has rained in the night, and I heard it at day-break, and it drizzles now.
(n) Smart rain. This water was measured in the morning.
(o) Rain at noon.
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(c) A small shower at the gardens
(d) Small rain; the produce at the gardens.
(e) It rained last night, and the water was measured this morning at the gardens. 20 P. At noon there was a smart shower of rain.
(f) Very gloomy and about to rain. 20 P. It began to rain about 8 o'clock, and it continued till near two. The sky begins to brighten a little.
(e) Yesterday at 3 P. it began to rain, and about 4 P. to blow, and the wind increased to great violence from the N and NE. About 7 P. a blast broke the pipe of the water-gage, at which time there was 0.5 in the cistern; and the quantity that fell afterwards was estimated at 0.5. The rain was heavy at times, and continued till one the next morning.
(f) Thick fog going off.
## A Meteorological Journal

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Total in November: 1,023

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- (e) The thermometer out was in the sun.
- (f) Thin fog.
- (g) This morning was very cold, but I did not observe.
- (h) Very sharp wind abroad.
- (i) One very small cloud. 7.10 A. Foul sky in the west. 2. P. Not a single cloud to be seen; the small stripe went off before 8, and the whole day has been delightfully pleasant.
- (j) Yesterday ended as delightful as it was at noon, and to-day promises to be just as fair and pleasant.
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(a) At Perree Baugh.
(b) Fogg.
(d) At Dandian in tents: thermometer wet with the dew.
(e) Very thick fog.
(f) Last night the wind was South of the West. At the gardens.
(g) In the morning it was E. 4
(h) Excessive fog, but going off.
(i) At the gardens.
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(a) A fog so thick hardly any thing is visible.
(b) Day at day-break it was 52 at Dumdum.
(c) Foggy, and piercing by cold.
(d) Fog, and thermometer wet: the air mild to the feeling.
(e) Foggy.
(f) Thermometer wet with dew.
(g) Thermometer wet with dew.
(h) Sun eclipsed, going off.
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**Miscellaneous:**

(a) Excessive fog.
(b) Thick fog rising into clouds.
(c) Fogggy.
(d) Excessive fog.
(e) Excessive fog.
(f) The clouds have been thick and it looked as if it was about to rain.
(g) Fogg (at Dundurn). 2.10 P. (At the gardens) thunder coming on, and drawing near.
(h) 6 P. Rain had begun in drops when last observation was made. There was thunder, but not any thunder gust.
(i) It has been a very tempestuous night, with excessively heavy thunder, and of very long continuance; the thunder shook the whole house several times.
(j) This fell in the last night.
(k) The wind has been S. 6 the greatest part of the day.
(l) It lightend a good deal till 8 P. and then cleared suddenly.
(m) This water fell in a thunder shower last night, from the W and NW, with much lightning, though but little wind.
(n) Much lightning in the former part of the night, and a gust of wind from N, about 11.
(o) Very heavy fog this morning, and a mass forming.

Total in February: 0.016
CONTENTS OF THE FIRST VOLUME.

The Introduction ... ... ... Page i
The Preliminary Discourse ... ... ... vii
I. On the Orthography of Asiatic Words ... ... ... iv
II. Astronomical Observations ... ... ... 47
III. A Royal Grant found at Mungir ... ... ... 112
IV. An Inscription on a Pillar near Buddhâ ... ... ... 119
V. On the Ruins at Mavalipuram ... ... ... 129
VI. Hints on Friction in Mechanics ... ... ... 150
VII. An Interview with the young Lama ... ... ... 172
VIII. A Journey to Tibet ... ... ... 178
IX. On the Gods of Greece, Italy, and India ... ... ... 188
X. On a Cave, with an Inscription near Gayâ ... ... ... 236
XI. An Inscription at Buddha Gayâ ... ... ... 243
XII. On the Seeks and their College ... ... ... 246
XIII. On the Veenâ, or Indian Lyre ... ... ... 250
XIV. On the Madhûca Tree ... ... ... 255
XV. On the Mode of Distilling at Chatra ... ... ... 262
XVI. 1. On calculating the Moon’s Parallaxes ... ... ... 271
2. On the Artificial Horizons ... ... ... 276
3. On the Intersections of Curves ... ... ... 278
XVII. 1. On extracting the Essential Oil of Roses ... ... ... 280
2. On the Gold of Limong in Sumatra ... ... ... 283
XVIII. On the Literature of the Hindus ... ... ... 286
XIX. 1. A Royal Grant found at Tanâna ... ... ... 299
2. On the City of Tagara ... ... ... 307
XX. On the Vajrâkta or Pangolin ... ... ... 312
XXI. Inscriptions on the Staff of Fitrúz Shah ... ... ... 315
XXII. A Conversation with an Abyssinian ... ... ... 318
XXIII. On the Indian Trial by Ordeal ... ... ... 323
XXIV. The Second Anniversary Discourse ... ... ... 335
XXV. Discourse III. On the Hindus ... ... ... 343
XXVI. The Lunar Observations corrected ... ... ... 356
APPENDIX: A Meteorological Journal ... ... ... 361