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ART. I.—*Translation of an Inscription found at Nagpore; with a Fac-simile, and Transcript in Balbodh.*—BY BALL GUNGADHAR SHASTREE, Esq.

Remarks on the historical value of the Inscription.

1. The accompanying Inscription, copied from a stone at Nagpore, was sent to me last year by Dr. Stevenson, to whom it had been transmitted by Mr. L. R. Reid. On examining it attentively, I found that, though copied with some care, it was inaccurate in many places; and besides wanting one or two lines at the commencement, had blanks in different parts, in which the letters must have been illegible on account of fracture or some other circumstance. The part omitted at the beginning, is, however, of no consequence in a practical point of view; for, since the two or three lines that follow contain the customary invocations, it could not possibly have reference to any other subject. In regard to the blanks, I have filled them up with such words as were suggested by the context; and it is highly satisfactory to find that with the exception of the name of one king, very little of the important part of the Inscription can be affected by any difference of opinion in regard to my conjectural readings, which, as admitting of doubt, I have distinguished with a mark of interrogation or enclosed within brackets.

2. It will be perceived from the subjoined English Translation, that

the Inscription contains a kind of eulogy on the kings of the Pramára family, written during the reign of Nara Verma, in the Samvat year 1161 or 1105 A. D. The race whose achievements it commemorates, is one of the four Agniculas, the account of whose birth or regeneration from the sacrificial fire of Vasishta Muni, as given by Col. Tod, is repeated in the 10th verse; though the motive assigned by the imagination of the poet to Vasishta for creating new tribes of Kshatriyas, is a desire of taking revenge on his opponent Vishwámitra, and not the general prevalence of heterodoxy and vice all over India.

3. The Pramáras (more properly Paramáras according to our Inscription) appear to have acted an important part in the history of the middle ages of India. I extract the following remarks from the authority just cited, regarding the extent of their territory, the names of the principal kings of their family, and the capitals to which their power was transferred at various periods.

"The Pramára, though not, as his name implies, the chief warrior, was the most potent of the Agniculas. He sent forth thirty-five *Sachæ*, or branches, several of whom enjoyed extensive sovereignties. 'The world is the Pramáras,' is an ancient saying, denoting their extensive sway; and the *No-kote maroosthullí* signified the nine divisions into which the country, from the Sutledge to the ocean, was partitioned among them.

"Maheshwar, Dhar, Mandoo, Oojein, Chundrabhaga, Cheetore, Aboo, Chandravati, Mhow, Maidana, Parmavati, Omrakote, Bekher, Lodurva, and Puttun, are the most conspicuous of the capitals they conquered or founded.

"Though the Pramára family never equalled in wealth the famed Solanki princes of Anhalwarra, or shone with such lustre as the Chohan, it attained a wider range, and an earlier consolidation of dominion than either, and far excelled in all, the Purihara, the least and last of the Agniculas, which it long held tributary.

"Maheshwar, the ancient seat of the Hya kings, appears to have been the first seat of government of the Pramáras. They subsequently founded Dharanagar and Mandoo on the crest of the Vindhya hills; and to them is even attributed the city of Oojein, the first meridian of the Hindus, and the seat of Vicrama.

"There are numerous records of the family, fixing eras in their history, of more modern times; and it is to be hoped that the interpretation

of yet undeciphered inscriptions, may carry us back beyond the seventh century.

"The era of Bhoj, the son of Monj, has been satisfactorily settled; and an inscription in the nail-headed character, carries it back a step farther, and elicits an historical fact of infinite value, giving the date of the last prince of the Pramáras of Cheetore, and the consequent accession of the Gehlotes.

"The Narbada was no limit to the power of the Pramáras. About the very period of the foregoing inscription, Ram Pramár held his court in Telungana, and is invested by the Chohan bard Chand, with the dignity of paramount sovereign of India, and head of a splendid feudal association, whose members became independent on his death. The bard makes this a voluntary act of the Pramáras; but coupled with the Gehlote's violent acquisition of Cheetore, we may suppose the successor of Ram was unable to maintain such supremacy.

"While Hindu literature survives, the name of Bhoj Pramára and 'the nine gems' of his court cannot perish; though it is difficult to say which of the three princes of this name is particularly alluded to, as they all appear to have been patrons of science.

"Chandragoopta, the supposed opponent of Alexander, was a Mori, and in the sacred genealogies is declared of the race of Takshac. The ancient inscriptions of the Pramáras, of which Mori is a principal branch, declare it of the race of Tusta and Takshac, as does that now given from the seat of their power, Cheetore.

"Shalwahan, the conqueror of Vicramaditya, was a Takshac, and his era set aside that of the Tusr in the Dekhan.

"Not one remnant of independence exists to mark the greatness of the Pramáras; ruins are the sole records of their power. The prince of Dhát in the Indian desert, is the last phantom of royalty of the race; and the descendant of the prince who protected Humayoon when driven from the throne of Timur, in whose capital, Oomerkote, the great Akbar was born, is at the foot of (the) fortune's ladder; his throne in the desert the footstool of the Bulotch, on whose bounty he is dependent for support.

"Among the thirty-five Sachæ of the Pramáras, the Vihil was eminent, the princes of which line appear to have been lords of Chamravati, at the foot of the Aravulli.

"The Rao of Bejolli, one of the sixteen superior nobles of the Rana's

court, is a Pramára of the ancient stock of Dhar, and perhaps its most respectable representative."*

4. As the preceding passage is almost the only one in the Annals of Rajesthán which has an exclusive reference to the Pramáras, I have taken it entire to show the result of the investigations of Col. Tod in regard to this family. I may state that those of the events mentioned by him, which relate to the whole of the period antecedent to the eleventh century of the Christian era, appear to rest almost entirely on tradition, the only written documents discovered before the time he wrote, being three copper-plate grants found at Ujjayani, two bearing dates between the *Samvat* years 1192 and 1200, and one without date.† After a careful examination of their contents, Mr. Colebrooke considers them as authenticating the following series of kings, viz. Udayaditya Déva; his son Nara Varma Déva; his son Yasho Varma Déva; and his two sons Jaya Varma Déva, and Lakshmi Varma Déva; the reigns of these princes extending from the latter part of the eleventh century of the Christian era to near the close of the twelfth. Col. Tod carries the line retrospectively on the authority of the *Madhucaraghar* Marble and *Bhoja Charitra*, and places the names of Sindhu, Munja, Sindhula, and Bhoja, before that of Udayaditya, the earliest king mentioned in the Ujjayaní plates.

5. A copper-plate grant, dated Samvat 1267, was found at Piplianaggar, in the territory of Bhopal, by the late Mr. L. Wilkinson, the Political Agent at that place. The inscription upon it, which appears with a translation by him in the Journal of the Asiatic Society of Bengal for July 1836,‡ brings down the genealogy to the beginning of the thirteenth century of Christ; following the prince last mentioned in the Ujjayaní plates, with the names of Vindhya Varma, Amushyayana, Subhása Varma, and Arjuna; and, as the late Mr. Prinsep observes in a note upon it, "exactly filling up the blank between the former prince and Birsal in 1220." This document also mentions Bhoja, as being the father of Udayaditya, confirming the last of the three names prefixed by Col. Tod to the Ujjayaní list, on an authority which might be regarded as not altogether decisive.§ Another copper-plate grant, found in the

* Annals of Rajesthán, Vol. I. p. 91.

† Trans. of the Royal Asiatic Society, Vol. I. p. 231.

‡ See page 377.

§ Two other grants by this same king, Arjuna, dug up at Piplianaggar,

same locality* by Mr. Wilkinson, supplies the name of Harrischandra Déva, the son of Lakshmi Varma, the brother of Jaya Varma. This is dated Samvat 1236, or A. D. 1180.

6. The Nagpore Inscription, now brought to light, contains, as before observed, an eulogy written by order of Nara Varma in Samvat 1161, or A. D. 1105, descriptive of the glory and achievements of his ancestors, and particularly his brother, Lakshmídhara. It will appear to be a document of some historical importance, as it confirms the names of Udayaditya, and his father, Bhoja, mentioned in the various records above referred to, and supplies the names of Bhadra Rája, Bhoja Rája, Bhimaka, and Vairi Sinha, ascending upwards from Bhoja in a reverse order of time, and carrying the line about 80 years backwards, or to the year A. D. 965, at an average of twenty years to the duration of each reign. These names, arranged in the order of time, and connected with those already found in other grants, will stand as follows :—

1. Vairi Sinha.
2. Bhímaka (his son).
3. Rája Rája or Bhoja Rája† (his son).
4. Bhadra Rája (his younger brother).
5. Bhoja Déva (his son).
6. Udayaditya (his son).
7. Lakshmídhara (his son).
8. Nara Varma Déva (A. D. 1105, his brother).
9. Vasho Varma Déva (A. D. 1137, his son).
10. Jaya Varma Déva (his son).
11. Lakshmi Varma Déva (his brother).
12. Vindhya Varma (son of Ajaya Varma).
13. Harrischandra (A. D. 1179 son of Lakshmi Varma).
14. Amushyayana (son of Vindhya Varma).
15. Subhása Varma (his son).
16. Arjuna (his son, A. D. 1211).

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appear to correspond with this, word for word, one later by three and the other by five years.

* See page 736, Journal of the Asiatic Society of Bengal for August 1838.

† The first syllable being a blank, either रा, भो, or any other letter may be supplied. This is the exception alluded to in para. first of this paper.

It must be noticed that in this enumeration, we see nothing of Sindhu, Múnja, or Sindhula, placed by Col. Tod before the 5th prince on the authority of Bhoja Charitra, &c.

7. Though we have two Bhojas in the above list, neither of them can, for a moment, be supposed to be identical with the famous patron of the "nine gems;" for had either been a lover of literature to any extent, the writer of our Inscription, who does not appear to have much regard for truth when exalting the merits of the ancestors of his master, would surely never have omitted to take due notice of such an agreeable topic. The theories of Mr. Bentley and Major Wilford, the former of whom places the reign of Rája Bhoja between the years 982 and 1082 A.D. and the latter supposes the death of that prince as having occurred between 977 and 982 at the latest,* appear, therefore, to have been shaken to the base by a clear and forcible evidence, the existence of which could not have been imagined at the time those distinguished orientalists wrote.

8. The records of the Pramára kings, already collected, are also quite sufficient to show how little reliance ought to be placed on the genealogies of the Hindu kings, given by Abul Fazil in the Ayeen Akbari. In his list of the Malwa kings, quoted in Mr. Prinsep's Chronological Tables,† it is difficult to identify even half of the names contained in the preceding catalogue.

9. In such a hyperbolical eulogy as the accompanying, no particular importance can be attached to any of the exploits assigned to the elder Pramáras, or to Lakshmídhara. But the defeat of Karna, king of the Karnatica, by Udayaditya, the conquest of Tripura by Lakshmídhara and his victories over the Angas, the Kalingas, the chieftains of the south as far down as Rama's bridge, and those of the north as high as the country of the Turushkas, on the banks of the river Vanku, some stream perhaps in Káshmír, may be particularized as showing the great extent of the resources of the Pramáras at the period under investigation.

10. The villages granted by Lakshmídhara, and confirmed by his brother and successor Nara Varma, are mentioned as being situated in the province of Vyapúr. The site of this I am unable to fix. I may,

* See Asiatic Researches, Vol. VIII. and preface to Wilson's Sanscrit Dictionary, page vi.

† See Appendix to the Bengal Asiatic Society's Journal for December, 1835.

however, offer a conjecture on the subject. Nagpúr, means a town of serpents, and is very frequently known to the learned among us by the synonymous epithet of Vyálapur. It is not improbable that the ancient name of the place was Vyápur, and that some influential individual or chief changed it into the more significant appellation of Vyálapur. The successors of Nara Varma appear to have reigned in Mandap and Nilagiri, which affords a proof in favour of Col. Tod's long list of the Pramára capitals.

11. The language of the Inscription is, as above remarked, extremely pompous and figurative, quite characteristic of the age in which it was written; though considered very elegant according to the modern perverted notions of our writers, who, like the author of this eulogy, do not even scruple to exalt their heroes above the gods, by employing childish play on words and other similar artifices. There is scarcely a single couplet in which we have not one or two words employed in a double meaning. Its hyperboles, metaphors, and mythological allusions, are so far-fetched and unnatural, that, notwithstanding all my pains, I fear, some of them may yet be found unintelligible to a mere English reader.

12. The character in which the Inscription is written, is what Mr. Prinsep calls "Kutila" or crooked, a name given to it in one of the grants of the middle ages discovered by him. A line or two at the bottom appear somewhat different from the rest, the form of the letters being evidently ornamental. The character, on the whole, is nearly the same as that of the Kháreptán grant, and I need not, therefore, describe it any further.

Translation of an Inscription found on a stone at Nagpore.

[The transcript begins with a part of a sentence, from which circumstance and from the absence of the usual invocation, it appears that the first line of the Inscription has not been copied or had been effaced]. O Goddess! may we be blessed with openness, generosity, sweetness, deep meditation, and equanimity, which attributes belong to you; and [O Sarasvatti (the goddess of speech), do thou also inspire me with thy attributes, simplicity, elegance, unity, and harmony.[1]] May the lord of Lakshimi, who is without a second in the three worlds, be propitious to

[1] Wherever a simile or contrast is expressed by a play upon words, I have distinguished their secondary sense by using brackets of this kind. [ ]

you (mankind). The sun and other luminaries shine forth, having an asylum in his imperishable heaven. May good poetry, which abounds in Játi and other kinds of metre, as well as in the figures of speech, pathetic sentiments, and other ornaments, be propitious to us; [resembling virtuous and learned men descended from a good race, possessed of noble accomplishments, and capable of feeling poetical charms]. May Shiva, who is formidable to the towers of his insupportable enemy;[2] who adorns himself with ashes, and to whom Kubera does homage, grant you happiness, like the Agni race [which is terrible to its foes, is adorned with prosperity, and honoured by the king of kings]. Glory to the lotus-seated Brahma, who, like pearls, is produced in the hollow of this oyster-like mundane egg, and is honoured by Mahesha [as pearls are by rich men]. May we be blessed with enjoyment and beatitude by the awful and noble figures of the lords of Umá and Ráma, one of whom delights in an utter absence of worldly desire, a wreath of human skulls, skins of tigers and elephants, and a sprinkling of ashes; while the other indulges himself in passion, and takes pleasure in garlands of flowers, apparel, necklaces, and fragrant ointments. May Vishnu be propitious, who, like a universal car, has created this universe without being different from it, to maintain the Karma Mímansa Philosophy? There is a noble mountain, named Abu, which mocks the pride of the lord of the mountains (the Meru) by its lofty summits, and resembles the blue firmament by its brows composed of sapphire. The circle of the lotuses, waving in lakes on its sky-reaching-peaks, may be compared to a fragment of another mundane egg. Brahma, being desirous of ascertaining whether the abode of the gods or that of men was purer,[3] suspended to the two extremities of this mountain, which, methinks, resembles a true balance, the heaven inhabited by gods, and the earth peopled by human beings; when the former went up in consequence of the pillar-like celestial mountain, and hence was proved to be endowed with greater purity. This Abu aspires to the beauty of the universal car, which has the earth and the heavens for its two wheels, connected by an axis, reaching on the one hand the expanse of water, and, on the other, the confines of space, and appears bending in this rugged career of life, by being impeded

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[2] Tripurásura.

[3] This alludes to the ancient Hindu custom of testing the character of a man by weighing him. Being lighter was always regarded as a proof of honesty or innocence.

in the regions of the stars. On this hill, whose green and pleasant brows were overflowed with the waters of the celestial streams, resided the Muni Vasishtha, the chief of those versed in the Vedas; who, obedient to his father (Brahma), carried to the upper portion of the mundane egg the river Yamuna, in the form of smoke proceeding from the sacred triad of fires, in order to effect a junction with the (celestial) Ganga. His precepts, like guides, extricate the car-like triad of the worlds, when pursuing a wrong direction, it sinks into the quicksand of temporal affairs, bordering on the great stream of knowledge. Once on a time when Kanshika (Vishwámitra) paid a visit to the forest, and was endeavouring to carry away the cow Nandiní who had delighted him by producing every thing necessary for his entertainment, the enraged Muni Vasishtha propitiated the fire by his offerings, and from it came forth Parmára, the true conqueror and slayer of foes. His family became an image of those of the sun and moon; that, assuming humility and delighting in huge armour, faithful banners, and great renown; [these glorying in having given birth to Rághava, Vishala-Varma, Satya Ketu, and Prithu.] That is invincible to the race of the immortal gods, is produced from fire, and fond of (polite) assemblies; [these gave birth to the kings Aja, Ráma, Nalla, and Bharata.] In this race flourished the king Vairi Sinha, on whose royal birth, prosperity, prowess, imperial dignity, generosity, and courage, shed a lustre; while the space before his throne was strewed with gems and rubies, dropped from the crowned heads of kings, who constantly attended his court to do him homage. While he was marching to conquer the remotest quarters of the globe, the regions of space, filled with umbrellas of peacock's feathers shining like emeralds, appeared as if choked up with the poisonous respirations proceeding from the exhausted Shesha,[1] trembling under the load of the earth, which was oppressed, under the feet of the marching train of his lusty elephants. His fiery and immortal spirit still survives in the subterranean regions in the person of the Vádava fire; on the earth, in that of the golden mountain; in the heavens, in that of the starry firmament; and in the horizon, in that of the gold-coloured arch. He ruled the earth, shaming Indra in heaven by his prosperity; defeating the army of his foes in hostile lands by his prowess; and surpassing, by his support of the earth, the lord of the serpents in the regions inhabited by those beings. From

[1] The great serpent that supports the earth.

him was born king Bhíma, who gave a new face to the earth ; whose wrath was cooled by tears flowing from the eyes of the widowed families of his enemies ; and the flame of whose valour is still visible in the starry firmament, sending down its smoke in the shape of the blue sky. The clusters of pearls, projected upwards from the foreheads of the elephants slain by him, though falling down in the shape of stars, have not yet reached the earth. Here is a great marvel ; to whom shall we relate it? Who will believe it? This king, though he supported the earth, earned extraordinary Lukshimi (wealth) and assisted the pure-minded, did not resemble Vikuntha (Vishnu) [as he was always irresistible.] His son Shri-Rája Rája (or Bhoja Rája), acted as the Pinak-armed god (Mahádeva) to the towers of his enemies ; and his fiery spirit, with a desire of protecting this globe, has overspread it in the form of the mountain Lokáloka. [5] Even in his pleasant excursions, his armies covered the earth ; the dust, raised by his cavalry, obscured the horizon ; and the noise of the chains rattling on the march of his elephants, filled the concavity of the basin of the universe. His foes, when they were transformed into gods on being slain by his sword, and saw their headless trunks surrounded by armed men, became impatient to descend from their celestial chariots to combat new heroes, but the heavenly virgins encircled round their necks and held them back from returning to the earth. His younger son, the renowned Shri Bhidra Rája was endowed with a fiery spirit, akin to the blazing Vádava, and slew his enemies, brandishing his sword like a stream, tossed about by a strong gale of wind. The dust raised by the march of his cavalry, assumed the appearance of smoke, which, methinks, may be compared to that of the all-devouring fire, as if the same proceeded through excavations made into the earth by his elephants. His foes regarded him as endowed with the profundity of the ocean, as manifested at the annihilation of the world; the might of the world-destroying wind ; the stability of the lord of the tortoises, that supports the earth ; the spaciousness of the basin of the universe ; the brilliancy of the world-consuming fire, and the magnitude of the celestial vault. The throne of his son Shri Bhoja Déva, who, occupying the pinnacle of royal greatness, peculiarly adorned this world, was the only refuge to those, who, having lost their kingdoms through envy, were obliged to do him homage by lower-

[5] The mountain supposed to mark the confines of the universe, or the space illuminated by the sun's rays.

ing their heads before his lotus-like feet, which were kissed by the lustre of the gems composing their crowns. (The next verse, which describes the train of the elephants of this king, is rather unintelligible). In the recitation of his praises in the assembly of the gods, Vikuntha (Vishnu) envies the four-mouthed Brahma; this god is jealous of the five-mouthed Harâ, who cannot bear to see himself surpassed by his six-mouthed son. This commander of the heavenly host again grieves, when he sees the superior eloquence of the chief of serpents, endowed with a thousand mouths. This king having attained the companionship of Indra, the state was involved in dissensions in consequence of being deprived of its sovereign; and at such a period came into the world his son Udayâditya, who subverted the king Kanrâ of the Karnâtaka, that had harassed the earth; imitating thereby the achievement of the great Boar. Though the groups of his foes, overcome by the dazzling sun of his glory, met a noble death from him on the field of battle, they derived full satisfaction, when they pierced [6] the orb of the day-star, mistaking him for their enemy in the heat of their revenge. The lord of the serpents having witnessed his victories on a day of battle, closed his eyes in a transport of joy; by which he was deprived of the gratification of hearing his praises recited, and the hopeless creature severely reproached his huge body, which performs the function of hearing by the organ of sight. Shri Lakshama Déva, the son of that light of the three regions, imitated Prajápati, by devoting himself to the protection of his subjects, and, following in his conduct the ethics of Manu, obtained for himself an imperishable renown. His marching drum, methinks, meant to proclaim, "O lord of the tortoises and others! give ye your combined support to the earth, oppressed under the load of this army. O hostile kings! humiliate yourselves quickly, or you will be ruined. O immortals, whose eyes have no power of twinkling, close ye your eyes, or they will be covered with dust." As soon as he began his march, the kings of the east deserted their brothers and relations to save themselves; those of the south were so terrified that they had no great hopes even of their lives; the princes of the west abandoned all hope as deceitful; while the chiefs of the north, in order to avert death, resolved to forsake enmity. When this prince

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6 This alludes to the belief of the Hindu warriors, that all those who die in the field of battle, penetrate the orb of the sun and pass to the higher regions.

with a view to procure noble elephants, invaded the eastern quarter of the globe, presided over by Indra, fear took refuge in the capital of the king of Gauda, as did Indra in heaven with his celestial companions. Having conquered Tripuri in a campaign, resembling an ordinary excursion of pleasure on some occasion of joy, and having annihilated his enemies, he spent (some time) on the banks of the Godávari; covered with pleasure gardens and hills, the beauty of which was enhanced by gentle breezes blowing over rivulets. In that sacred stream, whose waves were constantly bent upon undermining the hills on its banks, the elephants of the king plunged themselves, as if to expiate the sins committed in battle. These animals being in their rut, demolished the lower sides of the Vindhya mountains, mistaking them for the elephants of the enemy; as torrents rolled down from them in the disguise of trunks, while their lofty summits resembled frontal globes, and clouds covering their heads threw down a sprinkling of rain, in the form of the temporal juice. While the king was crossing these mountains, the hoofs of his fleet horses operated as a hatchet upon the rocks hardened by the action of water; while a horde of innumerable wild elephants, incited by the odour of the temporal juice, oozing from his elephants, sprang up and rambled through the forests. The elephants of Anga and Kalinga retired from the field of battle, when they beheld those of Shri Lakshama Déva, claiming a connection with the guardians of the light cardinal points and the love of their mistresses, and boasting of a companionship with the regents of the clouds. The praise of being the first of Purushas (men,) and the asylum of Shri (the goddess of wealth,) as well as that of having supported the earth, and protected it from the Bala Vairi [7] (the enemies of Indra) is said by the learned men to be peculiarly due to Vishnu; but this is an exaggeration. The billows of the sea, which reach the sky and the clouds at the world's destruction, and, are the companions of gloom, covering the universe at that period, yielded in height to the elephants belonging to the vassals of Lakshmídhara when they plunged themselves into the sea. (The next verse which follows the same idea is very obscure.) Those pearls which dropped from the golden girdles of the ladies of his vassals, while bathing in the sea, bestowed upon the waters of the Tamraparni, their peculiar quality (of

[7] This word, used in reference to the king, signifies powerful enemies, and as all the epithets are thus applicable to him, the assertion that the praise is peculiarly due to Vishnu, is represented to be an exaggeration.

producing pearls,) which contributes to the support of the king of the Pandyas. This Lakshmídhara on being imformed that he had reached the bridge, constructed with hills and huge rocks by Máruti and the other attendants of Ráma, when about to cross the sea, gave no heed to the statement, and formed a bridge of the elephants composing his retinue, as if to invade some other island in the ocean. No sooner had the shouts of the van of his three-divided army reached the point guarded by Yama (south), than the regent of the west, though holding a snare in his hand, became hopeless in regard to the protection of his post from the impending calamity. While the elephants of the king were quietly drinking up the waters of the ocean, each taking one draught, like Agasti, there is no telling where fire, the fishes, or the Mainak and other hills were. As to Hari, he must have been asleep. None of these knew what was taking place. The Mainak and other hills with large fishes, served as boats to the marching army, consisting of elephants adorned with pearls, which assumed the swinging motion of the Mandara. [8] When this king, being jealous of the Yakshas, marched towards the region guarded by Kubera, the people of that quarter abandoned their dwellings [as well as their riches]. In his gardens, he reared like Punnaga, Areca and other trees, the plant of fame, which was watered by the sweat dropping from the crowned foreheads of kings, whom his victorious arm, eminently skilled in the use of the sword, had humbled. After having rooted out Turuskha Datá (a Turkish chief) by his victorious arm, he resided on the Vanku, whose banks were covered with saffron. He then caused his favourite parrot to be taught to recite his praises in a mellifluous voice, resembling that of the goddess Sarasvati. On the occasion of a solar eclipse, this victorious king, impressed with pious motives, duly bestowed (upon Brahmans?) two villages in the province of Vyápur, and these were exchanged for another, called Mokhala Pátala by his brother Nara Varma Deva, with a view to secure eternal good. This king Lakshmídhara, caused this temple to be constructed, with figures commemorating his numerous exploits. In the Vicrama year 1161.

O learned men, be of good cheer, and examine our sweet composition with an acute eye. I bow to that audience, which sheds tears of joy at the charms of poetry.

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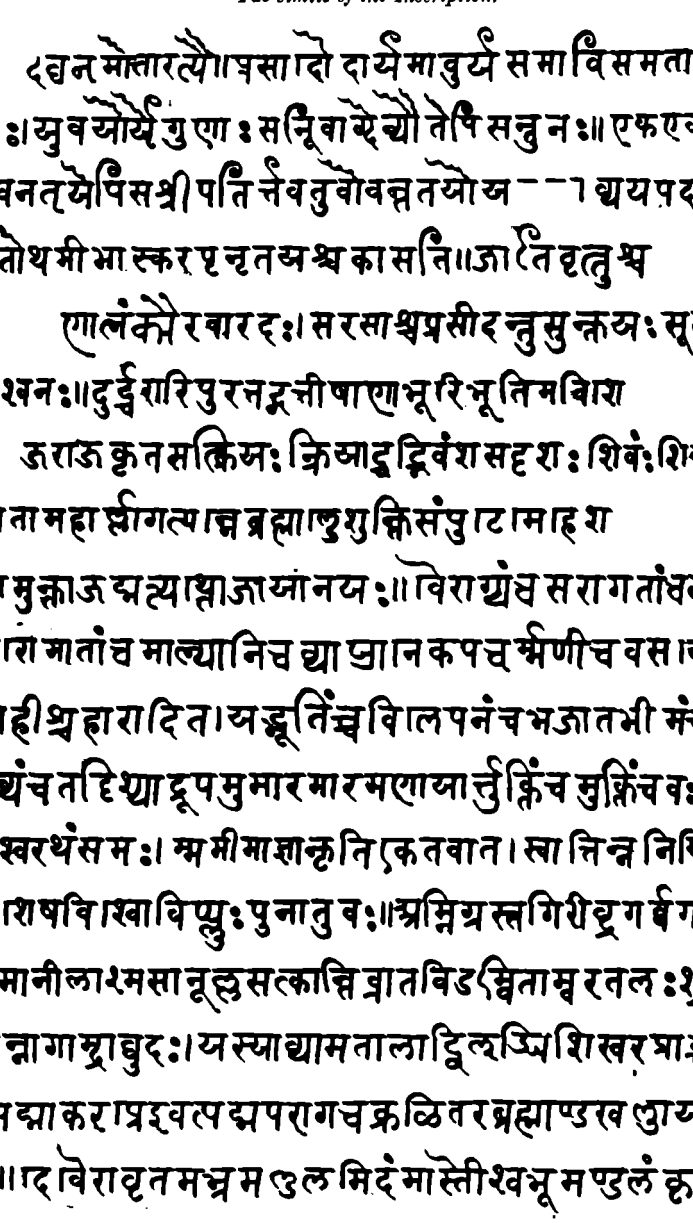
8 The mountain with which the ocean was churned by the gods.

Fac-simile of the Inscription.



त्वावर्म्मी तुल्यजमानवपुषा यस्यान्तरे न्यस्य च । ज्ञान्तृ
यावदवेतुमिन्नूतिविविः किंशुद्भुमित्यतायारूहूँतावदग
दमत्तीशिखरिस्तस्मान्नात्तामलुलं ॥ लात्तवित्तिथ्रुऊल
विप्रविभूमिचक्रमाकाशचक्रमपि यनदिगन्तानपि । सं
सारवर्त्मनि महाविषामनिषन्नत्ताग्नान्वोतिकतटविश्वन
धान्कृलन्मीः ॥ तस्मिन्वदविदांवरः सत्तगवानाकाशग
ज्ञापन्नः स्मरप्लावितकान्तकामलताट तिष्वद्विसाश्वामुनिः
यास्तवानलवृमवर्त्तियमुना प्रीत्येपितुव्रताणगङ्गास
द्भमसिद्वास्यसमनयब्रह्मालुरवलुप्रति ॥ विद्यामहास
रिदुपान्तविज्ञत्तिप्यारसंसारासेकतविषनूमसक्रु ॥ मा
तायस्यत्रिलाकरप्रमुत्यपसंप्रवृत्तमुत्तारयन्निशतासाधुक्र
टशत्रुयाः ॥ आयातस्य कटावनक्षितिपतराच्छिन्नतः कोशि
कस्यातिथ्याविततमुज्ञात्वऊननादानन्दिनीनन्दिनी निर्लुना
कुपितनतनहविषासंहर्षितादूर्हिषावीरः श्रीपरमार
ऽत्यनुपमः सत्यान्तिकानातवत् ॥ रायचर्द्दनथिशालवम्म
न्तत्सत्याकतुपृसकीर्त्तिपार्थिवः । वर्द्धातममहिमांशुचन्द्र
मः सततिप्रतिकृतिर्यदन्वयः ॥ वराजरामराजितानां
लाद्भवः सत्तारतः । ग्राहनुचक्रायारिवधउाजताक्षस
न्वयः ॥ ६ ॥ वंशास्मिन्वैरिसिंहः क्षितिपतिरतवद्र

रिन्नूति प्रतावथ गाल्लोदार्यी शौर्यप्रचयपरिचयप्राद्यासो
राघस्सिद्धिः। नम्रक्ष्मापालत्तालसूलदलितलुलत्क्नूाका
टीराक़ाटितुघघ्माणिक्यचक्रसुपुटितमणिमत्सादपीागप
कल्ः॥ सर्वाशाधिरूढप्रयाणसमाययास्यन्द्रनीलप्राते
म्मीयूरातपवाराणैः शुशुभिरनष्टावकाशादिशः। सप्यन्म
त्तकरीन्द्रघनक्ष्चरणप्राग्भारटीर्ल्लीतिराराग्मूर्द्धूतविपन्नारा
षसविषश्वासावरुद्धाऽव्च॥ पातालवडवामुखानलमिषा
त्पृथ्वीतात्लच स्फुरात्मोवल्लीचल केतवाद्दियतिच ब्रह्माण्ड
खण्डच्छुला — — श्वत्काश्वनचक्रवालं वलयव्याऊाङ्घदिग्म
ण्डलयत्याद्यापितनुल्लत्तत्य विचलीनतः प्रतापानलः॥
स्वार्ल्लाकपुव विद्धिव क्कितिपुचद्यालनूागाहृषुचस्वाराऊं
च रिपुव्रऊंचनुरक्तिन्वागा विराऊंन्च यः। ऐश्वार्य्येणच वि
क्रामेणच्च वरात्तारकृगात्वगचन्यकुर्व्वयपरानवश्वसमतिक्वा
र्मग्य पृथ्वीमयात्॥ २८॥ तस्मादिरिवृपावात्तवनवव्राचेव थदुः।
खाद्भवद्वाथान्नफणशान्नाकापदहनः श्रीत्तीयाकात्तनृ
पः॥ आविताावितनूतनस्सितिरंयब्रह्माण्डखण्डच्छलाद्यस्याद्यापि
विलग्नक्षातविप्रदाकेघ्रमः प्रतापानलः॥ अनुगगनमुद
स्थः स्थलमुत्क्राञ्चयायायदत्तिदलितकुष्टाकुस्मिकुम्भस्थ
लत्यः। सततमपिपपत्तन्नास्तद्घयावन्नपृथ्वीपृथुलतरलत्ता

रा घाऊ भा जात जा न्नास्रुत्या ध्वर्यमदृष्टम श्रुतमिदं कास्मै समा
चक्ष्महे। का न्वितत्प्रतिपद्यातचतदपिप्रभूयात। कौतुकात्सनुहृ
त्यापिवसुंवरामसहंशीलब्ध्न पिलकृंनीचयः कुर्वन्कार्यमान
कशः सुमनसामागान्नावेनुण्तां॥ ३८ तस्मादुरिवपुषि
नीवद्विवप्रारवलुद्यवरप्रवंसेक पिनाकपाणिरजनिथा
—ज रा जान्नृपः प्राज्ञः प्रावृतवात्पिपालयिपयायत्प्र
तापा मात्मात्मकालाक महामहीव्रवलयव्याजान्महीमण्ड
लं॥ यस्मिन्सर्प्यतिलीलयापिललितेः से न्यैःसमुत्क्रान्ति
तवाहथ हविसारिव्रलिपटलघालुपृटिग्मण्डलेः। अ यड।
न्टकरीण्डलद्यपटाप्राद्वालाना चूद्वलाप्रद्वक्षूद्वलनादनि
र्भरचूतब्रह्माण्डमाण्डादरेः॥ अन्निस्त्वृंशनिरस्त म स्तकत
आलक्षून्य घाउर्ल्ध त्त ववत्वस्वकवन्वनुदृतमाक्ष दृष्टात्ता
टे॥ ब्विश्तिं। संहर्षात्यतातावि मानशिखरादाग्निघ्यकागहन
दीरानसररागिण्णाउपुविारसन्नूयसिद्धाङ्गनाः॥ ३९॥ त
स्यासीदघपार्विवः पृथुयशाः श्रीत्ति दूराजानुजः स्फूर्ज्ज
द्दाउवपावकस्फुट — हः सादयरोयानलः। जः संग्राम
युण्गान्तवल्गितभुजाघुर्बातदूरार्लसत्काल्लानाथितमण्डल
ग्रप — ण्ण — मदूयद्भमतः॥ ब्रजतिजयिनिअतामितजास्व
नजाजुतुरलतुरंगावागाद्भूतत्तूरण्राजिः। विकंटकरटि

त्तारत्तपृत्तूपृष्ठरभ्रदुदितस्ववरायत्तादन्तकाल्लोग्निवूमः॥

गाङ्गीयपूलयार्णूवस्यनवलंकल्पान्नवातस्य च।स्तुगानंकमाठ

शितु---रता----भाउस्यच।तजः कालहुताशनस्य

चमहीयस्वंघाचक्रस्यच स्वीकृात्यवविनिर्म्मितयमवि

दुःमत्याजिपृथ्वीनुजः॥ॐ२॥तत्सूनुत्तुवानेकनृपणमतू

द्रूपालचूडामणि॥च्छायाडम्बरतघितांद्रिकमलः थी

ज्ञाद्धाटावाळप–यस्पाद्यपमम–यन्निचरणोराक्रा

सनाद्दासिनःसाद्धविद्वविनम्रनिर्ह्रुरनटात्काटीराकटि

त्विषः॥रटंत्सटटपाटवप्रकटभजरस्फुर्ज्जितस्फुर–मः

डमूरादुमरडिल्लिमाड़ामरा।स्फुटत्कनटन्कुयूरप्र

पदसंपतत्संयमभ्नमड्डवन–त्तल–गरय–मनुन्वा

कः॥वेकुण्ठःकमलासनायचतुरास्यायस्वयंचुःपुनःप

ञ्चास्यायहरायशम्भुरपिषड्वक्त्रायपुतायच।सनानीरपि

दन्दधूकपतायजःसंसहस्यमनाजाघापिस्पृहयत्यम

र्त्यसमिावाय–र्लिनुत्कीर्त्तयन्॥ ॐ८॥तस्मिन्वासव

वउतानुपगतिरांद्यचनुल्यानुलमण्नस्वामिनितस्यव

न्तुवुदयादित्यात्तवन्नृपतिः।यानाकृत्यमहाह्नातापग

गिलत्कल्लोटकल्लप्रत्नूमृ वीपालकदर्वितांत्तुवमिमांश्री

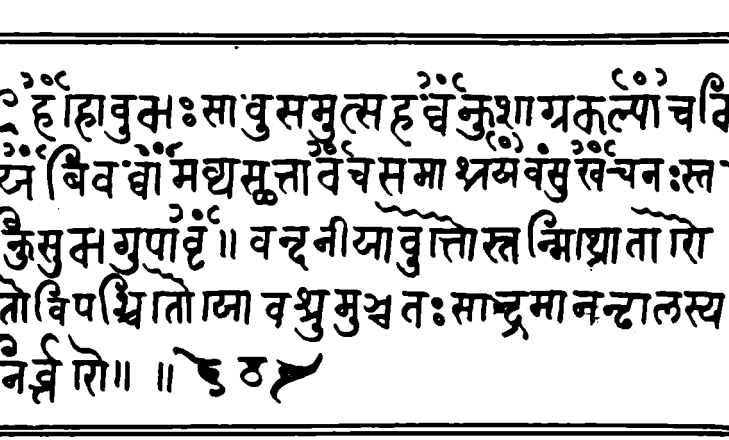
मद्दराहायितं॥र॥स्मादुग्रतरप्रताप––मणिनूटद्रु

ईर्ष्यतासादरपाङ्करविभ्रमादभिमुखः प्रापश्चिमाब्धेः पश्चता।
मान्यासायमिति प्रतीतिरुचितता मर्षप्रकार्षेण त्वमित्वात्ता
स्करमण्डलं रिपुत्तयः प्रापुः परां निर्वृतिं॥ एकस्यांत्तमिते
विलोक्य विजयंय॥ स्यापरस्यांस्तुव — — — वक्रतांसम
र्पयति दृग्भिर्हसतसद्याया किंवा न वृनिमीलितं क्षणं
तया॥ श्रोते: सुखिर्वश्चितयशः कल्लमकल्लमयहिपतिः
सीयं वपुर्विश्वति॥ १४॥ पुत्रस्तस्य जगत्यायेकतराणः
सद्यध्धूजापालनव्यापारसंवहाः प्रजापतिरिप — लक्ष्मा
दावानवत्। नीत्याय नमनुरक्तथत्तु विदाविना सो नावेव
स्वतः सर्वत्रापि सदा प्रवर्द्धतय ? कीर्तिर्नावं वस्वतः॥
सत्तुयविस्यतां गुरर्व्वलत्वराङ्कः कूर्म्मराजादयः स द्या
नप्यतन्वीदुतेनमर्तत्राप्रत्यार्थिपृथ्वीभुजः। वन्दुन्म क्षु
पितीयतागनिमिषाः पांसुः पुरापूरयात्यवं व्याहरतिप्र
याणपदाहा यस्यस्वनक्षुडाना॥ यस्मिन्स — — — वानृपवापिरि
बुत्वे: पूर्व्वः परित्यष्ठत्तकः प्राणस्यकघापिका नरतया
नापन्नृपासदन्धिणे:। प्रारगकृल्हिरसत्कालतिविकल
र्निर्ध्वीयातपश्चिमेर्म्मर्तुं कवल्लुमतरेत्टपतित्तिर्द्दसथ
या घास्यात॥ प्रयातिअस्मिन्नघमं दिशं हरक्रुहीर्घया
नन्यसमानदन्तिनं॥ यर्घा विशङ्को उपातः प्ररदरसूः

राशाद्दसहसापुरंदरः॥ नुत्वा द्वान्नतिसन्निमित्तऊनिताऊस
प्रयाण — मणाक्रम्यतिपुरीरालेकरतिकाविवस्यविद्दूषिगः
॥ यनावास्यतविद्व॥ निर्झरमनुत्संचारद्यानूल्लसल्लालायानलता
विनानवसतारद्दापकंद्व — ल॥ जाता नऊन्धग्रयमार्क्ना
निवीऊानियत्कुञ्जरमकूनानितटाचालाञ्चाटनतत्परायत्ता
रिगप्रवाद्दाम्भिपरंपरायाः॥ यद्यालालकनालनिर्झरकराः
कुञ्जाय मानान्नमकूटान्ताः कटकन्नितागविगलज्झयान्य
मानामूतः। प्रायास्त्वपिविासविसिनुरवियायद्याह्निनीवारणे
तुन्मीलन्मदामदुरे श्चिन्तिदारविन्यस्यपाद्दाचलाः। स्फार
त्कल्हारवारमुग्धितगुरुतटीकूटकुम्भकटङ्कपाञ्चाप्रद्भवतद्धुरा
गृत्वरिनहरिटगूढक्रचक्रम्यगणाः॥ यनालद्दपन्नासना
करिकररताटाद्यमटानागुठाश्वद्याविद्वागल्थचन्य द्विपक्रल
पटलश्यामलाविन्द्रापादाः॥ यदिक्भिन्नुरवन्द्वःक्वयमः
ल्लातादिगवात्टवः क्रीडाक्राडतुदुमूकानिऊलगुञ्जब्रह्म
चर्याहुनः। यत्मनान्तपगन्वसिपुरमनुन्मेतरीविहस्तीक्त
न्तेक्षेगथन्नकलिन्नकुञ्जरजुलेयुद्वायवाद्दाञ्जुलिः॥ द
वात्स्तापुरुषात्तमः सत्तगवानाशिश्रियत्तः श्रियायत्
नद्दृंवलिंविरितः दिगुनादिशंसमाश्वासितं। यनाकरिव
मुच्चारतिटवतः सानन्दमृन्दाकृतांयस्यप्राव्यपयानि भि

वुचऊ ने थीऊस्तुतिः प्रसुता॥ यकल्यानलवूममलुललिता
ठक्काट — नीविद्विष ःसंवर्त्ता त्रुसितान्धकारसुहृदस्कयरु
द्वियद्वांन्ववाःवित्ना — — — — लाद्घश्रयनुादपा ावगा ग्हा
यतेर्यत्सामन्वमतद्रु ाऊरवरिता स्तेयस्त्रा वनूर्म्मयः॥
ऊत्त सग्रूव ासादार्यताषावीमुपाश्टसि॥ मीलाये न्नीव
के र्स्तयविभ्रादान्द्ववादाव॥ लीह्वा न्त ःमवानयदीयपृववा
सामन्तरुसी गन्निनी थ्रिाणि — — — — — — — — णरसनीमु
म्नाः पतन्तिस्ममाः ातान्तिः संप्रविप प्रायनु पृथिवीस्न द्वां
म्नपल्लीपयज ःपश्चाद्या पितादवपान्ध नृपास — यात (वेजाम
त॥स्वा भिार्न्नप्रसासत्तरत्तनवातासमस्वाजामारुति प्रा।
आपाहृतशेलशृङ्गरविातादद्पिूति — — ज — — —
दृत्यन्नु वृह ालमकृघितंत ाऊरवऊ्राजयः ासनाहास्ति
कासतु ानेववविदावद्रीपान्तारापक्रमं॥ न्धावत्तकूप्रसय
घाजमाशौयस्यचि ाघसर्ष्वतास — — द्वाम्रत्नूत्स्वकीयांक
नुत्तं वजपाण्या ग्द्गापाचितुंपाशल्दृदघ्यपशाः॥ — ागनाल
प्रमुखावसन्निनुहवित्का लाग्निराास्लकचित्सन्निकापि
तिमिंगिलप्रच्छतयः ऋुत्सपिाया तहरिः। पताहृत्तिनाका
पियतऊल ाम तस्याप्यप्रावंषयः पीलाजक्वरित्तिः न्कृतेक
ात्ते ात्तेरगत्याथितं॥ ायेः संत्तूजति भिङ्गिलप्रत्तृतित्तिः

संसर्प्पिणस्त्वातापा ता क्त वस व न्नु तांशिखरि एणा मिना
कमुस्याश्रपि। ताम्य न्मन्द रड म्बरा णिदिविार तिरथा श
ाषमुक्ति यात्सनागञराऊ —।— रकराप्— — — ना
— इव ल्ले:॥ प्रक्षतिति क्तारिव राकराऊमन्यंलदाशांप्र
तियस्ययानु:। द्रिकपितीत्फङ्गितवितपारोत्तूपे: प्र
तीपेर्विन्त ग्येर्व्वत्तूव॥ श्राराभा:सयरायरावपितदापु
न्नागपूगादिमद्रुल्मीन्त र्वनाद वतायिवऊयश्रीमय
श:पादपा: यस्यासन्नऊदण्डचण्डमलसाल्लालासिल
म्रीन्कृताक्ताणीपालऊरुपालगण्डलगलल्लीलालकु
ल्याकुला:॥ एवालात्वाततुरुपक्रदत्तविलसद्दाह्राव
लीवल्लनेक्ता म्यकुकु माकसराविक मृदोवंकूप
कण्खाल्ल। यनावास्यसरस्वतीसवि धतासाविक्तावान्षा
टवश्चादूनुत्कदर्षंत्तिपकुरमत: कीराविापाच्या प्यत्
॥ तनव्यापुरमण्डलेसुकृतिनायास्मे ग्राह्मृग्राह्
यद्धमद्वयमग्रियणविविनाविश्राणितंश्रद्धयात
द्वात्यनरवर्म्मादवनृपति:पश्यत्सरीवर्त्मीतद्धामंमा
खलपाटकारव्यमंदिशादाशातयास्यचुञा॥ ९८॥ त
नस्वयंकृतानकप्रशस्तिस्तुतिचित्रितं। श्रीमल्लक्ष्मी
वारणेनताह्वागारमकार्यत॥ सं ११६२॥



Transcript of the Inscription in Balbodh.

दधन्भोत्तारत्यै ॥ प्रसादौदार्यमाधुर्य्यसमाधिसमतादयः ॥ युवयोर्यै गुणाः संति वाग्देव्यौतेपिसंतुनः ॥ एकएवभुवनत्रयेपिसश्रीपतिर्भवतुवोविभूतये । य (स्यचा) व्ययपदश्रितोप्यमीभास्करप्रभृतयश्चकासति ॥ जातिवृत्त (त्ते) श्च (संहितागु) णालंकारवारदः (वारिदाः) । सरसाश्चप्रसीदंतु सूक्तयः सूरयश्चनः ॥ दुर्धरारिपुरभद्रभीषणो भूरिभूतिम स) विशे (षभूषणः (रा) जराजकृतसाक्रियः क्रियाद्वन्हिवंशसदृशःशिवःशिवं ॥ जातामहार्ण्णवोत्पन्नेब्रह्माडेशुक्तिसंपुटे । महेश (संभ) तामुक्ताजयंत्यंभोजयोनयः ॥ वैराग्यंचसरागतांचनृशिरोमालांचमाल्यानिचव्याघ्रानेकपचर्म्मणीचवसनेचाहींश्चहारादिच । यद्भूतिंचविलेपनंचभजतेभीमंचभव्यंचतद्दिश्याद्रूपमुमारमारमणयोर्भुक्तिंचमुक्तिंचवः । वैश्वरथ्यासमः (क) म्म (र्म) मीमाज्ञानृ (मांसाभृ) तिकैतिशात् । स्वाभिन्ननिर्मिताशेषविश्वोविष्णुर्युनातुवः ॥ अमिः (म) ग्रस्तगिरीन्द्रगर्वगरिमानीलाश्मसानूल्लसत्कान्तिव्रातविडम्बिताम्बरतलः श्रीमान्नगेन्द्रोब्बुदः । यस्यव्योमतलोद्दिलङ्घिशिखरप्राग्भारपद्माकरप्रेङ्खत्पद्मपरागचक्रळि (मि) तरब्रह्माण्डखण्डायते ॥ देवैरावृतमभ्रमण्डलमिदम्मर्त्यैश्चभूमण्डलंकृत्वाव (ध) र्म्मतुलायमानवपुषोयस्यान्तयोर्न्यस्यच ॥ जानेयावदवैतुमिच्छतिविधिः किंशुद्धमित्येतयोरूर्ध्वंतावदगादमर्य्यादशखरिस्तस्मान्नभोमण्डलं ॥ लेभेविभिद्यजलविप्रधिभूमिचक्रमाकाशचक्रमपियेनदिगन्तनेमि । संसारवर्त्मनिमहाविषमेनिषन्न (ण्ण) भाग्रान्नतैकतटाविश्वरथांत (ग) लक्ष्मीः ॥ तस्मिन्वेदविदांवरःसभगवानाकाशगङ्गापयःपूरप्लावितकान्तकोमलतटेतिष्ठद्दासिष्ठोमुनिः । यस्तेवा (स्त्रेता) नलधूमवर्तियमुनांप्रीत्यैपितुः (सु) व्रतोगङ्गासङ्गमसिद्धयेसमनयद्ब्रह्माण्डखण्डंप्रति ॥ विद्यामहासरिदुपान्तविवर्तिघोरसंसारसैकतविषन्ण (ण्ण)मशक्तमेते। यस्यत्रिलोकरथमुत्पथसंप्रवृत्तमुत्तारयंतिशतशोप्युपदेशतायाः आयातस्यकदाचनक्षितिपतेराच्छिन्दतः कौशिकस्यातिथ्योचितवस्तुजातजननादानन्दिनींनन्दिनीं । निर्ज्जेताकुपितेननतेनहविषासंहर्षिताद्बर्हिषोवीरःश्रीपरमारहत्यनुपमः सत्याभिधानोभ-

वत् ।। राघवादृतविशालवर्म्मभृत्सत्यकेतुपृथुकीर्तिपार्थिवः । वर्धतेयमहिमांशुचंद्रमः संततिप्रतिकृतिर्यदन्वयः ।। वराजरामराजितानलोद्भवःसभारतः । ग्रहेन्द्रचन्द्रयोरिवव्यजायतायमन्वयः ।। ८ ।। वंशेस्मिन्वैरिसिंहः क्षितिपतिरभवद्भूरिभूतिप्रभावस्साम्राज्यौदार्यशौर्यप्रचयपरिचयप्राज्यसौराज्यसिद्धिः। नम्रक्ष्मापालभालस्थलदलितलुलत्कांतकोटीरकोटित्रुटयन्माणिक्यचक्रस्थपुटितमणितत्पादपीठोपकंठः । सर्वाशाविजयप्रयाणसमयेयस्येन्द्रनीलप्रभैर्मायूरातपवारणैः शुशुभिरेनष्टावकाशादिशः । सर्पन्मत्तकरीन्द्रचक्रचरणप्रग्भारदीर्णस्थिरारम्भोद्भूतविपन्नशेषसविषश्वासावरुद्धाइव ।। पातालेवडवामुखानलमिषात्पृथ्वीतलेचस्फुरत्सौवर्णाचलकैतवाद्दियतिचब्रह्माण्डखण्डच्छलात् । चञ्चत्काञ्चनचक्रवालवलयव्याजाच्चदिङ्मण्डलेयस्याद्यापिसमुल्लसत्यविचलीभूतःप्रतापानलः ।। स्वर्लोकेषुचविद्विषांक्षितिषुचव्यालेन्द्रगेहेषुचस्वाराज्यंचारिपुवज्रंचपुरजिन्नागाधिराजंचयः। ऐश्वर्येणचविक्रमेणचधराभारक्षमत्वेनचन्यक्कुर्वंश्वपराभवंश्वसमतिक्रामंश्वपृथ्वीमधात् ।। ।तस्माद्वैरिनृपावभेदनवधूवैधव्यदुःखोद्भवद्बाष्पाम्भःकणशांतकोपदहनः श्रीभीमकोभून्नृपः। आविर्भावितनूतनस्थितिरयंब्रह्माण्डखण्डच्छलाद्यस्याद्यापिविलोक्यतेवियदधोधूमःप्रतापानलः ।। अनुगगनमुदस्थः (स्ताः) स्थूलमुक्ताच्छगायेयदसिदलितदुष्टा (दृप्या)कुम्भिकुम्भस्थलेभ्यः।। सततमपिपतन्तस्तेद्ययावन्नपृथ्वीपृथुलतरलताराव्याजभाजोभजन्ते ।। अत्याश्चर्यमदृष्टमश्रुतमिदंकस्मिन्समाचक्ष्महेकोन्वेतत्प्रतिपद्यतेचतदपिमस्तूयतेकौतुकात् । उत्धृत्यापिवसुंधरामसदृशींलब्ध्वापिलक्ष्मींचयः कुर्वन्कार्यमनेकशः सुमनसाप्रागान्नवैकुण्ठता ।। ।।तस्माद्वैरिवरूथिनीवदधिपप्रारब्धलुप्यत्सुरप्रध्वंसैकपिनाकपाणिरजनिश्रीरा (भो) जराजोनृपः । प्रायःप्रावृतवान्निपालयिषयायस्यप्रतापानलोलोकालोकमहामहीध्रवलयव्याजान्महीमण्डलं ।। यस्मिन्सर्प्पतिलीलयापिललितैः सैन्यैः समुद्भ्रामितं वाहव्यूहविसारिधूलिपटलव्यालुप्तदिङ्मण्डलैः । अत्युद्भ्रान्तकरीन्द्रवृन्दपघटाभेङ्खालनोच्छृंखलप्रेङ्खच्छृंखलनादनिर्भरभृतब्रह्माण्डभाण्डोदरैः । यन्निस्त्रिंशनिरस्तमस्तकतयालब्धा-

न्यथादुर्लभंदेवत्वंस्वकबन्धुमुद्वतमधोदृष्ट्वाभटैर्वेष्टितं ॥ संहर्षात्पततोविमानशि-
खरादाश्लिष्यकंठेहठाद्वीरान्वेषणरागिणोरुरुधिरेसंभूयसिद्धाङ्गनाः॥ ✕ ॥ तस्या-
सीदथपार्थिवः पृथुयशाः श्रीभद्रराजोनुजः स्फूर्ज्जद्वाडवपावकस्फुटमहः सोदर्य्य
शौर्य्यानलः । यःसंग्रामयुगान्तचलगितभुजादुर्व्वातदूरोल्लसत्कल्लोलायितमंडलाग्र-
पटलेनामर्दयद्भूभृतः ॥ व्रजतिजयिनियत्रामित्रजातेनजज्ञेतरलतुरगवेगोद्भूतभू-
रेणुराजिः ॥ विकटकटिभारभ्रष्टभूपृष्ठरन्ध्रादुदितहवसमन्तादन्तकालाग्निधूमः ॥
गाम्भीर्यप्रलयार्ण्णवस्यचबलंकूर्म्मातवातस्यचस्थैर्यानंकमठेशितुःप्रचुरताब्रह्माण्ड-
भाण्डस्यच ॥ तेजःकालहुताशनस्यचमहीयस्त्वंशुचक्रस्यच स्वीकृत्येवविनिर्म्मि-
तंयमविदुःपत्याजिपृथ्वीभुजः ॥ ✕ ॥ तत्सूनुर्भुवनैकभूषणमभूदभूपालचूडामणि-
च्छायाडम्बरचुम्बितांघ्रिकमलःश्रीभोजदेवोनृपः । यस्याध्यासनमाश्रयन्तिचरणौ
राज्यासनोद्वासिनःस्पर्द्धाबन्धिवनम्रनिर्झरनटत्कोटीरकोटित्विषः । रटत्पटहपाटवप्र-
कटकुञ्जरस्फूर्जितस्फुरद्भ्रमरडम्बरोडमरुडिण्डिमोड्डामरा । स्फुटत्करटकुञ्जर-
भ्रमपदसंपतत्संयमभ्रमद्भुवनभूतलप्रगटयमरुच्चक्रैः ॥ वैकुण्ठकमलासनायचतुरा-
स्यायस्वयंभूःपुनःपत्र्वास्यायहरायशम्भुरपिषड्वक्त्रायपुत्रायच । सेनानीरपिदन्द-
शूकरतयेजस्वंसहस्राननायाद्यापिस्पृहयत्यमर्त्यसमितौयत्कीर्त्तिमुत्कीर्तयन्॥ ✕ ॥
तस्मिन्नासवबन्धुतामुपगतेराज्येचकल्याकुलेभ्रमस्वाभिनितस्यसूनुरुदयादित्योभवद्
भूपतिः । यनोद्वृत्यमहार्ण्णवोपमगिलत्कर्ण्णाटकर्ण्णप्रभुमुर्व्वीपालकदर्थितांघ्रिमि-
मांश्रीमद्वराहायितं ॥ यस्माद्दुग्रतरप्रतापनिचयादारूढदुर्दर्शनाद्दूरेभास्करविभ्र-
मादाभिमुखैः प्रापंचि यैः पत्र्वता । मन्येसोयमितिप्रतीतिवितताभर्षप्रकर्षेणतेभित्वा
भास्करमण्डलंरिपुचयाः प्रापुः परांनिर्वृतिं ॥ एकस्यांभ्र(स) मितौविलोक्यविजयं
यस्यापरस्यांस्तुव वक्त्र (कृ) तांसमर्थयतिदृग्विद्ग्रीहासतस्यहृये । किंचानन्दनि-
मीलितेक्षणतयाश्रीतैस्सुखैर्वेचित श्चक्षुःकर्ण्णप्रकर्ण्णप्यहिपतिःस्वीयं वपुर्नैदति ॥

✕ ॥पुत्रस्तस्यजगत्त्रयैकतरणेःसम्यक्प्रजापालनव्यापारप्रवहाःप्रजापतिरिवश्री-
लक्ष्मदेवोभवत् । नीत्यायेनमनुस्तथानुविदधेनासौनवैवस्वतःसर्वत्रापिसदाप्यवर्द्ध-

तयथाकीर्तिर्नवैवस्वतः ॥ संभूयधियतांगुरोर्बलभराद्भोक्कूर्मराजादयः सद्योनश्यत विद्रुतंनमतरेप्रत्यर्थिपृथ्वीभुजः । चक्षुर्म्मीक्षुपिधीयतामनिमिषाः पांसुःपुरापूरयत्येवंव्याहरतिप्रयागपटहोयस्यस्वनछद्मना ॥ यस्मिन्सर्पतिबांधवोपिविधुरैः पूर्वैःपरित्यज्यतेकः (का) प्राणस्यकथापिकातरतयानापेक्ष्यसे (ते) दक्षिणैः । आशावल्लिरसत्फलेतिविकलैर्निश्चीयतेपश्चिमैर्मर्तुंकेवलमुत्तरैर्नृपतिभिर्द्वेषाप्ययोध्यास्यते ॥ प्रयातियस्मिन्प्रथमंदिशंहरेर्निहीर्षयानन्यसमानदन्तिनां ॥ यथाविशद्वोडपतेः पुरंदरस्तथासुरैः स्वः सहसापुरंदरः ॥ उत्साहोन्नतिसान्निमित्तजनितानन्तप्रयाणक्रमेणाक्रम्यत्रिपुरीरगैकरतिकान्विध्वस्यविद्वेषिणः ॥ येनावास्यतविश्वनिर्झरमरुत्संचारचारूलसल्लीलोद्यानलतावितानवसतीगोदोपकण्ठंकिल ॥ जातानिजन्यभ्रमाज्जर्नादीजानियकुंजरमज्जनानि । तटाचलच्चाटनतत्परायारिंगप्रवाहोर्म्मिपरंपरायाः ॥ येन्यालोलकरालनिर्झरकराःकुंभायमानोन्नमत्कूटाताः कटकांतभागविगलद्दानायमानांबुदाः । प्रायस्तेपिविरोधिसिन्धुरधियायद्वाहिनीवारणैरुन्मीलन्मदमेदुरैर्विभिदिरेविंध्यस्यपादाचलाः ॥ स्फारत्कल्लारवारिस्थगितगुरुतटीकूटकुट्टाकटङ्कप्रायर्मेखत्खुराग्रत्वरितहरिचमूचक्रचक्रम्यमाणाःयेनालंघ्यंतसेनाकरिकरटतटोद्दामदानांबुगन्धव्याविद्धगण्यवन्यद्विपकुलपटलव्याकुलाविन्ध्यपादाः॥ येदिक्कसिंधुरबंधवःक्षयमरुल्लोलादिगिभ्याभृतक्रीडाक्रोडकुटुम्बकानिजलमुक्सब्रह्मचर्याजुषः । यत्सेनानृपगंधसिंधुरमरुन्मैत्रीविहस्तीकृतैस्तैरप्यंगकलिंगकुंजरकुलैर्युद्धायबध्नोंजलिः ॥ देवास्तो(वोसौ) पुरुषोत्तमःसभगवानाशिश्रियेयःश्रियायेनेदंबलिवैरितःसमवनाद्विश्वंसमाश्वासितं । येनाधारिवसुंधरेतिदव (र) तः सानंदमंदाकृतायस्य प्राप्यपयोनिधौबुधजनैर्न्याजस्तुतिः प्रस्तुता । येकल्पानलधूममंडललिखत्कादंबिनीविद्वेषः संवर्तोल्लसितान्धकारसुहृदस्तुद्यद्दियद्बांधवाः ॥ विभ्राजच्छकुलादयश्रमनुदेपाथोवगाहोद्यतैर्यत्सामन्तमतंगजैरधरितास्तेप्यम्बुधेरूर्मयः ॥ कुंभसंभवसोदर्यैयत्रापाधिमुपाश्रिते । शीलायौनीचकेस्तैयोविंध्यबांधववाडवे ॥ लीलाभिः प्रवणे यदीयपृतनासामंतसीमंतिनीश्रोणिश्रेणिगलत्सुवर्णरसनामुक्ताः पतंतिस्म याः ।

ताभिः संप्रतिपमथेनुपृथिवींयत्ताम्रपर्णीपयः पश्याद्यापितदेवपाण्ड्यनृपतेर्जीवातवेजा-
यते ॥ स्वामिन्नेषससेतुरत्नभवतोरामस्ययोमारुतिप्रायोपाहृतशैलगव्हरचितोप्य-
ब्धिप्लुतेरिच्छया ॥ येनागत्यकुतूहलेनकथितंतज्जीरवज्ञाययः सेनाहास्तिकसेतुनैव
विदधेद्वीपांतरोपक्रमम् ॥ त्रिधाविभक्तेनयथायमाशांयस्याग्रिमेसर्पतिसैन्यशब्दे । अ-
भूत्स्वकीयांकुभंव्यपायाद्रोपायितुंपाशभृदप्यपाशः ॥ मैनाकमुखावसंतिकतिचित्
कालामिरास्तेकाचित्सन्तिकापितिमिंगिलप्रभृतयः कुत्रापिशेतेहरिः । यत्तद्वेत्तिनको-
पियत्रजलधौतस्याप्यशब्दंपयःपीत्वायत्करिभिःकृतंकचुलुकैस्तैस्तैरगस्त्यायितम् ॥
यैस्संभूयतिमिंगिलप्रभृतिभिःसंसर्पिणस्तन्वतेपोताधानसबन्धुतांशिखरिणोमैनाकमु-
ख्याअपि । भ्राम्यन्मन्दरडम्बराणिदधिरेतैरप्यशेषैर्बुधैर्यत्सेनागजराजसारकरभै-
र्मुक्ताक्षितानोज्वलैः ॥ यक्षातितिक्षोरिवराजराजमन्यांतदाशांप्रतियस्ययातुः ।
द्विधापिभीत्युज्झितवित्तपाशिर्भूपैःप्रतीपैर्विभयैर्बभूवे ॥ आरामासधराधराअपितदा
पुन्नागपूगादिमद्गुल्मांतर्वनदेवताइवजयश्रीमद्यशःपादपाः ॥ यस्यासन्भुजदंडच-
ण्डिमलसल्लोलासिलक्ष्मीभृतःक्षोणीपालजभालमंडलगलत्कीलालकुल्याकुलाः । खे-
लोत्खातगुरुष्कदत्तविलसद्बाहावलीवेल्लनेक्काम्यत्कुंकुमकेसराधिकमृदोर्वकूपकण्ठ-
स्थले । येनावास्यसरस्वतीसविधतासाहित्यवाक्पाटवस्वादूनुत्कटपात्रिपंजरगतःकी-
राधिपोध्याप्यते ॥ तेनव्यापुरमण्डलेसुकृतिनायस्मैग्रहेंद्रग्रहेयद्ग्रामद्वयमग्रियेणवि-
धिनाविश्राणितंश्रद्धया । तद्भ्रातानरवर्मदेवनृपतिः पश्यन्परिवर्त्यतद्ग्रामंमोखल-
पाटलाख्यमदिशद्देशेभयेस्येच्छया ॥ ✕ ॥ तेनस्वयंकृतानेकप्रशस्तिस्तुतिचित्रितं
श्रीमल्लक्ष्मीधरेणैतद्देवागारमकार्यत ॥ सं ११६१

हंहोबुधाः साधुसमुत्सहध्वंकुशाग्रकल्पांधियंविदध्वं । मध्यस्थभावंचसमाश्रय-
ध्वंसुखंवनःसुक्तिसुधांगणध्वं ॥ वंदनीयावुभौस्तोमेश्रोतारौतौविपश्चितौ ॥ याव-
च्छ्रुमुंचतः सांद्रमानंदालस्यनिर्भरौ ॥.

ART. II.—*Result of a Comparison of the Observations of nine different Barometers, read every half hour, for 24 successive hours.* By GEO. BUIST, LL.D., in charge of Bombay Observatory.

The present paper was laid before the Society in an enlarged form, at the ordinary monthly meeting on the 9th July. It was originally meant to illustrate a Chart 3½ by 2½ feet in size, on which the Barometric curves deduced from the figure tables now alone given were projected. The portion of the paper specially alluding to these has been omitted as unintelligible without the chart, whose magnitude rendered it inadmissible, and which was not capable of being reduced to such dimensions as to permit of its being included in this journal.

An error in the standard Barometer which was then alluded to, having been detected by means of the combined observations, has now been corrected by the addition of 00·125 to the reading of the instrument. This very nearly corresponds with the interval which exists on the diagram, as well as in the readings noted on the figure tables printed along with it, betwixt the readings of the standard and the mean of all the readings of the other instruments. The standard Barometer is a large one by Newman (No. 58), the same as all the magnetic observatories are supplied with, with a tube of 530 diameter, requiring a correction of + 0·003 for capillarity. The scale is moveable, so that the correction for the rise of the mercury in the cistern is effected by bringing in contact with its surface the point of the rod to which the scale is attached. The barometer marked No. 8, is by Gilbert, and is the same in point of construction as those formerly supplied from the Government stores—the scale being of brass, the frame of wood. The Royal Society have stated, that no exact correction can be given for expansion in instruments of this form, which "no scientific observer would ever willingly use."* No account has been taken of it in the following remarks. The Barometers from No. 1 to No. 6 are uniform in point of construction. They were manufactured and

* Report of the Committee on Physics and Meteorology, &c. 1840. Though this instrument has been noted in the table, no account has been taken of it in the subsequent speculations.

brought to Bombay in 1843; the experiment under review having been made just after their arrival. No. 7 is by the same maker, and is of the same form nearly: it was brought to India early in 1840, and has since been occasionally employed in the Deccan as a mountain Barometer.

These instruments are all very beautiful in point of workmanship. They are fitted up with a brass frame, in which the attached Thermometer is sunk. The cisterns are of cast iron, with a glass plunger which can be screwed up so as to move the mercury to the top of the tube. The neutral point is marked on a short glass tube, enclosed in a cast iron sheath, ascending from the top of the cistern. The mercury is on each observation screwed up to this, which at once gives the correction for rise in the cistern and for capillarity. No correction for temperature has been made. The instruments were in this respect subject to nearly the same fluctuations of heat; the entire difference betwixt the attached Thermometers in no case amounting to two degrees Fahrenheit; this is equivalent to a difference in the Barometer of 0·005. If this be added, some of the minor discrepancies will altogether disappear.

The instruments were numbered arbitrarily, for the sake of distinction only, just before commencing observations. The mean of 48 readings of No. 4, is 29·699; that of No. 7, 29·743; the difference between them is ·044. These are considerably the lowest and highest. Nos. 5 and 6 are perfectly coincident, and Nos. 1, 2, and 3, only differ ·004 and ·006 from each other respectively. The greatest of these very little exceeds the differences given betwixt some of the mountain Barometers provided for the Antarctic Expedition by the Royal Society's Standard; the least of them are less than the disagreements betwixt the crown glass and flint glass Barometers of Somerset House.

The Sympiesometer which is noted in the table, is not here taken account of. It is a good instrument, by Adie, and has been in my possession since June 1840.

The following tables give the readings uncorrected. The standard is 36 feet above the mean level of the Sea; the other instruments 33 feet; there being no means of placing them exactly beside each other.

Observed Readings of Eight Barometers (half-hourly,) from 4 a.m. 20th June to 3½ p.m.

Bombay Mean Time.		Standard.		No. 1.		No. 2.		No. 3.		No. 4.		No. 5.		No. 6.		No. 7.		No. 8.		Sympiesometr.	
		Barom.	The.	Barom.	The.	Barom.	The.	Barom.	The.	Barom.	The.	Barom.	The.	Barom.	The.	Barom.	The.	Barom.	The.	Symp.	The.
A.	M.		degs.		degs.		degs.		degs.		degs.		degs.		degs.		degs.		degs.		degs.
4	0	29·705	83·5	29·694	82·0	29·698	81·6	29·696	81·6	29·650	81·7	29·700	81·7	29·700	81·6	29·730	81·8	29·684	81·5	29·24	83·5
4	30	·715	83·2	·713	81·7	·720	81·5	·714	81·6	·656	81·5	·712	81·5	·716	81·5	·723	81·6	·690	81·3	·26	83·3
5	0	·715	83·1	·720	81·5	·720	81·5	·720	81·5	·680	81·5	·720	81·6	·716	81·5	·710	81·5	·713	81·1	·26	83·0
5	30	·725	82·8	·742	81·2	·760	81·0	·760	81·2	·736	81·2	·760	81·2	·760	81·2	·736	81·2	·720	81·0	·28	81·8
6	0	·739	82·4	·748	81·1	·762	88·0	·768	81·1	·746	81·1	·768	81·0	.772	81·0	·750	81·0	·732	81·0	·35	81·7
6	30	·751	82·3	·752	81·2	·768	81·2	·774	81·0	·750	81·0	·774	81·2	·760	81·2	·783	81·2	·742	81·0	·30	81·9
7	0	·755	82·2	·762	81·8	·770	81·9	·776	81·8	·754	81·9	·776	81·9	·784	82·0	·784	82·0	·746	81·8	·31	82·0
7	30	·757	82·7	·768	82·5	·778	82·5	·780	82·5	·760	82·4	·780	82·4	·790	82·5	·790	82·2	·750	82·1	·30	82·6
8	0	·759	83·2	·774	82·6	·780	82·7	·784	82·7	·766	82·7	·784	82·6	.794	82·7	·792	82·7	·758	82·8	·28	82·9
8	30	·765	83·7	·778	82·8	·784	82·9	·790	82·8	·770	82·8	·790	82·	·798	82·8	·799	83·0	·770	83·0	·28	83·2
9	0	·771	84·6	·782	84·0	·780	84·0	·792	84·5	·774	84·2	·792	84·3	·799	84·4	·800	84·7	·774	84·9	·28	84·6
9	30	·757	85·2	·760	85·2	·770	84·8	·760	84·2	·756	84·9	·774	84·8	·776	84·8	·780	84·9	·760	85·0	·24	85·0
10	0	·747	85·7	·740	84·9	·744	84·8	·742	84·8	·709	84·7	·756	84·7	·750	84·8	·760	84·7	·730	85·4	·22	85·1
10	30	·745	86·0	·729	84·8	·739	84·5	·739	84·5	·700	84·5	·743	84·5	·744	85·0	·758	85·0	·746	85·3	·20	84·1
11	0	·735	86·2	·723	85·5	·736	85·3	·728	85·5	·690	85·4	·734	85·4	·736	85·6	·746	85·6	·740	86·0	·17	85·5
11	30	·735	86·6	·728	85·0	·738	84·8	·728	85 0	·698	84·8	·736	84·8	·736	85·2	·740	85·4	·737	86·0	·17	85·7
P.	M.																				
0	0	·727	86·5	·719	85·5	·725	85·0	·730	85·0	·680	85·2	·730	85·2	·729	85·7	·738	85·7	·730	86·2	·16	85·7
12	30	·712	87·0	·702	86·1	·705	85·8	·711	85·8	·665	86·0	·712	86·0	·711	86·3	·728	86·3	·719	86·8	·13	86·3
1	0	·699	87·3	·692	86·5	·700	86·3	·700	86·3	·688	86·3	·700	86·8	·700	86·5	·712	86·5	·718	87·0	·11	86·7
1	30	·700	87·6	·690	86·5	·700	86 3	·700	86·5	·688	86·3	·700	86·3	·700	86·5	·710	86·5	·706	87·1	·10	86·9
2	0	·693	87·8	·686	85·8	·691	85·7	·695	85·8	·678	85·5	·696	85·5	·694	85·9	·703	86·0	·702	86·5	·10	86·5
2	30	·685	87·5	·673	85·5	·678	85·3	·684	85·3	·671	85·2	·680	85·2	·681	85·5	·691	85·5	·690	86·2	·11	86·2
3	0	·686	87·2	·672	85·5	·680	85·3	·684	85·6	·673	85·2	·688	85·3	·684	85·5	·698	85·5	·692	86·2	·11	86·0
3	30	·677	87·2	·664	85·4	·670	85·1	·670	85·2	·656	85·1	·680	85·2	·676	85·5	·690	85·5	·688	86·0	·11	86·0

Table continued on next page.

Observed Readings of Eight Barometers (table continued) from 4 p.m. 20th June to 4 a.m. 21st June, 1843.

Bombay Mean Time.	Standard.		No. 1.		No. 2.		No. 3.		No. 4.		No. 5.		No. 6.		No. 7.		No. 8.		Symplesomr.	
	Barom.	The.	Barom.	The.	Barom.	The.	Barom.	The.	Barom.	The.	Barom.	The.	Barom.	The.	Barom.	The.	Barom.	The.	Symp.	The.
P. M.		degs.		degs.		degs.		degs.		degs.		degs.		degs.		degs.		degs.		degs.
4 0	29·671	87·1	29·658	85·1	29·660	85·0	29·669	85·0	29·656	84·8	29·670	85·9	29·670	85·3	29·630	85·1	29·680	85·9	29·11	85·6
4 30	·667	86·8	·650	84·9	·654	84·8	·660	84·8	·645	84·7	·668	84·8	·658	84·6	·672	84·9	·674	85·0	·13	85·4
5 0	·673	86·6	·656	84·5	·660	84·6	·662	84·5	·650	84·3	·664	84·3	·662	84·4	·678	84·5	·680	84·6	·14	84·6
5 30	·669	85·6	·652	84·1	·660	84·2	·654	84·1	·654	83·9	·660	84·0	·658	84·0	·670	83·9	·673	84·0	·12	84·1
6 0	·669	85·2	·650	83·7	·658	83·6	·650	83·8	·658	83·7	·660	83·6	·660	83·7	·672	83·6	·672	83·7	·12	84·3
6 30	·653	85·0	·656	83·5	·662	83·5	·668	83·4	·668	83·4	·672	83·5	·672	83·5	·690	83·4	·686	83·5	·14	84·2
7 0	·695	84·9	·690	83·4	·693	83·4	·690	83·4	·686	83·3	·698	83·4	·700	83·5	·713	83·4	·708	83·4	·16	84·2
7 30	·699	84·4	·706	83·4	·704	83·4	·700	83·3	·710	83·3	·714	83·4	·716	83·3	·730	83·3	·720	83·4	·18	84·1
8 0	·703	84·2	·712	83·0	·698	82·9	·694	83·0	·708	83·0	·698	83·0	·724	83·3	·728	83·5	·704	83·8	·20	83·8
8 30	·708	84·0	·700	82·3	·700	82·4	·700	82·5	·692	82·5	·710	82·5	·710	83·3	·717	83·5	·708	83·9	·22	83·3
9 0	·715	83·2	·709	81·9	·706	81·9	·718	81·9	·700	82·0	·728	82·5	·720	82·7	·732	81·9	·704	82·9	·24	82·7
9 30	·738	83·0	·728	81·5	·720	81·5	·730	81·5	·718	81·7	·744	81·7	·735	82·9	·750	81·5	·735	83·0	·27	82·3
10 0	·737	83·0	·732	81·8	·730	81·5	·740	81·5	·721	81·8	·742	82·0	·744	82·0	·754	81·5	·735	81·8	·29	82·2
10 30	·725	82·7	·720	81·5	·723	81·5	·726	81·6	·722	82·2	·740	82·5	·732	82·3	·754	81·5	·730	81·9	·26	82·2
11 0	·727	82·7	·722	81·2	·726	81·4	·728	81·5	·726	82·4	·742	82·5	·736	82·8	·770	81·9	·738	81·9	·26	82·4
11 30	·725	82·8	·730	81·6	·736	81·8	·736	81·9	·736	82·4	·746	82·4	·740	82·7	·776	82·0	·742	82·0	·27	82·7
A. M.																				
0 0	·718	83·0	·724	82·4	·724	82·3	·722	82·3	·726	82·5	·728	82·7	·726	82·8	·760	82·5	·732	82·4	·24	83·2
12 30	·701	83·0	·700	82·4	·710	82·4	·700	82·4	·700	82·6	·712	82·6	·704	82·7	·740	82·5	·722	82·2	·23	83·4
1 0	·685	83·1	·690	82·2	·688	82·2	·690	82·2	·696	82·4	·686	82·4	·684	82·5	·700	82·2	·700	82·1	·20	83·0
1 30	·675	83·0	·670	82·5	·660	82·4	·675	82·4	·668	82·5	·660	82·6	·660	82·5	·700	82·3	·690	82·1	·20	83·0
2 0	·657	83·0	·678	82·0	·667	82·0	·670	82·2	·658	82·5	·688	82·5	·680	82·5	·698	82·5	·683	82·2	·20	82·7
2 30	·680	83·0	·670	82·0	·672	82·0	·672	82·0	·658	82·3	·682	82·3	·670	82·3	·690	82·9	·688	82·0	·20	82·7
3 0	·673	82·9	·664	82·0	·668	81·9	·672	82·2	·660	82·3	·680	82·2	·670	82·2	·688	81·9	·680	82·0	·20	82·4
3 30	·675	82·7	·660	81·5	·660	81·5	·668	81·5	·660	82·0	·680	82·0	·676	82·0	·700	81·6	·680	81·8	·21	82·2
4 0	·675	82·8	·676	81·6	·676	81·5	·674	81·6	·660	81·9	·678	81·7	·674	81·9	·703	81·5	·682	82·8	·22	82·1
Means.	29·711	84·5	29·706	83·3	29·710	83·2	29·712	83·2	29·699	83·3	29·718	83·4	29·718	83·5	29·743	83·1				

Dismissing No. 7, whose sluggish movements render it liable to suspicion, the mean height of the whole of the others may be assumed as nearly the proper elevation of the mercury for the day; this was 29·710.

In comparing the altitudes of the Barometers at 4 o'clock on the morning of the 20th, which may be assumed as the minimum, or nearly so,—No. 7, continuing to descend till 5, with the maximum obtained by all the Instruments, save No. 2, exactly at 9 o'clock, we shall have the following result. In reality the comparison ought to have been with the maximum of 10 P.M. of the 19th, but of this we have no readings.

		1	2	3	4	5	6	7
Maximum diff. 054	9 A.M.....29·780	29·790	29·792	29·774	29·792	29·799	29·800	
Mean range 097	4 „ .... ·694	·698	·698	·650	·700	·700	·730	
Interval 5 hours	Diff.... 086	·092	·094	·124	·092	·099	·070	

The following is the difference betwixt the same hour of maximum and the afternoon minimum of the 20th, which follows at 5 P.M., at an interval of 8 hours.

	A. M.	1	2	3	4	5	6	7
Maximum diff. 035	9 A.M.....29·780	29·790	29·792	29·774	29·792	29·799	29·800	
Mean range 122	5 P.M. 656	·660	·662	·650	·664	·662	·678	
	Diff.....124	·130	·130	·124	·128	·137	·108	

The following is the range betwixt half-past 11 P.M. on the 20th and half-past 3 A.M. on the 21st.

	1	2	3	4	5	6	7
P. M. 11½ .....29·730	29·736	29·736	29·736	29·746	29·740	29·776	
·660	·660	·668	·660	·680	·676	·700	
A. M. 3½ ..... ·070	·076	·068	·076	·036	·064	·076	

Maximum diff. ·010 = mean range 71.

But on this occasion the Instruments attained the maximum and minimum irregularly, in point of time for example:

1	2	3	4	5	6	7
10 P.M	11½	10	11½	11½	11½	11½
732	736	740	736	746	740	776
660	660	668	66	678	674	700
½ p. 3	½ p. 3	½ p. 3	½ p. 3	4	4	½ p. 3
·072	·076	·078	·076	·068	·066	·076

Maximum diff. ·010 = Mean range ·070.

Five Instruments attained their maximum at ½ past 11, and two at 10 o'clock,—they had all fallen during a shower at ½ past 10; and though they all rose again, No. 1 & 3 did not attain the altitude they had reached

at the earlier hour; so, in like manner, the morning minimum was disturbed by a shower a little before 2, and again before 4, which deranged the hour of minimum of Nos. 5 and 6, whose lowest point was at 4 o'clock. With the correction of 125 here applied to the standard, which exhibits, notwithstanding its disorganization, much the fewest anomalies, it gives very nearly the true range after all. The morning hour of minimum noted on the separate record of the Observatory was 3 A.M. on the 20th, and half past 3 on the 21st, as shown by the standard Barometer, the morning maximum being 9 A.M., that of the evening half-past 11 —The afternoon minimum hour is half-past 4. This gives an interval of nearly six hours betwixt the morning minimum and maximum; of seven and a-half betwixt the latter and the minimum of afternoon; of seven betwixt this again and the night maximum, and of no more than four betwixt the last and the morning minimum. This, of course, strictly refers to the day in question, and to that only, though it will probably be found to be near that for the month of June on an average of years.

The mean amount of the ascending range betwixt 4 A.M. and 9 A M. on the 20th, is ·097, the maximum ·124, the minimum 70; both these are suspicious,—the fomer is the reading of a playful and vivacious instrument, No. 3, which seldom keeps with its brethren, the latter of a high set, but very dull sluggish one, which generally falls behind in all movements whether in ascent or descent; the maximum difference amongst the seven amounts to ·054.

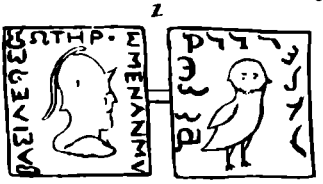
The mean amount of descent, betwixt 9 A.M. and half past 4 P.M. on the 20th, is ·122, the maximum ·137, the minimnm ·102,—this again by No. 7, the greatest difference betwixt any two is ·035.

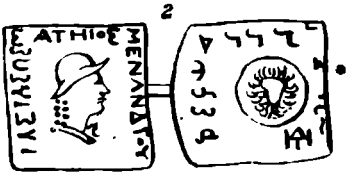
The morning descent from half-past 11 P.M. on the 20th, to half-past 3 on the 21st, is betwixt 70 or 71, according as the Instruments are taken by a fixed hour, or by the points of maximum and minimum attained at different hours.

This experiment I expect to be again able to repeat with a still larger collection of Instruments after the cold weather sets in; it is tedious and troublesome, and worthless, unless the Instruments be of nearly uniform make and of extreme accuracy. This, on the present occasion was, in all respects, the case.

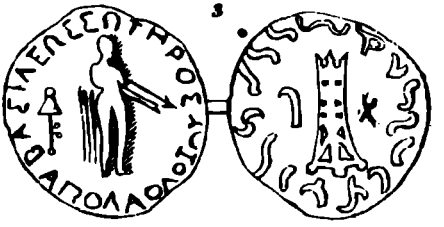
BACTRIAN COINS.

Menander.

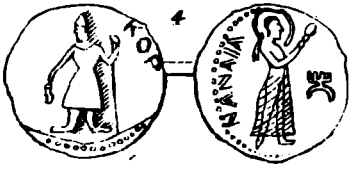


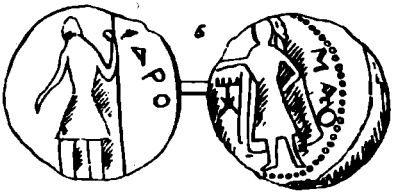


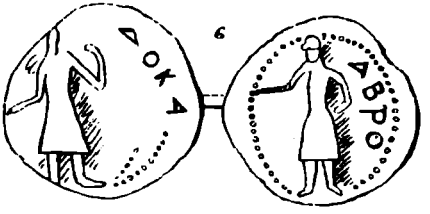
Apollodotus

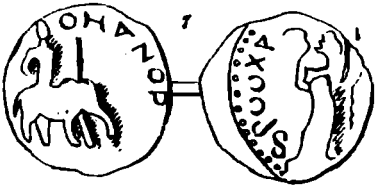


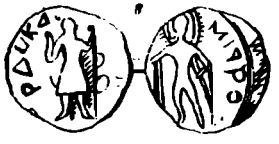
MITHRAIC COINS.

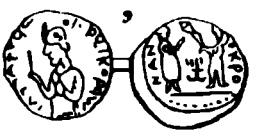


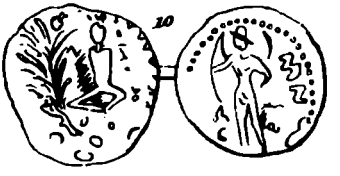












Over the Cell on the left hand of the large Inscription at Nassick.

ART. III.—*Observations on the Bactrian and Mithraic Coins, in the Cabinet of the Bombay Branch of the Royal Asiatic Society.* By JAMES BIRD, ESQ.

In the progress of deciphering the cave inscriptions on this side of India, I was led to the study of the Bactrian, Parthian, Indo-Scythian or Mithraic, Sassanian, and Kanaoj series of coins; and was not surprised to find proofs of an union between the *Bauddha* and *Mithraic* creeds; particularly after the deductions made by Mr. Prinsep on this subject, from his examination of the coins and relics discovered in the *Tope* of *Manikyala*.* Though an examination of our small cabinet may not add much to the obscure and lost portions of Indian history, it will nevertheless bring to light some new types of *Mithraic* coins; and is not without interest in the *Parthian* and *Roman* series; as the Parthian includes specimens of the coinage belonging to the *Christian kings of Edessa*, who were alternately in alliance with the Romans, and with their Parthian contemporaries, the kings of Persia. It may be yet further beneficial in extending the knowledge of numismatics among private individuals in this country; who having directed attention to the collection of coins and medals, may be willing to submit for publication the objects of their research, and thus widen the field of inquiry, by having before them, for comparison, stores of antiquarian relics, capable of illustrating the past condition and mythology of ancient India.

The conquests on the Indus, made by the Greek sovereigns of *Bactria*, the *Seleucidæ*, the *Parthian* and *Sassanian kings* of Persia, introduced into that part of the country, called *Indo-Scythia*, a variety of coins, distinguished by *Mythological devices*, and *bi-lingual inscriptions*, some of which have been improperly classed as belonging to unrecorded princes of Bactria, while they might be more truly ascribed to some of the Generals employed under the Seleucidæ, and to the Parthian and Sassanian satraps of Persia. In this department of oriental numismatics, notwithstanding the distinguished labours of Prinsep and Wilson, there remain ample materials for the investigation of others; and it is yet reserved for some one, possessing extensive historical acquirements, on the subject of

* Journal Bengal Asiatic Society for 1834, p. 438.

ancient times, and with a perfect knowledge of *Egyptian and Hindu* mythology, to appropriate the several coins to the different tribes and dynasties, to which they belong. Without presuming that I possess adequate acquirements for so great an undertaking, I may be permitted to add my mite to the stock of present knowledge on this subject; and if less successful than may be wished, in this investigation, my labours will doubtless be received with indulgence, where men of established reputation have left numerous *lacunæ* to be filled up.

Specimens of ancient Roman coins, in considerable number and variety are to be found in our cabinet; though we are far from being as rich as we should be in this department, and are without any of those which have been dug up in various parts of this country. The testimony of *Arrian's Periplus* of the Erythrian sea, the knowledge of towns and rivers on this side of India, evinced in Ptolemy's Geography, and the late discovery in the neighbourhood of Coimbatoor of five hundred and fourteen Roman coins, of the reigns of *Augustus, Tiberius, Caligula,* and *Claudius,* afford undeniable proof of the intimate connexion with India maintained by this people, during the first and second centuries of the Christian era, and at the period of their intercourse with the Parthians. Mr. Walter Elliot, of the Madras Civil Service, who is distinguished by like success and zeal in clearing up obscure portions of Indian history, informed me, by letter, that of these 514 coins, 134 were of the time of Augustus, 381 of the reign of Tiberius, 3 of Caligula, and 5 of Claudius. Roman coins have been previously found in the district of Coimbatoor, and the late Collector there, Mr. William Garrow, states that a silver denarius of Augustus was discovered in one of the ancient sepulchres of the country called *Pandukals**. whilst a number of irregularly shaped silver coins, stamped, by means of a punch, with various devices, and not uncommon in Southern India, were obtained from another of the same tumuli. These remains were with good reason attributed by Mr. Garrow, to a race of *Pandu Kulas* or Pandya tribe of Madura; one of whose chiefs dispatched the well known *Embassy to Augustus,* as related by *Dion Cassius,* which brought to him from India letters *written in Greek* as stated by Strabo, on the authority of Nicolaus Damascenus.† Somewhat more than fifty years ago, many

* An account of these tumuli will be found in Vol. III. p. 324, Transactions Bombay Literary Society.

† Strábonis Geograph. Lib. XV. p. 720.

gold Roman coins of the second century were recovered from the foundation of an old Hindu temple, near Nellore, some account of which will be found in Vol. III. of the Asiatic Researches. Besides these, several gold Roman coins were found, about three years since, in the neighbourhood of Sholapoor ; and an *aureus* of *Trajan* from Cuddapah, with a *solidus* of *Zeno* from Madura, was obtained not long ago by Mr. Elliot.

Many of these Roman coins were doubtless introduced into India, in exchange for commercial articles of luxury, exported by the channels of the Red Sea and Persian Gulf ; but some were probably brought by the *Jewish* and Christian refugees, who migrated to Mysore, in the *third* and *fourth* centuries : and with whose settlement in India, commenced the cycle of sixty, which was formed on the model of the Chaldean *Saros*, and dates from A. D. 75.

The word *dinar*, to designate the value of a particular coin in circulation among the Hindus, came to be used in *Sanskrit*, from the period when the Roman coinage was introduced into India; and the occurrence of this term, whether in inscriptions on antique monuments, or in ancient Sanskrit works, will enable us to determine the comparative age of either. The principal silver coin of the *Roman Republic* was a *silver denarius* after the model of the *drachma*, a leading designation of the Greek coinage, and Arrian in his Periplus, mentions that *denarii*, both gold and silver were among the articles exported from Europe to *Barygaza* or Broach.* In the Sanskrit inscription, from the *Bauddha* mound of *Bhilsa* in Malwa, translated by Mr. Prinsep, (Journal B. A. S. Vol. VI. p. 455,) the son of *Amuka*, subject to the great emperor *Chandragupta*, presents to the five temples of the all respected *Sramanas* (*Bauddhas*,) a piece of ground and twenty-five *dinars*, as an offering from the supreme Raja *Chandragupta* : who is not the *Sandracottus* of the Greeks, but was one of the family mentioned in the *Vishnu Purana*, and who ruled over *Magadha*, about A. D. 427, calculating from the death of Alexander the Great, according to the periods assigned for the *Maurya*, the *Sanga*, the *Kanva*, and *Andhra* dynasties of Hindu sovereigns. The name *dinar* again occurs in the *Raja Taringini*, a history of Kashmir, which states Toromana, younger son of Pravarasena, † struck dinars in his own name

* See Arriani Periplus Maris Erythræio page 28, Vol. 1. Geographiæ veteris Scriptores Græci Minores.

† History of Kashmir in As. Res. Vol. XVI. p. 37.

while he was yet only *Yava Rajya* or associated successor in the empire. This prince was cotemporary with Siladytia I. of Gujerat, who lived about A.D. 270—80 ; * previous to whose reign the Sakas, or Indo-Scythian tribes, had spread their power and influence throughout Western India; and soon after founded the city *Valabhipura* in Gujerat, which gives name to a particular era commencing A.D. 319. According to the authority of the *Raja Taringini*, the ruler of *Ujain* in Malwa, about this time was *Sriman Harsha Vikramaditya*, the same as *Shapur* II. of Persia ; who appears to have possessed himself of Sejistan, and other parts of Indo-Scythia ; while part of Western India bore him allegiance under the authority of his satraps. Gibbon,† on the authority of Theodoret, states that the united forces of Persia and India were present while this Shapur besieged Nisbis A.D. 337, during the reign of Constantius ; and that the King was obliged to relinquish the siege, and march for the banks of the Oxus as the Scythian tribes, in the neighbourhood of Kabul, had invaded the northern part of his kingdom. This *Shriman Harshu Vikramaditya* of Kashmir history, who destroyed the *Sakas*, is no other than Shapur II. who, on the authority of Assemanus, instituted a persecution against the *Manicheans* and *Christians* throughout his dominions. Some of the *Mithraic coins* and the *fresco painting* in a niche of the second idol of the caves of Bamian, belong to this period. But with these preliminary historical remarks, on the subject of coins, I proceed to illustrate those met with in our cabinet.

Bactrian Greek Coins.

We only possess three coins of this series ; two of which belong to *Menander*, and the other to *Apollodotus*. Eleven various coins of this class were presented to the Society, by Sir Alexander Burnes, during the

* This date is inferred from the copper plate grants of land, written in the cave character of the Sanskrit language, and obtained from Gujerat : which will be found in page 477, Vol. IV. for 1835, of the Bengal Asiatic Society, and Vol. VII. of the same work, page 966. The latter is plainly dated 365 Samvat or Vikramditya era A. D. 309, but Mr. Walthen, who translated the former, mistook the date of it for 9 of the Valabhi era ; whereas it is dated, agreeably to the custom of the Balhara emperors of India, in the 32nd year of the king's individual reign, or Sridhara Sena, who was the predecessor of Siladitya I.

† Gibbon's Roman History. Vol. III. p. 133. In addition to Gibbon's authority the Dissertatio de Syris Nestorianis, in part secunda Bibliothecæ Orientalis, page lv. may be consulted.

year 1832, but were subsequently sent to him in England, previous to the publication of his work, and have been since deposited, I suppose, among the archives of the British Museum. Without disturbing the chronological data, on which late numismatists have affiliated the reign of *Menander* with the period of the *Scythian invasion*, B. C. 126, by which the Greek kingdom of Bactria was overturned, I may briefly notice, that both this king and his successor, *Apollodotus*, prior to the discovery of their coins with bi-lingual inscriptions, were placed between *Euthydemus* and *Eukratides*, or B. C. 220, to 181. The devices of the *mummy* and feather, emblems of the Egyptian god Pthah, or the *Opifex Mundi*, found in conjunction with bi-lingual inscriptions, on the coins of Menander, like to those on the coins of the *Parthian kings, Phraates* IV. and *Vologeses* I., but not in use before the time of *Eukratides* and the subsequent Roman connexion with the Parthians, must have been adopted when the intercourse between Egypt and India had become familiar. The occurrence of these devices, and of *Coptic inscriptions too*, on some of the *Mithraic coins*, which date subsequent to the Christian era, seem to confirm the accuracy of those chronologists, who place *Menander* and *Apollodotus* low down in the Bactrian scale.

MENANDER.

1. Square silver coin, middle size, head with helmet to the right; on the obverse, with a Greek inscription, round the edge ΒΑΣΙΛΕΩΣ ΣΩΤΗΡ'Σ ΜΕΝΑΝΛΡ°Υ. On the reverse, an owl, the Athenian emblem for Minerva, with an inscription round the edge in Bactrian Pali PƐƐWP٦ጋሃ٦ᒪᴗ or Maharaja Rattasa Minanasa.

2. Square, copper; middle size head helmeted, to the right; inscription in Greek ΒΑΣΙΛΕΩΣ ΣΑΤΗΡ°Σ ΜΕΝΑΝΔΡ°Υ. Reverse, Medusa's head, the emblem of Minerva, with inscription, in Bactrian Pali PƐƐWP٦ጋ٦Pሃ٦ᒪᴗ or *Maharajasa Rattasa Minanasa.* The first of Menander's titles, *Maharaja* is the equivalent of the same in Greek; but the second, which has been considered a translation of *Soteros* has been variously read by Prinsep and Professor Lassen. Mr. Prinsep, after discovering the true nature of this Bactrian Pali, read the second epithet *Ladatasa* or *Nandatasa ;* but Lassen conjectured the reading to be *Tadarasa*, the Prakrit translation of preserver. Neither of their readings have been deemed satisfactory, and I doubt its being meant as a translation for *Soteros*, but is on the contrary the Pra-

krit corruption for *Aratta*, or *Arhata*, signifying the venerated. It is not a little singular, Plutarch mentions *Menander*, was so beloved by his subjects that, on his death, different cities contended for his ashes, and adjusted their disputes by dividing his relics amongst them, while a similar story, which is told of *Gautama* or *Sakya Sinha*, is current among his Bauddha followers. Professor Wilson, in his appendix to the History of Kashmir, observes that, in the *Mahabharat Kerna Parva*, the *Arattas* had for their chief city *Sakala* or *Sagala*; the same which was known to the Greeks by the name of *Enthydemia*. In the Parthian mansions of *Isiodorus Characenus* it is said to belong to the *Sacæ* or *Scythians*; and under the name of *Sagala* it occurs in one of the western cave inscriptions. The *Arattas*, under the corrupted Prakrit name of *Rattas*, are mentioned in Mr. Walter Elliot's Hindu inscriptions, as having been subdued by *Teila Chalukya*, in Saka 895, or A. D. 919. Their country was called *Kankara*; which *Masudi*, in A. D. 915, describes as extending along the Indus, and sea coast of India, from the country of *Khozar* in the neighbourhood of the Caspian.

Apollodotus.

3. Round copper figure of Apollo, looking to the right, and supporting by his left hand his arrow. Inscription in Greek ΒΑΣΙΛΕΩΣ ΣΩΤΗΡ°Σ ΑΓ°ΑΛ°Δ°Τ°Υ Rev: Tripod, with inscription in Bactrian Pali, more perfect than that on the coins published by Mr. Prinsep and Professor Wilson. It may be read 𑀫𑀳𑀭𑀸𑀚𑀲 𑀬𑀤𑀢𑀲 𑀅𑀧𑀮𑀤𑀢𑀲 or Maharajasa Yadatasa Apaladatasa. A similar coin will be found figured in Wilson's Plate IV. fig. 16, with the Pali inscription very indistinct. In our coin the second epithet for ΣΩΤΗΡ°Σ is doubtless *Yadatasa*, and cannot be a translation of the Greek term, but is meant to designate a tribe, as in the former coins of *Menander*. I am disposed to conjecture that it is meant to designate the *Yadavas*; the tribe from which Krishna sprung, which was a northern one. The coincidence between the legend of *Krishna* slaying the serpent *Kaliya*, in the sacred river *Yamuna*, and that of the *Pythian Apollo* killing the snake at Delphi, must be more than casual; and, as *Krishna's appellations* of *Govinda*, and *Kesava*, in *Sanskrit*, are direct translations of Apollo's titles, in *Greek*, viz. Nomios νομιος (the herding) and ευχαίτης Eukhaites, (well haired), there are strong reasons for presuming that the legends of the *Hindu Krishna* have been borrowed from those of the *Grecian Apollo*.

Across the field of this coin, written in Bactrian Pali, we meet with the syllable *Kra*; which, written in Greek, occurs on the coins of the Bactrian princes, *Enthydemus* and his son *Demetrius*. This appellation for the *Sun*, is sometimes written *Kraka*, as on the coins of the Parthian king *Vologesis* I., who lived A. D. 52; and seems of similar import as *Grag* in Armenian; which Mr. Newman, in his translation of his History of Vartan, page 81, says was commonly used by the Armenians to designate the *holy fire*, which the Parsees name, in *Zend*, *Azeran*. A curious passage, in *Arrian's* Parthics, says that *Spartembus*, a friend of the conqueror *Bacchus*, dying, left his kingdom to his son *Budyas*, who after a reign of 20 years, was succeeded by his son *Cradevas*. The resemblance of *Budyas* to *Buddha*, and the perfect Sanskrit termination *Deva*, are striking coincidences: and the very name of the deity *Kra Deva*, occurs in the inscription from Nasick, lithographed at the bottom of the present plate of coins. It reads *Sidham! Rajino Kshaparatasa Kshatrapasa napapanasa, dhipati dinak putrasa, upavedatasa, Kradevanya datumitrya daya dhama: navarka*, of which the *translation is—Be it accomplished. The compassionate gift of the sinless Satrap of King Shapur, son of the Supreme Lord, the day producer, follower of the minor Veda, to Kra Deva, the bestower of Mitra. The new sun, or year. The name of Kra Deva* again occurs in Inscription XIV. Plate XLIV. of my work on the Caves of Western India.

Mithraic Coins.

4. Middle size copper. Standing figure to the left, in cap, tunic, and boots, who holds a spear in his left hand, and is sacrificing over a fire altar. Inscription Greek, but of which, the usual BACAIЄVC BAEIAC ωN KANHPKI KOPANO part is only visible. R: Figure of a female to the right, clad in a long vest, and holding in her right hand a flower or branch, which is carried to the nose after the manner of the fire worshippers: to which practice, Job makes allusion, in Chap XXXI. v. 26—28.

"If I beheld the sun when it shined, or the moon walking *in* brightness;

"And my heart hath been secretly enticed, or my mouth had kissed my hand;

"This also *were* an iniquity *to be punished by* the judge, for I should have denied the God *that is* above."

Halo round her head, and inscription on the edge, in Greek NANAIA, the appellation for the Persian Diana, or *Nanæa* of the Maccabees, whose temple, at Elymeis, or Persepolis, was plundered by Antiochus Epiphanes. This goddess among the *Chaldæans*, *Syrians*, and *Phœnicians*, was the deified moon, and sometimes the morning star, named *Baal-at-Samin*, or the Queen of Heaven. She was the same as the *Mithra* of the Persians, the *Myllita* of the Assyrians, and the *Alitta* of the ancient Arabs.

5. Copper. Standing figure of a *Magus*, or priest of the fire-worshippers, who under this form usually represented the sun. Inscription in Greek letters; of which the first part APΔ is only legible, but is usually followed by the word OKPO, both combined signifying the excellent *Sun*, as APΔ, or APTA, according to Selden and Hesychius, means great or splendid, and OKPO is a Zend or Pali corruption for *Arka* the Sun, as rightly interpreted by Mr. Prinsep. Reverse, female figure to the left, sacrificing over a fire-altar; Nimbus round the head; Coptic inscription on the edge MAO, which is the Coptic word U&Y mother, and the same according to Plutarch as μουθ the goddess Math, the Egyptian *genetrix*, and the same as the Persian *Nanaia*.

6. Copper. Figure of a *Magus* looking to the left; part, of the Greek inscription *Ard Okro* on the edge. Reverse, figure looking to the left clad in a loose tunic. Inscription on the edge AΘPO, the Zend name for fire, and here the symbol for *Nanaia*; who, whether considered as the *Moon* or the planet *Venus*, was one of the seven fires, or planets, to which the Persians dedicated their fire temples.

7. Copper. Male figure riding on an elephant; inscription on the edge in Coptic Greek letters, ONAN OPO, meaning the good king, or an appellation for the sun; which is sometimes written PA ONAN OPO, signifying the sun, the good king. This inscription has been usually considered a Pali one, and read PAO NANO PAO, being interpreted *King of many kings*. It is true that *Nana* in the Pali language means *various*, and *manifold*;* but here it is the Coptic N&NE or N&NOY signifying good, applicable to PA or PH, the name of the sun: and that this interpretation is the correct one, seems evident from the fact of the reverse of this series of coins bearing a Coptic inscription ΦAPO *Pharo*, which has hitherto remained without explanation, but is nothing more than the Coptic defi-

* *See* Pali Grammar by the Rev. B. Clough; p. 73.

nite article Φ with the word APO for ΟΥΡΟ *the King*; or otherwise a name for the Egyptian god Horus, or a form of the sun. One of this series of coins, now in my possession, bears the following inscription ΕΛΙΗΡΟ, the word *El* being among the Cabalistic Jews intended to designate one of the numerous *intelligences* or divine orders of beings, formed to execute the commands of the first emanation from God, the primitive man or king of light; while ΙΗΡΟ, written on some of the coins ΟΗΡΚϵ, is only an appellation for Horus; who, after the Egyptian manner, is sitting on the reverse of this coin supported by an ornamented seat or lotus. On the reverse of No. 7 figure of a female, and imperfect inscription of ΑΡΔΟΚΡΟ.

8. Small, Copper; standing male figure, and inscription PAOKA. Reverse, standing figure looking to the left; rayed nimbus round the head; inscription on the edge MIAPO intended for *Mithro*, or the Persian name for Nanaia.

9. Silver, small size. Bust of a king looking to the left, and holding in his right hand a branch, as if worshipping the sun: inscription in Greek APPAT OPO OHPKI KOPANO, meaning *King of the Arratas Oerki of the tribe Karauna*. The *Karaunas*, or *Koranos*, were a Græco-Indo-Scythic tribe of robbers in the Punjaub, who are mentioned by Marco Polo.* Reverse, female and male figure, sacrificing in conjunction over a fire-altar, the former named in Greek letters NANA, and the other OKPO, being otherwise figures of the *moon* and *sun*, similar to the two colossal statues at Bamian, which were probably sculptured B. C. 337: as Clemens of Alexandria tells us, on the authority of Berosus the Chaldæan, that Artaxerxes, the son of Darius, and grandson of Ochus, set up statues of the Scythian Venus, at Ecbatana, and among the Persians and Bactrians, and pointed out that such should be worshipped.

10. Copper, small size. Figure of a saint, seated under a tree, like the wood hermits of old. Reverse, standing figure, whose head is surrounded by a nimbus; inscription in Coptic Greek letters NAN for EN&N, the good.

It has been admitted by those most competent to judge, that an intimate connection exists between the metaphysical systems of the Hindus and those of the Greeks; † and it is not less obvious, from the

* Travels of Marco Polo; p. 86.

† *See* Wilson's preface to Colebrooke's Translation of the Sankhya Karika, or Memorial Verses of the Sankhya Philosophy, p. IX.

testimony of the Bactrian, Parthian, and Indo-Scythian coinage, that regarding the mythology, and idolatry of the two countries, a system of *eclecticism*, on the subject of their gods, from the period when the Greeks who accompanied Alexander the Great into India, first discovered that the *Suraseni* worshipped deities similar in character to Bacchus and Hercules. Herodotus, the father of history,* tells us that the ancient Persians had neither statues, temples, nor altars; but worshipped the expanse of the firmament, under the name of *Jove*, (or the Hindu Indra,) adding thereto as deities, the sun, the moon, earth, fire, water and the winds; till in after times they copied the Assyrians and Arabians, by introducing among their deities *Mithra*, or the celestial Venus; and the same with *Nanaia* of our Mithraic coins, whose statues were originally set up by Artaxerxes, the grandson of Ochus. *In her physical character*, this goddess represented the natural fecundity of the earth; and in her *astral one*, the moon or the passive influence of the sun; and is hence called on the coins *Mao*, or the mother goddess. She is sometimes called in inscriptions *Myrionyma* or the many named; and when the government of Bactria and countries in the immediate neighbourhood of the Indus, passed from the power of the Greeks and Parthians, into the hands of the Indo-Scythian tribes, the latter appear to have adopted the worship of this goddess; whose name yet survives in Afghanistan, under that of *Bibi-Nani*, signifying in the Pali language, the *wise lady*. The last is an equivalent for *Prajna* or *deified nature*; known among the *Bauddhas* as *Dharma*, the type of inert matter, not yet evolved into various forms. This is at least her physical character connected with the metaphysical theories of generation; but in her celestial character, she is the Nanaia of the *Ard-okro coins*, the Chinese *Tienhow*, (the queen of heaven), named also Shing-moon, (the holy mother), or the passive principle and power of conception.

From the few coins and facts now before us we should not be warranted in tracing further the connection between the deities of the Greeks, Persians, and Indians; and a more comprehensive series of coins is requisite to develope the influence which the mythologies of these countries mutually exercised on each other, through an interchange of kindred subtilties.

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* Book I, para. CXXXI.

Art. IV.—*A Chemical and Microscopic Examination of the Rock Salt of the Punjaub.* By Herbert Giraud, M.D.

Until very recently, the only accounts we have had of the salt mountains of the Punjaub, have been of a geographical and physical character; the most accurately descriptive of which is that by Sir Alexander Burnes, in his travels into Bokhara (vol. I. p. 52.)

Attention however has been lately directed to the geological features of this interesting range of hills by Dr. Jameson's report of his Deputation by Government, to examine the effects of the great inundation of the Indus.* So far as regards the geographical and geological condition of the salt range, as it extends from Jalalpoor on the Hydaspes, to Maree on the Indus, this report is tolerably complete; but it may require a more extended comparison of the organic remains of the several rocks to determine how far the limestone which alternates with the red sandstones and red marls,—the sandstones and marls themselves, and the shelly limestone, are the equivalents respectively of the magnesian limestone, the new red sandstone, and the mauschelkalk of Europe.

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* "First report of Dr. Jameson of his Deputation by Government to examine the effects of the great Inundation of the Indus." Journal Asiatic Society, No. 135, 1843.

I cannot refer to this paper without directing attention to Dr. Jameson's account of the gypsum of Jalalpoor, which he conceived would be so important an article of importation into Bombay, and might be most advantageously used in the public buildings and for making ornamental works.—H. G.

Note by the Secretary.

A quantity of gypsum (*Pirre áplatne* de Paris) was imported into Bombay some years ago, from the Persian Gulf, where it is found abundantly, but I am not aware of the result of the experiments that were probably made with it. Judging from the specimens in the museum, it is not very pure, yet sufficiently so for most purposes for which it would be required in this country. Extensive rocks of earthy and granular sulphate of lime exist in the western parts of Marwar, and selenite occurs in various places in Kattiawar, also I found it at Dholgaum in the Rajpeepla country.

The following interesting description of Callabaugh is extracted from the introduction to Mr. Elphinstone's Cabool; —"Calla-baugh, where we left the plain, well deserves a minute description. The Indus is here compressed by mountains into a deep channel, only three hundred and fifty yards broad. The mountains on each side have an abrupt descent into the river, and a road is cut along their base, for upwards of two miles. It had been widened for us,

The salt from these mountains has never been in high repute for its purity, and is unfit for the most culinary purposes; this has been attributed to the presence of magnesia, although chemical analysis has never been had recourse to, to point out the nature of its foreign ingredients. There are, however, many features in its general character and appearance, as well as many points of relationship with rock salt from other parts of the world, and with the salt of the ocean that seemed to promise to invest with interest its microscopic and chemical examination. A large quantity of it has lately been imported into Bombay, and from this Dr. Malcolmson kindly favoured me with some well selected specimens.

As it is usually met with here, the salt is in large amorphous masses, varying in colour from white and pink to brick-red; with here and there the colouring material aggregated into extremely thin laminæ and filling minute vesicular cavities. In a moist atmosphere it is extremely deliquescent, owing to the presence of chloride of calcium; and, as it dissolves, the colouring matter is separated, and deposited in the solution. This colouring material is common, in variable quantity, to rock

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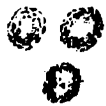
but was still so narrow, and the rock over it so steep, that no camel with a bulky load could pass; to obviate this inconvenience, twenty-eight boats had been prepared, to convey our largest packages up the river. The first part of this pass is actually overhung by the town of Calla-baugh, which is built in a singular manner upon the face of the hill, every street rising above its neighbour, and, I imagine, only accessible by means of the flat roof of the houses below it; as we passed beneath, we perceived windows and balconies at a great height, crowded with women and children. The road beyond was cut out of solid salt, at the foot of cliffs of that mineral, in some places more than one hundred feet high above the river. The salt is hard, clear, and almost pure. It would be like chrystal, were it not in some parts streaked and tinged with red. In some places, salt springs issue from the foot of the rock, and leave the ground covered with a crust of the most brilliant whiteness. All the earth, particularly near the town, is almost blood red, and this, with the strange and beautiful spectacle of the salt rocks, and the Indus flowing in a deep and clear stream through lofty mountains, past this extraordinary town, presented such a scene of wonders, as is seldom to be witnessed. Our camp was pitched beyond the pass, in the mouth of a narrow valley and in the dry bed of a torrent. Near it were piles of salt in large blocks (like stones at a quarry,) lying ready for exportation either to India or Chorassan. It would have taken a week to satisfy us with the sight of Calla-baugh; but it threatened to rain, and had the torrent filled, while we were there, our whole camp must have been swept into the Indus."—Page 58-60, 2nd Ed.

1.

2.

3.

4.



5.

6.

7.

H. Gerrach del.

salt from almost every locality, and has been too hastily referred by Chemists and Geologists to the presence of peroxide of iron; although it is known that other foreign ingredients have in many instances been found imbedded in rock salt, such as silica, carbonate and sulphurat of iron, which occur in the salt of Zipaguira in Tropical America. Sulphurets of lead and zinc in that of Halle in the Tyrol; while *organic matters* such as lignites, fruits, and minute shells, have been found in the salt of Williczka in Poland.*

Since the astonishing discoveries of Ehrenberg, which have not only displayed the internal organization of the myriads of living infusoria, but have also brought to light the fossil remains of generations upon generations of the animalculæ of early geological epochs, microscopic examinations of the aqueous rocks, particularly of those of the limestone family, have disclosed such vast quantities of organic remains in positions in which the presence of organic matter was least anticipated, that the history of no rock or compound mineral can be considered complete, until it has passed under a strict microscopic examination. To this I submitted the red colouring matter of the salt, and found it to consist altogether of organic remains.† Amongst a confused assemblage of matter, either too minute in its particles, or too broken up into irregular forms to distinguish anything like the traces of organization, there appeared many bodies which were evidently the remains of infusoria. That marked 1 in the accompanying drawing appears to correspond with the genus "Synedra" of Ehrenberg;—it measures $\frac{1}{259}$ inch in length and $\frac{1}{0003}$ inch in breadth. No. 2 resembles, if it is not identical with the "Gaillonella ferruginea" (Ehrenberg) the animalculæ which constitutes the colouring matter of the iron ochre, and is therefore invested with peculiar interest as appearing in the colouring matter of this salt. Each of the moniliform segments of which it is composed, measures $\frac{1}{1000}$ inch in diameter. No. 3 appears to be related to the last, and should probably be referred to the same genus. No. 4 is abundant in the salt; it has none of the characters of fossil infusoria, but may possibly be the scale of some small fish. It is so perfectly

* Traité elementaire de Mineralogie. Par F. S. Bendant, Tom. 2nd, Paris, 1832.

† The microscope I use is one of Chevalier's acromatics; power four hundred linear.

transparent, that the concentric lines on its surface are only discovered by causing the light from the reflector of the microscope to pass obliquely through it.

The vegetable remains consist of extremely minute filiform bodies having the characters of confervæ, and consisting of simple elongated cells, attached end to end to each other. (No. 4.) There are also amongst these, minute orbicular bodies which appear to be the spores of these confervæ. (No. 5.) The matrix, in which these distinctly organic remains are contained, is an aggregation of particles too minute and indefinite in form for their nature to be determined; it is probable that a great proportion of them are the ova of the infusoria.

These microscopic examinations were conducted with the greatest care, as it was conceived that further light might be thrown upon a recent discovery by M. Payen* of the existence of myriads of minute crustaceæ in

* The red colour is observed in the saline water of some springs, as in the evaporating vats of Salumba in Upper India, described by Mr. Gubbins, of the Bengal Civil Service, in the 7th volume of the Journal of the Asiatic Society of Bengal, page 363. The following extract is from a memorandum on the Maldiva Islands by Captain Moresby, I. N., read to the Bombay Geographical Society on the 3rd November 1836; but which does not appear in the proceedings. It throws much light on the cause of the rock salt of very distant regions having the same peculiar red colour.

"In the Milla-doo Madou Atoll are several islands (10 or 12) which have lagoons in them, which the dry land and trees completely surround; in some of these lagoons the water in them is brackish; they are not deep (from 2 to 6 feet); the bottom soft mud and very offensive in smell. No live coral grows in these lagoons; and shells are produced here, which are not found in the sea. In some of the lagoons at very high tides and strong breezes, the sea sometimes finds its way into them and again fills with water what was fast drying up.

"At Markandoo Island, which is on the centre and east side of the Atoll, there is a lagoon exactly in the centre of the island, which has no connection with the sea, nor ever had, the natives say; it is about one and a half feet deep, the water of a *deep red colour*, perhaps from decayed vegetable matter; it is brackish *and abounds in small shrimps;* and what is extraordinary, its margin is covered with mangrove trees, which are seldom or never found on any of the other islands. This lagoon, the natives say, is kept full by the rain, and that it never gets dry."

The red colour of the water no doubt arises from the shrimps or the animalculæ on which they feed, and not on the vegetable matter, to which is to be ascribed the offensive smell of the mud caused by the decomposition of the sulphates in the brackish water.—Ed.

the waters of tropical seas and of certain salt lakes, and which have been found to be the cause of the red colour of the salt, which may be obtained by evaporation from these sources. These crustaceæ have been referred by M. Andoin to the order Branchiopoda.

In the salt, however, I have in vain attempted to discover a single articulation of these creatures.

Chemical Analysis.

One thousand grains of the dried salt with boiling distilled water afforded a clear solution, and a red pulverulent residue.

I. The qualitative examination of the solution indicated the presence of the following salts : —

Chloride of Sodium.
Do. of Calcium.
Sulphate of Magnesia.

It remained unaffected by the action of hydrosulphuric acid. Neither bichloride of platinum nor tartaric acid, (the tests still adhered to by Chemists for determining the presence of potassa,) gave the least indications. The proportion of lime was determined by means of oxalate of ammonia—the preciptated oxalate of lime being converted by ignition into carbonate, from which the proportion of lime, and hence of chloride of calcium, was calculated.

It is always difficult to separate magnesia from the other bases with which it may exist in combination. Most Chemists calculate its proportion from precipitates afforded either by carbonate of potash or by phosphate of soda with free ammonia ; both these processes however are beset with sources of inaccuracy ; for, by the first, the neutral carbonate of magnesia precipitated by neutral carbonate of potassa, is decomposed by the action of water in such a manner as to give rise to bicarbonate of magnesia which is soluble in water, and even though the magnesian solution may be boiled with an excess of carbonate of potassa, yet a portion of magnesia will still remain in solution. The precipitate also of phosphate of ammonia and magnesia is liable to the same inconvenience, particularly as repeated washings are necessary before it is converted by ignition into the neutral phosphate of magnesia. Instead, therefore, of either of these

methods I made use of caustic potassa, by which magnesia is precipitated even better than by carbonate of potassa, and in hot water is so sparingly soluble that the loss is too insignificant to be of any importance.

2. In examining the composition of the *red insoluble residue*, I found it to remain quite unaltered under the action of boiling nitric and hydrochloric acids, proving that it could not be an oxide of iron; conceiving it, therefore, to be a silicate of some base, I fused it with carbonate potassa, and then by submitting the fused mass to the action of hydrochloric acid, it gave abundant indication of the presence of iron.

Hence the chemical condition of this mineralized organic matter is dentical with that of the iron ochre, and it is siliceous like Tripoli, both which are almost wholly composed of infusorial remains.

The following is the composition of 1000 grs. of the salt :—

Chloride of Sodium.....	966·11
Sulphate of Magnesia.....	17·93
Chloride of Calcium	14·36
Silicate of Iron	1·6
	1000.00

I find upon inquiry that this salt is much used as an aperient amongst the natives of Bombay, and it is probable that from the proportions of sulphate of magnesia, and chloride of calcium in its composition, its properties resemble those of many saline mineral waters : as those of Leamington in the new red sandstone district of Warwickshire.

V.—*Metrical Translation of the 1st Book (Sarga) of the Raghuvans'a, a Heroic Sanskrit Poem, by Kálidása.* By the Rev. J. Murray Mitchell.

Introductory Note.

A few preliminary observations will be of service in rendering the following translation from the Raghuvans'a interesting to English readers in general. The remarks now to be submitted will be of the most simple and elementary kind, embodying little or nothing that is new to Oriental

scholars, but probably not, on that account, the less useful to the class of readers for which they are intended.

We may conveniently divide Sanskrit literature into two parts, sacred and profane. It is by no means easy in all cases to draw the distinguishing line; but the two-fold division is nevertheless perfectly just. Generally speaking, the profane portion of Sanskrit literature, when estimated by the laws of criticism and taste, is far superior in merit to the part that is deemed more peculiarly sacred. The most indulgent criticism can scarcely discover any poetical merit in the Vedas and Puránas; while on the other hand the most fastidious taste must admit the beauty of many passages in the dramatic, heroic, and pastoral poetry of the Hindus.

Kálidása, the author of the Raghuvans'a, is one of the greatest, if not the very greatest, of the profane poets of India. His name is already familar to the literary public, having been introduced to notice by Sir W. Jones, in his elegant version of the drama S'akuntalá. In attempting to form an estimate of the merits of Kálidása, we encounter, in the very outset, a formidable diffculty, in endeavouring to ascertain whether or not there has been more than one poet of the name. It is about as certain as we can consider any event in Indian history to be, which is recorded merely in books, and not engraved on copper plates or the ever-during rock, that Kálidása flourished at the court of Vikramáditya. Yet it is nearly equally well ascertained that Kálidása flourished at the court of king Bhoja; and it is no easy matter to reconcile the two statements. Jones fixes his era in the century before Christ; Mr. Elphinstone inclines to the fifth century; Colebrooke and Professor Wilson say, at least 900 years ago.* Professor Wilson, in a later work than the one we have just quoted, fairly cuts the knot, by supposing that there were at least two poets, bearing the name of Kálidása. He appears to do so on the ground of the great diversity of style, between the writing generally ascribed to Kálidása and the Nalodaya. The writings of Kálidása are in general characterized, not only by exceeding elegance, but by perfect good taste; while the Nalodaya, in violation of all the canons of taste, is, as Colebrooke expresses it, "a series of puns on a pathetic subject." Without entering at length into this question, we shall merely remark, that if Kálidása had lived at the period when the Sanskrit language had attained the

* Wilson's translation of the Megadúta, p. vii.

highest stage of refinement, and just before its corruption began, he might possibly have been the author of the Nalodaya as well as the Raghuvans'a. Such a man, wielding at will the resources of the most perfect language ever known, was under a strong temptation to attempt, as in the Nalodaya, some of those wondrous feats in versification, from which the good taste of the West has not preserved European literature. Poets very frequently (to use the language of Wordsworth)

Have felt the weight of too much liberty,

and of their free choice they have circumscribed that liberty often by sufficiently odd expedients. Besides, it may be questioned, whether good taste is a uniform characteristic of the undoubted writings of Kálidása. Some instances might be pointed out of what are technically called *conceits*, even in his most elaborate works.

Assuming then the probability of there having been only one Kálidása, we must admire the greatness and variety of his powers. The commendations which have been heaped on the play of S'akuntalá, show, that in the estimation of the best critics, Kálidása is reckoned the prince of Hindú dramatic poets. Jones has styled him the Shakspeare of India. Two other dramas are attributed to his pen, and these are not unworthy of the author of S'akuntalá. In the Raghuvans'a we have a specimen of heroic, or what may be denominated epic poetry. We have also, the Kumára Sambhava (the birth of Kumára;) and the Meghadúta (the Cloud-messenger), beside the S'rúta Bodha, a treatise on prosody, and the disputed Nalodaya, all probably from his pen. Probably, the greatest effort of the genius of Kálidása is S'akuntalá. He excels more in tenderness than sublimity, and the plot of the drama of S'akuntalá affords full scope to the bent of his genius. When we speak of the epic poets of India, let it not be supposed that India can boast of epic poetry of the same kind as that of Europe. The rules of Aristotle would fall with crushing weight alike on Vyása, Válmika, and Kálidása. But apart from all factitious distinctions and laws, it must be confessed, that if sustained elevation of thought and feeling be deemed essential to an epic poet, Kálidása must forego the title. Very seldom does he give utterance to any very lofty sentiment; seldom does he himself kindle, or cause the minds of his readers to kindle. His merits, however, are still considerable. We find in the Raghuvans'a, exact and elaborately minute descriptions of natural scenery, proving that Kálidása had attentively studied nature, and studied her with a poet's

eye. Tenderness has been already mentioned as one of his excellencies. His comparisons, similes, allusions, and figures of all kinds, are most abundant; they are always at the least pretty, and sometimes beautiful. In regard to language, Kálidása ranks exceedingly high in the estimation, both of his own countrymen and European scholars. On this point, it would be somewhat presumptuous for one, whose acquaintance with Sanskrit is of no long standing, to express any very decided opinion of his own. One thing, however, is evident to the merest beginner. The style of Kálidása is elaborate and refined in the highest degree; the consummate skill of the artist is visible throughout; the polish indeed is sometimes excessive.

A good deal has already been accomplished towards introducing the writings of Kálidása to the notice of the European public. The drama of S'akuntalá has been rendered into English prose, by the masterly hand of Jones. Another drama, Vikrama and Urvasí, has been translated by Professor Wilson, in his well known and esteemed work, the Hindú Theatre. A beautiful little poem, the Meghadúta, or Cloud-messenger, has been rendered into English rhyme by Professor Wilson. The Kumára Sambhava and the Raghuvans'a have been translated into Latin prose by a German scholar, Adolphus Frederic Stenzler. The latter two works have been published along with their Latin versions, by the Oriental Translation Committee. Reference will be made to the merits of some of these works by and by.

The Raghuvans'a, the first book of which is now offered in a metrical English version, consists of 19 books. The exploits of the race of Raghu form its subject. The line of kings, whose history it contains, is a pretty long one, but the poet at pleasure compresses the narrative of a reign into a few stanzas, or extends it to several cantos. Eight entire cantos are occupied with the history of Ráma, the son of Das'arath. In this part of his work, Kálidása comes into competition with the author of the great mythological poem the Rámáyana. He will not suffer by the comparison. Schlegel and other German writers of high name have been profuse in their commendations of the Rámáyana, but most men will be disposed to side with Colebrooke on this question. Colebrooke does not consider the Rámáyana to possess poetical merit of a high order, but includes it with the sacred poems in general, which he characterizes as "flat, diffuse, and no less deficient in ornament, than abundant in repetitions." From this

censure he excepts, and justly, the chief profane poems. No part of the Raghuvans'a, so far as I know, can be pronounced "flat" or "deficient in ornament." On the contrary, over-refinement, and a far too lavish use of poetical diction and imagery, generally characterize it.

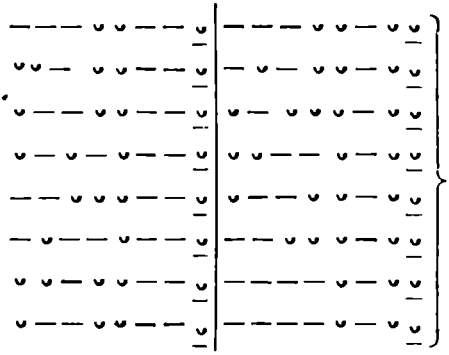
Into the moral character of the Raghuvans'a I shall scarcely enter. With the exception of the last canto, it is less faulty than might have been expected of the production of a Hindú poet. The last canto, however, is exceedingly objectionable.

As a translation of the Raghuvans'a into Latin prose, has already been given to the world, it may be asked, what need there is of offering a new version of any part of it. Probably, had the Latin version in question, been executed with any considerable degree of spirit and elegance, the following translation of the first canto would not have been thought of. But apart from its total want of elegance, the fact that Stenzler's Latin version is in prose, is a strong objection to it. With the exception of the very highest poetry, as for example that of the Sacred Scriptures, where the sublime elevation, or the fervid devotion, of the sentiment does not require the aid of poetical measures to sustain it, there is perhaps no species of metrical composition in the world, that will bear translation into literal prose. What becomes of the fire of Pindar, or the *curiosa felicitas* of Horace? what of the majesty of Virgil, when those writers are presented to us in a prose translation? And what of the nameless and undefinable fascination of the music that breathes from the language of every true poet?

Assuming then, that a metrical translation is perferable to a prose one, ought it to be in ryhme or blank verse? Generally speaking it can be much more faithfully executed in the latter. Translations into rhyme generally abound with factitious, not to say spurious, ornaments. The chief objection to a blank verse translation is the difficulty of making it sufficiently musical. In all other respects it is much preferable to rhyme.

The stanza in which the first, fourth, tenth, twelfth, fifteenth and seventeenth cantos of the Raghuvans'a are composed, is called by Sanskrit Grammarians Anushtubh. It may be called the herioc stanza of Sanskrit poetry. It is far more frequently used than any other in their great poems, such as Manu, the Mahábhárata and Rámáyana, and the Puránas. It bears a resemblance to the measure which is called in the technical language of Latin grammarians, Iambic Tetrameter. An English reader

will understand its general construction, if he supposes two lines of the octo-syllabic measure so much used by Scott, thrown into one, with the rhymes omitted. In the Sanskrit poets, a shloka or stanza consists of four parts of equal length, two of which are written in one line. A shloka is in English terms a couplet, with a distinct pause in the middle of each line. The following marks will show the construction of the first four stanzas of the Raghuvans'a :—



The mark ⏑ denotes a short syllable.
Do. — a long syllable.

It will be seen from the above specimen that each line is kept rigidly to its prescribed *number of syllables*. Each half-line consists of 8; and therefore the entire shloka, of 32 syllables. In this respect the Sanskrit poets enjoy less liberty than the Latin and Greek, who in most metres can vary the number of syllables within a considerable range. But the Sanskrit poets enjoy very great liberty in regard to the *quantity* of the syllables they employ. The four first syllables in each half-line are long or short at pleasure. The last syllable of each line is also long or short.

On the whole, the best idea of the Anushtubh may be obtained from a specimen like the following :—

I sing a race from birth stainless; successful in each bold emprize;
To ocean's bounds they were victors; and borne on cars to heaven on high.
The sacred fire they kept duly; all watchful they in duty's hour;
Fell on the guilty due vengeance; no suppliant craved their grace in vain.

The reader who has been accustomed to the rhythm of English verse only, will feel a shock at the middle of each line, arising from the substi-

tution of a Spondee for an Iambus in the fourth foot. But the reader who is acquainted with classic metres will recollect the Scazon or Choliambus (limping Iambus), frequently used by Catallus,—as *e. g.* in the well-known ode :—

Peninsularum, Sirmio, insŭlārŭmque.
Ocelle, quascunque in libentĭbus stagnis.
Marique vasto fert uterque Neptŭnus.
Quam te libenter quam que lætŭs ĭnvīso.

In these lines, at the sixth foot, we have the Spondee, and it has the same effect on an ear accustomed only to English metres, as in the Sanskrit metre under review.

In the following version of the first canto of the Raghuvans'a, the number of syllables which each line has in the original is exactly followed in the greater part of the translation. At the 35th stanza a syllable is omitted at the commencement, which changes the verse to Trochaic. The Trochaic measure is kept up to the 60th stanza.

The Spondee at the end of the first hemistich of each shloka has not been attempted. It does not accord with the genius of the English Iambic stanza.

Occasionally, the pause, for variety's sake, has been removed from the middle of the verse. I am not aware that this is ever done in the original.

Occasionally also elisions (as they are generally, though not very correctly, called), have been introduced. In the hands of one who skilfully wields the English measures, elisions tend greatly to the beauty, as well as the variety, of the verse,—as in the line of Milton,

O'er many a frozen, many a fiery Alp,—

in which there are no fewer than three such elisions. Indeed, justice cannot be done to our English metres without the occasional use of elisions. They have accordingly been sometimes employed in the following version :—

METRICAL TRANSLATION OF THE 1ST BOOK OF THE RAGHUVANS'A,

AN HEROIC SANSKRIT POEM; BY KA'LIDA'SA.

The pair like thought and speech * conjoined (that I may thought and speech obtain)
The world's great parents, I invoke,—Párvatí and the Lord supreme.
But what the sun-descended † race! the Poet's feeble genius what!
Ah! fondly, on a fragile raft, I tempt a wide and stormy sea;—
I can but prove a laughing-stock, aspiring thus to bard's renown,
As if a pigmy strained his arm to reach the high o'erhanging fruit.
Yet, since, by ancient bards prepared, a pathway to the theme leads on,
I pass, even as the thread may pierce the diamond-perforated gem.
I sing a race, unstained from birth, successful in each bold emprize,
Victorious even to Ocean's bounds, and borne on cars to heaven on high;
The sacred fire they duly kept; no suppliant craved their grace in vain;
Fit vengeance on the guilty fell; all watchful they in doubtful hour;
'Twas but to give, they gathered; still, their measured words to truth were given;
Victory they sought for glory's sake; for offspring the connubial tie.
Learning in childhood; next in youth, each wordly task and joy were theirs;
Hermits in age; from bodily chains freed by devotion's power at last.
Even such was Raghu's lofty line; even such the poet's mighty theme,—
For why? their storied high renown impels me to the fond attempt.
Then be it heard, heard by the wise, 'twixt good and bad discerning well,
Even as the quality of gold is tried in the refining fire.
Vaivasvat, of the Manus seventh,—high-honoured by the wise was he,
The mightiest far of earthly kings, like Om the mightiest word of power.
Pure was his race; purest of all, Dilíp beheld the light of day,
Who shone the first of kings, as shines the moon within the milky sea.
Broad-breasted, shoulders like a bull's, like Shála boughs his long arms reached;
As in its own peculiar seat, the Kshatri virtue in him dwelt.
With all-surpassing force endowed, with peerless splendour was he graced,
Towering o'er all on earth he strode, as Meru o'er the mountain towers.
Nor less his wisdom than his force, with aims that wisdom to beseem,
And bold his efforts as his aims, and like his efforts his success.
Stern and yet mild the monarch's mood, he stood before his subjects' eye,
Dreaded yet loved, like Ocean's depths at once with pearls and monsters filled.
And not one hair's breadth from the path, the path prescribed, of holiness,
His subjects swerved; his chariot tracks with vigilant eye they followed still.
'Twas for his people's good alone his royal revenues were ta'en,
As the sun drinks earth's moisture up to pour it back a thousand fold.
With care his martial force he kept; by twofold means his power preserved,

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* Literally *word* and *meaning*. † The well known *Súrya Vans'a*.

A mind much versed in holy books, and his good bow aye ready bent.
Secret of purpose, self-possessed,—his thoughts ye gathered doubtfully,
Till from the issue forth they shone, like quickening memories of the past.
Him, bold in danger's darkest hour, unwearied in each noble deed.
'Midst all his wealth no avarice swayed, nor pleasure 'mid his bliss enslaved.
Modest, though wise; though powerful, mild; liberal, yet careless of display;
Like a rich garland round him wreathed, his native virtues graced the king.
Unhurt by pleasure's deadly power, with large capacious mind endowed,
He saw his years steal on apace, yet vigorous was he as of old.
He trained, protected, nourished all; his people's father he in truth,—
Their natural parents gave them birth, all other duties he performed.
Chastising guilt for order's sake, for offspring seeking marriage ties,
His *labour* and *enjoyment* too became *religion*, righteousness.*
Earth's best he gave in sacrifice,—Heaven's best poured Indra back again,
And thus by mutual interchange, the two sustained the twofold world.
Unmatched the peace in other lands that flourished in his happy realm,
No robber's daring deed was known,—' twas heard of as an ancient tale.
Virtue he honoured in a foe, (like medicine by the sick man prized,)
Cast off the vicious tho' a friend, (even as ye would a poisoned limb.)
Such was he,—sure, combined in him were all the mighty elements,
For every faculty was bent on every side to scatter bliss.
Earth, girdled by its sandy shore and circled by its ocean fosse,
He swayed alone, and calmly swayed, as it had been a single town.
Sprung of the line of Magadha, Sudakshiná his royal spouse,†
(So from her gentle nature called) was sweet as holy gifts are sweet.
Many within his palace walls the lovely dames that owned him lord,
But Lakshmí ‡ and this fair alone his heart's devotion full received.
Much longed of Sudakshiná to see another self produced,
And still he wished, but vainly wished, for long delay had baulked his hope;
Until at last he went to prove the utmost power of holy rites,
The burden of his state-affairs resigning to his counsellors.
§ First the sacred rites they rendered, then the pious king and queen
Sought the sage Vas'ishta's dwelling, by desire of offspring led.
Seemed they, on the car ascending, (deep and pleasant was its sound,)
Like the lightning and Airávat‖ on the murky thunder-cloud.
Lest the holy sage be burdened, small the retinue they chose,

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* There seems a reference here to the Bráhmanical opinion of the four grand objects of human pursuit; *religion*, *power*, *enjoyment*, *final emancipation*. The king's pursuit of enjoyment was as good as the pursuit of religion.

† There is here a play on the words, a thing pretty frequent in this poem. "*Sudakshiná* was as *pleasing* as the *dakshiná*."

‡ Lakshmi seems here to mean the Goddess Lakshmi, the wife of Vishnu, the goddess of prosperity.

§ The measure in the translation here changes to Trochaic. It differs from the former by the omission simply of one syllable at the commencement. It is a livelier measure than the former. The measure in the original is the same as before.

‖ The elephant of India.

Yet their native port majestic looked a guard around them placed:
O'er them played the blissful breezes, breathing Shála odours round,
Fell the fragrant flow'r dust o'er them, danced the rows of forest trees:
Pleased they heard the peacocks' voices shrill resounding on the way,
Still, as rolled the sounding chariot, lifting up their heads to gaze:
Stedfast on the chariot looking pairs of antelopes they saw,
In whose large and glassy eyeballs mirrored they themselves appeared:
In a line the cranes were flying, gently murmuring, overhead,
Like an arch* enwreathed with garlands, baseless, hanging in the sky:
Softly swept the breezes with them, ominous of good success,
Nor was face nor raiment blemished by the dust the steeds upraised:
Sweet the fragrance of the lotas, sweet as their own breath was sweet,
Wafted from the lakelet's bosom, where the cooling ripples ran:
Offerings they received and blessings in the towns themselves had reared,
Where the sacrificial column showed the recent holy rite:
Each with present of fresh butter crowded the old herdsmen near,
Whom the royal pair would question of the forest trees around:—
Theirs was beauty, theirs was splendour, moving onwards clothed in white,
Like the moon with Chitrá† beaming in a pure and cloudless heaven:
This and that the gracious monarch, smiling, showed his loving spouse,
Nothing recked he of the journey long protracted though it was;
Till at last, with jaded horses, at the holy hermitage
Of the Rishi, in the evening, late arrived the royal pair.
From the forest depths returned and moving near the dazzling fire,
Holy hermits there were bringing wood and fruit and kus'a grass;
Round the entrance deer were couching, fed on rice with nicest care,
Seemed they like the Rishi's children, fearless crowding by the gate;
Here the sages' gentle daughters, watering quickly left the trees,
Lest they scare the timid warblers from the little water-pools:
Now the blaze of day was over,—and the ruminating deer,
Where the ground with rice was sprinked, lay at ease around the cell.
By the sacred offering's odour, and the smoke the breeze conveyed
From the holy fire there blazing they were purified anon;—
"Stop the car" exclaimed the monarch, and then, turning to his spouse,
Gently helped her in descending, then himself alighted down.
Lowly did the meek ascetics in obeisance faithful bend
To the monarch great and gracious and to her his partner dear:
When the evening rites were ended, they beheld the mighty sage,
With Arandhatí‡ there shining, like the Fire-god with his spouse:
Reverently the mighty monarch and his queen their feet did grasp,
While with accents kind and courteous greeted them the holy pair.
Soon each hospitable office banished all the journey's pain,
Then the sage the sage-like monarch questioned on his kingdom's weal;
He the all-victorious hero, graced with matchless eloquence,

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* तोरण The head of a gateway, perhaps whether arched or not.

† *Spica Virginis.* ‡ His Wife.

Fitly answered thus the question of the reverend awful sage :—
" * Since thou divine and human harm alike dost ward off skilfully,
" Success and all prosperity in every point my kingdom bless ;
" Resistless are thy sacred spells, they quell all enemies afar ;
" Superfluous lie my arrows by,—my darts that never missed the mark.
" Thou throw'st the offering in the fire, a sacrifice of solemn pomp,—
" 'Tis turned into a shower of grain, that banishes all want and fear :
" Safe and unharmed my people live the utmost term of human life,
" Thy holy merits are the cause, 'tis thou procur'st our happiness.
" O sage of heavenly lineage born, while thou remain'st my steady friend,
" Joy linked with joy must flow to me, and blessing heaped on blessing crown.
" Yet what is Earth to me with all its lovely isles, its precious gems,
" When never from thy daughter here a child—another self—has sprung
" The Manes of my fathers see the S'ráddha's offering must expire ;
" Scarce can they now partake, but turn in sorrow from the sacred cake.
" And all the holy water too, which I have poured, must cease to flow ;
" Foreseeing this, they drink it now all tepid by their woeful sighs.
" Thus purged in soul by holy rites, yet darkened by a failing line,
" Splendid yet wrapped in gloom am I, like Lokáloka† the far mount.
" The righteousness of holy deeds is blessedness in worlds to come,
" But double bliss ('tis here and there) springs from a spotless progeny.
" Thus thou behold'st me desolate, and mourn'st thou not, O holy man ?
" Fast by thy door a cherished plant is barren all and sapless found.
" This greatest, crushing, load of grief, O mighty sage, I cannot bear ;
" Like a bound elephant am I, vain-struggling the cool stream to reach ;
" And thou must point the path to rest, the mode deliverance to attain,
" Who still in all distress hast proved the saviour of Ikshwáku's line."
The Rishi heard the monarch's words, and wrapped in thought profound he stood,
With fixed eyes, a moment's space,—so in a pond might fishes sleep.
Through deepest meditation's force his fixed mind beheld the cause
Why failed the mighty monarch's line, and thus the sage addressed the king :—
" 'Twas once, when thou hadst been to pay thy worship to the King of Heaven,
" And back wert speeding, Surabhí‡ beneath the kalpavriksha§ stood.
" To her all worthy of regard thou paid'st not veneration due,
" For eager wert thou pressing home to join thy spouse so well beloved.
" 'Dost thou despise me'? she exclaimed ; ' be without offspring, till thou learn'

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* The measure in the translation is here Iambic again, and so to the end. In the original it never varies.

† Lokáloka is enlightened on one side, and dark on the other. The account given of it in the Vishnu Purána is as follows :

" Beyond the sea of fresh water is a region of twice its extent, where the land is of gold, and where no living beings reside. Thence extends the Lokáloka mountain, which is ten thousand Yojanas (80,000 miles) in breadth, and as many in height ; and beyond it, perpetual darkness invests the mountain all round ; which darkness is again encompassed by the shell of the egg."

Wilson's Vish. Pur. p. 202.

‡ Or Kámadhenu, the cow of plenty ; who gratifies all the wishes of her owner.

§ A tree that yields everything desired.

" ' My offspring to revere ;' even so lighted on thee her withering curse.
" Loud sporting were the elephants amid the Gangá's heavenly stream,
" And nor by thee, O king, the curse, nor by thy charioteer, was heard ;
" Yet 'tis for that impiety that all thy hopes have blasted been,—
" Pay worship wheresoe'er 'tis due, or bid adieu to happiness.
" To yield the offering needed for Varuna's lengthened sacrifice.
" Now deep she dwells in Pátála, whose doors fierce serpents strictly guard ;
" But monarch, to her offspring here pay with thy spouse the reverence meet ;
" If she shall but propitious prove, she too is Surabhí to thee."
Forth stepped the blameless Nandaní from out the wood while thus he spoke—
The cow whose milk the sage employed to offer holy sacrifice.
Brown was her hue, all beautiful, soft, polished, like the freshest spray ;
Gleamed on her forehead a white mark, as the new moon in twilight gleams.
Whene'er she to her young one turned, her warm milk streamed upon the ground.
As from a fount,—'twas holier far than water in the sacrifice.
The dust excited by her hoofs the body of the monarch touched,
And gave a purity as if the king had bathed in holiest spot.
Right joyfully the awful sage beheld the beautiful in form,
And thus addressed his royal guest no longer doomed to blighted hope.
" Know, monarch, thy deliverance comes, I see, I see it close at hand,
" Since thus at once, when called by name, bliss-giving Surabhí has come.
" Living on what the woodland yields, her must thou follow step by step.
" As students science' footsteps track, even so must thou propitiate her ;
" Move onwards, when she moves ; when'er she rests, rest thou beside her there ;
" Recline, when she is pleased to couch ; drink, whensoe'er thou see'st her drink.
" And to the border of the wood, let thy queen also follow her,
" With punctual care, at noon ; and so, still meet her in the even tide.
" Thus shalt thou yield her reverence meet, till she shall all propitious prove.
" Success attend thee ! Be thou first of all who bear a father's name."
" So be it." Humbly, with these words, the prudent monarch with his spouse
Like meek disciple bending low, received his holy master's word.
Then did the holy awful sage, when even's darkening hour arrived,
Dismiss the monarch to repose, whom brighter hopes were cheering now.
All boundless was that sage's power, yet lest the holy rite be marred,
Thoughtful, he but the simplest means prepared the monarch to receive.
He pointed out a hut of leaves ; soon entered it the king and queen :
And while the sage's pupils there in holy studies passed the night,—
Where kus'a grass bestrewed the floor, full sweetly slept the royal pair.*

* The last three lines correspond to two in the original, the last shloka of which is in a longer measure than the rest of the book. The addition of one or two longer stanzas at the end is frequent. It may be compared to the use of the Alexandrine in English metres.

VI.—*Botany of the Bombay Presidency.*

The following notice, by Sir H. J. Hooker, of the late Mr. Graham's Catalogue of Bombay Plants, extracted from the Journal of Botany for 1841, will interest such of the readers of this Journal as know that work, or who take an interest in Botany or in Agri-Horticultural improvement. Of no part of India is the Botany so little known, as of the Bombay territories; but it is hoped, that an improved and greatly extended catalogue will soon be published by a gentleman well qualified for the task, to whom much of the value of Mr. Graham's work is due.—Ed.

"*A Catalogue of the* Plants *growing in* Bombay and its vicinity, *spontaneous, cultivated, or introduced, as far as they have been ascertained.* By John Graham, Bombay, 1839."

"Besides the late John Graham, Esq., Deputy Post Master General of the Bombay Presidency, whose name stands as the author of this catalogue, Joseph Nimmo, Esq., of Bombay, has been long known as deeply interested in the Botany of Western India, and with both of them we have enjoyed correspondence. The MS. of this work in question was presented to the Agricultural and Horticultural Society of Bombay in 1838, accompanied by the following letter, addressed to James Little, Esq., Secretary to the Society.

"Sir,—I beg to present to our Society a list of the vegetable productions of the Bombay Presidency, and to signify my willingness to see it correctly through the press, should the Society deem it worthy of publication. It has been drawn up with great care, through the assistance of Mr. Nimmo, and not a single plant is put down which has not been seen and examined by one or other of us. I need hardly say that such a list is much wanted by all who pay any attention to the study of botany, and will save much time and trouble in consulting books and figures.

I am, &c. &c.

John Graham,

Member of the Agric. and Hortic. Society.

"The Committee of the Society promptly and liberally accepted the offer, and the printing of the catalogue had proceeded under Mr. Graham's superintendence, as far as the 200th page, when death terminated his labours. The remainder has been completed, the preface tells us, under the superintendence of Mr. Nimmo, who has been for many years

a zealous and successful labourer in the same field of science, and who has given the gratifying assurance, that he will continue to dedicate his time to the investigation of this hitherto neglected part of India, much of which still remains unexplored, and that he will print supplements to their catalogue from time to time, as additional species and additional information present themselves. Various have been the assistance and contributions received from different sources towards promoting the interests of this volume, but acknowledgements are more especially expressed to Mr. Law of the Civil Service, together with Drs. Lush, Gibson, Murray, and Heddle, of the Medical Establishment, with all of whom the author was in constant correspondence and from whom he received very important aid. With regard to Mr. Graham himself, we learn that he was a native of Dumfries-shire, and that he arrived in India in 1828, under the patronage of the late Sir John Malcolm, who was at that time Governor of the Bombay Presidency, and that he was honored with his friendship, and esteem, and resided in his family until he was nominated by him Deputy Post Master General, an appointment he held till the period of his death. He possessed a combination of qualities which peculiarly fitted him for that office. The performance of his arduous duties, indeed, left him little leisure for the prosecution of his favourite pursuit; but the few and brief opportunities which were afforded him, were eagerly seized and improved; and one of the objects he had most at heart, while Superintendent of the Society's Garden, shortly after its establishment, was to store it with an extensive assortment of rare wild, as well as useful Indian plants, chiefly collected by himself. He expired at Khandalla, the favourite scene of his botanical researches, on the 28th of May, 1839, at the age of 34, after only a few days illness. The intelligence of his decease was received at every station within the Presidency with an almost universal feeling of sorrow and regret, and his friends have testified their admiration of his character, and their grief for his death, by the errection of a handsome monument over his grave.

To Mr. Nimmo, this country, Britain, and the Glasgow Botanic Garden in particular, is indebted for the introduction of several rare and beautiful Indian plants, amongst them the singular *Impatiens Scapiflora* (W. and A.) in the *Botanical Magazine*, tab. 5387, the splendid *Habenaria Gigantea*, (Bot. Mag. tab. 3374) the *Habenaria Goodyeroides*, (Bot. Mag. tab. 3397) and many others.

The arrangement of the work under notice is that of De Condolle's *Prodromus*, and the number of species, including *Ferns*, is 1799, exclusive however of several new plants mentioned in the supplements, and some new genera. The book is much more than a catalogue ; there are tolerably copious synonyms, references to figures, remarks on the uses, properties, &c. and frequent poetical and classical allusions and characters of the new species. That such a publication in the Presidency itself will tend materially to promote the study of the Botany of the Western side of India, we cannot for a moment doubt ; nor that this stimulus will induce many, who have the inclination and the opportunity, to explore the great chain of the Ghauts, (which could not fail to yield an abundant harvest) and much interesting country to the north of Bombay, particularly Guzerat, Cutch, and the great sandy deserts bordering on the Sindy and on Moultan."

VII.—*Ehrenberg on the Formation of the Coral Islands and Coral Banks in the Red Sea.*—(Concluded from page 136.)

Historical Account.

The most ancient accounts of corals being masses of rock, refer to those of the Red Sea, and to the dangers said to be incurred near them on voyages from North Africa to India, which attracted the attention of nations in very remote ages. It is, nevertheless, surprising, that there are no particular accounts of these coral banks even at the present day. It is true Forkal's exertions have thrown some light upon the subject, still he has not given us a complete description of these phenomena. He merely sketched with a few happy strokes the general appearance and the extensive distribution of the corals,* whilst both before and after his time, the animals which form the corals have been treated of with little detail, and without order.

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* Descr. animal, p. xxix. Montes coralliferi aburbe. Tor usque ad Ghonfadam ripas muniunt submarinas densissime post hanc urbem versus meridiem rariores evadunt (an desinant plane nescio) ita nautae, quantumvis timidi et inexperti jam securis navigent velis nocturno quoque tempore. Suensia littora nesciunt Cotallia.

In Lord Valentia's map of the Red Sea and in other geographical and hydrographical papers, many coral reefs are marked ; thus some light is thrown upon their extent, but they require further illustration and should not be confounded with sand-banks. We had many opportunities of ascertaining, that they were often marked in wrong situations and in wrong directions; we found also that their forms were generally given incorrectly. It appears that those who have been there and have given us an account of their voyages, sailed by these cliffs and islands at high water without stopping to examine them, sketching the places pointed out to them by the Pilots without perfectly understanding them. As only a few havens have been accurately examined and are perfectly known, they cannot give a clear idea of the whole.* As the interest excited by the description of the coral islands in the Pacific is now so great, we feel assured that an account of those in the Red Sea will not be unacceptable.

The stay of Dr. Hemprich and myself on those coasts, enables us to give a more perfect description of these banks. We stayed there eighteen months, nine months in 1823 and the beginning of 1824, and the other nine in 1825. We spent nearly twelve months on board a vessel in that sea sailing almost through the whole of its extent ; we saw a great number of islands and coral banks, and touched at forty-eight different points on the coasts for the purpose of examining them accurately. We observed about 150 different islands and places on the coasts, situated in various degrees of latitude, besides those which we examined, stretching along the coast of Sinaitic Arabia, nearly 200 miles in length. We also made a collection of the different species of coral animals which we found on the coral banks, nearly the whole of which we presented to the Royal Museum; and which contains 110 different species, consequently nearly 3 times as many as those collected and described by Shaw, Forksâl, Savigny and Rûppell together. The knowledge of the formation of corals in the Red Sea, thus gained by labour attended with considerable danger, is, I trust, sufficiently accurate, to render the following a just account of the subject.

General description of the extent of Coral Banks in the Red Sea.

The Red Sea if compared with the Mediterranean, Baltic, and North Sea, and the Atlantic ocean with their coasts, appears to Europeans to

* The chart of this sea by the officers of the Indian Navy was not published when those observations were written.—*Edit.*

differ from them in having all its shores encircled with flat rocky banks, which just rise to the surface of the water, but are almost always covered with it. They are sometimes found at a great distance from land, and as they are not easily discernible even when very near, vessels are exposed to great danger from them. These banks are always wet, even when they rise above the surface of the water and become visible; the Arabs call them Shaebĕ, in the plural Shabeān to distinguish them from islands which they call Gesīre, in the pural Gesirāt. With the exception of Suez, Tor, and Yambo, there are very few havens in the Red Sea which allow even the Native craft to anchor near the shore, on account of the flat banks of rock which often stretch out a quarter to half a mile, and are covered with little water, or are quite dry at low ebb; it happens frequently that the crew cannot even go on shore in small boats owing to the shallowness of the water, but are obliged to leave the boats a great distance from land, making them fast to rocks and anchors, while they themselves wade a considerable distance through the water to reach the land. When we visited these shores the crew usually carried us, with our arms and luggage, on their backs, to the land and back for a mere trifle.

Besides this rocky beach which is evidently connected with the mainland, upon which there are occasional hills formed by the sand drifted from the shore, there are other flat rocks scattered at small distances in the sea; these being rather lower than the rocky beach, are covered with water, and between it and them there are channels containing one and sometimes two fathoms of water, formed by the waves which break over them; here small vessels may safely anchor. These rocks which rise from the bottom of the sea are covered with corals, they form indeed the coral banks of the Red Sea; they are sometimes found in one unbroken chain near the coasts, sometimes they run in parallel lines into the sea. In the most violent storms, vessels which are on the leeside of these coral banks may be considered out of danger, as they may be secured in various manners with iron hooks, chains, ropes and anchors. These reefs are sometimes very long, and vessels which are driven by violent winds and sometimes by currents so near them that the rudder and sails are rendered useless by the force of breakers, are inevitably lost, the rising surf throwing them against the rocks and thus dashing them to pieces. I shudder when I remember the danger to which I was personaally exposed when our ship was sailing from Suez to Jedda; we were driven in broad daylight on

one of these small reefs near Wush, notwithstanding the continued exertions of the crew ; three shocks which the vessel received by three waves carrying us over the bank, made us every moment expect certain destruction. Happily there was sufficient water on the reef to bear the vessel, so that the fourth wave carried us again into the deep water where we were kept in dreadful suspense for three hours, until it was ascertained that the vessel was merely shaken but not broken. Sheikh Imam Abdullah, a man with snow-white hair, who was on a pilgrimage to Mecca, received in solemn silence the blessings and the tears of gratitude of 50 persons who ascribed their deliverance to his presence.

These reefs are most numerous on the Arabian coast, half way down the Red Sea. From Tor in the Bay of Suez down to Camfuda in Arabia Felix, all we saw were of the same form; but this formation of coral banks becomes more rare both in the north part of the Red Sea from Tor to Suez, and in the south part from Camfuda to Mocha ; in the south we saw only one of this description a little north from Nakuhs. This the Arabs affirm to be the last ; they call it therefore Shaeb-el-Chassa. We could not ascertain for ourselves that there were, indeed, so few coral banks in the southern part of the Red Sea, but the seafaring men told us that they could sail day and night both from Suez to Tor and from Camfuda to Mocha, while no Arab vessel which keeps the coast in view, ventures to sail by night in the whole middle part from Tor to Camfuda. As sudden storms frequently rise, and there are but few secure places for casting anchor, broad daylight is required in order to put in to any port.

The depth of the middle part of the Red Sea is so great that an anchor cannot be cast there and this causes such tremendous waves to rise on a stormy day, that no vessel without a deck can resist them. I do not recollect to have seen such a rough sea and such high waves in any other sea with which I am personally acquainted, and which are the Mediterranean, the Adriatic, the North Sea, the Baltic and the Caspian Sea near Astrachan, although I have had many stormy days on the four first mentioned seas, and make full allowance for the small size of the vessels used by me on the Red Sea.

The highest waves I have ever seen, I found in the deep sea between Sherm-el-Sheik, the isle of Tiran and Ras Mohammed at the entrance of the bay of Akaba, where also according to seafaring men no bottom is found at a depth of 100 fathoms. We did not meet with such

high waves in the southern part of the Red Sea, although on my return from Abyssinia I had to endure a severe storm for three days.

I had also sufficient opportunity of ascertaining that there is no want of coral banks in those regions, for when we crossed the sea from the Arabian isle Camaram to Dhalac, we met with coral banks near every island and with several detached coral rocks, nearly the whole of which were covered with water, and consequently would be reckoned amongst the most dangerous in the Red Sea if they were situated in the track of vessels. I am, therefore, of opinion that the inconsiderable depth of the sea* and the want of high waves rather than the want of coral rocks are the causes, why seafaring men sail with greater security in Yemen. In this general description of the coral banks of the Red Sea, I cannot omit noticing that in the middle and deepest part of this large sheet of water from Djedda in Arabia to Cosseir in Africa, not a single coral bank is to be found. On my return from Yemen to Cosseir I was on board the large Egyptian brig El-Kandil, which, on account of its having a deck and being commanded by a Grecian Captain, sailed on the high sea out of sight of land. Contrary winds obliged us to tack for twelve days and nights, notwithstanding this, we did not meet with a single coral reef on this voyage, the captain steered the vessel towards evening in the direction of the Arabian coast, and during the night he sailed into the high sea in the direction of the African coast. The only rocks which we saw in the high sea was in the latitude of Cosseir itself; it was the isle Fennatir, consisting of two rocks; northward of this island more isles and rocks gradually make their appearance which allow the entrance of native vessels into the bay of Suez only at day-light. In a similar manner do the islands of Tiran and Barkan with other neighbouring coral reefs block up the entrance into the bay of Akaba; Fennatir however is no coral bank, but consists of two small rocks rising above the surface of the water.

If you look at the shores of the Arabian sea and compare with them the coral rocks and isles of the same, you will find that where the water is shallow, there coral banks and isles abound, but that not a single coral reef rises out of deep water. They are therefore in greater abundance in the neighbourhood of flat shores, or where it is apparent volcanoes have

* Don Juam de Castro in 1540 found the depth of the middle of this southern part only 10 to 11 fathoms. Hist. Gen. des Voyages I. 174; also Lord Valentia in 1804.

produced risings and fillings up of the bottom of the sea. The Arabian seamen of Tor told us expressly, that the bay of Suez, in the southern part of which there are many large coral banks at some distance from the shore, is nowhere very deep, as they have had occasion to ascertain by casting anchors, and more frequently by fishing with angles. According to their account, the greatest depth of the bay of Suez in the middle part, does not exceed 50 fathoms; it is often much less, only 20 to 12 fathoms; farther towards Suez it is only 10, and gradually near the city from 2 fathoms down to 1 fathom. South of Ras Mahammed a log line of 100 fathoms deep did not reach the bottom, and deeper measurements were not tried. The greatest depth in the large basin or bay of the Pharaoh's sea, Birket Firawn, which I myself have measured with a line of 50 fathoms, amounted to 45 fathoms. It is true, from the appearance of Naphtha near Gebel Setic (mountain of Olives) on the African coast, (I have seen such Naphtha in Tor and observed the rocks of Gebel Setic at a distance) which is in the same latitude as the numerous coral banks of the bay, the hot wells near Haman Firawn, and the warm wells near Tor, as also the mountainous region abounding with black rock, which Burkhardt says he saw near Ras Mahammed, but which we did not find, we have reason to conclude that there have been volcanoes, and may still be in the neighbourhood. It is probable that the reason of there being many more small islands and rocks scattered along the coast of Arabia than on that of Africa, is that the whole of the coast is of a more volcanic nature. That this is the case was an opinion entertained by Leopold Van Buch; and is mentioned at the end of his celebrated work on the Canary Islands, inferred from the works of former travellers, and which I had occasion to place beyond a doubt in a lecture which I delivered at Berlin in the year 1827, *On the character of the Libyan Desert*, by adding facts observed by myself to what was already known. It is true that the whole Arabian Peninsula presents evidence of former volcanic eruptions which may have produced it wholly, or altered its shape, while none of these signs have as yet been observed on the African coast from Cosseir down to Massava, although it has been frequently visited by travellers both by land and water. It is, therefore, probable, that the latter coast has fewer coral reefs, and what I saw in the neighbourhood of Cosseir, confirms this supposition. In the southern part of the Red Sea there is at the present time a focus of volcanic activity called Sebahn or Gebel Taer (mountain of

birds, mountain of the monastery). Many small coral reef islands are also found in the midst of the sea, the depth of which is not great. From the middle part of the Red Sea to Cosseir there being no volcanoes, the water is very deep and quite free from islands and coral banks. The coast near Suez has no coral reefs and is level.

On the formation and peculiar shape of the Coral Banks of the Red Sea.

All coral banks in the Red Sea have something characteristic. Their tops are flat and run parallel with the surface of the water. They never form indented cliffs above the level of the sea. Their tops lie from between ½ to 2 fathoms below the surface of the water, and at low water one or more small points appear which, with every fresh wind are covered by waves. These points are but small loose masses of rock of a darkish colour; they are never corals but always fragments of a very hard limestone with a slaty fracture. They often appear to be beacons planted there on purpose, and often may be used as such; but we had opportunity to ascertain that the greater part of them were no artificial beacon, there being numerous similar points close by. The greater part of all such coral reefs, of which a few stones only rise above the sea, is a few feet below the surface of the water. We never saw local elevations of the height of a couple of fathoms; we never met with any thing like raised mountains except they were islands containing no corals whatever. I never could find any fragments of coral on the surface of all the many flat and elevated islands visited by me, neither could I see any meadows or fields of dead but well preserved coral animals, as Forster, Vancouver and Peron found in the South Sea, and which the latter ventured to describe, not as a volcanic product but as the production of a receding sea.

The shape of the coral banks in the Red Sea is not circular with a lake in the middle, as it has been observed in the South Sea. The peculiarity of Australian reefs which was first noticed by Flinders, namely, that the part exposed to the high sea and the breakers is always higher than that to the leeward, cannot be applied to the coral reefs of the Red Sea. It is true the sides of all coral banks are irregularly indented; but we found them almost always in straight lines; we never saw one side of them very remarkably elevated, although in the Red Sea too there is a certain regu-

larity in the winds, and the north winds are decidedly the most prevalent there. We never saw the outer edge of the reefs elevated even when exclusively exposed to breakers and stormy waves ; on the contrary I have often found this outer edge sloping and gradually deepening. This is partly the case with the coral bank which forms the haven of Tor.

The characteristic form of the coral banks of the Red Sea is rather long, fringe-like, and tabular. Generally speaking these coral banks form the edge of the coast, but they are also found in numbers at a distance of several miles from the shore, rising out of the high sea ; still as many as we closely examined, seemed to run parallel with the coast, and thus appeared to be connected with it at their basis. I do not remember to have seen a single reef among the number of those examined by us which runs at a right angle with the coast ; it is true we met with some whose banks differed little in length and breadth, but also these sometimes show their affinity with those of a fringe-like form, as they are placed together in rows and form, one fringe often broken but still retaining on the whole the same character as the others.

The Arabian coral banks besides their being flat, long and running parallel with the coast, have this peculiarity, that the water is extremely deep on the side towards the open sea, so that the depth of the sea sometimes exceeds a hundred fathoms. The coral banks forming the immediate edge of the coast so as to be united with the shore, have of course but one fall towards the sea, which usually is very deep close to the edge. The rocks which rise from the open sea have on account of their long and narrow shape, properly speaking, only two declivities, one towards the coast, the other towards the open sea. The declivity of the broad flat coral reef is often gradually sloping. The sea towards the shore is generally not very deep, so that larger vessels avoid as much as possible to sail between the reefs and the shore. However, middle-sized vessels and small craft prefer sailing between the coral reefs, as the sea being less agitated permits them often for many miles to make the best of every favourable breeze, and in case a storm should arise, havens are close at hand. On the other hand, they lose also in speed as they have to follow the windings of the coast, and in case of a contrary wind they can make but little progress by tacking. The depth of the water on the outer edge of the reefs is, generally, the greater the more distant these are from the shore, and sometimes even close to it, the bottom cannot be fathomed.

During a stay of seven months at Tor, I became well acquainted with the fisherman Maallem Ansaree, (Master Ansaree,) a very respectable and experienced old man, who was afterwards created presbyter of the little place. He has an excellent fishing apparatus, and I induced him to measure the bottom of the sea a second time. At some of his experiments I myself was present in his boat. The flat top of the coral reef which forms the haven of Tor is longer than broad, and is covered in the winter at low water with four feet, and at high water with eight feet, but in summer at low water often with eight feet, and at high water with twelve feet of water. It is obvious that the bottom is formed by a rock running from the northern end of the Bay in a southerly direction, because on that spot near the fort a modern limestone (*Tertiary*) is found, which also forms the edge of the coral bank. The haven or the sea within the reef towards the land, has in its greatest depth eight to nine fathoms of water. The reef is about three times as long as wide, has a gradual and no rapid fall towards the land, but its declivity towards the sea is generally very abrupt, and at a short distance the water is 50 fathoms deep. The reef falls in an oblique direction towards the shore, but there is no ridge on the side towards the sea, but above down to the middle there is a flat tabular plain, and although on the side towards the sea the depth of the water increases rapidly, still its declivity is not perpendicular. Near the southern point of the reef there is a heap of loose stones and fragments of coral, which rises above the surface of the water and serves instead of an artificial beacon.

Of the influence of Geological relations upon Isles and Coral Banks of the Red Sea.

Wherever in modern times, a strict examination has been instituted, there it has been found, that the most intimate connection existed between the islands and the coral reefs, and this we found to be the case in the Red Sea. The whole of the coral reefs examined by ourselves, without one exception, owe their peculiar shape, not merely to the small petrifying animals which we call corals, but more particularly to the geological conditions of the coast and the bottom of the sea. We noticed everywhere, except where sand, corals and depth of water rendered all observation impossible, that the basis of all risings from the bottom of the sea, which, when islands were covered with sand, or when coral banks

with corals, consisted either of a volcanic product, or of a very hard, and sometimes a soft porous limestone, which was evidently formed from cemented fragments of small animals, but whose special ingredients it was impossible to determine. It was evident that these rocks had no direct connection with the shells and corals which lived upon them.

I describe first the islands of volcanic rock. We touched only at two islands which were evidently called into existence by volcanic activity, namely, at the Arabian island Ketumbul in the southern part of the Red Sea, between Camfuda and Gisan. The whole is one indented comic rock consisting of lava which is partly decayed, and appears to have formed the northern edge of a submarine crater which has long been extinguished. The other island we visited was the Abyssinian island Huakel, which is situated still more to the south and contains mountains. I examined them only on the north-west side ; they consisted of rock something like burnt jasper without lava or basalt. From both I have brought specimens of rock. Ketumbul rises about 300 feet, and Huakel 150, from the level of the sea. Both are encircled by corals which do not appear to participate in the peculiarities of these islands. From a distance we noticed the volcanic island Gebel Taer or Sebahn, which is a mountain of inconsiderable height (only about 150 feet) without any distinguishing mark. Its centre rises in a peak sloping gradually on the west and north side There are no other volcanic islands in the Red Sea, nearly the whole extent of which we have examined.

The more lofty islands were formed of a very white limestone or limetuff, which we found sometimes hard and sometimes porous ; or of a tertiary sandstone ; the former sometimes in strata as upon the islands Barkan and Sanafer in the north, and Cameran, Belhosse, Dhalac, Massava, and Farsan in the south of the Red Sea. Tiran, the largest of these islands, is situated at the entrance of the bay of Akaba, and consists of a singular and fantastic rock. The greatest mountain on the island is barren and very perpendicular towards the sea, rising about 800 feet. It contains a field of gypsum, covered with a coating of gypsum like Bergmehl,* which is found sometimes in very large masses, and sometimes in the form of a cracked and very soft crust, which gives no firm footing but crumbles into white powder. On the side towards the shore it is accessi-

* Mountain Meal.

ble and not very perpendicular. I managed to climb it as far as the middle, but on account of the rock being so soft I found it a difficult and rather dangerous task. The lower part of it is a conglomerate of sandstone, and on the east side there are very hard rocks of a tertiary compact limestone.

Respecting the numerous small and flat islands which scarcely appear above the surface of the sea, and which seem so very much like the coral banks, we found that many of those which we visited had a foundation of a very hard rock, which is almost constantly under water, while the upper parts of the islands were more or less elevated sand hills. We noticed this especially at Reman at the entrance of the bay of Akaba, at Samak north-west of Cumfuda, at Ras Kafil at the same place, at Ormuk and Badie between Loheie and Cameran, and at Sheik Said near Massava. On other islands these rocky places became visible and nearly dry at ebb tide. There is an almost innumerable multitude of similar islands on the Arabian Coast. Many of them we closely inspected: they vary so little in their nature from those we above described, that we did not think it worth the time, the trouble, and the danger always connected with it, to subject them to a particular examination.

I proceed to describe the shape of a few islands. It is for the most part roundish, and they rarely possess creeks; they generally extend in straight lines which meet at angles (forming tongues of land) or they have undulatory outlines, but others are longish; still we did not find the more elevated parts running in a paralellism with the coast, but, as is the case with the double island Hassani and Libbehn, they separate from the coast in right angles, while the submarine rocks which accompany the islands run in an opposite direction. The two groups of islands Farsan and Dhalac, appeared to me remarkable: they lie opposite each other and almost in the same latitude in the southern part of the Red Sea, but they are low and probably consist of a number of small islands round a larger, without the least vestige of volcanic rock. Again, there are three islands which have a semicircular or horse shoe-like shape, caused by deep inlets. Sanafer at the entrance of the bay of Akaba, and Badie not far from Cameran in the south, together with Havakel on the Abyssinian coast, appear to be the only ones which approach the shape of a ring. Perhaps the lava island Ketumbul may be counted among them, if a few small rocks which are in the neighbourhood are taken into the landscape. The

two last mentioned istands evidently contain volcanic rocks, and we therefore need not wonder at their kettle-like shape, which rather confirms the opinion that they have been formed by volcanoes ; but with regard to the islands of Sanafer and Badie, this shape alone certainly does not authorise us to infer that they owe their existence to similar causes. They do not contain the least trace of volcanic rock, although Badie on account of the small quantity of land, has a remarkable shape not very unlike that of a ring. I walked all over it, and saw in some places, at ebb tide, the flat limestone which is here so generally met with, but no other mineral ; the plain, which is raised and convex, is covered with drifts and fragments of the same decayed limestone. Sanafer has only one deep bay running from south to north, and the limestone rocks are more lofty and are divided into groups with gradual declivities, of decayed rock, without any other characteristic. If the number of circular islands in the Pacific were not greater, it is not likely that travellers would have been struck with the shape, and laid it down as a rule for the formation of islands and coral banks, and if their volcanic character were not evident, modern travellers would not have expressed themselves so decidedly in favour of it, as a different opinion was then generally prevailing.

The limestone of the flat and small islands which are often encircled by a comparatively very broad margin of submarine corals, differs not from that of the more lofty islands. It is often evidently nothing but cemented and hardened sand. The colour of this mineral under water, or a little above it, was generally ash-grey or blackish, but on all the somewhat higher islands, or even on those which were only a few feet above the surface of the water, the colour was brilliant, white and chalky. Sometimes horizontal stripes were seen in it, which seem to indicate a deposit from the water. I have deposited a specimen of this rock in the King of Prussia's Museum of Minerals. The larger islands Farsan, Dhalac, and Camaran,* consist entirely of this rock and a layer of drift sand, with a small quantity of mould. This rock loosened in flat slabs from rocky banks which are quite flooded only at high tide or from submarine coral reefs, which are never free from water, were covered with corals

* This description of Cameran is not very clear or accurate ; that island consists of a mass of recent shells of all sizes and of corals cemented into a hard rock, which rests on a red argillaceous limestone with small shells.—*Edit.*

but were by no means corals themselves. But these stones were often, even when of a thin flat shape, so hard that nothing could break them but continual and forcible blows of a hammer. But the rocks exposed to air and sun, though in their nature the same and connected with those described above, were generally very soft, or had retained their hardness only in a few places. The water has sometimes washed out these limestone rocks, so that they are perforated like a net and have very sharp corners, which together with the dark colour makes them look like lava-stones, though this is not the case. On fracture the white colour is seen, and the fine fragments of shells, &c. clearly show their real nature, but large petrifactions are very rarely found in them.

There is another characteristic connected with the formation of islands in the Red Sea, which is not without influence upon the formation of coral reefs. All islands which stood as firm rocks out of the sea, had no prominent coral banks on the sea side, but however different their geological character was, they were all perpendicular on the sea side, and on the land side there was a flat elevated piece of land annexed to it, around which corals formed a broad margin. This is the case with the island Tiran, which is formed of tertiary rock ; this is the case with the lava island Ketumbul ; this also is the case with the islands Barkan, Sanafer, Hassani and Belhosse, which are formed of " limetuff." The flat sandy pieces of land of the former islands run north-east in the direction of Arabia, but those of Belhosse run south-west in the direction of Africa. This seems to show that the sea, which is comparatively deep in the north-easterly direction, has completely washed away the upper part of the island, as far as the rock, which protects, as it were, the other flat part of the island to a certain distance. Such appearances should not be regarded as unimportant when the question is about the formation of coral reefs, as they show in a striking manner that their formation may vary considerably. With regard to the accumulation of sand, I could not help comparing these appendices of the Arabian islands with the sand fields attached to the Abyssinian rocks, which I have described in my pamphlet on the character of the African deserts. Just as in the Abyssinian deserts, the prevailing north wind causes the sand to accumulate in the southern part of the mountainous regions, so is the effect of the waves of the Red Sea, which cause the sand to accumulate behind the island, *i. e.* turned away from the prevailing breakers, as in the above case from the

direction of the prevailing wind. From this description it is clear that Geology has much to do with the formation of the flat islands, as well as of the coral banks of the Red Sea.

Of the influence of Coral Animals upon the Rocky Banks of the Red Sea.

Stone-forming coral animals cover the surface of all the rocks in the Red Sea, beginning at the middle part of the Bay of Suez, but are not found on the sands. The first impression of the traveller is, that these animals have built the whole of these rocks. In the first part of this work I have described the strikingly pleasing effect, which large fields of coral reefs have, when seen under favourable circumstances at low water and in a quiet sea ; how they appear like meadows covered with flowers, in the midst of which the bark is gliding along, without our knowing indeed which of these flowers to contemplate most, and of which to take a drawing and fix in colours, as the next often seems to be more brilliant than its neighbour ; and not rarely the most beautiful are beyond our reach, or, it is dangerous to get out, as the edges of the coral may break and you are precipitated into gaping clefts or at least seriously hurt. When disturbed, almost all of them are nothing but a brown, indented, leafed, or melon-like limetuff, the examination and contemplation of which is really tiresome, although the individual forms appear so wonderful.

Wherever we examined isolated coral reefs which were always covered with water, we found on their surface, which are flat, and have only holes and clefts here and there, but are upon the whole pretty even, trunks of coral animals and trees of branch corals all alive, mixed together like flowers in the field. Here also some forms always predominated, but never to the exclusion of the rest. In this sheet of coral there was nothing even similar to our heaths or pine forests. There were madrepora, heteropora millepora, astreæ, favia, caryophyllia, mæandrias, pocillapora, and stephanocora, &c., alike large and plentiful, intermixed usually, with giant-shells, pearl-shells, fungia, sea hedge-hogs, fishes and holothuria ; and upon those that were dead we found a large number of zoanthinia actinia, xenia, and halcyonia, with an immense quantity of annuláta and turbellaria. Round the foot of the coral trees there was often a white limestone sand.

Separate branches of corals were usually found so firmly adhering to

a hard rock or to other dead corals, that we required hammer and chisel to loosen them under the water ; often it was necessary to do this with all our might ; on all such excursions we wore bathing-dresses. But occasionally these branches of corals could also be moved and loosened without force, they were growing upon pieces of dead corals which were lying in the sand. I never found more than three generations growing one upon another. I have rarely found fragments of much decayed corals upon which were other fragments of corals which had grown after them and also decayed, and connected with these a third generation of an entirely different species in full vigour. None of these ever formed high masses, neither do they appear to have been adhering to any rock ; and this perhaps has been the reason that former generations have perished. I have never seen masses formed by the gradual growth of different generations one upon another reach weight, which might not be attained by a single branch of the same species without a foundation of any extraneous matter. But almost everywhere on knocking off branches of coral, I met with that limestone tuff which forms the bases and mountains of most of the islands, and is one of the general formations of the mountains on the earth. I have never observed in the Red Sea, masses of rock, which showed by entire coral branches imbedded in them in a perpendicular manner, that the sand washed by the sea between these coral branches had filled up their interstices, in consequence of which these coral branches remain unbroken, only covered with a cement, like petrified trunks of trees or like insects in amber. But yet if this process in nature, which is described to be so grand in the Pacific, is really true, I must have often seen it in the Red Sea.

Nor did I by any means find the outer edge of every coral reef, or the point which had to resist the whole force of the most furious surge, destitute of live corals, but just in these places this animal life was thriving in its most pleasing and grand form. But there were usually no corals to be found in the outer edge of rocky islands, rising perpendicular above the sea from a great depth, the rebounding surge being too furious ; whilst high waves generally flow over the coral reef and thus lose all retiring force.

There is no doubt that coral animals contribute to the growth of coral reefs also in the Red Sea ; but I am perfectly convinced that this is not done in masses and layers. This growth appears to be rather the

work of the individual animal and his family. The case of these corals is similar to that of dead plants and trees. The former do not actually increase the quantity of mould, nor the latter of decayed wood to the whole height of their bulk, so that new generations would grow upon the old ones. A few feet of mould indicate thousands of years and of extinguished generations: just so a few inconsiderable marks would show that hundreds of years had been required to increase the height of coral reefs. Besides, I am inclined to believe, that coral animals rather contribute to the protection and preservation of the islands than to their growth.

From accurate observation of individual coral animals, I have come to the conclusion, that every single coral branch is neither an individual animal whose life has a certain central point, nor a common dwelling for a number of animals whose age and decay could bring sudden destruction upon all. In both cases it would be possible that a coral branch should suddenly lose his common life and appear like a dead tree. This is contrary to what I have experienced, and consequently all that has been inferred from it is incorrect. The coral branch forms a whole, bound together by knots according to certain laws, whose parts are a great number of organic individual animals, which cannot separate themselves at will, but are connected together by parts not essential to their individual life. The blossoms of a tree are similar to a coral family in appearance, but in their nature there is a great and marked difference between the inseparate life of the individual blossoms on a tree, and the perfectly separate organic life of the flower-like animals in corals. Every individual animal blossoms in its perfect state, and in the event of a forcible separation can lose all the remaining parts of his family structure, and by the development of eggs and formation of knots become the author of a new structure. The stem of the plant is an essential part of the blossom, which, if severed from it, would fade and die, and on the other hand the blossoms are not essential parts of the stem, the life of which would not be destroyed in case of their being forcibly separated from it. But the life of coral animals is never destroyed when the stem is broken and separated, and the individual animals can continue to exist and propagate as was proved long ago by the excellent remarks of Cavolini, and as my observations of the anomalous forms wherever the coral branches were broken, have confirmed again and again. This is the reason why it is almost impossible to destroy live corals when under water, except when

they are loose and tossed about by the waves, which injure all the individual animals, either by grinding or violently knocking them against the sand; or except when they are by an extraordinary accident suddenly and completely covered with sand, or left dry by the retreating waters, or are boiled by volcanic heat. These observations and inferences render it probable, that the opinion so frequently entertained that coral animals die in whole generations, in order that other generations may grow upon their ruins, is not according to nature, and therefore I cannot adopt it.

Here I must not omit mentioning a few other things respecting the nature of the coral animals which are by no means unimportant. I noticed upon the coral reefs of the Red Sea immense blocks of living mæandra and fabia. I could not examine them as they were too large to be removed, and as I was several times unsuccessful in my endeavours to knock off a piece under water, although I exerted myself to the utmost and called in the assistance of the natives. I could easily believe, that Pharaoh might have seen them, that they were ancient monuments of thousands of years standing, and of generations still more remote; for many of them measured more than a fathom and some 1½ fathoms in diameter, which considering that they are nearly as round as a ball, will make them immensely large masses.*

* According to Monsieur de Blainville (Dict. des Sciences Naturelles Zoophytes p. 94) Forskal is said to have met with still larger coral blocks namely, of 25 cubic-feet, but this is an error. Monsieur de Blainville translates l'on en tire des blocs qui ont vingt-cinq pieds et qui ne coûtent cependant qu'une piastre, but Forskal says, page 131, Lapides 25 pedem (unum) cubicum aequantes et e littore transvecti (,) emuntur uno piastro reliq.

But it appears that Forster has seen the largest coral blocks. Adalb. de Chamisso mentions p. 187, blocks of coral often one fathom long and from three to four feet thick, but Forster speaks distinctly of coral branches upon Tortoise islands, which are dead, and have been raised by volcanoes above the surface of the water, measuring fifteen feet wide. Forster's travels p. 125. Perhaps Heteropora Palmata is somtimes so large. I do not recollect to have seen them larger than nine feet in diameter, and those were Daedalina. Madreporina were only from four to five in diameter. Shaw says that he has seen pyramidal Heteropora near Tor, from eight to ten feet high, but I believe that he was deceived by the depth of water: Voyage dans le Levant II. p. 86. These colossal forms of the Daedalina, which are the most interesting of the species remain frequently quite unnoticed, because it is impossible to get at them for the purpose of examination. I myself believe that I was obliged to leave unnoticed many particular species, perhaps genera, of them.

These coral banks, which are undoubtedly very ancient, frequently formed on the outer edge of the coral reefs the uppermost masses, and prove, as it appears to me, that in the whole time which was requisite for their growth, the coral reef had not risen higher, as no succeeding generation of its species has covered them. It is very probable that the original stock continues to live in gigantic *family mansions;* as I at least convinced myself, that in very considerable blocks the inner regularly built and deserted chambers of the more concave stars, as for instance the Astraea dipsacea, reach down as far as the middle of the basis, whilst more flat stars drive themselves between these at acute angles, and thus prove them to be of a later date. I noticed sometimes in such large blocks a few curious hollow places which may have been caused by injuries and the death of individual animals, but sometimes such hollow places were again covered by knots of the next animals and anew called to life.

I am convinced that only this individual aggrandizement of the coral stock, or this extension of family can be called growth of the coral reefs of the Red Sea. The loose structure of the branchy heteropora, madrepora, and millepora cause these species to be less regular, and at a certain height they become less productive, especially in the formation of cells, as old trees grow more slowly than young ones. Perhaps the remotest generations of the gigantic Heteropora (madrepora) palmata of the Indian Ocean may be found in a quiet colossal whole, which remained undisturbed for thousands of years.

Farther, in the nature of the coral animals there appears to be something very unfavourable to parasitic forms of their own class. The largest coral stems, however old they may be, are free from all parasites of their own species, although they are often bored and molested by balana and annulata, and sometimes also by bivalve shells. I do not recollect to have seen a single instance where a live coral in the midst of another living coral stem has developed itself; therefore in museums the largest and most beautiful specimens of mæandra, peteropora, pocillopora, &c. may be seen in their perfect state. This unfriendly nature of the coral animals is certainly not a small objection to the opinion, that accumulated generations of them form islands in the Indian Ocean, as nothing of the kind takes place in the Red Sea.

If I express in a few words the general impression, which the observation of the influence of the coral animals upon the formation of islands in the Red Sea has left upon my mind, it is this: that there is not a single

island in a state of growth, but that all are in a state of decay, and that consequently the corals do not promote the growth of the island, but serve only as borders and covers to the submarine rock. Thus it appears that the corals do only delay or hinder the total destruction of the islands by waves, but do not produce new ones. To this may be attributed the opinion that coral animals build as high as the surface of the water; for I think that the corals only prevent the islands which are sunk and in a state of decay below the water, from sinking still deeper.

Concerning the formation of the fossil coral strata which are sometimes of an immense size, it is not probable that they are the work of these animals, but merely an aggregation of masses which have decayed after the death of the animals; for nowhere does such a stratum appear to be a compact, well preserved, coral reef. They are thus formed: the waves wash fragments of coral from the reefs and accumulate them in deep basins until they form thick strata; volcanoes may have raised these strata here and there, as it sometimes happens with shell fragments, and as they have raised whole coral banks of evidently a single layer high above the sea, and this in good preservation, as described by Forster and Vancouver.

Historical sketch connected with the growth of Coral Reefs in the Red Sea.

As mention is often made of the growth of coral reefs, and in the Indian Ocean, whole Archipelagos and thousands of coral reefs are believed to be built by coral animals, and finished by winds and waves, so also it is true that navigators and the inhabitants of sea ports of the Red Sea, talk of coral reefs growing and havens and straits becoming narrower. My experience respecting this matter is as follows. In Tor, where the south end of the coral reefs which forms the haven, was marked by a small heap of stones, I was assured by the old navigator Maallen Ansari, as well as by the oldest man in the small Greek colony, who soon after died, that during their life time, of which the latter, who was about 60 years of age, remembered full 50 years, that neither had the signal altered nor the coral reef grown higher, nor had any family tradition to this effect been handed down. I have also turned over the oldest accounts of sea-faring men respecting this very simple port, and found that a description of it given by the Portuguese Don Juan de Castro in the year 1541, coincides so fully with my own observations in the year 1823, that I am inclined to believe that the coral animals have not excerised

any considerable influence in that spot, although a space of nearly 300 years have since elapsed, and every opportunity and accommodation is afforded at Tor to the increase of these animals.

In the same way, the description given at that time of the anchorage of Cosseir which has also nothing peculiar, agrees fully with its form as seen by ourselves at the present time. I also find the description given by de Castro of the three islands near Massava, on the Abyssinian coast, and of the Port of Massava fully applicable to their present form and condition. I will not conceal that when I was at Djedda, the inhabitants of the place bitterly complained of the encroachment made by the corals, which were blocking up the port; also that I found it difficult, because of its complicated form, to compare historical accounts; but at the same time while I do not doubt the fact, I am rather inclined to ascribe it to the encroachment of sand and the inconsiderate throwing overboard of ballast which generally consists of coral blocks, and which is constantly done with impunity. The remarks which Forskal makes respecting the increase of land on the Arabian coast and near Suez, agree with the opinion of sand being accumulated. Near Suez there is no doubt that this is the case.

ART. VIII.—*On the occurrence of Quicksilver in the Lava Rocks of Aden.* By J. P. MALCOLMSON, M.D., Bombay Medical Establishment.

To J. G. MALCOLMSON, Esq.,

Secretary R. A. S. &c., Bombay.

Dear Sir,—I have the pleasure of forwarding to you a specimen of a stone containing quicksilver in its metallic state. The stone was found at Aden about fifteen feet below the surface, about two hundred yards from the beach, by the workmen who were employed in making a road from thence through the centre of the projected new cantonments. You will observe the globules of the metal are deposited on the surface, adhering pretty strongly to what seems a coating of carbonate of lime: this would at first view lead to the conclusion that the mercury had been accidentally lodged there. On further examination with a glass it will, however, be found that small globules are also thickly disseminated in the interior of the stone,—almost every cell containing the metal adhering to its side. This induces me to believe that the mercury is not a foreign deposit but

has been secreted or separated from the stone, as other metals are supposed to have been. The stone is lava, and a large quantity of a similar description is found in the hills above the town.

It is a subject of some interest to have this specimen fully and minutely examined, it being a very unusual circumstance to find quicksilver in lava or in rocks which are supposed to be of an igneous origin. Its usual habitat being sandstone, slate, sand, &c.

I shall feel much obliged if you will examine and let me know your opinion regarding the specimen, which is quite at your disposal to use as you think proper.

Believe me to be,
Dear Sir, yours very truly,
JOHN MALCOLMSON, *Asst. Surg.*
Bombay Establishment.

Bombay, 24th August, 1843.

NOTE BY THE SECRETARY.

The occurrence of native mercury in the volcanic rocks of Aden, was first noticed by my friend and namesake Dr. J. P. Malcolmson of the Bombay Army, in an official report, an abstract of which was published in the *Bombay Times*. A short time after the appearance of this notice, an anonymous correspondent of that paper, stated that the quicksilver had found its way accidentally into the porous stones near the harbour, and that Dr. M. should have been aware of this.

When Dr. M. was in Bombay, he presented, at my request some specimens of the rock to the Museum of the Asiatic Society, with the above account of the locality from which they were procured. From that statement it does not seem probable that the mercury could have been accidentally introduced ; still, as Dr. M. has returned to the spot, he should endeavour to place his interesting discovery beyond the reach of doubt.

The rock certainly does contain a little native mercury which runs out on its being broken. There are however brilliant metallic-looking particles which were nothing more than crystals of glassy felspar ; and a white coating in some of the cavities which resembles horn mercury, is perhaps a variety of hyalite.

From the extensive mobility of this metal in its metallic state, there is very little prospect of its being found at Aden in sufficient quantity to justify attempts at working it, even should it be found in a greater quantity than it has yet been.

It does not appear at all improbable that mercury should be found in a porous volcanic rock such as that of which a great part of the south-western corner of Arabia is composed.

The granites of Peyrot in France are said to be impregnated with native mercury, and in the following extract from a paper read before the Academy of Sciences of Paris on the 12th June last, it will be seen, that M. Leymerie ascribes to a similar source the native mercury discovered in the *detrital* or tertiary clays, resting on the *Jura* limestone of *Larzac* and also near Montpelier, where it was known to the peasants from the death of trees whose roots penetrate into it.

" Il suffit de se rappeler à cet égard qu'à diverses époques, depuis le dépôt et la consolidation du terrain jurassique qui constitue le Larzac et une partie des Cévennes, la région dont il est question a été soumise à l'influence des actions souterraines, qui ont produit le soulèvement de plusieurs chaines de montagnes. Dès lors,. on conçoit sans peine qu'à une de ces époques, des bouffées mercurielles provenant directement des profondeurs du globe, ou que l'on peut encore attribuer à une distillation de gîtes déjà existant dans les terrains anciens qui supportent les couches secondaires du midi, ont pu venir pénétrer la masse préalablement crevassée et fissurée du Larzac, et ensuite s'y condenser. La plus grande partie du métal parvenu à travers les marnes jusque dans les calcaires aura bientôt coulé de fissure en fissure, jusqu'à la première couche marneuse qui, dans le plus grand nomber des cas, devait être capable de le retenir. Ensuite, ce mercure sera venu au jour avec une portion de celui contenu dans les marnes elles-mêmes, entre les tranches des couches qui composent le talus occidental du Larzac, oú il a pu être poussé en partie, par exemple, par l'eau des sources si vives et si fréquentes le long de la ligne de contact des assises calcaire et marneuse. Quant au mercure signalé à la partie supérieure des marnes tertiaires de Montpellier, on peut faire deux hypothèses. Il peut résulter d'une action directe de l'intérieur à l'extérieur, comme celui du Larzac, et la présence du calomel natif semblerait le faire croire, et alors nous serions conduits à rapporter le phénomène à l'époque du dernier soulèvement des Alpes, lequel a exercé comme on sait, une certaine influence sur les terrains du S. de la France, où il s'est manifesté, notamment dans les Corbières et dans les Pyrénées, par l'apparition des ophites. On pourrait, en second lieu, supposer que le mercure de Montpellier aurait coulé après coup à une époque assez récente du terrain jurassique des Cévennes dans les sables, et,

par suite, dans la surface des marnes qui forment le sol fondamental de cette ville, et alors on pourrait faire reculer l'introduction des minerals mercuriels dans le Larzac jusqu'à une époque plus ou moins ancienne, et la rapporter par exemple au soulèvement de la Côte-d'Or, qui s'est fait ressentir d'une manière si prononcée dans le massif jurassique dont il est question".....*L'Institut. 15th June* 1843 : Page 196.

JOHN GRANT MALCOLMSON.

ART. IX.—*Note on a Set of Specimens from Aden.* Presented to the Museum. BY G. BUIST, LL.D.

These specimens were partly collected by Captain Yeadell, of the Artillery, and other officers of the Garrison—partly by myself in April 1840.

The glassy slag or obsidian is not of frequent occurrence ; it appears in veins or streams running down from the summits of the volcanic peaks like recently indurated lava. Near the cantonments, these present fantastic and beautiful appearances,—the torrent of melted matter seeming to have encountered numerous obstructions in its course, and to have been split into a variety of cascades,—just as we see exemplified in cataracts, whose descent is not perpendicular, where the water has encountered breaks and irregularities of surface.

The greater part of the rocks of the Peninsula of Aden are more or less vesicular, presenting an amygdoloidal structure. Calcedony, such as that presented, is of abundant occurrence.

The volcanic ashes were found on the summit of the hill near Steamer Point, about 500 feet above the level of the sea : they were just under the surface, and occasionally mixed with shells.* They bear no resemblance whatever to the driftsand to be seen in abundance at the bottom of the rocks.

Decayed shells, such as are herewith sent †, are scattered everywhere over the hills near Steamer Point, to a height of at least 500 feet : the leisure of a single morning permitted no further examination. I was at first disposed to have believed that they must have been carried there by birds or wild animals for the sake of the Mollusk. The uniformity of their distribution was hostile to this view ; and the extreme, but perfectly uni-

* These consist of a species of Pupa, a land shell.—*Edit.*

† Murex Inflatus, a common shell on the coast.—*Edit.*

form, state of decay in which they were found led to the conjecture, that most probably they were elevated from the bottom of the sea at the time the volcano itself emerged from it. The Peninsula of Aden, it must be recollected, corresponds, in form and magnitude, very closely with a section of one fourth or so of the upper portion of mount Ætna. The Sicilian volcano is 10,000, the Arabian one about 2,000, feet in altitude.

The cone of the former, which includes the crater, is about 1,100 feet, the interior of the crater about 600, in altitude. Aden, as now reached, may be regarded as a cone altogether; the circumference of sheet measured along the ridge of the Shum Shum range, is about four miles; that of Ætna very nearly the same.

Considering the length of time Aden has been occupied by our troops, and the abundance of leisure which the officers must enjoy, it is singular that up to this date we should know so little of its natural history. Of its Fauna and Flora, scanty as these are, we literally know nothing; and very little of either its Hydrography, Meteorology, or Geology. A list of questions on these subjects might probably elicit information, which does not seem likely to be spontaneously imparted.

Masses of oyster shells similar to that now sent for exhibition—for I have no duplicate—are strewed in abundance along the beach, some of them of very great magnitude. They appear to have become united while their inhabitants were alive. Masses of cockles are also plentiful; they have obviously been cemented after death by extraneous calcareous matter.

ART. X.—*Note on a Series of Persian Gulf Specimens.* Presented to the Museum. By G. BUIST, LL.D.

The specimens laid before the Society were collected for me, partly by Commodore Brucks, I. N., and in part by Mr. Woosnam, Surgeon in the *Sesostris* Steamer. They are chiefly from the Island of Karrack and the north-western shores of the Persian Gulf: the precise localities of the greater part of them are unknown to me; but a large tract of coast is said to be composed of the same substances as those on the table.

The salt is not, properly speaking, rock salt, but a mineral found abounding in the crevices and hollows of the rocks where the sea-spray is driven up in high tides or stormy weather, and afterwards evaporated by the sun.*

* This salt is whitish, without the tinge of red so remarkable in rock salt from almost all parts of the world.—*Edit.*

The small portion of coral is from the summit of the island of Karrack which, at the height of 300 or 400 feet above the level of the sea, is said to be entirely composed of this substance. The present specimen appears to be a piece of the ordinary Madropore, which at this moment abounds in these seas. The rocks here seem to be for the most part volcanic. Karrack itself is described by Dr. Winchester as composed of coralline sandstone and limestone, plentifully mixed with fossil tubipora. In the limestone are numerous oysters, cockle, limpet and other shells. (Bombay Geographical Transactions, March 1838.) There are no Atolls or Lagoon Islands in the Persian Gulf; and the knowledge of a mass of recent coral, elevated by volcanic agency to such latitude as the summit of the Island of Karrack would be a curious addition to the stock of facts collected by Mr. Darwin, on the evidence of alternate subsidence and emergence of rocks in the ocean, furnished by the existence of coral beds, and an important instance of one more of the recent elevations of land in these parts, of which the shores of the Red Sea afford such abundance of examples:

The Selenite is said to be found in thin veins crossing through shells, gravel, and sand, impregnated with saline matter. These statements are given on the authority of gentlemen who have no pretension to Geological knowledge, and are, therefore, to be received with reservation. They are at the same time, in perfect conformity with appearances presented all along the shores of the Red Sea, especially around the Gulf of Suez. At this last place, the appearance of Selenite, such as that now exhibited, invariably indicates the presence of Sodalite, the surface of the ground crisping under the feet like wet soil after a severe frost. In no instance have I found this to fail in the Suez Desert ; where the ground was highly saline, sulphate of lime invariably made its appearance in thin veins exfoliating where they cropped out ; extending along to the length of from 3 to 20 feet, and seldom penetrating, so far as I could observe, without the means of making any very considerable excavations, more than a few inches into the ground. The veins generally consisted of parallel plates of Selenite, which might be sliced down to any degree of thinness that was desired. On some occasions, but these were of rare occurrence, its structure was fibrous like satin spar, the fibres being nearly transparent and horizontal, at right angles to the axis of the vein.

ART. XI.—*Eclipse of the Sun on the 21st December 1843; as seen from the Observatory, Colaba.* By DR. BUIST.

In both the Bombay Almanacs for 1843, the time of the commencement of the eclipse is erroneously set down:—the Calendar published at the *Courier* office gives 7 h. 54 m. as the hour, that of the *Times* 7 h. 26 m., the latter being only a minute wrong. The sun rose bright and fiery at half-past six—the sky was everywhere cloudless and clear; not a film of mist or streak of vapour, beyond a slight transparent haze, being visible down to the edge of the horizon. In making a fresh adjustment of the instrument, an altitude and azimuth circle 81 inches horizontal, and 12 of vertical diameter, the instant of primary contact was lost by a few seconds; it appears from calculation to have occurred at 7 h. 25 m. The appearance at first presented was as if a notch had been struck out from the sun's upper limb: the moon itself, the cause of this, being undistinguishable from the surrounding sky. The defective space was almost absolutely black, sharp, and perfectly well defined; the sky itself was of the deepest tint of blue. As the eclipse proceeded, the moon's disk was faintly illuminated—its figure being discernible, but barely so from the surrounding space. The sun was at no time sufficiently obscured to permit the moon to be examined without the interposition of a shaded glass. No inequality of light was perceptible, nor any spots upon its disk, which was indicated by a faint dimness of appearance barely discernible through a coloured glass. When the eclipse was at its greatest, the visible figure of the sun resembled the moon three days after change, only that its light was infinitely more intense, and its limbs perfectly well defined, without any faintness or irregularity: the cusps were sharp and clear, terminating in the finest points. Professor HENDERSON* states, in reference to the annular eclipse of the 15th May 1836, that "shortly before the formation of the annulus, the cusps were seen to approach and to be broken into several parts. When they were about 30 or 40 degs. from each other, an arch of faint reddish light was seen extending from the one to the other; this appearance lasted for several

* Astronomical Observations, made at the Royal Observatory, Edinburgh, for the year 1836. Published by order of H. M.'s Government.

seconds, when suddenly a small detached portion of the sun's limb like a string of beads, with dark intervals, appeared between them. At the dissolution of the annulus similar appearances were noticed in reverse order."

Though the eclipse of Thursday was scarcely of sufficient magnitude to entitle the observer to feel assured that this phenomenon would present itself, it was looked for with the utmost attention, and from the extreme acuteness and prolongation of the cusps, was at one time expected to have made its appearance. The expectation however was not destined to be realized: the sharp thin line of light bordering the moon at the period of greatest obscuration was unbroken to the end. It is somewhat curious, that in observing the total eclipse of the sun, visible in the South of Europe, on the 8th July 1842, Mr. Bailie, Vice-President of the Astronomical Society, states, that the beads were as distinctly visible as in the annular eclipse seen at Edinburgh in May 1836—the black string described as generally preceding them not having been apparent: * while Professor Airy, the Astronomer Royal, in observing the same thing, saw from Turin, "nothing whatever of the beads or other irregularity in either of the extremities of the sun's limb. The cusps were perfectly well defined till they met." †

The observations were made by three parties simultaneously—one with a 46-inch achromatic glass by Dolland—a second with a 30-inch glass by Gilbert—and the third with an altitude and azimuth circle of 9-inch radius, and an 18-inch telescope.

Observations were made from 6 till 11 A. M. every ten minutes with the standard barometer, the sympiesometer, Daniel's hygrometer—the wet and dry bulb,—the solar and terrestrial radiation, and standard thermometers, as well as with the actinometer. The table detailing these is subjoined; the barometrical readings are given without correction. The following are the general results: The barometer rose between six and eleven from 30·140 to 30·220, uncorrected for temperature. It reached its greatest altitude of 30·223 at forty minutes past ten, about an hour later than its ordinary average. The amount of its fluctuation was pretty nearly the same as is due to the present period of the year: but its actual altitude is considerably greater than it has been any time

* Report of the Astronomical Society, Nov. to Dec. 1842. Published in *Athenæum*, 7th Jan. 1843, No. 773.

† Ib., 14th Jan., No. 774.

for 20 months past ; we have no regular hourly observations anterior to 1st September 1842. It fluctuated considerably betwixt 8 h. 50 m. when it reached a height of 30·202, and 11 h. when it stood at 30·220—having fallen to 30·200 at 9—it rose again and remained at 30·202, for the next three observations. From half-past nine to 20 minutes from eleven, when, as already stated, it reached its maximum of ·223, it continued to rise steadily and rapidly, and then, in the course of ten minutes, fell 00·003, and continued, as usual at this hour of the day, to descend till afternoon. The sympiesometer, as it generally does, attained its maximum of 30·62 more than an hour before the barometer culminated ; like the other, it fluctuated for a time, rising to the same height as that just named at 9h. 20m., 10h. 10m., 10h. 20m., and 10h. 30 m., and sinking back again, being from ·61 to ·63 at the intermediate periods of 10 min. By the system of observing six times every hour for eight hours a day at the culminating periods of these instruments, presently in pratice at the Observatory, it is shown that there is nothing at all unusual in these phenomena, unless the extreme pressure of the atmosphere observable for nearly a week past, and the unusually late hour at which this on Thursday reached its maximum.

The thermometer which, in the shade, was 67·3 at 6 o'clock, had before 8 o'clock risen to 70 ; at this it continued stationary till 9 o'clock, when it began to rise steadily as usual, but with somewhat greater rapidity—at 11 it stood at 73·7. Much in this case is dependent on the position of the instrument ; another, in a somewhat more airy and elevated position than the standard, sunk by nearly two degrees. A black bulbed thermometer, exposed to the sun, stood, at 7 o'clock, at 85 ; by 8 it had risen to 113, when it began rapidly to descend, attaining its minimum of 87·8 at 8 h. 50 m. It pursued, with great exactitude, the course of the eclipse, having, by 10 o'clock, risen to 144, and by 11 to 162 : the latter of these is to be received with hesitation, from the too great closeness of the position where the instrument was placed permitting an undue accumulation of heat.

The solar-radiation thermometer pursued a totally different law, having stood at nearly the same point at 6 h. as at 10 h.—20°, *viz.* 62 ° 2′ in the former, and 62° 6′ in the latter case : it had fallen to 58° 1′ at 10, it recovered after 7, but scarcely rallied from that till ¼ from 9. At 11, it had risen to 65° 6′. From 8 to twenty minutes past 9, the liquid in the actinometer was below zero. The dew point, as indicated by

Daniel's hygrometer, receded from 65° to 62·5, being found at the latter at 6 h. 11 m., and at the former at 9 h. 40 m. The variation in the dampness of the atmosphere as indicated by this, as well as by the wet and dry-bulb thermometers, being extremely small—the latter instrument varying from 4 to 7 of difference, that is, of actual range; it followed with considerable accuracy the progress of the eclipse.

To the ordinary observer, the most remarkable of all the phenomena presented, was the appearance of the landscape around. The more conspicuous stars had mostly set before sunrise, so that there was no means of knowing whether they might or might not have been seen, if in the sky. Objects, particularly white ones, assumed a bluish-green appearance. The sea, especially towards Malabar Point and the entrance of the Harbour, had a strange melancholy hue,—and a large vessel, a few miles off, looked like a spectre ship. The Cathedral tower, Scottish Church steeple, and Colaba buildings seemed the ghosts of what they were by daylight. The atmosphere was peculiarly still, the land-wind having nearly gone to sleep, and the sea-breeze not having been awakened. The sky was so cool and the sun's rays so feeble, that to be out in the air from 8 to 9 uncovered occasioned no inconvenience. Shadows of objects appeared ill-defined and ragged towards the edges: this altered during the progress of the eclipse, the sides of the shadow towards the South and East being first impaired, that to the South and West becoming afterwards affected. The wind was throughout the day peculiarly faint and unrefreshing.

The amount to which light is diminished even in the case of an entire eclipse, generally occasions disappointment. In the total obscuration in July 1842, already referred to, it was in no case necessary to use a taper to read with, though stars were seen at Turin and other places in the neighbourhood. Dr. Halley observes, in reference to the total eclipse which occurred in 1715—the last which was visible in London—that no one saw more than Capella and Aldebaran of the fixed stars. The rapidity with which the iris of the human eye adjusts itself so as to compensate in a great measure for the withdrawal of light, when this is effected gradually, is such that we are scarcely aware of the amount of loss unless by instrumental observation.

Meteorological Observations during the Eclipse of the Sun, 21st December, 1843.

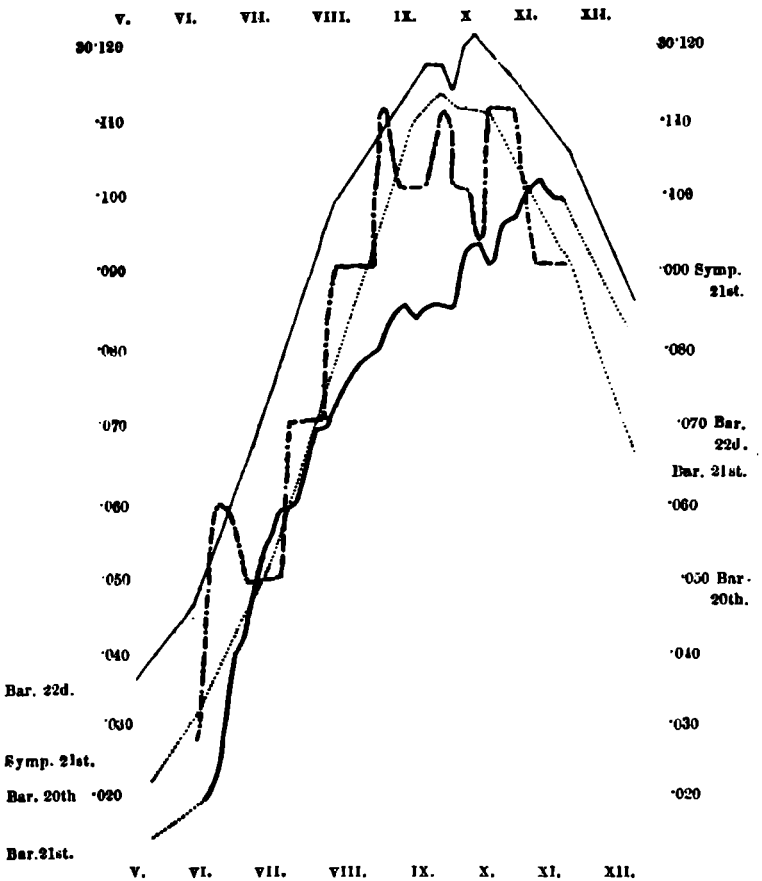
Bombay Mean Time.		Standard Barometer, uncorrected.		Standard Therm.	Hygrometer.		Difference.	Sympiesometer.		Radiation.		Difference.	Daniel's Hygrometer.		Difference.	Actinometer.	Bombay Mean Time.	
		Barometer	Thermometer.		Dry.	Wet.		Sr.	Thr.	Solar.	Terrestrial.		Dew Point.	Air.				
h.	m.		deg.	deg.	deg.	deg.			deg.	deg.	deg.	deg.	deg.	deg.	deg.		h.	m.
6	00	30·140	72·0	60·6	69 0	65·0	4·0	30·54	70·2	74·9	62·2	12·7	65·0	70·5	4·5		6	00
	10	·142	72·0	69·5	69 0	66·0	4·0	·56	70·3	74·4	62·3	12·1	64·0	70·0	6·0			10
	20	·150	71·9	69·3	68·6	64·4	4·2	·57	70·2	71·0	59·3	11·7	54·0	70·0	6 0			20
	30	·156	71·7	69 3	68·8	64·6	4·2	·57	69·9	70·0	58·9	11·1	63·5	70·0	6·5			30
	40	·160	71·6	69 3	68·8	64·6	4·2	·56	69·9	71·0	58·7	12·3	63·6	69 7	7·1			40
	50	·167	71·6	69·3	69·7	64·0	4·7	·56	69·7	77·1	58·2	18·9	61·8	69·9	8·1			50
7	00	·171	71·6	69 3	68·9	64·0	4·9	·56	69·6	85·7	58·2	27·5	62·5	70 0	7·5		7	00
	10	·175	71·6	69·3	68·8	63·8	5·0	·56	69·7	93·1	58·1	37 0	62·0	70·0	8·0	22·31		10
	20	·176	71·5	69·5	69·0	63·5	5·5	·58	69·8	101·7	58·2	43·5	63·0	70·1	7·1	20 02		20
	30	·181	71·5	69·5	69·0	63·9	5·1	·58	69·8	108·6	58·5	50·1	62·5	70·5	8·0	21·88		30
	40	·186	71·6	69·6	69 0	64·0	5·0	·58	69·8	113·4	58·4	54·0	63·2	70·4	7·2	22·61		40
	50	·186	71·6	69·9	69·6	64·1	5·5	·58	70·1	113·2	59·1	54·1	62·9	70·6	7·7	23·71		50
8	00	·190	71·7	70·2	69·6	64·0	5·6	·60	70·3	113·2	59·0	53·2	62·8	70·8	8·0	17·03	8	00
	10	·192	70·5	70·5	69·3	65·0	4·3	·60	70·5	109·7	58·9	49·8	62·7	70·7	8·0	Liquid below Zero.		10
	20	·195	71·6	70·5	70 4	65·0	5·4	·60	70·7	103·6	58·5	45·1	63·0	70·5	7 5	do.		20
	30	·196	71·6	70 5	69·0	65·0	4·0	·60	70·7	96·5	58·1	38·4	63·5	70·6	7·1	do.		30
	40	·200	71·6	70·4	70·0	65·5	4·5	·62	70·5	89·7	58·3	31·4	64·2	70·5	6·3	do.		40
	50	·202	71·5	70·4	70·0	66·0	4·0	·61	70·7	87·7	59·2	28·5	64·4	70·5	6·1	do.		50
9	00	·200	71·5	70 5	70·3	66·1	4·2	·61	70·8	91·2	59·1	32·1	64·9	70·8	7·1	do.	9	00
	10	·202	71·5	70·6	70·5	66·1	4·4	·51	71·0	98·2	60·1	38·1	65·5	71·4	5·9	do.		10
	20	·203	71·7	70·9	70·6	66·0	4·6	·62	71·1	106·6	60·6	46·2	64·0	71·7	7·7	14·84		20
	30	·202	71·8	71·2	71·0	66·0	5·0	·61	71·3	118·2	60·8	57·4	64·2	72·2	8·0	30·95		30
	40	·210	72·0	71·5	71 5	65·0	6·5	·61	71·4	127·5	61·0	66·5	63·5	72 3	9·8	25·50		40
	50	·212	72 2	71·7	72·0	65·9	6·1	·60	71·8	137·5	60·8	76·7	64·1	72·9	8·8	30·11		50
10	00	·210	72·5	72·2	73·4	66·1	6·3	·62	72·0	144·1	61·2	82·9	62·9	73·1	10·2	33·17	10	00
	10	·216	72·6	72·6	72·5	66·3	6·2	·62	72·4	148·4	62·0	86·4	63·6	73·2	9·6	34 56		10
	20	·216	73·0	72·8	73·0	66·1	6·9	·62	72·9	154·7	62·6	92·1	63·8	73·7	10·9	36·80		20
	30	·220	73·0	73·2	73·5	66·1	7·4	·61	73·1	158·2	63·1	95·1	63·0	73·9	11·9	36·63		30
	40	·223	73·5	73·4	74 0	66·5	7·5	·60	73·5	160·2	64·0	96·2	63·0	74·4	11·4	38·81		40
	50	·220	73·5	73·7	74·5	66·6	7·9	·60	73·8	162·2	64·7	97·5	63·7	74·2	11·0	39·29		50
11	00	·220	73·7	74·2	74·9	67·5	7·4	·60	74·2	162 2	65·6	96·6	64·4	74·7	10·3	39·70	11	00

Zenith distance and Azimuth of the Sun and Moon, 21st December, 1843.

Time.	Object.	Zenith distance.	Azimuth from the North.	Hour.	Wind.	Weather.	Remarks.
A. M. H.M. S.				A. M. HS. MS.			
7 24 56	Eclipse begins.	Deg. Min.	Deg. Min.	6 0	E.S.E.	Light Breeze.	Sky Clear.
7 31 55	☉ Upper Limb.	77 3 E.	120 42 E.	0 10	,,		,,
7 41 15	☉ Lower Limb.	75 40 ,,	,,	0 20	,,		,,
7 44 15	☽ ,, ,,	74 43 ,,	121 02 ,,	0 30	,,	Sun rise at 6h. 31m.	,,
7 50 21	☉ ,, ,,	73 52 ,,	123 30 ,,	0 40	,,		,,
7 58 23	☽ ,, ,,	72 37 ,,	123 20 ,,	0 50	,,		,,
8 0 29	☉ ,, ,,	71 53 ,,	123 44 ,,	7 0	,,		,,
8 6 3	☽ ,, ,,	70 36 ,,	124 48 ,,	0 10	,,		,,
8 10 45	☉ ,, ,,	69 53 ,,	125 02 ,,	0 20	,,	Sun eclipsed at 7h. 25m.	
8 16 10	☉ ,, ,,	68 51 ,,	125 45 ,,	0 30	,,		,,
8 20 42	☽ ,, ,,	67 55 ,,	126 31 ,,	0 40	,,		
8 30 31	☉ ,, ,,	66 08 ,,	127 47 ,,	0 50	,,	Thick mist in the West.	
				8 0	E.		Sky Clear.
8 41 46	☉ Upper Limb.	63 31 ,,	129 13 ,,	0 10	,,		,,
8 44 59	☽ ,, ,,	63 00 ,,	130 02 ,,	0 20	,,	Faint sunshine.	,,
8 50 25	☉ ,,	61 58 ,,	131 50 ,,	0 30	,,		,,
8 55 50	☽ ,,	61 07 ,,	131 45 ,,	0 40	,,	Middle of the Eclipse at 8h. 40m.	
9 0 50	☉ ,, ,,	60 08 ,,	132 33 ,,	0 50	,,	Faint sunshine.	,,
9 10 25	☽ ,, ,,	58 40 ,,	134 12 ,,	9 0	,,	,,	,,
9 20 37	☉ ,, ,,	56 47 ,,	136 10 ,,	0 10	,,	,,	,,
9 30 2	☽ ,, ,,	55 33 ,,	137 49 ,,	0 20	,,	,,	,,
9 33 6	☉ ,, ,,	54 29 ,,	138 52 ,,	0 30	,,	,,	,,
9 40 10	☽ ,, ,,	54 02 ,,	139 50 ,,	0 40	,,		,,
9 45 31	☽ ,, ,,	53 15 ,,	140 58 ,,	0 50	,,		,,
9 50 1	☽ ,, ,,	52 36 ,,		10 0	,,		,,
9 55 24	☉ ,, ,,	51 30 ,,	143 29 ,,	0 10	,,	Eclipse ends.	,,
				0 20	,,		,,
				0 30	,,		,,
10 10 41	Eclipse ends.			0 40	,,		,,
				0 50	,,		,,
				11 0	,,		,,

☞ The precise time of the beginning of the Eclipse could not be observed accurately to a second; therefore the time given may be a few seconds out. The end of the Eclipse has been correctly observed to a second.

Magnetic Observatory, Bombay, 21st December, 1843.



On the diagram the curves of the barometer and sympiesometer on the morning of the eclipse, and that of the former instrument on the day before and after, are laid down to thousandths of an inch—the readings being taken for the 21st, six times an hour throughout, and in like fashion from eight to ten on the 20th and 22d. Before and after this, where the movements are represented by straight lines, the readings are only made once an hour. The curves of the 21st present to the eye at once the singular fact formerly referred to—that of the barometer having continued to rise till within 20 minutes of 11 on the morning of the eclipse—that is, for nearly an hour beyond its ordinary time,—the maximum of the sympiesometer as usual preceding that of the barometer by about 50 minutes. On glancing over the observations made at the observatory since the 1st September 1842, I am unable to discover that, out of 400 days on which the barometer has been read hourly, this ever

occurred before. My study of them has not been sufficiently careful to enable me to speak positively of the fact ; but my impression is, that the rise is, within the period specified, unprecedented. It will be interesting to know whether anything of a similar nature has ever been noticed at other stations similarly circumstanced. In the table the scale readings of all the instruments, save the actinometer, are given without correction—in the diagram the barometer is corrected for temperature : this has very little bearing on the present occasion on the mere form of the curve, as the thermometer only ranged four degrees in all throughout the entire course of the eclipse.

Art. XII.—*Meteorological Observations.*

The Meteorological report given in the previous number of the Journal consisted of a return of twenty-four hours' consecutive observations made on the term days,—the state of the Observatory in respect of the number of assistants then employed not permitting continuous observations such as to supply the average of the month. The term day observations of July and August 1842, were lost in consequence of the sickness of the only assistant who at that period remained attached to the Observatory. Government having subsequently sanctioned the employment of Native assistants in place of two of the Europeans originally employed, the observations have been carried on without interruption from the 1st September 1842 to the present time, and the abstracts now supplied present the means of the hourly observations for the month,—getting rid of casual variations and furnishing the elements of the mean directions of the barometeric curve.

It was stated in the last number of the Journal that the Barometer by which the observations were noted from May to July 1841, was a standard by Adie of Edinburgh, and that its readings were 0·150 higher than the Observatory standard by Newman, subsequently employed, and assumed as correct :—so that in order to reconcile the observations recorded in the first number of the Journal with those subsequently published up to April 1843 (No. V.,) 0·150 must be substracted from the former or added to the latter. An elaborate series of comparisons with other Barometers made in January 1843, and given at length in the previous part of the number, together with a comparison of the Bombay and Trevandrum observations with each other, led to the suspicion that air had been admitted into the tube when the Barometer was originally set

up. The instrument having been taken down and inverted, a bubble was discovered of such magnitude as to elevate the mercury on its re-adjustment 0·100. The tube was not boiled afresh and some slight vesicles still appear to adhere to it; from this circumstance and from the amount of discrepancy still existing between it and the other instruments with which, as already stated, it was compared, the total error appearing to exist in the present return, is ·125. They have been given as copied from the Observatory records of scale readings corrected for temperature and capillarity, but it requires the addition of ·125 to make them correct. The observations by Adie's Instrument given before June 1841, require 0·025 to be substracted from them to render them correct—the instrument referred to is that marked No. VII. in the list of comparative observations. The returns which may be supplied subsequent to the adjustment of the barometer in June 1843, will require a correction of +0·25 only, this will be duly noted on the preface to the tables.

G. Buist.

Magnetic and Meteorological Observatory, Colaba, mean hourly Observations for September, 1843.

Bombay Mean Time	Barometer. Corrected to 32 Fah.	Stand. Ther.	Thermometer. Dry.	Thermometer. Wet.	Difference.	Remarks.
A. M.		° ′		° ′	° ′	
0·0	29·636	80·6		73·8	6·8	This month is generally all cloudy, the sky being scarcely clear 1-8th.
1·0	·618	80·6		73·8	6·8	
2·0	·610	80·3		74·3	6·0	
3·0	·603	80·2		73·9	6·3	22nd. A squall accompanied with rain and lightning at 2h. 45m.
4·0	·603	80·1		73·7	6·4	
5·0	·607	80·0		73·1	6·9	23rd Another at 5 minutes to one A. M. accompanied with rain and distant thunder; ceased at 1 h. 15m. A.M. lightning continued in vivid flashes until 10 minutes to 2h. A. M. when all got calm and wind gentle.
6·0	·628	79·5		72·3	7·2	
7·0	·644	79·4		72·8	6·6	
8·0	·666	80·6		73·4	7·2	
9·0	·676	81·3		73·5	7·8	
10·0	.676	81·8		73·9	7·0	
11·0	·664	82·3		74·2	8·1	29th. Squall accompanied with rain and lightning.
0·0	·648	82·8		74·7	8·1	
P. M.						
1·0	·626	83·0		74·6	8·4	
2·0	·603	83·3		74·9	8·4	
3·0	·580	83·2		75·8	7·4	
4·0	·582	83·2		76·2	7·0	
5·0	·587	82·5		75·7	6·8	
6·0	·606	81·9		76·0	5·9	
7·0	·620	81·3		76·0	5·3	
8·0	·632	80·4		75·7	4·7	Quantity of rain during the month 9·23.
9·0	·642	80·8		75·2	5·6	
10·0	·649	80·0		74·6	5·4	
11·0	·644	80·6		74·0	6·6	
Mean.	29·626	81·3		74·5	6·8	

Magnetic Observatory, Colaba, mean hourly Observations for October, 1842.

Bombay mean Time.	Barometer. Corrected to 32 Fah.	Stand. Ther.	Thermometer. Dry.	Thermometer. Wet.	Difference.	Remarks.
A. M.		° ′		° ′	° ′	
0·0	29·733	81·6		77·0	4·6	During all the days of this month the proportion of the cloudy to the clear sky, in its mean state, was not more than 3-8ths.
1·0	·727	81·3		76·8	4·5	
2·0	·720	81·2		76·0	4·6	
3·0	·718	80·9		76·5	4·4	
4·0	·720	80·7		76·3	4·4	31st. The lightning struck the H. C. S. *Coote*, Bombay Harbour, at 8 minutes past 4 A. M., and shivered her foremast from top to bottom; no lives were lost. The thunder seemed more than an hour nearly overhead.
5·0	·723	80·6		76·2	4·4	
6·0	·730	80·1		75·8	4·3	
7·0	·763	80·2		75·4	4·8	
8·0	·782	81·4		75·6	5·8	
9·0	·791	82·7		76·2	6·5	
10·0	·791	83·9		77·2	6·7	
11·0	·771	84·6		77·8	6·8	Quantity of rain during the month. Inches 1·63.
0·0	·745	85·0		76·1	6·9	
P. M.						
1·0	·725	85·4		78·1	7·3	*General Remarks.*—The troubled appearance of the sky and the depression of the Barometer manifested between the 20th and 31st, correspond with the setting in of the Coromandel monsoon, which commenced with a violent hurricane on the 24th day, when many ships perished. The Barometer had recovered its unaccustomed level before the severe fall of rain and lightning, which occurred on the 31st.
2·0	·703	85·7		78·0	7·1	
3·0	·689	85·8		79·1	6·7	
4·0	·686	85·8		79·1	6·7	
5·0	·695	85·1		78·6	6·5	
6·0	·706	83·8		78·0	5·8	
7·0	·725	83·2		77·8	5·4	
8·0	·741	82·7		77·6	5·1	
9·0	·746	82·5		77·8	4·7	
10·0	·747	82·3		77·6	4·7	
11·0	·743	82·1		77·5	4·6	
Mean.	29·742	82·8		77·4	5·4	

Magnetic Observatory, Colaba, mean hourly Observations for November, 1842.

Bombay Mean Time.	Barometer. Corrected to 32 Fah.	Stand. Ther.	Thermometer. Dry.	Thermometer. Wet.	Difference.	Remarks.
A. M.		° ′		° ′	° ′	
0·0	29·931	80·0		73·8	6·2	During the month, the nights were generally clear, days about 3-8ths cloudy with circo stratus.
1·0	·918	79·8		73·8	6·0	
2·0	·908	79·6		74·2	5·4	
3·0	·902	79·4		73·8	5·6	
4·0	·903	79·1		73·6	5·5	From 10th to 19th, the days were all cloudy and light rain fell.
5·0	·910	79·2		73·0	6·2	
6·0	·924	78·3		72·3	6·0	
7·0	·940	78·4		72·8	5·6	
8·0	·967	80·0		73·3	6·7	
9·0	·986	81·1		73·4	7·7	
10·0	·985	82·3		73·9	8·4	
11·0	·972	83·1		74·1	9·0	Quantity of rain during the month. Inches 0·38.
0·0	·940	83·9		74·8	9·1	
P. M.						
1·0	·916	04·3		74·6	9·7	
2·0	·893	84·7		74·9	9·8	*General Remarks.*—In the morning during the whole of the month, the mean direction of the wind was East by South when it was relieved by the sea breeze from N. W.
3·0	·886	85·1		75·8	9·3	
4·0	·886	84·8		76·1	8·7	
5·0	·894	83·9		75·7	6·2	
6·0	·901	82·4		76·0	6·4	
7·0	·884	82·2		76·0	6·2	
8·0	·939	81·8		75·7	6·1	
9·0	·947	81·2		75·0	6·2	
10·0	·949	80·5		74·5	6·0	
11·0	·940	80·3		74·0	6·3	
Mean.	29·927	81·4		74·4	7·0	

Magnetic Observatory, Colaba, mean hourly Observations made during the month of December, 1842.

Hour.	Barometer. Corrected to 32 Fah.	Thermo.	Thermo. Wet	Difference.	Remarks.
A. M.		° ′	° ′	° ′	
0·0	29·839	73·2	71·8	6·4	During this month, the days and nights were generally clear, only a few circo stratus prevailing.
1·0	·830	77·7	71·1	6·6	
2·0	·821	77·5	72·4	5·1	
3·0	·812	77·0	70·7	6·3	The days about the 20th and 25th were almost clouded by stratus.
4·0	·814	76·7	70·6	6·1	
5·0	·821	76·2	70·7	5·5	
6·0	·844	75·4	69·1	6·3	
7·0	·862	75·1	69·1	6·0	
8·0	·889	76·6	69·7	6·9	No rain during the month.
9·0	·888	78·3	70·3	8·0	
10·0	·895	79·5	70·7	8·8	
11·0	·879	80·8	70·5	10·3	
0·0	·851	81·9	70·5	11·4	
P. M.					
1·0	·824	82·5	71·1	11·4	
2·0	·798	83·0	72·4	10·6	
3·0	·787	83·5	73·0	10·5	
4·0	·785	83·5	73·6	9·9	
5·0	·786	82·7	73·6	9·1	
6·0	·812	81·3	73·0	8·3	
7·0	·835	80·6	72·9	7·7	
8·0	·849	80·0	72·8	7·2	
9·0	·861	79·3	71·8	7·5	
10·0	·854	78·5	71·4	7·1	
11·0	·845	78·3	71·6	6·7	
Mean.	29·835	79·3	71·4	7·9	

Art. XIII—*Extracts from the Proceedings of the Society.*

At a Monthly Meeting of the Bombay Branch of the Royal Asiatic Society held in the Library rooms on Wednesday the 12th July 1843.

The Hon. G. W. Anderson, President, in the Chair.

A large and beautiful Map of the Rivers Jud and Haines in North Eastern Africa, lately partially explored by Lieutenant W. Christopher, I. N., was submitted for the inspection of the members by the President.

The Secretary laid on the table a copy of the fifth number of the Society's Journal, and it was resolved to continue the publication in the same form, as papers were received.

The Secretary then intimated that agreeably to the instructions of the Society, a case of Geological Specimens had been packed and were ready for transmission to the Museum of the Economic Geology of India, and that another case was nearly ready for the Museum of the St. Andrew's Society.

The following donations to the Library were then submitted to the meeting :—

1. By Government, Copy of 4th Edition of the Law relating to India and the East India Company, by Government.

2. By Do. through the Medical Board, Medical Topography of the Presidency Division of the Madras Army.

3. Do. of the Centre Division of the Madras Army.

4. By Lieutenant E. B. Eastwick, Copy of Easy Lessons in Chinese, by S. W. Williams.

5. By the Right Rev. Dr. Whelan, Copy of a work entitled Apercu Géneral sur l' Egypte, par A. B. Clot-Bey.

6. Vols. 12, 13, and 14, Memoirs of the Royal Astronomical Society of London, from that Society.

7. By the Rev. J. M. Mitchell, in the name of Major T. B. Jervis. A copy of that gentleman's lithographed maps of the Islands of Bombay and of the Khanat of Bokhara.

At a Monthly Meeting of the Bombay Branch of the Royal Asiatic Society held in the Library rooms on Wendnesday the 9th August 1843.

The Hon. G. W. Anderson, President, in the Chair.

The following papers were read :—

1. Further remarks on silk cultivation in Kattiawar, by Dr. B. A. R. Nicholson, Civil Surgeon, Rajcote.

Resolved, that, with his permission, Dr. Nicholson's paper be forwarded to the Secretary of the Agri-Horticultural Society, for submission to that Society.

2. * A Letter from Ball Gunghadur Shastree, Esq., forwarding an Inscription copied from a stone at Nagpore, with a Balbodh transcription and an English translation, together with remarks to illustrate the Genealogy of the Dynasty to which it refers. This Inscription which is dated in the Samvat year 1161, or A. D. 1105, was received by L. R. Reid, Esq., from Major Wilkinson, Resident at Nagpore.

3.* Observations on the Bactrian and Mithraic Coins in the cabinet of the Bombay Branch of the Royal Asiatic Society, by J. Bird, Esq.

This paper was illustrated by a copy and translation of an inscription from the Cave Temples at Nassick.

4. * A Chart of Observations made on nine different Barometers and one Sympiesometer half hourly, for twenty-four successive hours, with remarks in reference to the state of the weather at Bombay during the present season, by Geo. Buist, Esq , LL.D., in charge of the Magnetic Observatory, Bombay.

5. An Introductory Observation to a metrical translation of the first book of the Raghuvánsá, a heroic poem, by Kalidasa ; by the Rev. J. M. Mitchell.

6. * A Note accompanying a series of Geological Specimens from Aden, collected by the Author and Captain Yeadell, by Geo. Buist, Esq., LL.D.

7. * A Note accompanying a series of Geological Specimens, collected by Commodore Brucks, in the Persian Gulf, by Geo. Buist, Esq., LL.D.

8 * A Translation from the German of the 3rd part of Ehrenberg's celebrated paper on the coral banks of the Red Sea ; by the Rev. C. C. Menge, received through the Rev. G. Pigott.

Read a letter from the Secretary to the Geographical Society, dated 25th July, forwarding a further series of specimens of minerals, rocks, shells, &c. for the Museum, agreeably to the resolution of that body, dated 6th May, 1841.

The following books were presented to the Library :—

1. Transactions of the Agri-Horticultural Society of Western India, by the Society.

2. Memoire sur le lac Moeris, printed at Alexandria, by the Egyptian Society, through Messrs. Frith & Co.

3. Four papers on the Mineral resources of Southern India, by Captain Newbold, F.R.S., by the author.

4. Days in the East, a Poem, by Lieutenant J. H. Burke, Bombay Engineers, by the Author.

To the Museum.

A further very valuable collection of Minerals and Geological Specimens, from Malwa, were presented through the Secretary, by the late Lieut. H. M. Blake, 7th Regt. N. I.

A collection of rock specimens from Aden, the Persian Gulf, Cabool,

and a few fossils from Lower and Upper Scinde, were presented by Dr. G. Buist.

A series of specimens from Egypt were also laid on the table by Dr. Buist.

The Secretary pointed out the form of a fossil crustacean from Scinde, and of those from Egypt, first taken to Europe by him, which would, with other specimens in his possession, go far to prove that the rocks of both these countries were posterior to the formation of the chalk.

At a Monthly Meeting of the Bombay Branch Royal Asiatic Society, held in the Library rooms on Wednesday the 13th September, 1843.

The Hon. G. W. Anderson, President, in the chair.

M. M. Etienne d' Quatremere, Member of the Institute of France, was proposed as an Honorary Member, by Jas. Bird, Esq., seconded by Jas. Burnes, K. H., and Col. T. Dickinson.

In accordance with Act. IX. of the Regulations, the meeting proceeded to an immediate ballot, when M. M. Etienne d'Quatremere was duly elected.

M. M. Chas. D'Ochoa, was proposed as an Honorary Member by Jas. Burnes, K.H., seconded by Jas. Bird, Esq. and the Rev. G. Pigott, and duly elected.

* Read a letter from Mr. John Murray, of Albermarle street, dated 2nd August, declining to undertake the republication of the Society's Transactions.

The Secretary was instructed to communicate with him or Messrs. Longman & Co., with a view to recover the copper plates.

Read a letter from the Honorary Secretary to the Royal Asiatic Society, stating that the 3rd number of the Society's Journal only had been received.

Duplicate copies were directed to be sent by the first opportunity.

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* At the Monthly Meeting of the 14th June, the Secretary submitted to the meeting a proposal by Captain Le Grand Jacob that the Society republish many of the valuable papers in the Transactions.

It was resolved that the Secretary be directed to communicate with Messrs. Murray & Co. on the subject of republishing the 3 vols. of the Transactions in an octavo size, and that the further consideration of the subject be deferred till their answer is received.

The list of members referred to in this letter, was sent by the June mail.

The following papers were read :—

1. * A letter from J. P. Malcolmson, Esq., M. D., of the Bombay Medical Establishment, forwarding a specimen of volcanic rock from Aden, containing metallic mercury, with remarks.

2. * Chemical and microscopic examination of the rock salt of the Punjab, by H. Giraud, Esq., M.D., Bombay Medical Establishment.

The Secretary laid the following donations on the table, from M. M. Chas. D'Ochoa :—

1. Copy " Exercices Pratiques l'Analyse de Syntaxe et de Lexigraphie Chinoise," par S. Julien.

2. " Examen Méthodique des faits qui concernent le Thain-Tehn ou l'Inde," par G. Panthier.

3. " Vindicia Sinica. Dernière Réponse a M. S. Julien," par G. Panthier.

4. " Réponse à l'Examen Critique M. S. Julien, Inséré daus le Numéro de Mai 1841. Du Journal Asiatique," par ditto.

The thanks of the Society were voted to the authors of the papers, and to M. M. Chas. D'Ochoa for the works presented by him.

Copies of the " Vispárád" and " Yáçná," lithographed for the Society, were laid on the table, and it was resolved that copies of the work should be presented to the undermentioned Societies.

The Asiatic Society of Bengal.
The Literary Society of Madras.
The King's Library, Paris.
The St. Petersburgh Academy of Sciences.
The British Museum.
The Dublin University.
The Asiatic Society, Paris.
The University of Bonn, through Professor Lassen.
The Berlin University Library.
The Royal Asiatic Society.
The Edinburgh University.

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* Printed in No. 6 of the Journal.

The University of Leyden.

The Cambridge University, and

The Bodleian Library, Oxford.

It was resolved that copies of the "Vandidad" sent to the Bodleian and Cambridge University Libraries, by two of the members, should be presented in the name of the Society.

The Secretary was directed to present the following works of the Society to Mr. Chas. D'Ochoa :—

A copy of each of the Society's numbers already published, and a copy of the "Vandidad," "Vispárád," and "Yáçná," lithographed by the Society.

At a Monthly Meeting of the Bombay Branch of the Royal Asiatic Society, held in the Library rooms on Wednesday the 11th October 1842 :—

The Hon. G. W. Anderson, President, in the Chair.

The following papers were read :—

1. On the ruined City of Beejapoor, its Persian inscriptions, and translations of the latter into English, Part II., By James Bird, Esq.

2. On the derangement of the atmosphere between the tropics which occurred at the period of the late comet's appearance, by Captain C. Giberne, 16th Regiment N. I.

The following donations were made to the Library :—

By Government, Part I. Vol. III. Wright's Icones Plantarum.

To the Museum.

1. A beautiful collection of minerals from an excavation in the lines of the Sappers and Miners within the Poona cantonments, by Captain F. Wemyss, Engineers, through Colonel Dickinson.

2. A large and beautiful slab of the sulphate of lime, by Col. G. R. Jervis, Engineers.

Laid on the table, a specimen copy of the *Collection Oriental.*

Resolved that the Secretary do order it, if not above 100 francs per volume.

Dr. Burnes then called the attention of the meeting to the approaching departure of Col. Dickinson, one of the *Vice-Presidents* of the Society, and proposed the following resolution, which was seconded by the Rev. G. Pigott :—

" That at the next meeting, it be taken into consideration, how the Society can best mark its sense of Colonel Dickinson's zeal and diligence in forwarding the interests of the Society."

Resolved unanimously, that the above motion be notified in the usual monthly circular, calling the next meeting of the Society.

At an Anniversary Meeting of the Society held in the Library rooms on Thursday the 9th November.

The Hon. G. W. Anderson, President, in the Chair.

The following papers were read :—

1. Miscellaneous remarks on the observations now in progress at the Observatory, Bombay, in reference to Atmospheric pressure, accompanied by plans indicating the variation of the Barometer and Sympiesometer, in reference to this subject, by G. Buist, Esq. LL.D.

1. Memorandum on the Mahratta literature published at the lithographic presses of Bombay, by R. X. Murphy, Esq.

From the Private Secretary to the Honorable the Governor, transmitting a letter from the Secretary to the New York National Institution, proposing to open a correspondence with the Society.

Resolved, that the Society accept the offer of the New York Institution, and that the Secretary be directed to communicate the same to the Private Secretary of the Honorable the Governor, for the information of the Institution.

The Secretary called the attention of the Meeting to a report of the Proceedings of the Asiatic Society of Bengal, in which an application was directed to be made to the Supreme Goverment for copies of the Observevations made at the Magnetic and Meteorological Observatory of Bombay, and suggested that a similar application should be made to the Bombay Government on behalf of the Society.

Resolved, that application be made for two copies of these papers, one for the Library, and one for more careful preservation, amongst the works of reference.

The Secretary submitted a memoradum on the progress made during the year in augmenting and arranging the Museum.

The new catalogue in a nearly finished state was laid on the table. It was stated that it contained all the details usual in Catalogues of Libraries in Europe, and that the old arrangement of the books had been as little altered as possible, consistently with finding space for the books of those departments which had been greatly augmented during the last few years, and with the adopted recommendations of the special Committee.

The Society directed that the best thanks of the Society should be communicated to Charles D'Ochoa, Esq., Honorary Member of the Society, for his great and disinterested exertions in the arrangement of the Library and the formation of the Catalogue.

The following motion, of which due notice was given, was then brought before the meeting:—

"That in consequence of the approaching departure of Colonel Dickinson, one of the Vice-Presidents of the Society, it be taken into consideration at the meeting how the Society can best mark its sense of Colonel Dickinson's zeal and diligence in forwarding the interests of the Society."

It was proposed by Dr. James Burnes, K.H., Vice-President, and seconded by the Rev. G. Pigott:—

"That the Society cannot allow Colonel Dickinson to vacate his place as Vice-President, without tendering to him its best thanks for the great attention which during a long period of years he has devoted to its interests, and for the many useful suggestions he has at different times offered for the advancement of its objects."

Resolved unanimously that the Secretary be directed to forward a copy of the above resolution to Colonel Dickinson.

The accounts of the Society were laid on the table.

The Society then proceeded to the election of Office-Bearers for the ensuing year.

The Office-Bearers elected were as follows:—

PRESIDENT.

The Honorable G. W. ANDERSON.

VICE-PRESIDENTS.

The Right Rev. LORD BISHOP of Bombay.

The Honorable J. H Crawford.

James Burnes, K. H, F. R. S.

The Honorable Sir Erskine Perry, Knight.

Committee of Management.

C. Morehead, Esq, M.D.	J. L. Philips.
The Rev. G. Pigott.	James Bird, F.R.G.S.
W. Howard, Esq.	Col. G. R. Jervis.
J. Harkness, Esq.	The Rev. J. M. Mitchell.
G. Buist, Esq. LL.D.	S. S. Dickinson, Esq.

J. G. Malcolmson, F.R.S, Esq., Secretary.

Messrs. Forbes & Co., Treasurers.

At a Monthly Meeting of the Bombay Branch of the Royal Asiatic Society held in the Library rooms on Wednesday the 13th December 1843.

The Honorable G. W. Anderson, President, in the Chair.

Read a letter from Lieutenant Colonel Dickinson, acknowledging receipt of copy of the resolution of the monthly meeting of the 10th November, relative to his retirement from the office of Vice-President.

Read a letter from Dr. F. Tanman, Junior, dated Berlin, July 6th, 1843, acknowledging the receipt of a box of Geological Specimens forwarded to him, and requesting to be supplied with a series of Zeolites from Poona, also offering to forward another collection of rare minerals for the Society's Museum.

Read a letter from W. Escombe, Esq., Secretary to Government, presenting 2 copies of the Alif Laila to the Library, by Government.

Read a letter from H. Torrens, Esq., Secretary to the Asiatic Society of Bengal, acknowledging the receipt of a copy of the Vendidad, and of a box of Geological Specimens, and presenting to the Library a series of Oriental works ordered by the Society through Messrs. Thacker and Co. Also a letter from these gentlemen mentioning their having received the books free of charge.

Skins of two species of bears, and a collection of skins, skulls, and

horns of various mountain sheep and antelope, were presented by Dr. Elliot, late of the Indore Contingent, through the Secretary.

A note from J. G. Malcolmson, Esq., was read by the acting Secretary, referring to a very fine silicified palm tree, and the lower jaw of a Mastodon discovered in February at Peermocha near Broach, and presented to the Society. They were found in a marine tertiary sandstone conglomerate which extends over a considerable part of the Broach and Rajpeepla districts.

The following works were presented by Manockjee Cursetjee, Esq., Mémoires des Antiques du nord, and Ultimi progressi geographia.

The thanks of the meeting were directed to be communicated to the respective donors.

The meeting then adjourned to Wednesday the 10th January, 1844.