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OF THE

ASIATIC SOCIETY OF BENGAL,

5403
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THE SECRETARIES.

VOL. XVI.

PART I.—JANUARY TO JUNE, 1847.

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" It will flourish, if naturalists, chemists, antiquaries, philologers, and men of science, in different parts of Asia will commit their observations to writing, and send them to the Asiatic Society at Calcutta. It will languish if such communications shall be long intermitted; and it will die away if they shall entirely cease."—SIR WM. JONES.

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E R R A T A.

PART 1ST.

<i>Page</i>	<i>Line</i>	
301	12	for Triunba read Trúmba.
"	19	for Sherí at el Beitha read Sherí 'at el Beitha.
302	4	for Tarimyer read Tarmiyeh.
"	12	for Jeddiah read Jedídah.
"	18	for Jeddiah read Jedídah.
303	10	for After "When it bore East" read On the right bank, &c.
"	17	for Khiyat read Khayt.
"	24	for Jeddiah read Jedídah.
"	3	for (in note,) Keif read Kúf.
"	6	for Nhar read Nahr.
304	8	for bending read trending.
"	18	for Dojin read Doj'm.
"	3	of note, Seghimeh read Seghirmeh.
"	4	for Sir read Sú, and for Tau read Táúk.
"	67	for Hamria read Hamrín.
"	11	for Hamrool read Hamrín.
"	13	for Physens read Physcus.
"	"	Last of note, Opio read Opis.
305	23	for Daláhee and Lagros read Daláhú and Zagros.
"	24	for Malwujep read Malwiyyeh.
306	28	for approached read approach.
"	29	for was read is.
307	1	for Siel el Azeez read Sid 't Azeez.
308	3 & 5	for Maluryeh read Malwiyyeh.
309	9	for passing read passes.
"	25	for Malwújeh read Malwiyyeh.
313	19	for Hebba read Kebla.
315	3	for round read mound.
"	6	for Shiragoor read Shirazoor.
"	2	of note, "Ustrima" read "Ustrina."
"	13	for Sammariah read Samarrah.
"	18 & 22	for Dina read Dúra.
"	28	for Sammariah read Samarrah.
316	19	for this read thus.
"	24	for present read personal.
317	9	for Yet alij read Tel alij.
"	10	for Apis read Opis.
"	22	for Mahrwan read Nahrwán.
"	24	of note, for it read is.
"	29	for Zellar read Tellúl.
"	37	for Malwryeh read Malwiyyeh.
318	17	for had read hove.
319	16 & 17	for after the numerals ° and not t.
"	16	for Mahirgeh read Malwiyyeh.

<i>Page</i>	<i>Line</i>	
319	21	for Abri Delif & Maluryeh read Abú Delif Malwiyeh.
"	24	for Majainmah read Majammah.
"	25	for On the east side, &c. read On the east side.
"	26	for Mahrwan read Nahrwán.
322	12	of note, for analysis read anabasis.
"	23	for M. Batta' read M. Botta.
323	12	for Asperiall read Aspinal.
"	21	for "Durn" read "Dum."
325	25	for Tekriths read Tekritlis.
326	11	for "Al'arab" read "Al'Arab."
"	14	for Tekrith read Tekritlis.
"	24	for a Scorpii read a Scorpiu.
"	13	for Khanisah read Kanísah.
327	2	for Arnin read a ruin.
"	3	for Kamsah read Kanísah.
"	4	for "El Tet'bha" read "El Fet'hha."
"	6	for S. W. read N. W.
"	4	of note, for (Tageit) read (Tagrit).
328	1	for easting read casting.
"	13	for Khalidj—fresh sentence, Observing, &c.
"	24	for Extending to the Eastd. read Extending to the Eastd. from it ;
"	1	of note, for "E. Seliva" read "El Selwa."
329	2	for Mejiris read Nejiris.
"	"	for Nejin read Nej'm.
"	6	for gazing read grazing.
"	8	for tints read tents.
330	6	for "El Tettha" read "El Fet'hha."
"	9	for Makhal read Mak'húl.
331	31	for Maluryah read Malwiyeh.
"	34	for Tholush read Tho'liyeh.
332	11	for Trumbee read Trúmba.
"	12	of note, for Al Athus read Al Athur.
"	14	for Bukhtyari read Bakhtiyári.

ADDITIONAL ERRATA IN PART 2D.

614	16	for POTAMIDA read POTAMIDÆ.
621	23	for <i>biporcatus</i> read <i>porosus</i> .
623	note,	for <i>Geckotidæ</i> read <i>Geckonidæ</i> .
643	3	for on the Pinang read in the Pinang.
656	5	for <i>Polycopodium</i> read <i>Polypodium</i> .
909	14	for 3½ inch read 0½ inch.
921	30	for HEXAHONOTUS read HEXAGONOTUS.
927	6	for <i>catenularies</i> read <i>catenularis</i> .
929	5	for Dryiphis read Dryiophis.
1066	11	for <i>twelveth</i> read <i>twelvth</i> .

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*Remarks on the Sequel to the Periplus of the Erythrean Sea, and on the country of the Seres, as described by Ammianus Marcellinus :
By JAMES TAYLOR, Esq., Civil Surgeon, Dacca.*

At a period long anterior to the navigation of the Erythrean Sea by the Egyptian Greeks, the Arabians carried on a trade with India, and were the means, either directly, or through the Phœnicians, of supplying the Western world with the valuable productions of the East. It is generally supposed that they availed themselves of their knowledge of the monsoons to make periodical voyages to this country across the open sea, and that they had settlements along its western coast, and even as far south as Ceylon. On these points, however, nothing certain is known ; and with the exception of the fact of there being enumerated in the Sacred Writings particular spices and perfumes which are the indigenous productions of India, there remains little or no evidence of the trade that existed between Arabia and the farther East at the remote period here referred to. Of the extent to which Indian commerce was carried on by the Sabeans, and Phœnicians ; of the commodities they gave in exchange for the merchandize they imported ; or of the emporia on the Indian coast, whither they repaired for the purpose of traffic, we are entirely ignorant : and indeed, of the ancient trade of India generally, it may be said, that we have no authentic information prior to the Christian era.* The earliest work extant, in which a detailed account

* Appendix, No. 1.

No. I. NEW SERIES.

B

is given of the navigation and commerce along the coasts of India, is the *Periplus of the Erythrean Sea*. This treatise is ascribed by some geographers to Arrian of Nicomédia, the author of the *Periplus of the Euxine Sea*, but there is reason to believe that it was written not by him but by an Egyptian Greek of the same name, who, it is generally supposed, flourished early in the second century of the Christian era. Arrian of Alexandria, who appears to have been both a mariner and a merchant, delineates in this narrative or journal, the course of navigation along the coasts of Eastern Africa, Arabia, Persia, and India. He mentions their principal seaports or marts, and specifies the articles of merchandize found in them—distinguishing them by commercial names, composed in some instances, of Greek terms, in others, of words derived from the language of the country. How far Arrian extended his voyage along the western coast of India, we are not informed. It is supposed, however, that he did not proceed beyond Nelkunda, the modern Nelisuram on the Malabar coast: and the account, therefore, which he gives of the countries situated to the south and east of this, is generally considered as the result, not of personal observation, but of information, obtained from native traders, whom he met in the ports of Western India. Rennell was of opinion that, in the time of the Ptolemies, the Egyptians sailed, not only beyond Cape Comorin, but even up the Ganges to Palibothra. It is probable, however, from what Strabo states, that foreigners seldom extended their voyages so far as the capital of India. He incidentally alludes, indeed, to sailing up the Ganges, or against the stream, to Palibothra; but he does not state, whether this was done by Egyptian or by native navigators, while in another place he distinctly informs us that few of the Egyptian merchants, who sailed from the Red Sea to India, ever proceeded to the Ganges; and adds that the persons, who made this voyage, were illiterate and incompetent to comprehend matters or questions relating to Geography.* He describes the Ganges as entering the sea by a single mouth or outlet†—an error which must be ascribed to the imperfect knowledge that the Egyptian traders had of the Gangetic Delta, and which Strabo could not have committed, if these navigators had been in the habit of ascending this river as high as Palibothra. It would seem from the *Periplus*, that the trade between Malabar and Coromandel was

* Strabo, 686.

† Ibid, p. 690.

carried on in the coasting vessels of the country : but that voyages from the latter coast to the Ganges were made in ships, that sailed across the Bay of Bengal. These were native or country-built vessels, and like the ships described by Fa Hian about the end of the 4th century, as sailing from the Ganges to Ceylon and thence to China, they appear to have been manned by Hindoos.* That the Hindoos were a maritime people in ancient times, is now generally admitted. In evidence of this fact, may be mentioned the allusion to marine insurance in the Institutes of Menu, the circumstance of Hindoos having formerly resided in Java, and the notice "in poems, tales, and plays dating from the 1st century before to the 12th century after our era, of adventures at sea in which Indian sailors and ships alone are concerned."† Mention is made in the Brihatkatha of a "king of Bengal who proceeded on an expedition to the coast, and of Srimanta, Chand, and Dhanapati, celebrated native merchants, who made periodical voyages in a fleet to Ceylon."‡ The historians of Ceylon relate that a king named Wijeya, who held the sovereignty of their island for a period of thirty-eight years commencing B. C. 543, was a native of Bengal, and that he had been exiled by his father Singababu, king of the latter country, who, it is said, sent him away with seven hundred followers to seek his fortune on the sea.§ It may be inferred from these circumstances, which so directly prove the early maritime communication between Bengal and Ceylon, that the transportation of merchandize from the Ganges to the marts of Southern India was effected by the natives of the country, that the Egyptian traders seldom extended their navigation beyond Cape Comorin, and that the commercial intercourse that existed between them and the natives of Bengal centred in the ports of Southern India. Arrian appears to have derived his information regarding the navigation of the Bay of Bengal from native traders whom he met in some of these ports, and to their inaccuracy in geographical details, and love of the marvellous, may be ascribed the errors and fabulous statements which occur in his description of the countries, and tribes of Eastern India.

The concluding part of Arrian's journal, which relates to countries

* Professor Wilson's Account of the Foe Kue Ki, in Jour. Royal As. Soc. Vol. 5, p. 108.

† Ibid.

‡ Preface to Bengálí Dictionary by Babu Ram Comul Sen.

§ Knighton's History of Ceylon, p. 11, 51.

eastward of Cape Comorin, is regarded as a supplement to his work, and is hence designated the Sequel to the Periplus of the Erythrean Sea. The first place mentioned in it after leaving Kolkhi, is the bay of Argalus, where the pearls brought from the island of Epiódorus, supposed to be Manar, were perforated ; and where, also, the fine muslins called Ebargeitides were sold. Proceeding along the Coromandel coast, the author enumerates certain marts called Kámara, Padooka, and Sópátma, which carried on an extensive trade with the sea port of Limúrikè. He next notices the island of Palaisimoondus, (the Taprobana of other ancient authors) or Ceylon, which he describes as a country of great extent, "the northern part of which" is civilized and frequented by vessels, equipped with masts and sails; and returning thence to the coast beyond or to the north of the marts above mentioned, he gives a brief account of a district called Masalia, which is evidently the modern Masulipatam. The portion of the sequel, which is descriptive of this place and of countries farther to the east, forms the subject of the following remarks. It is thus translated by Dr. Vincent :—

"Masalia, a district which extends far inland. In this country a great quantity of the finest muslins are manufactured. And from Masalia the course lies eastward, across a bay, to Désarèné, where the ivory is procured, of that species called Bósaré.

"Leaving Désarèné the course is northerly, passing a variety of barbarous tribes ; one of which styled Kirrhadæ, a savage race, with noses flattened to the face. Another tribe are the Bargoosi ; and there are others distinguished by the projection of the face like that of the horse, (or by its length from the forehead to the chin ;) both which tribes are said to be cannibals.

"After passing these, the course turns again to the east, and sailing with the coast on the left, and the sea on the right, you arrive at the Ganges, and the extremity of the continent towards the east called Khrusè [or the Golden Chersonese.]

"The Ganges is the largest river of India ; it has an annual increase and decrease, like the Nile ; and there is a mart on it of the same name, through which passes a considerable traffic, consisting of the Gangetic spikenard, pearls, betel and the Gangetic muslins, which are the finest manufacture of the sort.

“ In this province also there is said to be a gold mine, and a gold coin called Kaltis.

“ Immediately after leaving the Ganges, there is an island in the ocean called Khrusè, or the Golden Isle, which lies directly under the rising sun and at the extremity of the world towards the east. This island produces the finest tortoise-shell that is found throughout the whole of the Erythrean Sea.

“ But still beyond this, immediately under the north, at a certain point where the exterior sea terminates, lies a city called Thina, not on the coast, but inland ; from which both the raw material and manufactured silk are brought by land, through Bactria to Barugáza, or else down the Ganges [to Bengal] and thence by sea to Limúrikè, or the coast of Malabar.

“ To Thina itself the means of approach are very difficult ; and from Thina some few [merchants] come, but very rarely : for it lies [very far remote] under the constellation of the Lesser Bear, and is said to join the confines of the Euxine Sea, the Caspian, and the Lake Meotis, which issues at the same mouth with the Caspian into the Northern Ocean.

“ On the confines, however, of Thina, an annual fair or mart is established : for the Sesatæ, who are a wild, uncivilized tribe, assemble there with their wives and children. They are described as a race of men, squat, and thick set, with their face broad, and their nose greatly depressed. The articles they bring for trade are of great bulk and enveloped in mats or sacs, which in their outward appearance resemble the early leaves of the vine. Their place of assembly is between their own borders and those of Thina, and here spreading out their mats [on which they exhibit their goods for sale], they hold a feast [or fair] for several days, and at the conclusion of it, return to their own country in the interior.

“ Upon their retreat, the Thinaæ, who have continued on the watch, repair to the spot, and collect the mats which the strangers left behind at their departure ; from these they pick out the haulm, which is called Petros, and drawing out the fibres, spread the leaves double, and make them up into balls, and then pass the fibres through them. Of these balls there are three sorts—the large, the middle-sized, and the small ; in this form they take the name of Malabathrum : and under this de-

nomination, the three sorts of that masticatory are brought into India by those who prepare them.

“All the regions beyond this [towards the north] are unexplored, either on account of the severity of the winter, the continuance of the frost, or the difficulties of the country; perhaps also the will of the gods has fixed these limits to the curiosity of man.”*

Such is Arrian's description of the northern part of the Bay of Bengal, and of the countries of the farther East. He professes to trace the course of the navigation from Masulipatam eastward, but is so vague and obscure in his narrative as to lead us to conclude that he never visited this part of India. He delineates a line of coast from Desarene to the Ganges which is entirely imaginary, and places on it people that may be recognized by their names, as tribes which are referred by the Hindoos to the interior of the country. In geographical accuracy, the Sequel is certainly inferior to the first portion of the Periplus, wherein the places on the western coast of India visited by Arrian himself are described, but in other respects it may be considered as equally correct, since most of the countries, tribes, productions, and customs that are mentioned in it, admit of being identified in the present day.

Masalia is evidently the Mæsolia of Ptolemy, the site of which is referred by D'Anville to that of Masulipatam or Masalipatam, as it is written in some books of travels. Masulipatam has long been celebrated for its cotton fabrics. Tavernier mentions as the peculiar manufacture of this place, “painted calicuts” or pencilled cloths, “called Calmendar,”† the finest qualities of which were perhaps the *sindones* (translated muslins) which are here alluded to by Arrian. He also speaks of Masulipatam as possessing the best anchorage in the Bay of Bengal, and as being the principal port on the Coromandel coast, from which vessels sailed to Pegu, Siam, Arracan, Bengal, Cochin China, Ormus, Madagascar, Sumatra, and Manilla.‡ A city called Tarnassari,§ which stood in the vicinity of Masulipatam, is mentioned

* Vincent's Periplus of Erythrean Sea, vol. II. page 523—528.

† Tavernier's Travels in India, Book I. Part II. Chap. XI.

‡ *Ibid.* ————— Book II. ————— Chap. X.

§ Tarnassari, which Dr. Vincent mentions, he could not find in modern maps, but the site of which, he supposes, may have been between Pulechat and Bengal, is laid down in a map attached to Sir Thomas Herbert's Travels (p. 336) on the banks

by Barthema and Vertomannus,* who visited India between the years 1490 and 1502, as the port whence they sailed direct to Bengal. This locality, indeed, appears from the earliest times to have been the point on the Coromandel coast from which most of the vessels destined for distant ports, took their departure; and it may therefore be regarded, as identical with the emporium situated in Mœsolia, and mentioned by Ptolemy as the place *unde solvunt qui in Chrysam navigant*, or with the Masalia of the Sequel, whence vessels sailed to Desarene. The bay, across which the course is mentioned as extending eastward, can be no other, with reference to the position assigned to it, than the upper or northern part of the Bay of Bengal, stretching from Masulipatam to Balasore. No account is given of the ships in which the navigation of this part of the bay was made, but doubtless they were similar to the vessels that frequented the ports of Kamara, Padooka, and Sopatma on the Coromandel coast, where, according to Arrian, were found "the native vessels, which make coasting voyages to Limúrikè, the Monoxyia of the largest size called Sangara, and others styled Colandiophonta, which are vessels of great bulk and adapted to voyages made to the Ganges and the golden Chersonese." The Sangara vessels, (*Σαγγαρά*) named Monoxyia by the Greeks, are met with in various parts of India, and are used both in coasting and inland navigation.† In some of the eastern districts of Bengal as Dacca, Sylhet, and Mymensing, this kind of boat is called Saranga; it consists, as the Greek term *μονοξύλον* implies, of one tree or timber,‡ which is scooped out to form the hull of the vessel,§ two or more tiers of planks being generally placed on each side to enlarge its dimensions. Large canoes of this kind are common in Assam. The Bulam boats of Chittagong,

of the Kistna at some distance inland from Masulipatam. In Nieuhoff's Travels, (in A. D. 1662) it is placed on the south side of the river Nagunda, in the site, apparently, of Temerycotta.

* Vertomannus's Voyages, R. Eden. London, A. D. 1576.

† Pliny mentions that the Monoxyia of the Malabar coast were used for transporting pepper from the interior.

‡ From *μονος* one, and *ξύλον* wood.

§ Dr. Clarke mentions boats of this kind on the Don. (Vide Clarke's Travels in Russia, Tartary and Turkey.) In the South Seas, two of these canoes are joined together by transverse planks forming a kind of deck. The Jangar (Sangara?) of the Malabar coast is a double platform canoe of this description.

and the Goddo vessels of Arracan, are Monoxyla of a large size, and like those mentioned in the text, are used in coasting navigation. These vessels are built of several rows of planks firmly fastened together with coir and ratan. Methold, speaking of the trade between Bengal and Masulipatam early in the 17th century, remarks: "Once a year there arriveth at Masulipatam from thence a fleet of small vessels of burden about 20 tons, the planks only sewed together with *cairo* (a kind of cord made of the rinds of cocoanuts and no iron in or about them)." (Vide Purchas's Pilgrims). The voyage, however, from the Coromandel Coast to the Ganges, was performed, not only in monoxyla, but also in vessels called Colandiophônta, which appear to have been ships of considerable burthen and constructed for sailing on the open sea. Fa Hian, who visited India about the close of the 4th century of our era, alludes to large-sized vessels, which, in all probability, were identical with the Colandiophônta here mentioned. He states that on proceeding to To-mo-li-ti,* a city situated at the confluence of the Ganges with the sea, he found a number of merchants embarking in large ships to sail to the south-west; that he took a passage in one bound for Ceylon: and that the wind being favourable, the north-west monsoon having set in, he arrived there in fourteen days.

The region called Désarênè (Δησαρηνη) situated across a bay and eastward of Masalia, is supposed by some, to be northern Circars—by others, to be Orissa. That it is not the latter province, however, is certain from the fact of Utcala or Orissa, and Désárana or Desarene being mentioned as different countries in the Brahmanda Purana; both being included with Traipura or Tipperah among the kingdoms belonging to the empire of Bharata, and situated behind the mountains of Vindhya.† The term Désarênè on the supposition that it is a compound of the words *des* a country, and *aruni* a wilderness or forest, might be regarded as referring to the extensive tract of jungle on the southern part of Bengal, viz., the Sunderbunds bordering on the sea. Arrian, however,

* To-mo-li-ti is supposed to be the Tamaralipta of the Mahabharat or the Tamaralipti of the Puranas. It is regarded as the modern Tumlook (Vide Professor Wilson's Account of Fa Hian's Travels in the Journal of the Royal As. Society, No. IX. page 138.)

† "Wilford's Essay on the Sacred Isles of the West." As. Res. Vol. VIII. page 337.

mentions Désarène as situated—not in the vicinity of the Ganges, but at a considerable distance from it; and it is probable, therefore, that he refers to an inland country or tract of jungle, lying on the south-west side of Bengal, and called in ancient times, from its constituting ten forest cantons,—Dásáranya or Dásaráná.* It seems to have comprised Sumbhulpore (celebrated for its diamonds) Sirgoojia, Ramghur, and Chota Nagpore, whence come, according to Wilford, the rivers Cocila or Koil and Bráhmāni, the united streams of which form the river Dosaron of Ptolemy.† In the Vishnu Purana, the Dosarnas are mentioned as a tribe or nation, and are designated by Professor H. H. Wilson in his translation of that work, “the people of the ten forts subsequently multiplied to thirty-six, such being the import of Chát-tisgerh, which seems to be the site of Dosarana.”‡

The words rendered: “the ivory of that species called Bósarè,” are *ελέφαντα τὸν λεγόμενον βοσαρή* in the original. Dr. Vincent supposes that they refer to the horn of the Rhinoceros, but it is more probable that *βοσαρή* is a corrupt compound of *Bous*, or *Bos*, and *Arnee*, (the Hindee name of the buffalo) contracted into Bósarè; and that *ελέφαντα* does not here signify ivory, but denotes the gigantic or elephantine size of the wild buffalo. *Baeare*, it may be mentioned, is the name which is given to the wild male buffalo in the eastern part of Bengal. Large bovine animals, as the buffalo and the bison, are frequently compared with the elephant, or have from their huge size, the term *elephant* applied to them. In Abyssinia, buffaloes are called elephant-bulls, not only from their immense bulk, but also from their naked black skin resembling that of an elephant.§ (Rees’s Encyclopedia Art. Bubalus.) Speaking of the Urus (*Bos sylvestris*) of the Hercynian forest, Cæsar remarks: “these Uri are little inferior to elephants in size, but are bulls in their nature, color, figure.”|| Marco Polo, in describing the buffaloes of Bengal, also observes: “Oxen are found in Bengal as tall as elephants, but not equal to them in bulk.”¶ The “*Bos Indicus*,”

* Ancient Geography of India. As. Res. Vol. XIV. p. 391.

† Wilford. As. Res. Vol. XIV. p. 405.

‡ Wilson’s Translation of the Vishnu Purana, page 180.

§ Elephants are mentioned under the name of “*Lacæ boves*” by Pliny.

|| DeBello Gallico Lib. VI. Chap. XXVIII.

¶ Marsden’s Translation of the Travels of Marco Polo.

which Elian mentions as having horns large enough to contain three *amphoræ*,* is evidently the Arnee or wild buffalo of India, which is remarkable for the immense size of its horns. It is the animal described by modern Naturalists under the name of the Gigantic or Taur-elephant Arnee,† an appellation, which it happens singularly enough is synonymous with *ἐλέφαντα βωσαρή*, the latter being a compound of *βωσ* and *αρή*. The Taur-elephant Arnee, which is also the quadruped referred to by Marco Polo, was formerly a denizen of the forests of Ramghur, which, together with Chota Nagpore, formed a part of the region of Dasaranya or Dasarana of the Puranas, or the Dêsarênè of the Periplus. The words, therefore, of the text, *ἡ Δησαρηνη χώρα φέρουσα ἐλέφαντα τὸν λεγόμενον βωσαρή* translated by Dr. Vincent “Desarene where, the ivory is procured of that species called Bôsarè,” should be rendered *Desarene where, the elephant-sized animal is procured of that species or variety called Bôsarè*.

The course or track of sailing after leaving Dêsarêné, is described as extending in a northerly direction along a line of coast inhabited by various barbarous tribes, one of which styled Kirrhadæ (*κίρραδοι*) is characterized as “a savage race with noses flattened to the face.” The Kirrhadæ are regarded by some writers as a tribe of the “mountain and jungle tracts of Orissa,”‡ but the well marked Indo-Chinese feature, here ascribed to them, clearly indicates that they are a people of Eastern India. Dr. Vincent considers them, as the Mughs of Arracan, but it is more probable, that they are the Kiratas of the Puranas, and, that like Dêsarênè, their country is here erroneously described by Arrian, as bordering on the sea. In the Puranas they are designated “forest-ers;” “barbarians;” “mountaineers”§—appellations which are understood as referring to the inhabitants of the mountains of Eastern India. In the Brahmakanda Purana they are described as “shepherds living on the hills to the north-east of Bengal.”|| The Kiratas, who possess a

* Cuvier's “Theory of the Earth,” page 69.

† “The Gigantic or Taur-elephant Arnee which appears to be a rare species, only found single or in small families in the upper eastern provinces and forests at the foot of the Himalaya, though formerly met in the Ramghur districts.” (Cuvier's Animal kingdom by Griffith's and others. Vol. IV. p. 389.)

‡ Murray's Ency. Geograph. Part I. Book I. Chap. II. Sec. VII.

§ Wilson's Translation of the Vishnu Purana, pages 175 and 190.

|| Wilford's Essay on the Sacred Isles of the West. As. Res. Vol. VIII. p. 38.

tract of hilly country in the Morung, to the west of Sikhim, and situated between Nepal and Bhotan, appear to be the descendants of the ancient Kiratas. Like almost all the aboriginal hill tribes of Eastern India, the Kiratas have the Mongolian features ascribed to the Kirrhadæ: they are described as a brave and warlike race, and are said to have been an independent and a powerful people in former times. One of the ancient dynasties of Rajahs that governed Nepal, belonged to the "Kirrat tribe of Eastern mountaineers." It comprised twenty-seven princes, the first of whom reigned B. C. 640.* The founders of this dynasty were probably Hindus, viz., the Kiratas classed by Menu among the tribes who were expelled from the caste of Kshatriyas. That the Kirrhadæ of the Sequel are identical with the Kiratas of the Puranas, or Kiratas of the Morung, is further probable from the circumstance of the Bargoosi being associated with them—the latter tribe being the Bhargas mentioned in the Vishnu Puranas, as neighbours of the Kiratas.† Arrian has erred in placing the Kirrhadæ on the coast and on the western side of the Ganges. Ptolemy, with greater accuracy, has assigned to them an inland position eastward of that river. He describes their country as one of *India extra Gangem*, situated higher up than, or north-west of, a range of mountains called Mœandrus,—in the vicinity of which, there was a tribe or people named Pladæ, or Besadæ. Mœandrus is the Garo range of hills to the east of Sylhet and Mymensing—the position assigned to it by D'Anville; while Kirrhadia, from the relative situation given to it by Ptolemy, may be regarded as the country of the Kiratas in the Morung. The Besadæ, like their neighbours the Kirrhadæ, are described as flat-nosed, broad-faced, of a white colour (that is of a fair complexion when compared with the people of the plains) and of a short stature, which are characteristic features of most of the hill tribes on the eastern frontier of Bengal. The country of the Kirrhadæ, according to Ptolemy, was celebrated for its malabathrum; and on the supposition that this article is betel, Vincent refers the Kirrhadæ to Arracan and the country about the mouth of the Megna, where betelnut is extensively cultivated. Malabathrum, however, is not betel, but a species of *Cinnamomum albiflorum* which abounds in

* Prinsep's Genealogical Tables.

† Wilson's Translation of the Vishnu Purana, page 190.

the valleys along the base of the mountain ranges from Sylhet to Missouri.* It is said to be of a superior quality in the Morung, and doubtless, it is to this latter locality, which constitutes the country of the Kiratas, that Ptolemy alludes, when he states : *ὅτι δὲ τὴν Κιρραδίων ἐν ἡ φασὶ γίνεσθαι τὸ κάλλιστον μαλάβαθρον*, viz., that the best malabathrum is produced in the country of the Kirrhadæ.

The Bargoosi (*Βαργουσι*) are an ancient hill tribe of Eastern India, called Bhargas in the Vishnu Purana.† The Bhargas and Kiratas are there mentioned as people of the East who were subdued by Bhima. This accords with a tradition current in Nepal and in the Morung, viz., that Bhimsen the son of Pandu (the Bhima of the Vishnu Purana) had dominion in that part of India, it being further stated that he was the “king of 1,10,000 hills that extended from the source of the Ganges to the boundary of the Plub, or people of Bhotan.” The Kirats mention Belkath in the Morung, as having been the site of the capital of his kingdom.‡

The mention of people “distinguished by the projection of the face like that of the horse (*ἰπτιοπροσώπων* and *μακροπροσώπων*) is not a fiction of Arrian’s, but an absurdity, which he borrowed from the natives of the country, various fabulous or marvellous tribes of the description alluded to in the text, being mentioned in the Puranas, as inhabiting the mountains of Eastern India. Wilford, in speaking of a people in the vicinity of Bhotan, described by Ctesias as having the head and nails of a dog, remarks : “We read also of tribes with faces like horses in these mountains.”§ He also states that mention is made in the Vara Sanhita Purana of a people called “Asvavadana” or horse-faced, and “Purushada” or cannibals.|| The belief, indeed, in the existence of people of forms or shapes, such as are here mentioned, has been entertained by the natives of India from the earliest times ; and to them, doubtless, must be ascribed the origin of the numerous fabulous stories related by ancient authors from Megasthenes downwards, viz., “of men with ears so large that they could wrap themselves up in them, of others

* Buchanan—Royle.

† Wilson’s Translation of the Vishnu Purana, page 190.

‡ Martin’s Eastern India, Vol. 3, p. 38. As. Res. Vol. IX. page 68.

§ Wilford. As. Res. Vol. IX. p. 68.

|| Wilford. As. Res. Vol. VIII. p. 338.

with a single eye, without mouths, without noses, with long feet and toes turned backwards, of people only three spans in height.”*

The existence, however, of cannibals in the hilly countries bordering on the eastern frontier of Bengal is not fabulous, but a fact which is generally admitted in the present day. It was known to Herodotus upwards of two thousand years ago. Speaking of the natives of India, he remarks : “Some inhabit marshes and live on raw fish which they catch in boats made of reeds divided at the joint, and every joint makes a canoe. These Indians have a dress made of rushes which, having mowed and cut, they weave together like a mat and wear in the manner of a cuirass.” This account seems to refer to the aboriginal tribes of the low country beyond the Ganges, or the ancient inhabitants of the marshes of Mymensing and Sylhet. It is stated that to the east of them there are other Indians called Padæi (παδαῖοι) who are cannibals. Tibullus† describes them as a people of the farther east ; and though they have been mentioned by Cellarius as belonging to India intra Ganges, yet it is certain from his testimony and that of Herodotus, as is stated in the work, entitled “Universal History,” that they were situated “to the east of the Ganges and even at a considerable distance from it.” Herodotus, speaking of their customs, observes—“If any man among them be diseased his nearest connexions put him to death, alleging in excuse that sickness wastes and injures his flesh. They pay no regard to his assertions that he is not really ill, but without the smallest compunction deprive him of life. If a woman be ill, her female connexions treat her in the same manner. The more aged among them are regularly killed and eaten : but to old age there are very few who come, for in case of sickness they put every one to death.”‡ The practice here detailed is followed in the present day by a tribe of Kookis, who reside far in the interior of the Tipperah country. An intelligent native, who

* Robertson’s Ancient India, p. 34.

“The Assamese believe in the existence of a tribe called Barkanas having ears hanging down to the waist : the left ear serves as an ample bed to sleep on with sufficient to spare to wrap the body up in.” Wilcox. As. Res. Vol. XVII. p. 456. Appendix, Note II. The same idea is also entertained by many of the natives about Dacca.

† “Ultima vicinus Phœbo tenet Arva Padæus.” Lib. IV. Eleg. 1. V. 45.

‡ Rennell’s Herodotus, p. 308.

had been employed by the late Mr. Scott, Governor General's Agent in Assam, to explore some of the countries in the vicinity of that valley, lately assured me that he and his party once met a tribe of Kookis, who made it a practice to kill the sick and aged among them, and to eat their flesh. He mentioned that he had ocular demonstration of the fact, and that he ascertained it was the practice among them, to allow neither the aged to die from natural decay, nor the young or old to be cut off by disease, but to anticipate this result by slaying them, and then to eat their bodies. They believed that by so doing, they prevented the transmigration of the soul of the deceased into the body of an inferior animal, and that they thus retained it among them. The Battas of Sumatra, and the tribe of Gonds called Binderwurs,* near the source of the Nerbuddah, are cannibals like the Kookis here mentioned. They kill and eat the sick and the aged among them. Dr. Leyden considers the former as the Padæi of Herodotus, but it is more probable that the latter were the cannibals of the Tipperah hills. Besides the Kookis of the Tipperah and Chittagong hills, there are other tribes called Abor and Tikleya Nagas on the northern part of Assam, who are mentioned by Dr. Buchanan as cannibals. They appear to be the Anthropophagi of Ptolemy, mentioned by him as inhabiting together with the Annibi, &c. a country on the northern side of Serica.

Arrian states, that "after passing these," (viz., the Kirrhadæ, Bargoosi, and other barbarous tribes) "the course turns again to the east, and sailing with the coast on the left and the sea on the right, you arrive at the Ganges." This has been supposed to refer to that part of the bay which extends from Orissa to the eastern mouth of the Ganges; but the tribes, mentioned in the text, cannot possibly be identified with people inhabiting any part of the coast situated between Masulipatam and the Ganges; and the course or track of sailing, which Arrian here describes, must, therefore, be regarded as erroneous. Désarène and the country of the Kirrhadæ and Bargoosi are, not maritime, but inland regions; and it is obvious, therefore, that the line of coast, which is here delineated, is entirely imaginary.

Arrian correctly describes the Ganges as being the largest river in India, and as having an increase and decrease, or a periodical rise and fall, like the Nile. Herodotus alludes to the Ganges, not by name, but

* Coleman's Hindu Mythology.

as the river beyond which, the tribes living in marshes and the cannibals called Pādæi, were situated. Iambulus, the history of whose life and travels is recorded by Diodorus Siculus,* appears to have been the first foreigner who arrived at the mouths of the Ganges. It is not known in what age he lived, but it is probable, that it was subsequent to Alexander's expedition to India. He and his companion after leaving the island (supposed to be Ceylon) where they had resided for seven years, came to the territory of a king of India, *through sandy and shallow places of the sea* (the mouths of the Ganges), and were there shipwrecked. The companion of Iambulus was drowned, but he himself was cast on shore and carried by the villagers to the king at the city of Palibothra, many days journey distant from the sea. The king, who had a great regard for the Greeks, received him well, and supplied him with the means of enabling him to return to Greece. Strabo, as I have already stated, describes the Ganges as having only one mouth. Ptolemy, however, mentions it as terminating by five branches called Cambusiam, Magnum, Camberichum, Pseudostomum and Antibole, which are enumerated with reference to their relative position as first, second, third, fourth, and fifth—Cambusiam the most westerly branch, being the first, and Antibole the most easterly, the fifth one. Wilford remarks: "Ptolemy's description of the Delta is by no means a bad one, if we reject the longitudes and latitudes as I always do, and adhere solely to his narrative which is plain enough." Accordingly, he identifies the Cambusiam branch with the Balasore river, which, he states, was in former times erroneously supposed to be a branch of the Ganges. The Ostium magnum is regarded as the Hooghly. The Camberichum derives its name from the Cambadacca or Cambaric river—the Jumna or Jubuna river which unites with the Ganges and Saraswati at Treveni near Hooghly. The Pseudostomum, or false mouth, was probably so called, because it lay "concealed behind numerous islands," and was "often mistaken for the easternmost branch of the Ganges." Antibole was the most eastern channel of all, and is the Dacca river, or the old Ganges, as its name of Buri-Ganga imports. It seems from the Periplus Marciani Heracleotæ† to have been the limit or boundary of India extra Gangem, and the point from which measurements and dis-

* Lib. II. Cap. IV.

† Geograph. Veter. Script. Gr. Minores. Hudson, Vol. I. p. 28.

tances relating to countries in India were frequently made. Pliny alludes to a large island situated between two branches of the Ganges. It was called Modogalica or Modogalinga, and is described as constituting the territory of a separate people or nation. According to Wilford, the upper part of the Bay of Bengal was divided into three parts, called in general Calinga, or the sea shore in Sanscrit, from its abounding with creeks. Modo-Galenca or Galinga from the Sanscrit Madhya Calinga, or middle Calinga, comprised the Delta of the Ganges; the country between Cuttack and the western branches of the Ganges being the western Calinga, and Arracan or the country of the Mughls the eastern one (Errata et Addenda As. Res. Vol. IX.). Madukali, supposed to signify *Madhas creek*, seems rather to be synonymous with Madhya Calinga, or the middle region of creeks, and to be identical, therefore, with the Modogalinga of Pliny. Modukali is situated on the river Borrassia between the Jessore and Furreedpore districts. Satore, which is within a few miles of it, is evidently a place of great antiquity: and, in all probability, it was the site of the capital of the ancient Modogalinga. There are a great many ancient tanks in its vicinity, and large quantities of bricks are still found at a great depth under ground. There is also a very large mosque here, which appears, from its style of architecture, to have been built soon after the Mahomedan conquest of the country.*

The mart, which derived its name from the Ganges, (*ἀμπόριον ἐν τῷ δμάνυμον τῷ ποταμῷ ὁ Γάγγης*) appears from the circumstance of the fine Gangetic muslins being mentioned as an export from it, to have been an emporium situated in the vicinity of Dacca, where the finest cotton fabrics in all India have been made from the earliest times. It is likely, that it stood in the neighbourhood of Sonargong, situated about twelve miles to the south-east of the city of Dacca. Sonargong (Suvernagrama) is mentioned in the Sanscrit work called *Jatimala*,† as one of the countries in which the descendants of certain brahmins from Sacadwipa

* This mosque is perhaps the largest in the southern part of Bengal. It has nine domes supported by as many stone pillars, and its walls are of great thickness. The date of its erection is not known, but it is probable, from its style of architecture resembling that of some of the mosques of Vicramapura and Sonargong, that it was erected in the 13th century.

† See enumeration of Indian classes. As. Res. Vol. V. p. 56.

settled in early times. A remote antiquity also attaches to it, from its possessing a place called *Panchomee Ghaut* which, tradition asserts, derived its name from the circumstance of the five sons of Pandu, viz., Yudhisthera, Bhima, Arjunah, Nakula, and Sahadeva, having bathed there on the occasion of the Asocashtami festival, which is held in the month of March. In the historical annals of Ceylon mention is made of Singababoo, who shortly before the death of Buddha, obtained the throne of Bengal, then designated Wango, apparently a corruption of Vanga or Banga (See Knighton's History of Ceylon). The ancient Hindu capital of the kingdom of Banga, or Bengal, was situated (at a later date than that above referred to) in the vicinity of Sonargong, at a place called Vicramapura.* The latter now constitutes a pergunnah, which comprises a considerable tract of country around Feringy-bazar on the western bank of the Issamuty,† formed by the junction of the Dellasery and Luckia rivers. It is said to have been originally an island, and to have derived its name from Rajah Vicramaditya, who is supposed to have resided here for some time. This prince was probably Sriman Hersha Vicramaditya, the ruler of Oojeen, "who, after expelling the Mlèch'chhas and destroying the Sacas, had established his power and influence throughout India." Pravaraséna, a king of Cashmere, who flourished in the second century of the Christian era, is said to have waged war against the kingdoms of the south, and to have defeated the son and successor of Vicramaditya, named Pratapa Sila or Siláditya. He is represented by Bedea ad-din, a Mahomedan historian of Cashmere, as having invaded Bengal; and after subduing Behar Sinh, the ruler of Dacca (Sonargong), he is said to have given the government to Palas Sinh, the son of Siláditya, whom he had conquered.‡ Vicramapura was, at a subsequent period, the place of residence of Adisur and Bullal-sen, whose rule, it is well known, extended over the whole of Bengal. Prior to the time of Adisur, Bengal was under the government of the kings of Magadha, from whose yoke he is said to have delivered it. Banga was the eastern kingdom belonging to his

* "Vicramapura in Bengal, which is Paundraka" is inscribed on the Kesava Sena Plate found at Edilpore in zilla Backergunge (Vide Jour. of As. Society, No. 73, for January 1838.)

† See Rennell's Map of the environs of Dacca.

‡ As. Researches, Vol. XV. page 41.

dominions, and from it Bengal derived its name. Bullal-sen, who is supposed to have reigned in the 12 century* of our era, is generally regarded by the Hindoos, as the adopted son and successor of Adisur; but in the Ayeen Akbery, these princes are represented as the founders of two distinct dynasties—the Pal Rajahs being placed between them. Bullal-sen, regarding whose birth the natives have some fabulous stories, is said to have been descended from the family of Dhee Sinh, who reigned over Hindoostan, and whose descendants sat upon the throne of Delhi for a period of 137 years.† Lakhsmān (Lokymon), the son of Bullal-sen, built the town of Gour, in the vicinity of which there were, prior to his time, only small forts to which Adisur and Bullal-sen occasionally came from Sonargong, to watch over the frontier. It is mentioned by Rennell, on the authority of Dow, that Gour was built about 730 years before the birth of Christ, but according to Dr. Buchanan, there is no tradition to this effect among the natives of the country. The latter states: “When Adisur erected a dynasty that governed Bengal, although he resided mostly at Suvarnagram or Sonargong near Dhaka, he had a house in Gour, then probably near the western boundary of his dominions. The same continued to be the case during the government of his successor Bullal-sen. His son Lakshman, or Lokymon, extended his dominions far to the north-west, made Gour the principal seat of his government, and seems to have built the town in Gour, usually called by that name, but still also known very commonly by the name of Lakshmanty, corrupted by the Moslems into Loknowty. His successors, who seem to have been feeble princes, retired to Nodiya (Nuddea) from thence they were driven to the old eastern capital of Bengal.” (Martin’s Eastern India, Vol. III. page 68.)‡ The place where the palace of Bullal-sen stood, is still pointed out by the natives of Vicramapura. It is called Rampal, and is situated about two miles inland from Feringy-bazar.§ The site of the palace itself is named Bullal-baree, and like that of Bullal-sen’s residence at Gour, it consists of a level spot of ground covering an area of about 400 yards, surrounded by a wide ditch. No traces of buildings are to be seen on the surface of this inclosed space,

* *As. Researches*, Vol. V. page 64.

† See Preface to *Bengali Dictionary* by Babu Ramcomul Sen.

‡ *Vide Appendix*, Note II.

§ *Rennell’s Map of the Environs of Dacca.*

but in its immediate vicinity and in the country to some distance around it, there are found at a great depth under ground, the foundations of walls from which large quantities of bricks have been dug, and sent to Dacca and different places in the neighbourhood. Sculptured images of Hindoo gods, pieces of timber, large slabs of stone, and various articles of gold, and copper, consisting of ornaments and of vessels used in celebrating poojahs, have been excavated from these places. There is a tank in the centre of Bullal-baree, in which were deposited, it is said, the ashes of the Hindoo prince, who governed this part of Bengal, when it was invaded by the Mahomedans. It is called "Mitha Pukar," and is said by the natives to have belonged to that part of the palace which was occupied by the females of the Rajah's Court. Near it is the Agnikunda, where the funeral pyre was kindled. Tradition asserts that the Rajah, when he went forth to oppose the invaders of his territory, took with him a carrier pigeon, whose return to the palace was to be regarded by the prince's family as an intimation of his defeat, and a signal therefore to put themselves to death. He gained the victory, it appears, but unfortunately, whilst he was stooping to drink from the river after the fatigues of the day, the bird escaped from the loose folds of his dress in which it was concealed, and flew to its destination. The Rajah hurried homeward, but arriving too late to avert the consequences of this unhappy accident, he threw himself upon the funeral pile still smoking with the ashes of his family, and thus closed the reign of the last dynasty of Hindoo princes in this part of India. The other objects of antiquity pointed out by the natives are a large tank on the banks of which the Rajah's elephants were picketed; the remains of a road leading to Sonargong on the opposite side of the river; several small mounds called Deool-baree, the sites of Hindoo temples: and a few more recent structures as mosques and bridges. One of the mosques is said to have been built by Pir Adam, who obtained possession of the country after the death of the Rajah. The natives state that there was in ancient times in Vicramapura, a mart called Lakhi bazar, which was under the direct control of the Rajahs, and that it was so designated from the circumstance of no merchant being allowed to carry on traffic in it, who was not possessed of property to the amount or value of one lac of rupees. This tradition, however improbable it may appear as regards the origin of the name of the mart, is in other respects, in strict accord-

ance with the spirit of the ancient Hindoo laws, which gave to the king a direct interference in the commercial affairs of the state. "In commercial affairs the king," says Heeren, "was permitted to exercise an extraordinary degree of influence. He might absolutely forbid the exportation of merchandize, or reserve the whole monopoly to himself. He issued ordinances relative to the buying and selling of goods; he regulated the price of the market, and received as his customary dues five per cent. on the profits of sale."* The mart of Vicramapura stood in a part of Bengal, which, from its numerous navigable rivers, possesses great facilities for inland trade. Situated at the confluence of the large rivers, which proceed from Sylhet, Assam, and Rungpore, and having a direct communication with the Bay of Bengal, this place was no doubt the centre of an extensive trade, which yielded, in the shape of customs and imposts on its merchandize, a considerable portion of the royal revenues of the Rajahs of Banga. Sir W. Jones alludes to a town situated on an island at the confluence of the Ganges and Brahmaputra, which derived its name from Lacshmi, the goddess of wealth,† and which may, therefore, be considered as identical with the Lakhi bazar of Vicramapura. There are no traces of this mart now to be seen, but from the names of several places in the vicinity of Rampal, as *Sanchacara-bazar*, or shell-cutters' bazar, *Pan-hatta*, or betel-leaf market, *Recabee-bazar*, &c. it is probable that this spot was the site of a city in former times. From the appearance which the country presents, it is further probable that this city was not built in a compact form, but consisted, like all Hindoo towns in the lower part of Bengal in ancient times, of detached groupes of houses erected on elevated portions of ground interspersed with gardens, fields, and creeks,—constituting *paras*, or separate municipal divisions assigned to people of different castes and trades.‡ Wilford refers to this locality a town, which, he says, was called Antibile by Ptolemy,

* Heeren's Asiatic Nations, Vol. III. C. II. p. 349.

† Sir W. Jones's Works, Vol. VII. p. 383.

‡ In the lower part of Bengal there appear to have been comparatively few brick buildings in ancient times. The expense of erecting durable structures of this kind must have been considerable, as the only lime that was procurable here was made from shells gathered on the drying up of the marshes in the cold season. All the very old mosques in Sonargong and Vikramapura were built with shell-lime, which from its great purity and whiteness, is said to have been made from cowries.—The houses were constructed of bamboos and straw, and in making buildings of this

and Antomela by Pliny : he states that its Sanscrit name was Hastimalla, or Hathi-malla in the spoken dialects, and that both it and the country about it were called Hastibandh, because the Rajah's elephants were picketed there. (As. Res. vol. xiv. 444.) Murray places the Gangetic mart of the Periplus in the site of Chittagong.* Heeren remarks in regard to it : "at the mouth of the Ganges merchandize was conveyed to a town of the same name : situate probably in the neighbourhood of Duliapur to the south-east of Calcutta and on the central branch of the river." He quotes Mannert and adds in a note "its situation however cannot be defined with precision. It was not merely the emporium for Chinese commerce, but also for the productions of Bengal particularly fine muslins."† The articles of Chinese commerce here alluded were silk, iron, and skins from Serica, which appears to be Assam ; the other exports (not the produce of Bengal) that are mentioned in the text, viz., malabathrum and spikenard—were procured, the former from Sylhet and Assam—and the latter from Rangpore. It may, therefore, be inferred from the great commercial intercourse that has long been established between these places and Dacca, that the mart through which these articles passed, was situated in the vicinity of the latter—it being contrary to probability that they should have been sent to a town on the western branch of the Ganges, while Vicramapura was the capital of the ancient kingdom of Banga, and the site, according to the traditions of the natives, of a rich mart. Was the Gangetic mart of the Periplus identical with the Gange regia of Ptolemy? With regard to the name of the latter, I may observe, that mention is made by some of the older geographers of two cities called Gange. In enumerating the mouths of the Ganges, Cellarius remarks : "Inter ostia fuit urbs Gange Ptolemæi diversa ab Artemidori Gange, modo dicta ad superiores partes hujus fluminis." The Gange Artemidori was situated above, or to the north-west of Palibothra. This appears from the account which Strabo, on the authority of Artemidorus, gives of the course of the Ganges.‡ He states that this river, on emerging from the

kind, the people of Sonargong are said to excel. They are frequently ornamented in the interior with painted reeds or bamboos and fine mats.

* Murray's Encyclopædia of Geography, Vol. I.

† Heeren's Asiatic Nations, Vol. III. p. 183.

‡ Strabo, Lib. XV. p. 719.

Himalayan mountains and entering the plains of Hindoostan, flows to the south as far as a city called Gange, and that thence it runs in an easterly direction to Palibothra and the sea. Wilford identifies it with Allahabad. Gange Ptolemæ, on the other hand, stood in Bengal, and apparently in its southern part, for it is mentioned by Ptolemy as situated near the mouths of the Ganges (*περὶ τὰ στόματα τοῦ Γάγγου*). The longitude assigned to it by Ptolemy is nearly that of the Camberichum branch of the Ganges, or the meridian of the middle part of the Gangetic Delta. The city of Tilogrammum is placed near the mouth of this river, and Gange regia about one degree farther to the north. D'Anville places Gange regia at Rajhmal,* and Rennel at Gour.† Wilford in assigning a locality to it, mentions in different parts of his writings, two sites to which he refers it: the first is Satgong or Hoogly, and the second is Calcutta, supposed by him to have been anciently called Chatragram—the metropolis of a district called Gunga-Reddha.‡ Some geographers of the sixteenth and early part of the 17th centuries considered Gange regia as identical with the city of Bengala,§ which stood in the eastern part of Bengal. It seems not improbable, however, from Vicramapura having been the seat of the Gangetic mart of the Periplus, and the ancient capital of Bengal, that this place was the site of Gange regia, the capital of the Gangaridæ, whose territory comprised the country about the mouths of the Ganges, and extended, according to Curtius, beyond or to the east of that river—it being in accordance with the constant experience we have of Asia, which shows, as Heeren states, “that royal cities are always the principal depôts of inland traffic.”

The exports from the Gangetic mart were malabathrum (rendered betel in the text), spikenard, pearls, and muslins, (*ὅτε οὐ φέρεται τὸ τε μαλάβαθρον καὶ ἡ γαγγητικὴ νάρδος καὶ πικρὸν καὶ σινδῶνες αἱ διαφορόταται αἱ Γαγγητικαὶ λεγόμεναι.*)

Malabathrum is supposed by Salmasius, Vincent, and other writers to be betel-leaf, but as the former article was imported into Rome, and as the latter is used in its fresh or green state, and is spoiled by being

* D'Anville's Ancient Geography.

† Rennel's Memoir of a Map of Hindoostan.

‡ As. Res. Vol. XIV. p. 380, and Vol. V. p. 278.

§ Vide Appendix, No. III.

transported to a distance, it is obvious that they are not identical. It has also been regarded as tea, but it is now generally admitted, as will be afterwards shown, to be the leaf of the *Cinnamomum albiflorum*, which abounds in the valleys along the foot of the hills from Sylhet to Mussoori. It appears to have been prepared for exportation in the vicinity of the places where it grows, and was thence conveyed to the Gangetic mart to be shipped to the ports of Southern India.

Gangetic spikenard was so called, it is supposed, by Dr. Vincent, because it passed through the mart on the Ganges. It is the *Nardostachys Jatamansi*, a species of Valerian, which grows in Bhotan, and which was imported into the Gangetic mart from Rhandaramacotta or the modern Rungpore. Pliny mentions a variety of nard which grew on the banks of the Ganges, but as it is described by him as having a strong disagreeable taste, on which account it was designated *Ozanitis*, and as it was held in no estimation, it is not probable that it is the article referred to in the *Periplus*. Marco Polo mentions spikenard among the articles of export from Bengal in his time.

The pearls that passed through the Gangetic mart appear to have been obtained from the rivers of the eastern part of Bengal. Though small and of inferior quality, these pearls were, no doubt as much in demand among the poor, as the more valuable pearls from Perimula, Ceylon, and the Persian Gulf were among the rich. The Romans purchased pearls wherever they were to be obtained, and are said to have even invaded Britain for the sake of the pearls that are found in one of the rivers of Wales.* Robertson remarks: "Among all the articles of luxury, the Romans seem to have given the preference to pearls. Persons of every rank purchased them with eagerness; they were worn on every part of dress, and there is such a difference both in size and in value among pearls that while such as were large and of superior lustre adorned the wealthy and the great, smaller ones and of inferior quality gratified the vanity of persons in more humble stations of life."† It seems not improbable, therefore, from the ready market which pearls of every kind and quality met with at Rome, that the inferior pearls of the eastern part of Bengal were exported in ancient times. They are found in a species of muscle in the rivers and marshes of the *Dacca*, *Tipperah*, and *Mymensing* districts, and are collected by the *Buddeahs*,

* The river *Conway*. Vide *Suetonius*.

† *Robertson's Ancient India*, p. 58.

a vagrant gipsey tirbe, who live in boats throughout the year. They dispose of the shells, which are used for domestic purposes by the Hindoos, and sell the pearls at the annual fairs which are held in Vikramapura, Sonargong, and Bhowal. The pearls found in the present day are small, of a reddish colour, and generally of little worth, but occasionally, a pair of the value of 100 Rs. is met with; the Buddeahs sell the ordinary kind by weight to dealers in precious stones, who frequent the fairs for the purpose of purchasing them. The quantity sold by them, at the Cartick Barnee, or fair held in Vikramapura in 1841, was estimated at three thousand rupees in value; one pair was disposed of at one hundred rupees. The pearls suited for ornaments are retailed by the merchants at a price ranging from four annas to four rupees per ten pairs, and the rest are disposed of to native physicians for medicinal purposes.

The Gangetic muslins described in the text as the finest fabrics of the sort, are the fine muslins of Sonargong, and of the other places of manufacture in the district of Dacca. It may be inferred from one of the Institutes of Menu,* that the cotton manufacture was a branch of industry of considerable importance in his time, and that, therefore, the art of weaving the finest cloths was practised even in that early age. It is probable that these fabrics were exported from Sonargong from a very early period, and that they constituted the delicate vestures so frequently alluded to by Latin authors, under the names of *vestes tenues vel pellucidæ, ventus textilis, nebula*. The extreme tenuity of texture, which these terms imply, is a quality that belongs, rather to a cotton, than to a silken fabric, and leads us to conclude that the cloths so designated were the very fine transparent muslins of Dacca. The term *kapides*—derived from the Sanscrit *Karpassa* or Hindee *Kapas* signifying “cotton,” was also used to designate fine muslins. It is employed by the author of the Periplus in two senses, viz. first, to denote the raw material of cotton, as when he states that the region of Membarii is fertile in Karpasos from which the Indian cloths are manufactured; and secondly, as the name of fine muslins, in which acceptation it would seem to refer to the Gangetic muslins of the text. The two Mahomedan

* Let a weaver who has received ten palas of cotton thread, give them back increased to eleven, by the rice-water and the like used in weaving; he who does otherwise shall pay a fine of ten panas. (Inst. No. 397.)

travellers of the 9th century state that cotton garments were made in the kingdom of Rami "in so extraordinary a manner that no where else was the like to be seen." The country which is here alluded to is evidently Bengal, from the circumstance of Rhinoceros' horns, Lign Aloe, and skins being mentioned as exports from it, and of shells being used as money. The cotton garments are described as being so fine, that a web might be drawn through a ring of middling size. This is a test which has been used by the Dacca weavers from time immemorial, and there can be no doubt, therefore, that the fabrics here alluded are the Dacca muslins.

The gold mine mentioned in the text appears from the words λέγεται ἔτι καὶ χρυσορυχία περὶ τοὺς τόπους Ἰνῶν in which it is described in the original, to have been situated not exactly *in*, but rather *in the vicinity of*, the province to which the Gangetic mart belonged. The words must be considered as referring not to the alluvial plains of the Gangetic Delta, but to a country in its vicinity; and they have allusion, in all probability, to a gold mine which formerly existed in the adjacent hilly country of Tipperah. Tavernier in his account of this country remarks; "there is here a gold mine but the gold is very coarse." He also states that the gold from this mine was exported to China and exchanged there for silver. Tipperah does not produce gold in the present day, but the natives assert that it was obtained in that country in former times, and that the Kookis or hill people were in the habit of bringing it from the interior, and presenting it as tribute to the Rajah. The gold coin called Kaltis, νόμισμα τε χρυσοῦ ὃ λεγόμενος Κάλτις is supposed by Wilford, to have been the refined gold named Candan, for which India was celebrated in ancient times.* A small fragment or piece of gold of an irregular shape, having either a plain surface, or a few obscure symbols marked upon it, constituted the earliest type of a gold coin in India; specimens of this description of coins have been found in Southern India and the Sunderbunds.† As stamped coins, however, were current in India in the time of Arrian, it is probable that Kaltis was one of them. Stuckius mentions a coin called Kallais which was current in Bengal in his time. Tavernier, speaking of Tipperah, states that the Rajah "makes thin pieces of gold like to the Aspers of Turkey, of

* *As. Researches*, Vol. V. p. 269.

† *Journal Asiatic Society*, Nov. 1835. No. 47, p. 627.

which he has two sorts; four of the one sort making a crown, and twelve of the other." The modern gold coin of Tipperah has on one side the Singha or lion resembling at the same time the Chinese dragon. The era employed is that of Salivahana, which dates 78 years later than the Christian. (See Marsden's *Numismata Orientalia*.) Kaltis, however, appears to have been the coin of the lower part of Bengal in which Gange regia was situated. The name of Sonargong, or Suvernagrama, (the town of gold) seems to imply, that it was a place of great wealth, or what is not improbable, the appellation may have been given to it, from the large quantity of gold that was brought to it in the course of trade. Formerly, a considerable quantity of gold was imported into the eastern part of Bengal from Arracan and Pegu. Speaking of the vessel in which he sailed from the latter country to Chatigan, Cæsar Frederick remarks: "save victuals and ballast they had silver and gold and no other merchandize."* Gold is still brought annually from Pegu to Naraingunge; and no doubt it was one of the chief imports into Sonargong in ancient times. Sonargong was the seat of a mint in the time of the Mahomedan Kings of Bengal, as appears from coins of the Sultan Shums-ooddin having the word Sonargaun marked upon them, and bearing the dates 754 and 760 of the Mahomedan era.†

Khruse, which is mentioned as situated at the mouth of the Ganges, is regarded by Dr. Robertson as an imaginary island. From its being described as lying directly "under the rising sun and at the extremity of the world towards the east," Dr. Vincent identifies it with Sumatra, which is situated on the Equator, and is celebrated for its gold and tortoise shell. Khruse, it will be observed, is twice mentioned by Arrian; first as a continent, and secondly as an island, and in both instances, as a place in the immediate vicinity of the Ganges (*κατὰ ἀνατολὴν δὲ τὸν ποταμὸν*): from which, it would seem that Arracan or some island off that coast, is the locality that is here referred to. Perhaps the expression "directly under the rising sun," applies merely to the situation of Khruse

* Hakluyt's *Voyages*, Vol. II. p. 370.

† Speaking of these coins Marsden states, "on four specimens belonging to the *Société Asiatique*, M. Reinaud finds the place of coinage Sonargaun (*aurificium urbs*) an ancient city on the *Brahmaputra*, and the dates 754 and 760 (*Numis. Oriental. Illustr.*)

within the torrid zone.* Arrian seems to have been aware, that Desarene and the country of the Kirrhadæ and Bargoosi lay to the north of the Tropic of Cancer: and after describing these countries, therefore, he traces the course from them towards the south, and defines the intertropical position of Khruse by the expression above mentioned. Khruse was the most remote maritime region towards the east that was known in the time of Arrian, as appears from its situation being referred by him, to "the extremity of the world towards the east." In all probability, however, it comprehended, not only Arracan, but likewise the country designed by Ptolemy, the Golden Chersonese, which is now generally admitted to be Pegu. It is likely also that it included Malacca and Sumatra.

Beyond or to the north of Khruse was situated Thina—a region the boundaries of which are mentioned as extending even to the confines of the Caspian, and the Euxine seas, the former being erroneously described according to the prevailing opinion of that time, as communicating with the Northern Ocean.† Thina appears from the geographical position assigned to it by Arrian, to have been the country called "Chin" by the Hindoos. Dr. Buchanan states that the ancient Hindoos do not mention any kingdom as intervening between Kamroop (Lower Assam) and China; and that they considered the former territory as bounded on the east by "Chin," by which term, however, he thinks, was probably meant the country situate between the Indian and Chinese empires—China itself, he states, being, according to Abul Fazel, the Maha Chin of the Hindoos.‡ Sir Wm. Jones mentions that in the 8th century before the birth of Christ, there was erected a kingdom in the province of Shensi, the capital of which stood nearly in the 35° N. L. and about 5° west of Si-gam.§ Both this country and its metropolis were called Chin, and the dominion of its princes was gradually extended to the

* The extent of the torrid zone is differently mentioned by ancient geographers. Eratosthenes limited it to eight degrees, and Posidonius to a little more than twelve on each side of the Equator: but in general it was considered (as originally defined by Aristotle) as comprehending the portion of the earth included within the Tropics. (See Robertson's America, Vol. I. p. 369, No. VIII.)

† Strabo, (Lib. XI. p. 773,) Pomponius Mela, (Lib. III. c. 5,) Pliny, (Lib. VI. c. 13.)

‡ Buchanan's Topography of Rungpore. Martin's Eastern India, Vol. 3, p. 403.

§ As. Res. Vol. II. p. 371.

east and the west. It is probable, he further states, that this nation was descended from the Chinas of Menu—one of the ten tribes who were expelled from the caste of Kshatriyas, “for having abandoned the ordinances of the Vedas and the company of the Brahmins.” The country however, in which the Chinas of Menu originally settled, was apparently not so far distant as Shensi: for according to the same distinguished author, it is designated by the learned Hindoos, “a country to the north-east of Gour and to the east of Kamroop and Nepal”—a description which seems to imply that it is the Chin mentioned by Dr. Buchanan, and not the remote region of Maha Chin, Shensi, or China. The account given by Menu of outcast and exiled Kshatriyas, called Chinas, having emigrated to a country to the east of Bengal, is supported by a tradition current among the Koch, and I believe, also among the Mech and Hajong tribes of Rungpore and Assam, viz., that their chiefs are descended from Kshatriyas “who had fled into Kamroop and the adjacent country of Chin.”* Both accounts are considered fabulous, but it seems not improbable that they are founded on truth, and had their origin in an incursion of military adventurers, who, on being expelled from caste, turned their arms against the barbarous tribes above mentioned. Accordingly, the Chinas and Kiratas mentioned by Menu as degraded Kshatriyas should be regarded, not as the ancestors of the aboriginal tribes of Chinas and Kiratas, as some have erroneously inferred, but as foreigners of Hindoo descent to whom the names of the tribes they conquered were given by the nation from whose society they had been exiled. Of the skill in arms of the early Brahminical conquerors of India, a highly interesting account is given in the appendix to Mr. Torrens’s work entitled “Remarks on the scope and uses of Military Literature and History.” They appear from the ancient authorities there adduced to have acquired at a very early period high military discipline and superior tactical knowledge. This military science, therefore, coupled with the physical strength which, doubtless, these warriors possessed (proceeding, as there is reason to believe they did, “from the great plateau of Central Asia”) must have rendered them formidable enemies to the comparatively weak and uncivilized aboriginal inhabitants of India. Their conquests, it may reasonably be inferred, soon extended to the fertile countries east of the Ganges; and it was, we may suppose, at no

* Buchanan’s Topography of Rungpore. See Martin’s Eastern India, p. 415.

distant period from the time they entered the plains of Hindoostan, that the two outcast or exiled classes of Kshatriyas called Chinas and Kiratas by Menu, invaded Assam and the Morung and were thence designated by the names of the uncivilized tribes whom they vanquished. The country of Chin, described as adjacent to Kamroop on the east, can be no other than the eastern part of the valley of Assam. This remote and secluded region was almost a *terra incognita* to the natives of India prior to the 17th century. Bukhtyar Khulijy invaded Assam in the 13th, and Sultan Hossein Addeen in the 15th centuries, but little information was obtained regarding it until A. D. 1660, when Aurengzebe sent an expedition to it under Meer Jumla.* Tavernier mentions, that until this time, little or nothing was known of Assam. He describes it as one of the richest and most productive countries in Asia.† His account of it and that contained in the *Alumgirnamah* of Mahomed Cazim‡ were the only sources of information whence geographers drew their descriptions of this country before the commencement of the present century. The natives of Bengal had few opportunities of becoming acquainted with Assam, prior to the conquest of it by the English Government. Strangers were denied admission into it; trade was carried on at the mountain passes leading into it, or at fixed marts on the banks of the Brahmaputra, where this river enters Bengal: and the only persons, therefore, who could give any information respecting Upper Assam were the few pilgrims who penetrated to the Brahmakund. The word Thina, the name of the country of the Thinae or Sinae, is supposed to be a corruption of Chin or Cheen, but it seems more probable that it is derived from T'hai—the name of an extensive Indo-Chinese race, which comprehends the Siamese, the Laos or Shyans, the Khamtis, and Ahom nations, that are spread over a tract of country, stretching from Upper Assam and the sources of the Irawaddee on the north, to the gulf of Siam on the south. The Thinae and Sinae mentioned by Arrian and Ptolemy are one and the same nation, and apparently the T'hai or Shyans inhabiting the extensive region above mentioned. The Ahoms of Assam are descended from the Laos or Shyans. The date of their settlement in that country is not known but there is reason to infer that it was anterior to the introduction of Buddhism into Siam. Capt. Low remarks that “the Chang priests of Assam speak a dialect of the Siamese.” He

* Stewart's History of Bengal. † Tavernier's Travels. ‡ Asiat. Res. Vol. II.

also states that "the Laos are supposed to have progressed from some northern or north-eastern region, since the Khamti bordering on Assam speak a language scarcely differing from the Siamese."* It seems not improbable therefore that the Thinae and Sinæ of Arrian and Ptolemy are the T'hai and Shyans. There were two capitals belonging to the Thinae or Sinæ. Thina, the capital of the Sinæ mentioned by Arrian, and Sera, the metropolis of the Sinæ noticed by Ptolemy, are evidently, from the northern site assigned to them, the same city. Ptolemy places this city in 38° N. L. but it is probable that it stood in 28° N. L. in the vicinity of Sadiya in Upper Assam. Thinae, the other capital of the Sinæ or Thinae, is referred by Ptolemy to a situation far south, and is generally considered as having stood on the coast of Siam. The two cities, therefore, viz. the Thina of Arrian (or the Sera of Ptolemy) and the Thinae of Ptolemy belonged—the former to the Shyans of Upper Assam, and the latter to the Shyans of Siam. Arrian speaks of the remote situation of the capital of Thina, of the difficulty there was in travelling to it, and of the few persons who came from it *εις δε την θιναι ταύτην ουκ εστιν ευχερης απελθειν σπαιως γαρ απ' αυτης τιτες ου πολλοι ερχονται*, or as Heeren renders the passage, "it is not easy to arrive at Thina and but few individuals have made the journey and returned again." This may be regarded as applying to Upper Assam. All the information, it may be presumed, which Arrian obtained regarding this rarely visited country, was afforded by maritime traders from Bengal, whom he met in the ports of Western India, and as they could only speak of it from hearsay, it cannot be a matter of surprise, considering the proneness of the natives to exaggeration in their accounts of distant countries, that he should have been led to assign to it the remote situation which is mentioned in the text, and to extend its limits to the confines of the Caspian and the Euxine seas. The city of Thina is mentioned as situated at a certain point where the exterior sea terminates; but it is at the same time stated that its site is not on the coast, but inland. The sea, which is here alluded to, appears to be the gulf of Siam. It is called the exterior sea, no doubt with reference to its position to Khruse, which was considered by Arrian as the extremity of the world towards the east. It appears to have been known to the ancients that the country of the Thinae or Sinæ bordered at one point on the sea, long before they heard of the

* Journal of Royal As. Soc. Vol. V. p. 259.

navigation to the east of Khruse (Malacca or Sumatra). This information could only have been derived from the T'hai or Shyans inhabiting the country extending from the gulf of Siam to Upper Assam : and it was communicated, doubtless, by them to the few persons who travelled to Thina or Sera, the capital of the Sinæ for the purpose of carrying on trade. Ptolemy mentions that Marinus had heard of Cattigara, the most eastern sea port known to the ancients, (and which is supposed to have stood on the coast of Siam) but that he never met or was acquainted with any person who had made the voyage to it from the golden Chersonese.* It follows, therefore, that he obtained his information through Maës the Macedonian, whose agents carried on a trade with the Sinæ on the frontier of Serica : and that the T'hai or Shyans of Upper Assam were the channel through whom this information was conveyed. The commercial routes leading from Thina or Assam extended through Bactria to Barugaza ; also down the Ganges and thence by sea to Limurike : ἀπ' ἧς τότε ἔριον, καὶ τὸ ὄθονιον το σσηκόν, εἰς τὴν Βαρυγάζαν δια Βάκτρων περὶ φέρεται καὶ εἰς τὴν Λιμυρικὴν πάλιν διὰ τοῦ Γάγγου ποταμοῦ. The first of these routes was viâ Thibet or Bhotan. The Thibetans formerly carried on a considerable traffic with the Assamese. A caravan consisting of about twenty persons of the former people repaired annually to the frontier of Assam, and took up their quarters at a place called Chouna, while the Assamese merchants were stationed at Gegan-shur, a few miles distant from it. The articles of merchandize brought by the Thibetans were silver bullion and rock salt, which they exchanged with the Assamese for rice, silk, lac, and articles the produce of Bengal.† This, no doubt, was one channel through which the merchandize of Thina reached Bactria. Another appears to have been through the *dwaras* or passes that lead into Bhotan. Tavernier mentions that in his time merchants travelled through Bhotan to Cabul to avoid paying the duty that was levied on merchandize passing into Hindoostan viâ Gorruckpore. He describes the journey as extending over deserts and mountains covered with snow, tedious and troublesome as far as Cabul, where the caravans part, some for Great Tartary—others for Balk. At the latter place merchants of Bhotan bartered their goods.‡—The

* Ptol. Lib. 1, C. 14—Vincent, Vol. II. p. 602.

† Hamilton's Gazetteer of Hindoostan.

‡ Vide Bhotan in Tavernier's Travels.

account which is given in the Sequel would indicate that the merchandize brought from Thina or Assam to Balk or Bactria was purchased there by merchants who were proceeding or who were on their way to India—and who afterwards sailed down the Indus to Barugaza or Guzerat, where they took shipping for the Red Sea. The second route mentioned by Arrian, viz., down the Ganges and thence by sea to Limurike, no doubt refers, as Dr. Vincent supposes, to the Brahmaputra. Merchandize from Thina or Serica was brought by this channel to the Gangetic mart in the vicinity of Dacca, and was thence shipped to Limurike. It consisted of silk—raw and manufactured, skins and iron, all of which are exports from Assam or the countries bordering on it. Silk abounds in Assam and has always been an article of export from it. Mr. Hugon states that large quantities of silk cloths were formerly exported to *Lassa* by merchants known in *Derung* as the “Kampa Bhotas,”—the quantity they used to take away was very considerable, but in the latter years of the Assam Rajah’s rule from the disorganized state of the country the number of merchants gradually decreased. He estimates the total quantity of raw silk now exported at upwards of 24,000lb. weight, and the total quantity produced in the province at more than double that weight—“the Assamese,” he observes, “generally keeping more for their own use than they sell.” It is exported principally to Berhampore and Dacca.*

The people called *Sesatæ*, who inhabited a country on the confines of Thina, are generally supposed from their features, and make or form, to be identical with the *Besadæ* of Ptolemy, placed by him, as has already been mentioned, near a range of mountains called *Mœandrus*. The *Sesatæ* are described in the text as “a wild uncivilized tribe” and as “a race of men squat and thick set, with their face broad, and their nose greatly depressed.” The words τῶ μὲν σώματι κολοβοὶ καὶ σφῶδρα πλατυπρόσωποι, σιμοὶ εἰς τέλος, αὐτοὺς δὲ λέγεσθαι Σησάτας παραμοίους ἀνημέριους, of which Dr. Vincent’s translation is given above, are rendered by Heeren “a set of ill-formed, broad-faced, and flat-nosed people, who are called *Sesatæ*, and resemble savages.”† This is a correct description of the aboriginal tribes bordering on Assam, and there can be little doubt, therefore that the *Sesatæ* are one of them. All these tribes exhibit the Indo-Chinese features, and many of them have the harsh and savage-like ex-

* Journal Asiatic Soc. Vol. VI. p. 34.

† Heeren’s *As. Nations*.

pression of countenance, which is here mentioned as characteristic of the *Sesatæ*. The northern Garos are a stout, strong-limbed people, with strongly marked Chinese countenances." The southern Garos are described as having "a surly look, a flat Caffre nose, small eyes, a wrinkled forehead, over-hanging eyebrows, with a large mouth, thick lips, and round face,"* they are stout and able-bodied men. The *Khassias* have the Mongolian cast of countenance, but less strongly marked, perhaps, than in some of the neighbouring tribes: they want the oblique position of the eyelids, which is so characteristic of the Chinese face, but have the flat, depressed nose. They are a strong, muscular, and active race, and are employed from childhood, both men and women, in carrying heavy burdens up and down their hills. The *Cacharees*, whose country is situated between *Sylhet* and *Munipore*, are scattered over several districts on the eastern frontier of Bengal. They have the Indo-Chinese features strongly marked; but they vary in stature and complexion. The *Kookis* of the *Chittagong* hills are described as "a barbarous, active, muscular race, short, of stouter and darker complexion than the *Chooméas*, and like them have the peculiar features of the natives of the eastern parts of Asia, namely, the flat nose, small eyes, and broad face."† The *Kookis* of the *Tipperah* hills are short, broad-shouldered, but slender-limbed; they have small dark eyes, and the flat nose. The *Nagas*, who occupy the ranges of hills on the southern side of *Assam* are distinguished by the peculiar features of the Chinese. The *Kookis* (or *Lunctas*) and the *Nagas* appear to be amongst the most uncivilized of all the hill tribes of eastern India. They devour animal food in its most disgusting forms, as the flesh of elephants, tigers, jackals and snakes. I have already mentioned the *Kookis* of the *Tipperah* hills as being apparently identical with the *Padæi* of *Herodotus*. The *Kookis* of the *Chittagong* hills are also cannibals. Many of the *Naga* tribes go naked, and hence the appellation of *Naga* derived from the Sanscrit, which is given to them. *Ptolemy* mentions them under this name, viz., "*Nangalogœ quod significat mundum nudorum.*"‡ The *Koch* are an aboriginal tribe, who occupy the low country in the *Bungpore* district, skirting *Assam* and *Bhotan*: they are also found in the *Mymensing* and *Dacca* districts. They are a strong race of men, possessing the broad outlines of the Tartar countenance: they live in

* *As. Res.* Vol.—† *As. Res.* Vol.—‡ *Ptol. Lib.*—

the heart of the forests, where they cultivate patches of ground with the hoe : they raise cotton, and kill elephants and deer for the sake of their tusks and horns which they bring for sale to the weekly markets, held on the borders of their forests. The Koch, who inhabit the forests in the northern part of the Dacca district, are altogether a much stouter and more hardy race, than the Hindoos or Mahomedans in the neighbourhood. They live in the midst of the forests of Bhowal, Cossimpore, and Atteya, and notwithstanding the unhealthy state of this part of the country, they suffer much less from malaria, than the other inhabitants in the same part of the district. With the axe and hoe they clear away the jungle, and cultivate rice, oil-seeds, and cotton, which they sell or barter at the weekly markets held in the vicinity of the forest. They often suddenly vacate their locations, and the land they have brought into cultivation, and move into the interior, where they recommence their labour of clearing away the jungle. They live in small villages consisting of a few huts frequently situated at a considerable distance from each other. They eat animal food and drink spirits, and from this mode of living they possess considerable physical strength, and armed with spears do not hesitate to attack on foot, wild elephants and tigers. They are strictly honest and faithful in all their dealings, and have the virtue, which few of their neighbours possess, of paying a great regard to truth. They are of a taciturn and reserved disposition. These tribes have different languages, and are in the practice of carrying on traffic with the Bengalese and Assamese, through the medium of persons, who act as interpreters and brokers at the marts they visit. Many of them, however, can speak the Bengalee language and barter their goods themselves. In former times, the intercourse between the aboriginal tribes and the civilized people of the plains was much less frequent, than it is in the present day. The hill men accompanied by their wives and children generally travelled in large bodies to the marts or *hauts* on the frontier : and on their arrival there, they held no direct communication with the people of the plains, but sold their goods, either through interpreters, or by means of signs—both parties keeping at a distance from each other during the negotiation. I have been informed by some old native merchants of Dacca, who formerly carried on trade in Tipperah, that before the Company's Government was established in that district, the Kookis from the oppression and injustice which they suffered from

the people of the plains, were in the habit of bartering their goods in this manner. A similar practice, though arising apparently from a different cause, occurs in Malabar. Speaking of the tribe called Nayaree in that country, Col. Welsh states : "They crawl to the road side or to a certain distance from a habitation, deposit something, such as a bundle of twigs, some wild berries or a honey-comb, set up a loud and hideous shriek or scream, and then retire to a sufficient distance to watch the result, when the nearest person either converses with them at a distance on the exchange, or at once deposits what may serve their purpose, and get out of the way to enable them to approach, and carry off their supplies without personal contact."* The Garos and Kookis bring down to the plains large basket loads of cotton, which they exchange for rice, dry-fish, betel-nut, salt, goats, poultry, ornaments, &c. Speaking of the former people and the places where they carry on traffic, Dr. Buchanan remarks : "They repair once a week during the dry season, more particularly in December, January, and February. Almost the only article which they bring for sale is cotton in the seed, for the conduct of the Bengalees has totally put a stop to the collection of Agal-wood. On the Garos arriving at the market the Zemindar in the first place takes a part of the cotton as his share (Phul) ; the remainder is exchanged for salt, kine, hogs, goats, dogs, cats, fowls, ducks, fish, dry and fresh, tortoises, rice and extract of sugar-cane for eating : for tobacco and betel-nut for chewing, &c." The Khassias bring to the mart on the borders of their country, cotton, iron ore, honey, wax, oranges, ivory, and cassia, and sell or exchange them for spirits, rice, tobacco, fish, &c. They and all the other hill tribes on the eastern frontier of Bengal, carry down their goods in large conical-shaped baskets, or hampers, called *tapas* by the Khassias. This kind of basket is made of ratan or bamboo, and is supported upon the back by means of a broad band which encircles the forehead. Men and women carry heavy loads of goods to the plains in this manner. The account, which is given of the Sesatæ coming to an established mart on the borders of Thina accompanied by their wives and children, and carrying heavy burdens in mats, so closely resembles the description which is given of the hill people of Assam and their mode of conducting traffic as to leave no doubt, I think, that the Sesatæ are one of these tribes,—*παρα-γίνονται σὺν γυναῖξιν καὶ τέκνοις βασίζοντες φορτία μεγάλα ἐν ταρπένοις, ὠμαππελί-*

* Welsh's Military Reminiscences, Vol. II. p. 111.

ων παραπλήσια. The word *ταρπόναις* is supposed by Dr. Vincent to signify *sirpeis*, rendered mats made of rushes, bags or sacs. It is more probable, however, that *tarponais* is a corruption of *tapas*, and that it refers to the baskets in which the hill people carry down their merchandize to the plains. Though both Vincent and Heeren have rendered the words *ταρπόναις ἀμαμπελίνων παραπλήσια*, mats resembling in their outward appearance the early leaves of the vine, or looking like the early branches of the vine, yet they consider *αμαμπελίνων* to refer, not to the material of which the mats were made, but to the articles contained in them, and which are supposed by them to have been the betel-leaf and areca nut, from which malabathrum was prepared. Malabathrum, however, is not betel-leaf nor areca nut, but the leaves of two or more species of *Cinnamomum* which are found in the valleys along the foot of the hills on the eastern frontier of Bengal. These trees bear fruit of the shape of a small oval drupe or berry, about the size of a black currant, and it is apparently to the resemblance between this fruit and a young or early grape, that the word *αμαμπελίνων* is applied, as signifying, *like the early fruit of the vine*.

The *Sesatæ* accompanied by their wives and children brought in their *tarponais* or baskets, large loads or burthens, (*φορτία μεγάλα*) of the branches of these trees, from the valleys in the interior, and bartered them at the marts or *hauts* on the borders of their forests, for the produce of the plains. It is mentioned that they held a feast or festival at the mart, or in other words, they feasted on the articles of food, &c. which they received in exchange for their merchandize. The barter was, no doubt, effected either by signs, or through persons, who, understanding their language, acted as brokers on behalf of the *Thinæ* or people of the plains of Assam. This is probable from the circumstance of its being mentioned that the *Thinæ* "continued on the watch," while the *Sesatæ* were at the mart. The *Thinæ* or Assamese merchants appear to have entrusted the negotiation of their business to interpreters, while they themselves remained at some distance watching the proceedings.

The *Sesatæ* having completed the barter, and feasted for several days on the commodities they received, took their departure for their own country in the interior; or in other words, they returned to the jungles of their mountain recesses; after which, the *Thinæ*, coming forth from their place of retreat, repaired to the spot, and collected the baskets of

goods, which the strangers (the Sesatæ) had left behind them, (*ὅτι δὲ τὰυτὰ ἰσοκρίντες τότε παραγίνονται ἐπὶ τοῖς τόποις καὶ συλλέγουσι τὰ ἑκείνων ἑμπορεύματα.*) Whether the Sesatæ brought any merchandize besides the article which is described as *ἑμαμπελίονον παραπλήσια* does not appear from the text. This is the only thing that is there specified; and from it, the Thinaæ or the Assamese merchants proceeded to prepare the two articles called Petros and Malabathrum. The words, that refer to the former article, are in the original *εξειδάσαντες καλῶμους τοὺς λεγομένους πέτρους*. Dr. Vincent supposes that they apply to betel, and that the first part of the sentence, which he renders "they pick out the haul which is called Petros," is descriptive of the process of picking out the nerves or central fibres of the leaf of the Piper Betel, called in the preceding part of the text, from the resemblance between it and the vine, —*ἑμαμπελίονον*; while he regards the rest of the sentence as having reference to the folding of these leaves with areca or betel-nut, cardamoms, lime, and other adjuncts, into balls, or rather small parcels, which, he concludes, constituted the masticatory called Malabathrum in the text. He is of opinion that the betel leaf and areca nut were procured from Arracan, which he identifies with the country of the Kirrhadæ, celebrated for its Malabathrum, and that the Sesatæ, whom he supposes to have been the Tartars of Lassa, were the carriers of this article along with other merchandize from that country to the frontier of China. Dr. Vincent's interpretation, however, fails to explain the circumstances which are connected with the manufacture and ultimate disposal of this article of traffic; and is not reconcileable with the text. The Sesatæ are there represented as bringing the article described by the word *ἑμαμπελίονον*, from which Petros and Malabathrum were made, from their own country to a mart on its border; as bartering it for articles on which they kept a feast for several days; and as then returning to their country in the interior. Their neighbours, the Thinaæ, then prepared the substances of Petros and Malabathrum, and brought them to India. The supposition that the Thinaæ are the people of the valley of Assam, and the Sesatæ one of the aboriginal tribes bordering on that country, is in accordance with the statements of the text. Dr. Vincent, on the other hand, represents the Sesatæ or Tartars of Lassa as bringing the articles from which Petros and Malabathrum were formed, from a distant foreign country (Arracan) to the frontier of China. But, indepen-

dently of this being opposed to the text, it is difficult to comprehend why betel-leaf and areca nut should be carried to so great a distance for the mere purpose of being made into balls, and afterwards brought back to India under the name of Malabathrum, as is there mentioned. Wilford gives a very different interpretation of this passage of the Sequel. He supposes that Malabathrum is a kind of tea, which is prepared in the form of balls, and sold at some of the frontier towns of Ava, Assam, and Laos. He considers the Sesatæ as identical with a gipsey tribe called Besatæ, who are hucksters by trade, and who, in this capacity, frequent the different fairs throughout the country. The Besatæ, he supposes, made small baskets of certain leaves as large as those of the vine, which they sewed together with the fibres of the bamboo: and then filled with leaves of a certain plant rolled into balls, which were of three sorts according to the quality and size of the leaves. The Petros of the text, he supposes to be the leaf of the Dhac tree (*Butea frondosa*) which is used all over India to make baskets, and which are fastened with skewers from the fibres of the bamboo. According to this interpretation, malabathrum or tea, was sold by the Thinxæ or Chinese to the Sesatæ or Besatæ, who brought it into India for sale. But the reverse of this is stated in the text, viz., that the Sesatæ brought the article of which Malabathrum was formed from the interior of *their country*, and sold it to the Thinxæ, who made it into balls which *they* (the Thinxæ) conveyed into India.

Petros and Malabathrum consisted neither of betel nor tea, but of different parts of the trees yielding Tejpatra and Cassia Lignea. The former is the *bark*, and the latter are the *leaves* of one or more species of trees of the genus Cinnamomum. That Malabathrum is identical with Cinnamomum albiflorum is established by the fact, that Saduj is the name which is given to Malabathrum in the writings of the Arabs, while Saduj is applied in Persian works to Tejapatra or Tejpata, which is the Cinnamomum of Botanists. "Malatroom," says Royle, "is assigned as the Greek name in Persian Materia Medica." Cinnamomum albiflorum is also designated Tuj and Patruj* in Hindoostan—the former name being generally applied to the *leaf*, and the latter to the *bark* of the tree. Tuj, Tejpata, or Tejapatra, by all of which names this leaf is known, is used as

* Royle's Illustrations of Botany of the Himalayan Mountains, p. 325. Dr. Butler's Topography of Oude, p. 43.

a condiment in all parts of India. It is indigenous in Sylhet, Assam, Rungpore, and in the valleys along the base of the mountain range, as far as Mussouri. The dry branches and leaves are brought annually in large quantities from the former place, and sold at a fair which is held in Vicramapura, close to the supposed site of the Gangetic mart of the Sequel. Tuj, however, is a name that is also given in the eastern part of Bengal, to the bark of a variety of Cinnamomum Zeylanicum, or Cassia lignea, which abounds in the valleys of Cachar, Jyntea, and Assam. Mr. Landers describes Cassia lignea, as indigenous and growing luxuriantly, along the second range of the Naga hills in Assam, as plentiful at Tublong, Chackting, and Nokangies, and as an article that is brought to the plains by the Abor tribes of Yung-yack, Tangsee, and Tamlow.* It is prepared and sold by the Khassias in the Cherra Poonjee bazar, whence it is exported to Sylhet, Dacca, and other marts in the eastern part of Bengal. Moghul merchants repair to the former place for the express purpose of purchasing cinnamon. As Tuj, therefore, is an appellation that is applied to Cinnamomum albiflorum, and Cassia lignea, so Patruj, which is the name of the bark of the former, may, in like manner, have been used in ancient times, to designate the quills of the bark of the latter tree. It is probable, therefore, that the words, *ἐκπίδωκτες καλάμους τοὺς λεγομένους πέτρος*, refer to the bark of *C. Zeylanicum* or *Cassia lignea*; and therefore, instead of signifying "they pick out the haulm which is called Petros" as they are translated by Dr. Vincent, they should be rendered *they peel the pipes or quills [or the bark] called Petros*;—*καλάμους* having reference to the tubular or hollow cylindrical form, which the bark of cinnamon assumes in drying, and *πέτρος* being a corruption of Patraj or Putruj, the name of the bark of *Cinnamomum albiflorum*, and no doubt, formerly also that of *Cassia lignea*. The account, which is given in the Sequel regarding the mode of preparing Petros and Malabathrum, seems to imply that the Sesatæ brought the green branches of the *Cinnamomum albiflorum*, and *Cassia lignea* trees, from the forests in the interior of their country, to the marts on the frontier, and sold them there to the Thinæ or Assamese, who peeled the bark called Petros. This, probably, was done after the ripening of the fruit, which is considered the best season for peeling the bark of the Cinnamon or Cassia tree: and it is, apparently, to this

* Journal of the Agricultural and Horticultural Society of India, Vol. II. No. X.

circumstance, viz., to the branches having the fruit on them, when brought for sale, that Arrian alludes when he describes them by the term *ἀμαμπελίων*, or in other words, as being in external appearance, like the early fruit of the vine. The Thinæ or Assamese having peeled the branches of the Cassia tree [literally the quills or pipes called Petros] proceeded next to prepare Malabathrum. For this purpose they picked the leaves, and folding them double, they rolled them into small balls and passed a cord or string, made of the fibres of the bark through them *ἐπίλεπτον ἐπιδιπλώσαντες τὰ φύλλα καὶ σφαιροειδῆ ποιοῦντες, διεύρουσι ἀπὸ τῶν καλῶν ἴναις*. These balls, which appear to have consisted each of a single leaf, were made of three sorts, which were designated according to their size, the large, the middle-sized, and the small *γίνεται δὲ γένη τρία ἐκ μὲν τοῦ μέγιστος φύλλον, τὸ ἀρόσφαιρον μαλάβαθρον λεγόμενον. ἐκ δὲ τοῦ υποδεεστερου, τὸ μεσόσφαιρον, ἐκ δὲ μικροτερου το μικροσφαιρον*—a distinction which seems to indicate that three varieties or species of the genus *Cinnamomum*, differing from each other, in the size of the leaf, or in the strength of its aromatic flavor, were used for the preparation of Malabathrum. Dr. Buchanan has described three species of *Tejyata*, and it is probable that the three kinds of Malabathrum, here referred to, consisted of the *Cinnamomum Albiflorum*, the *Cinnamomum Tamala*, and the *Cinnamomum Zeylanicum*.* The term Malabathrum is generally supposed to be a compound of *Tamala* (one of the Sanscrit names of *C. albiflorum*) and *putra* (a leaf):—the original word *Tamalapatra* having been corrupted by Greek and Latin writers into *μαλάβαθρον*, and this again into Malabathrum. Garcias first suggested this as its probable derivation: “Appellant autem Indi, Folium Tamalapatra quam vocem Græci ad Latini imitantes corrupte Malabathrum nuncuparunt.” It has been conjectured by others, that Malabathrum is derived from “Malabar,” and the word “bathrum,” which is supposed to have been the name given to betel in that province. “Ferunt apud Indos nasci in ea regione quæ Malabar dicitur: vernacula ipsorum lingua bathrum sive bethrum appellari inde Græcos composita voce nominasse.” (H. Stephani Thesaurus Linguae Græcæ, Vol. IV. 1412.) It is very evident, however, that this cannot be regarded as the origin of the term, for it is stated in the *Periplus*, that the name was given to the article on the confines of Thina where it was obtained, and

* Dr. Buchanan has described several species of Malabathrum leaf or *Tejapatra*. (See *Trans. Linnean Soc.* Vol. XIII. p. 556.)

that under this designation, it was brought into India by those who prepared it. It is more probable, that Malabathrum is derived from the Sanscrit words *mala* (a garland) and *putra* (a leaf); the compound *malapatra*, which is thus formed, and which signifies a garland or string of leaves, having been subsequently corrupted into *μαλάβαθρον* or Malabathrum. This etymology of the term, indeed, is indicated by the details given in the text regarding the mode of preparing Malabathrum; for it is there mentioned, that the leaves were made into balls, and that the fibres of the plant were passed through them; "that in this form" the article took the name of Malabathrum: and that "under this denomination," it was brought [from the confines of Thina or borders of Assam] into India, by those who prepared it. The name, it will be observed, was not given to the leaves in their original state, or the state in which they were brought by the Sesatæ from the forests in the interior; but was applied to them after they had undergone a certain manipulation, viz., when made into small balls, and strung together on the fibres of the plant, in the form of a garland or a thread of beads. This mode of preparing the leaves of the Cinnamon or Cassia tree appears to have been adopted in order to preserve the aromatic-stimulant properties of Malabathrum during its transportation to distant countries. The small balls, of which Malabathrum consisted, were each composed of a single leaf (the *Pilulæ Malabathri* of the older commentators), and were used as a masticatory. That Malabathrum was applied to this purpose, is stated in the text; and, that it was so used by the Greeks and Romans, is tolerably certain from the remarks which are made regarding it by ancient authors. Dioscorides states that it was placed under the tongue to purify the breath; and that it was a tonic to the stomach: *υποτιθεται δὲ τῇ γλώσσῃ πρὸς ἐνωδίαν νόσητος*. Pliny also ascribes the former property to it: "sapor ejus nardo similis esse debet sub lingua oris et halitus suavitatem commendat lingue subditum folium.* Eastern India appears to have furnished the greater portion, if not the whole, of the Malabathrum that was imported by the ancients. Though *Cinnamomum albiflorum* is indigenous in Malabar, and Coromandel, yet no mention is made of Malabathrum having been prepared from it in these countries. This article together with others is noticed as an import into Nelkunda on the Malabar coast, from countries farther to the east, † *ἐλάφας καὶ ὀρόνια σηρικὰ*

* Pliny. Lib. XXIII. Chap. 48. † Vincent's *Periplus of the Erythrean Sea*, p. 462.

καὶ ἄρβος ἢ γαπανικὴ (rendered γαγγικὴ καὶ μαλάβαθρον ἐκ τῶν ἰσχυρῶν. The articles of merchandize here mentioned are the productions of Eastern India, and were, no doubt, exported from the Gangetic mart. Malabathrum appears to have been shipped to Nelkunda, Limurike, and the other ports of Southern India, and was thence exported to the countries bordering on the Mediterranean, where it was known by various names, besides that of Malabathrum, as φύλλον ἰνδικόν—σφαῖρα μαλαβαθρον—φύλλον κατασφαῖρον*—Herba Paradisii—Folium—appellations which refer to the country where it was produced, the form of its preparation, and the high estimation in which it was held by the ancients. Malabathrum, besides being used as a masticatory, constituted an ingredient in the Mithridatic antidote,† and in the Theraica; it was also infused or macerated in wine, and was employed as an aromatic and tonic. The leaves and bark of Cassia lignea yield an essential oil, which enters into the composition of many of the odoriferous oils which are prepared by the natives of India. It is extracted by boiling the bark of Tuj with a quantity of fixed oil and water, during which process, the essential becomes incorporated with the fixed oil, to which it imparts its odour.

The Romans were in the habit of preparing this perfume by macerating both the leaf φύλλον, and the wood or bark ξυλοφύλλον, in fixed oil in the manner which is practised by the natives. It is probable, however, that the leaves of other Indian plants, besides those of the Cinnamon and Cassia trees, were imported into Rome under the name of Malabathrum, for the purpose of being used in perfumes or ointments. Dioscorides describes Malabathrum as a plant found growing without roots on the surface of marshes, and remarks that it is by feeding on its leaves that the Onychia becomes aromatic. Pliny states that this kind of Malabathrum is more odoriferous than saffron: that it is of a black colour: rough to the touch, and of a salt taste: and that its flavor ought to resemble that of Nard. He adds that the perfume which Malabathrum or *the leaf* yields, when it is boiled in wine surpasses all others.‡ Malabathrum, in all probability, was a generic term, which was applied to leaves of different plants rolled up in the manner which is described in the text, and it may, therefore, be regarded as the name,

* Art. Malabathrum et Foliatum. Lexicon Universale, Hoffman, A. D. 1698.

† Vide Celsus de Medicina, Lib. V. Chap. XXIII.

‡ Pliny. Lib. XII. C. XXVI.

not of a particular plant, but of a *mode of preparing leaves* which was adopted to preserve their odoriferous and aromatic qualities. The masticatory called *Malabathrum* consisted solely of the leaves of the *Tejpatra*; but the perfume, which was designated by the same name, appears to have been prepared from other plants, besides the leaves and wood of *Cassia*. The unguent of this name was manufactured and sold at Rome by a class of persons who, from the trade or business they followed, were called *Malabathrarii* (*Malabathrarii vocabantur unguentarii qui malabathrum unguentum pretiosissimum vendebant.*) (*Plaut. Aul. III. 5. 37.*)*

Arrian concludes his narrative by stating that all the regions beyond *Thina* were unexplored, either on account of the severe frosts and the difficulties of travelling, or because it was perhaps the will of the gods to fix these limits to the curiosity of man. This account seems to refer to the region of *Uttara-Cura* which is described by the Hindoos as inaccessible to the steps of man, and to the rays of the sun. The name was applied to the north-eastern portion of the Himalayan mountains; and according to Professor Wilson, this region appears to be the north-eastern part of Assam, designated by Ptolemy—*Ottorocaras*, and by Ammianus Marcellinus—*Opurrocarra*. The lofty mountains, which bound the eastern extremity of this valley, belong to the Himalayan range, and are, it is calculated, about 8000 feet in height.

The country of the *Seres* is the *Thina* of Arrian, which I have endeavoured to identify with Assam. The name of *Seres* appears to have been applied both to the inhabitants of the valley of Assam and to the hill tribes bordering on it, and hence the *Seres* of some authors are the *Sesatzæ* of the *Sequel* to the *Periplus*.

Pomponius Mela mentions the country of the *Seres* as situated between India and Scythia, and describes them as a people celebrated for their justice. "They have become known to us," says he, "by their commerce, for they leave their merchandize in the desert and then retire till the merchants they deal with, have left a price or barter for the amount which, upon their departure, the *Seres* return and take."† The

* Syrian *Malabathrum* was that imported into Europe viâ Syria "ex India in Syriam (unde Syriaci cognomen) inde in Europam adferobantur." *Lexicon Universale, Hoffm. Art. Malabathrum.*

† *De situ orbis. Pomp. Melæ, Lib. III. C. VII.*

mode of conducting traffic which is here described is so similar to that mentioned in the Sequel, that there cannot be a doubt, I think, that the Seres and Sesatæ are identical. Justice, which is mentioned by Pomponius Mela as a characteristic of the Seres, means here, honesty in carrying on traffic, and a strict regard for truth—virtues which all the hill tribes on the eastern frontier of Bengal have the character of possessing in an eminent degree. The desert is the jungle or forest (*aruni*) at the foot of the hills, where the hill people barter their goods to the merchants of the plains.

Pliny gives a similar description of the Seres. He states that they are a quiet, and inoffensive people, but that they resemble wild beasts in one respect, namely, that they flee from the sight of men, or rather that they shun intercourse or personal communication with other people, though they are at the same time desirous of carrying on traffic with them.* This, no doubt, refers to the caution and reserve which the hill tribes have always exhibited in their traffic with the people of the plains. Pliny also mentions the Seres as celebrated for silk which their woods produced. In speaking of the embassy from Ceylon to the emperor Claudius, he represents the chief ambassador as stating that they (the people of Ceylon) knew the Seres through the medium or channel of trade, and that his (the ambassador's) father, by name Rachia, had often visited them. He informed the emperor that if strangers approached the country of the Seres, they incurred the risk of being assailed by wild beasts—a remark, which seems to imply, that there was a dense jungle infested with beasts of prey on the frontier of Serica, and that it was dangerous for persons unacquainted with the paths or roads through it to travel to Serica. The Seres are described by the ambassador as giants or people exceeding the ordinary stature of men, as having red hair, and blue eyes, and as speaking an unintelligible language, which rendered it difficult to carry on trade with them.† Pliny mentions that the first river in the country of the Seres was called Psitaras (the Tistha in Rungpore?), and that in carrying on traffic with them, the merchants placed their merchandize on the farther side of the river. If the Seres wished to barter, they took the goods which were there deposited, and left the commodities which the foreign merchants wanted in exchange. The people referred to by the ambassador

* Pliny. Lib. VI. C. XVII.

† Ibid. Lib. VI. C. XXII.

appear to be the Bhotiyas, who are a tall race of men, and who probably dyed their hair of a red colour. According to Klaproth,* the ancient Tibetans called Khiang, who were of the Bhotiyah race, painted their faces of a red colour. The Bhotiyas repair to the great fair held annually in the Rungpore district, and it was probably here that Rachia, the ambassador's father, saw them. Pliny himself, in describing the Seres, seems to allude to the aboriginal tribes of Rungpore bordering on Assam. The forests of their country produced silk (*tassar*) which was bartered on the banks of a river described as the first in their territory, and which was perhaps the frontier between Bengal and Assam. The barter was carried on in the manner mentioned by Arrian and Pomponius Mela.

Pausanias mentions two nations of the Seres. Holwell in his Dictionary extracted from "Bryant's Analysis of Ancient Mythology" states: "Pausanias (L. 6. p. 519.) describes two nations of the Seres who were of an Ethiopic, Indic and Sythic family. The first was upon the Ganges, the other region of the Seres is the same with China, and lies opposite to the island of Japan, called by Pausanias Abasa and Sacais." The Ethiopic and Indic Seres here mentioned are the hill tribes and the people of the valley of Assam. The term *Ethiopic* was applied to the former from the similarity of some of their features to those of the Negro race. Megasthenes compares the inhabitants of India with the Ethiopians. Sir William Jones also remarks, "that the mountaineers of Bengal and Behar can hardly be distinguished in some of their features, particularly in their lips and noses, from the modern Abyssinians;"—a fact which he adduces in confirmation of the opinion that Ethiopia and Hindoostan were peopled or colonized by negroes.† The *Indic* Seres, on the other hand, were a people who occupied the lower or western part of the valley next to the Ganges, and who consisted of the descendants of the early Hindoo invaders of the country and of the aboriginal inhabitants of the plains. The *Scythic* Seres may be regarded as the Thinæ or Sinæ who occupied Upper Assam and the region extending to the gulf of Siam, opposite to which was the island of Abasa or Sacais, which is apparently Java.

The *Ἔθρεα βάρβαρα Σηρῶν* of Dionysius‡ are the Sesatæ of Arrian, or some kindred uncivilized hill tribe bordering on Assam. He describes

* *Nouv. Journal Asiatique*, Tom. 4, p. 104.

† *As. Res.* Vol. I. p. 427.

‡ *Orb. Descript.* V. 752.

them as possessing neither flocks nor herds, but as employed in gathering from the flowers of the desert, a substance that was carded and woven into precious or costly fabrics, which surpassed in the variety and richness of their colors the mingled beauties of the enameled mead, and which rivalled in their delicate texture, even the fineness of the spider's web. The material here referred to, is *tassar* or *moonga* silk, which abounds in the forests or jungles of Assam (the desert *aruni* mentioned in the text), and the rich and varied colours that are mentioned, were no doubt, imparted to it by the indigenous dyes of Assam, namely, *lac*, *room*, *manjit*, and *mismee-tita*, which give the beautiful red and blue colours with which the silks of that country are prepared in the present day.

The Schiratæ or Siratæ of Elian are evidently the Ethiopic Seres of Pausanius, or the Sesatæ of the Sequel. They are mentioned as a people with flat noses, situated in *India ultra Gangem*—in whose country there were serpents of an enormous size (Boa or python tigris) that devoured cattle. Sir. W. Jones regards the country of the Siratæ of Elian as identical with Sylhet, Siret or Srihaut, a place, which he states, was celebrated among the ancients for the fragrant essence extracted from *Malabathrum*.* The Seres mentioned by Horace,

“ Doctus sagittas tendere Sericos
Arcu paterno ?———”

Hor. Lib. i. 29.

are the mountain tribes bordering on Assam, all of whom are expert at the use of the bow and arrow.

The Seres are mentioned by ancient writers as a people who are remarkable for their longevity. They were said to live to the age of two hundred years. Ctesias and Elian state that the fruit of a tree called *Siptachora*, from which amber exuded, and upon which there was found a small insect yielding a purple dye, possessed the virtue of prolonging life to the same number of years. It would seem from this circumstance that the Seres inhabited the country in which the *Siptachora* grew, and as there can be no doubt that the insect alluded to is the lac insect, it may be concluded that Lower Assam is the region which is here referred to. This is rendered the more probable from the account which Ctesias gives of this country. Wilford mentions that Ctesias (accord-

* Works of Sir W. Jones, Vol. VI. p. 384.

ing to a passage in the Bibliotheca of Photius) gives the name of Hyparcho to the river which proceeded from the country whence the Sip-tachora was brought. "The mountains abound with trees hanging over the numerous streams which flow through them. Once a year during thirty days tears flow plentifully from them, which falling into the waters beneath coagulate into Amber. These trees, the Hindoos call Sipa-chora. In the country about the sources of this river there is a flower of a purple color which gives a dye, not inferior to the Grecian, but even much brighter. There is also an insect living upon these amber-bearing trees the fruit of which they eat, and with these insects bruised, they dye stuffs, for close vestures, and long gowns of a purple colour superior to the Persian. These mountaineers having collected the amber and the prepared materials of the purple dye, carry the whole on board of boats with the dried fruit of the tree, which is good to eat, and then convey their goods by water to different parts of India. A great quantity they carry to the emperor (the king of Magad'ha) to the amount of about one thousand talents. In return they take bread, meal, and coarse cloth. They sell also their swords, bows and arrows."* Assam appears to be the country which is here referred to by Ctesias. Lower Assam abounds in *lac*, while *munjit*, *mishmi-tita* and *room*, which are found in Upper Assam, are apparently the dyes that are mentioned, as produced about the sources of the river Hyparcho. Room is a species of *Ruellia*, of the family of *Acanthacea*. Dr. Griffiths states, that with it the deep blue cloths of the Kamptis and Singphos are dyed; he calls it "a valuable dye and highly worthy of attention."† According to Ctesias the term *ὑπαρχος* "Hyparcho," the name that was given to the river proceeding from the country in which the *σιπταχόρα* grew, means *φέρων πάντα τὰ ἀγαθὰ*, i. e. "producing all good things."‡ This must have reference to the valuable merchandize consisting of silk, lac, and other dyes, lign aloe, musk, ivory, gold, silver, and steel, which were exported to India, viâ the Brahmaputra.§

Strabo mentions that the Seres formed a republic or commonwealth;

* Wilford's Essay on Anugangam. As. Res. Vol. IX. p. 65.

† Journal of Asiatic Society.

‡ Heeren's As. Nations, Vol. II. Appendix, IV. p. 380.

§ Amber is still found in the north-eastern parts of Assam in considerable quantities, or rather between Assam and Burmah.

and that it was governed by a council of five thousand persons, every one of whom found or provided an elephant for the use of the State. "Nam Seres tam longæ dicuntur vitæ ut ducentesimum annum excedant. Ferunt etiam quendam optimatum ordinem rempublicam gubernare ex quinque millibus consiliorum constantem, quorum quisque elephantem reipublicæ præbeat." (Strabo, Latin text, p. 702.) This seems to have reference to the Raj corporations of Assam. Major Fisher remarks: "the most ancient form of tenure by which land was held in Assam was under a grant from the prince addressed to a body of proprietors, who were erected into a corporation called a Raj, and who possessed the land on terms by which they were bound each for the other and for the whole estate. The proprietors of land in every Raj were classified according as they paid revenue to the prince direct, or to some one in whose favour an assignment was made. The Raj was entrusted with the local administration of affairs and transacted business in periodical meetings."* It is probable that the council of five thousand, which Strabo mentions, consisted of the heads or chiefs of these corporations, and that each Raj was bound to provide an elephant for the service of the State. The circumstance of the country of the Seres furnishing the number of elephants here specified is, of itself, sufficient to identify Serica with Assam. There is no other country in the situation assigned to Serica, namely, on the north of *India extra Gangem* and of *Sina* or Siam, than Assam, that abounds in elephants, and it may, therefore, be inferred from this fact, coupled with the accounts of other ancient writers, who describe Serica as an extensive and fertile valley watered by large rivers, and abounding in silk, that Assam is the country that is here referred to. It is estimated that upwards of 700 elephants are exported annually from Assam: many also are killed for the sake of their tusks.

Ptolemy describes the Seres and Sinæ as contiguous nations. India extra Gangem, which comprised Arracan, Pegu, and Ava,—constituting the *Argentea regio* and *Aurea Chersonesus* of Ptolemy—is mentioned by him, as being divided from the country of the Sinæ by a line commencing at the extremity of Serica, and extending through the middle of the great bay (Sinus Magnus) on the south.

The country of the Sinæ therefore was adjacent on the west to India

* Journal of Asiatic Society, No. 104.

extra Gangem. It is described as bounded by unknown regions on the east, by the sea on the south, and by Serica on the north. The Sinae appear to have been the ancestors of the modern Siamese, of the Shyans of Laos, and other adjoining States, and of the Ahoms of Assam. The Siamese, who are a branch of the Laos, separated from them A. D. 813. The Laos civil era, or that of the introduction of Buddhism into that country, commenced A. D. 638.* The Shyan chronicle preserved in Munipore states that the ancient territory of the Shyans was called Pong, and that it constituted a kingdom, the capital of which was Mogaung or Mongmaorong, as it is called by the Shyans. Their first king, named Khool-lee, reigned in the 80th year of the Christian era. Chukapha, the first Ahom king of Assam, of whom there is any authentic information extant, reigned in the 13th century. It appears, however, from this chronicle, that some centuries anterior to this, Assam was invaded by Samlongpha and placed by him under the dominion of his brother Sukampha, king of Pong. This is said to have occurred about the year A. D. 77.† It has been discovered that there are no traces or mention of Buddhism in the religion of the Ahoms, and it is therefore, inferred, that they emigrated to Assam before A. D. 638, the era of the introduction of the Buddhist faith into Laos.‡ This circumstance, coupled with the fact of the Ahoms having a list of the names of forty-eight kings descending from the god Indra down to Chukapha, renders it probable that they were in possession of Upper Assam at an early period, or as far back, at least, as the second century—the era in which Arrian and Ptolemy wrote. The name of Thai, which signifies “free,” is supposed by Capt. Low to have been assumed by the Siamese at the time they separated from the Laos. It seems not improbable, however, that it is of more remote origin, and that Thai is the root of Thinae, while Shyan is that of Sinae—the names by which the inhabitants of the Laos and Siamese territories were known to the ancients. Thai Nai, it may be remarked, is an appellation which is given to the central Siamese, and Thinee appears as the name of a town in 23° N. L. 98° E. L. in the territory of the Shyans dependent on Ava. The Laos also called their country “Chi Mai,” signifying “Priests’ dominion,”§

* Capt. Low’s History of Tennasserim, Jour. Royal As. Soc. Vol. V. p. 259.

† Pemberton’s Report on the Eastern Frontier, p. 110.

‡ Journal Royal As. Soc. Vol. V. p. 256.

§ Ibid.

and it is probable, that from this word is derived Chimay, which was the name given by the older geographers to a lake, whence the Brahma-putra was supposed to issue.

Serica is described by Ptolemy, as bounded on the east and north by unknown countries, on the west by Scythia extra Imaum, and on the south by India extra Gangem and the country of the Sinæ. The words which describe the relative position of the latter nation, are in the Latin text; “*Quodque supra Sinas, Serum jacet regio et metropolis.*”^{*} This evidently refers to Upper Assam, which may, therefore, be considered as the country, in which, Sera, the metropolis of the Sinæ (*Σηρας της των Σινων μητροπολις*) was situated. A river called Serus is represented by Ptolemy, as rising in a situation apparently corresponding with that of the mountains in which the Irawaddee has its origin, and as running to the south, through India extra Gangem. The latitude, which is assigned to Sera, is ten degrees north of that of Sadiya in Upper Assam—the former being mentioned as 38° N. L. and the latter being 28° N. L.—an error which is, no doubt, to be attributed to the very vague and imperfect knowledge which the ancients had of this country.

The journey from the Stone Tower to the frontier of Serica occupied a space of seven months. It is described as attended with many difficulties and hardships, and it seems to have been from the account of the bleak inhospitable regions of Bootan and Thibet, the excessive cold of the climate, and the severe storms which the travellers encountered: “*via autem quæ est a turra lapidea ad Seras vehementissimis obnoxia est tempestatibus,*”[†] that Ptolemy was induced to assign to Sera the northern latitude which is mentioned above. Marinus derived his information regarding the route to Serica from Maës of Macedon, called Titianus, who sent agents from the Stone Tower to trade with the people of that country. He describes the route, which the caravan travelled from Byzantium to the Stone Tower, as crossing Mesopotamia from the Euphrates to the Tigris, as proceeding through Assyria and Media to Ecbatana, to Hecatompylos, and to Margiana, and thence through Aria, or Herat, to Bactria or Balk. It next crossed a range of mountains called Montes Comedorum, whence it proceeded through the country of the Sacæ, and then arrived at the Stone Tower.[‡] Different sites have been assigned to the latter place, but it is probable, notwithstanding the

^{*} Ptol. Lib. I. Chap. XVII.

[†] Ibid. Chap. XI.

[‡] Ibid. Chap. XII.

position given to the Montes Comedorum to the north-east of Bactria, that it was a station near one of those *Topes* or lofty towers, which are to be seen in the kingdom of Cabul. No itinerary appears to have been kept of the route from this place to the frontier of Serica, but from the account which is given of it, and of the difficulties that occurred in travelling through the intervening country, it seems to have been identical with that mentioned by Arrian from Thina to Bactria, or with the route from Bootan to Cabul and thence to Balk, which is described by Tavernier, as extending "over deserts and mountains covered with snow, tedious and troublesome as far as Cabul, where the caravans part, some for great Tartary, others for Balk."

It would appear that the merchants, who traded with the Seres, were not allowed to enter the country of the latter, but that they carried on traffic with them at an opening or pass in the mountain Imaus. This evidently refers to one of the *duwars* or mountain passes into Assam, where the merchants from Bhotan and Thibet formerly assembled to traffic. The circumstance of strangers having been prohibited from entering Serica has been regarded as an indubitable proof of the identity of that country with China, but the same jealousy of foreigners, it may be remarked, existed among the Assamese, and led to their exclusion from their territory. Dr. Buchanan remarks that in former times the only communication that was permitted by the Assamese between their own country and Bengal, was by the pass of Luckhah, eighteen miles north of Sylhet, and that of Bookool in Cachar, all access by the Brahmaputra having been strictly prohibited. Dr. Wade also states, "strangers of every description and country were scrupulously denied admission into Assam."* The same prohibition was enforced against the admission of strangers through the *duwars* or passes leading into it from Bootan and Thibet, and it appears, therefore, to have been at one of these passes, described as an opening in Imaus, that the agents of Titianus carried on their trade with the Sinæ, Seres, or Assamese. There are two routes from Bootan and Thibet to Assam, by which a commercial intercourse is carried on in the present day. That from Bootan is by the valley of the Monas, viâ Tassgong and Dewangiri: the other does not enter any part of the Deb and Dhurma Rajah's dominions, but extends through a tract of country dependent on Lassa, from Towung to

* Martin's Eastern India. Vol. 3. p. 626.

the Kooreeparah Duwar. The traffic is conducted by a class of Tibetans called Kumpas, an appellation that is given to the inhabitants of the southern part of Thibet or that portion of it which is included within the great bend of the Sanpo up to the point where it enters the Abor hills. The Kumpas proceed to Hajoo in Assam, the resort of pilgrims from Bootan and Thibet, and carry on their traffic at the great annual fair which is held there. "It is estimated" says Capt. Pemberton, "that during the season there are about two thousand Kumpas assembled at Dewangiri, where they erect huts for temporary occupation on the subordinate heights. On quitting the hills to descend to the plains they are accompanied by Gurpas and Zeenkafs on the part of the Dewangiri Rajah, from whom they obtain passports and pledge themselves to return by a stated period. "The goods they bring, consist of red and party-coloured blankets, gold dust, silver, rock salt, chowrees, musk, and a few coarse Chinese silks, munjeet and bees wax:" these they exchange for lac, the raw and manufactured silks of Assam (the *ἔργον καὶ τὸ ὄθιον* τὸ *σπινθὲρ* of the Periplus), cotton, dried fish and tobacco: they return homewards during the months of February and March, taking care to leave the place before the return of the hot weather or rains."* In 1809 this trade amounted to two lacs of rupees. The principal article that was purchased by the Kumpas was silk, consisting both of the muga and eria kinds.

That Assam is the country that is referred to by Ptolemy, is further probable from the fact stated by him, namely, that there was another route to Serica viâ Palibothra: "quod non solum inde ad Bactra iter si per turrim lapideam, sed et in Indiam quoque per Palimbothra."† This might be regarded as referring to the route through Nepal and Thibet to China, but it seems more probable that it has allusion to the Brahma-putra and the entrance to Assam by Gowalpara, which is the route by the Ganges mentioned by Arrian, or that by which merchandize was exported to Limurike.

Again, Ptolemy remarks that beyond, or to the east of Serica, there was an unknown or unexplored country containing lakes or marshes, in which grew large canes, so compact or close to each other, that the inhabitants in the neighbourhood were in the habit of using them as

* Vide Pemberton's Report on Bootan, p. 144.

† Ptol. Lib. 1. Chap. XVII.

bridges; "ac quod his orientalis terra sit incognita stagna habens paludosa in quibus calami nascuntur magni et ita compacti ut accole transfretare soleant:"* or according to the *Periplus Marciani* Heracleotæ, "paludes habens uliginosas in quibus calami magni nascuntur, atque adeo densi et conferti, ut per illos sibi invicem adhærentes fiant transitus."† There seems to be an allusion here to the cane bridges, which are so common in the hill countries bordering on Upper Assam; or to the roots of branches of trees growing on the opposite sides of streams or pools and so intertwined as to afford a passage across them. Lieut. Yule, speaking of bridges of this kind in the vicinity of Cherra Poonjee, remarks, that while travelling through that country, he saw such bridges in every stage, and that one measured 90 feet in span: they were generally composed of the roots of two opposite trees bound together in the middle. (Vide *Journal Asiatic Society*, Vol. XIII. p. 613.)

Ptolemy states that mountains surround Serica, (montes autem cingunt Sericam,) and that it is traversed to a considerable extent by two large rivers—a description which proves that Serica was a valley. The mountains surrounding Serica were designated the *Anubi*, which appear to be the Abor hills; the *Anacii* extending from Scythia extra Imaum into Serica, which are apparently the Auka hills on the northern side of Assam: Mount *Casius*, or the mountain where the Brahmakund is situated: Mount *Thagurus*, apparently the Tabis of Pomponius Mela, and Pliny, which seems to be Beging; and the chain or range of the *Emodi* or Himalaya, the eastern parts of which were called *Sericus* and *Ottocorras*—the latter being identical with the Uttara Cura of the Hindoos, or the snowy range which separates Assam from the country of the Lamas.

Two rivers called Oecharde, and Bautes or Bautisus, flowed through Serica. They are delineated in the map of Serica, attached to Ptolemy's Geography as running to the north; but this must be an error, as there is no country in the situation assigned to Serica, namely, *bordering on India extra Gangem (Burmah) and the country of the Sinae (Siam and Laos) on the north*, which has rivers proceeding in this direction. It is evident that the rivers, which are alluded to, are the Sanpoo or

* Ptol. Lib. I. Chap. XVII.

† Vide Geograph. Vet. Script. Græc. Minor. Hudson, p. 29.

Eroochoomboo, and the Brahmaputra, and that the error in their delineation in the maps of Ptolemy's Geography by Agathodæmon, consists in their being laid down, as running *to*, instead of *from*, the north or north-east. The Oechardes is described by Ptolemy, as having its origin in Scythia extra Imaum, as flowing through that country, as having a great bend or curve in its course, and as afterwards entering Serica. This exactly corresponds with the Sanpoo which runs through Thibet, and which has an extensive bend or turn in its course before it enters Assam. The Bautes is the Brahmaputra. It is delineated in the map of Serica, as being composed of two large affluents rising from the mountains called Otorocorras or Sericus, and Casius. They are the Dibong, which is composed of two branches; and the Brahmaputra which proceeds from the mountains on the east and north-east of Assam. The Bautes is described by Cellarius, as entering Serica "*recto casu*," which perhaps refers to the straight course of the Brahmaputra from the Brahmakund. This celebrated place of pilgrimage is designated the sacred pool—the Deo-panee—or divine well of Brahma. The summit of the rock, which is described by Capt. Bedford as inaccessible, is called by the Hindoos—the Deo Bari or dwelling of the deity, and it is perhaps with reference to this natural temple of the god of the Hindoos, that the ancients designated this rock and mountain—Mount Casius—a name that was probably suggested by the resemblance (real or supposed) between this rocky mountain and Mount Casius of Syria, the site of a temple to Jupiter. Dr. Stevenson remarks: "when the ancient Romans came to any new country they were sure to find there a Jupiter."* "The common figure," says the Abbe Bannier, "by which Jupiter Cassius used to be represented, was that of a rock or steep mountain, as is to be seen on several medals quoted by Vaillant."†

Ptolemy describes the two rivers Oechardes and Bautes, as flowing through the greatest part of Serica. (*Sericæ autem regionis maximam partem duo percurrunt fluvii.*) This may be considered as referring to the two great parallel branches of the Brahmaputra, which enclose Majuli and the islands in the upper part of its course. These branches, perhaps, ran a much longer course than they do at present, and were distinguished by the names of the two great parent streams, the Oechardes

* Journal Royal Asiatic Society, Vol. V. p. 191.

† Vide Mythology of the Antients, Vol. II. p. 220.

and the Bautes, or the Sanpoo and the Brahmaputra, of which they are formed. This division of the river into parallel branches is mentioned in connexion with one of the oldest traditions regarding Assam, namely, that the original territory occupied by Khuntai, the first king of that country, included two very long islands formed by branches of the Brahmaputra.*

Several nations or people are mentioned by Ptolemy as inhabiting Serica—a certain proof that this valley was one of great extent; and with reference, therefore, to its situation on the north of India extra Gangem (*Burmah*) it can be no other than Assam. Ptolemy mentions, *Anthropophagi* on the northern parts of Serica. Below them were the *Annibi*, who derived their name from their own mountains (*gens ejusdem nominis cum montibus quibus superjacet*). They are the Abor tribes, who occupy a range of hills on the northern side of Assam. In the same situation, namely, the northern side of Serica, Ptolemy mentions the *Auzacii*, who appear to be the Aukas. Between them and the Annibi were a people called *Siszyges*. Many of the names mentioned by Ptolemy closely resemble the names of places or tribes of people in Assam in the present day: thus the *Damnæ* appear to be the Doms: the *Garinæi*—the Garos: the *Nabannæ* (rendered *Rabannæ* by Berthius and other commentators)—the Rabhas: the *Asmeracæi*, the Mirees: the *Oechardæ*—the people of Chardwar: the *Batæ*—the Booteahs: the *Ottorocorræ*, the people of Outtergorah. The situations or relative positions which Ptolemy assigns to these different nations, do not in every instance correspond with the localities inhabited by the tribes or people of Assam bearing the same names in the present day; but though this is not the case, there can be little doubt from the close affinity that exists between them, that they are the people that are alluded to.

Ammianus Marcellinus gives a general account of the physical aspect, extent, fertility, and nations of Serica. He describes it as a valley extending to the Ganges, and as abounding in silk, from which it may be inferred that Assam is the country that he alludes to.

“Ultra hæc utriusque Scythiæ loca, contra Orientalem plagam in orbis speciem consertæ celsorum aggerum summitates ambiunt Seras ubertate regionum et amplitudine circumspectos: ab occidentali latere Scythia adnexos: a Septentrione et orientale nivossæ solitudini coherentes:

* Vide Buchanan in Martin's Eastern India, Vol. III. p. 602.

qua meridiem spectant adusque Indiam porrectos et Gangem. Adpellantur* autem iidem montes Anniva et Nasavicium et Asmira et Emodon et Oपुरocarra. Hanc itaque planitiem undique prona declivitate præruptam, terrasque lato situ distentas duo famosi nominis flumina O'Echar-des et Bautes lentiore meatu percurrunt. Et dispar est tractuum diversorum ingenium : hic patulum alibi molli divexitate subductum : ideoque satietate frugum et pecoribus et arbustis exuberat. Incolunt autem fecundissimam glæbam, variæ gentes e quibus Alitrophagi et Annibi et Sixyges et Chardi aquilonibus objecti sunt et pruinis. Exortum vero Solis suspiciunt Rabannæ et Asmiræ et Essedones omnium splendidissimi : quibus Athagoræ ab occidentali parte cohærent et Aspacaræ. Betæ vero australi celsitudini montium inclinati urbibus licet non multis magnis tamen celebrantur et opulentis : inter quas maximæ Asmira et Essedon et Asparata et Sera nitidæ et notissimæ. Agunt autem ipsi quietus Seres armorum semper et præriorum expertes : utque hominibus sedatis et placidis otium est voluptabile, nulli finitimorum molesti. Cœli apud eos jucunda salubrisque temperies, aeris facies munda, leniumque ventorum commodissimus flatus : et abunde, silvæ sublucidæ : a quibus arborum fetus aquarum asperginibus crebris veit quædam vellera mollientes ex lanugine et liquore mistam subtilitatem tenerrimam pectunt nentes que subtemina conficiunt sericum ad usus adhuc Nobilium, nunc etiam infimorum sine ulla discretione proficiens. Ipsi præter alios frugalissimi pacatoris vitæ cultores, vitantes reliquorum mortalium cœtus. Cumque ad coëmenda fila, vel quædam alia fluvium transierent advenæ nulla sermonum vice propositarum rerum pretia solis oculis aestimantur : et ita sunt abstinentes ut apud se tradentes gignentia nihil ipsi comparent adventicium (advectitium).”†

The words, “*in orbis speciem consertæ celsorum aggerum summities ambiunt Seras,*” are generally supposed to refer to the mountains of Serica mentioned in the subsequent sentence of the text, but it may be fairly questioned, whether they should not be taken in their literal sense, and be considered as applying to those extensive causeways, the remains of which are still to be seen in Assam. Dr. Wade mentions several of these embankments. He describes a military causeway extending from Coos Bahar (Cooch Behar) in a northern direction to the

* Appellantur.

† Ammianus Marcellinus, Lib. XXII. Chap. VI. pp. 293, 294. Edit. Gronovius.

utmost limits of Assam—forming a part of the southern boundaries of the Bootan dominions. “A modern causeway formed by Pertaub-sing, which runs from Coosbeyhar through the whole extent of Assam to Sadiya, forms the boundaries of Dehrung on the north.” The Okkooruralee causeway is mentioned as separating the country of Ranigawn from Beltola. “The famous causeway of Rangulighur, which divides the district of Coliabur on the east from Upper Assam, is described as a rampart which runs from Colone near its junction with the Brahmaputra during a course of ten miles to the southern mountains.” “A great causeway or high road raised to preserve the interior from the inundation of the river Dehing” is mentioned as situated in Khonani. It is described “as a work of immense labour.” Rung-pore, the capital of Assam, is said to have had the Duburriunniali rampart, or high road, as its security or defence on the east. It is further stated that the banks of the river Dikho, near which the fortress of Rungpore stands, “are connected by a lofty rampart with the southern mountains through an extent of ten or fifteen miles. It was constructed in remote antiquity for the protection of Gourgown, which was the principal residence of the monarch, and all the great officers of state.”* These causeways, besides constituting roads and dams to protect the low country from inundation, served also as defences, for which purpose they were surmounted with palisades of bamboos. Mahomed Cazim describes a high broad causeway leading from Salagereh to Ghergong, a distance of about fifty coss (one hundred miles), each side of which, he remarks, “is planted with shady bamboos, the tops of which meet and are intertwined.” He further describes the latter city as encompassed with a fence of bamboos, and states that within it are high and broad causeways for the convenience of passengers during the rainy season. “The Raja’s palace is surrounded by a causeway planted on each side with a close hedge of bamboos, which serves instead of a wall, and on the outside there is a ditch which is always full of water.”† Butkhyr Khulijy, who invaded Assam in 1205, mentions stockades which were formed of stakes interwoven with bamboos in that country.‡ Fitch, also, in describing Coonch (Cooch Behar) remarks: “all the country is set with bamboos or canes made sharp at both ends and driven into the

* See Wade’s *Geography of Assam* in Martin’s *Eastern India*, Vol. 3. pp. 630, 633, 635, 637. † *As. Res.* Vol. II. p. 179. ‡ Stewart’s *History of Bengal*.

earth.”* The words, “*ubertate regionum et amplitudine circumspectos*” applied to the Seres, seem to imply, that the “*aggeres celsi*,” with which they were surrounded, were not mountains, but works of art, constructed to protect their extensive and fertile territory from the incursions of hostile tribes. It is probable, therefore, that these defences, the summits of which are described by Ammianus Marcellinus, as interlaced or intertwined in a circular form, were stockades at the duwars, or close hedges of bamboos erected or planted on the causeways of Assam, with their tops intertwined in the manner mentioned by Mahomed Cazim.

The position which Ammianus Marcellinus assigns to the Scythians, corresponds with that of *Scythica extra Imaum*, which is placed by Ptolemy on the western side of Serica. On the ground that this Scythia is Thibet, Murray infers that China, which lies to the east of that country, is Serica. The account, however, which both Ptolemy and Ammianus Marcellinus give of the other boundaries of Serica, is opposed to the opinion which identifies Serica with China. The former author makes no mention of the sea, as the boundary on the east, which, in all probability, he would have done if he had been describing China: but speaks of Serica, as bounded in this direction by unknown lands. Ammianus Marcellinus describes Serica, as situated beyond the two Scythias, (*viz.* to the south of them,) and as lying opposite to *the eastern country*, which can be no other than China. He more particularly describes the country of Seres, as being adjacent on the north and east, to a dreary region of frost and snow, which refers, no doubt, to the lofty snowy peaks of the Himalaya, which surround the eastern part of the valley of Assam. That Serica is not China, but Assam, is still more probable, from the circumstance of India being mentioned by Ammianus Marcellinus, as lying to the south of the latter country. This is *India extra Gangem*, which is referred by Pomponius Mela, Pliny, and Ptolemy, to the situation assigned to it in the text. Pomponius Mela, and Pliny give a general description of the situation of Serica. “They agree,” says Vincent, “that their boundary [*viz.* that of the Seres] on the north is Tabis, and Taurus on the south: that all beyond them north is Scythia, and all beyond them south is India east of the Ganges.” Tabis and Taurus seem to be mountains in Upper Assam, the former being, perhaps, the mountain

* Huklyut's Voyages.

“Reging” of the Abors, which is so conspicuous an object from Sudiya; while the latter may refer to the high Naga hills, which may have been regarded as extending to the exterior sea, or gulph of Siam. India, which Ammianus Marcellinus mentions as bounding Serica on the south, is evidently *India extra Gangem*. This, coupled with the circumstance of Serica being described as extending to the Ganges, seems quite conclusive of the identity of that country and Assam. It is mentioned as an extensive and fertile valley, inhabited by various nations, watered by large rivers, and abounding in silk, and it is evident, therefore, that the description applies to no other valley than Assam. The account, which Ammianus Marcellinus gives of the country of the Seres (namely, as extending to the Ganges) renders it probable that the eastern part of Bengal or the countries east of the Brahmaputra and Tistha, as Rungpore, Mymensing, and Sylhet, were designated India Serica. In the second book of “*Ravennatis Anonymi*,” we find mention made of an extensive region called “*India Serica*,” which was traversed by numerous rivers “*Per quam Indiam Sericam transeunt plurima flumina: inter cetera, quæ dicuntur id est Ganges, Torgoris, et Accessenis quæ exeunt in Oceanum*,” (Vide *Ravennatis Anonymi Geographia*, Edit. by Gronovius.)

The mountains called *Anniva* (the Annibi of Ptolemy) are the Aber hills. *Nazavicium* is the Naga range. *Assira* is the range inhabited by the Miris. *Emodon* refers to the Himalaya. *Opurocarra* (or the *Ottorocara* of Ptolemy) is Uttararocora or Outtargorah or the mountains on the north eastern part of this valley.

The Oechardes and the Bautes, as I have already mentioned, are the Sanpoo and the Brahmaputra, or rather the two paralld branches of the latter which enclose Majuli and the other islands in Upper Assam. They are mentioned as rivers “*nominis famosi*.” This refers to the Brahmaputra, or rather the Brahmakund, which has always been a celebrated place of pilgrimage among the Hindoos. “During the time of the Ahoms,” says Lieut. Rowlatt, “it was necessary for the king on his ascension to the throne to be washed in water brought from this place, and until this ceremony was completed he was not considered fit to take upon himself the reins of government.” (*Asiatic Society’s Journal*, Vol. XV. p. 486.) This romantic spot is described by Capt. Bedford “as situated on the left bank of the river: it is formed by a projecting

rock, which runs up the river parallel to the bank and forms a good-sized pool that receives two or three rills from the hills immediately above it. When seen from the land side by which it is approached, the rock has much the appearance of an old gothic ruin, and a chasm about half-way up which resembles a carved window, assists the similitude. At the foot of the rock is a rude stone seat : the ascent is narrow and choked with jungle, half way up is another kind of seat in a niche or fissure, where offerings are made : still higher up from a tabular ledge of the rock, a fine view is obtained of the Kund, the river, and the neighbouring hills : access to the summit, which resembles gothic pinnacles and spires, is utterly impracticable." (See As. Res. Vol. XVII. p. 353.)

The Oechardes and the Bautes are represented by Ammianus Marcellinus as meandering through a plain or valley, which he describes as *undique prona declivitate præruptam*, and through wide or open tracts of country (*terrasque lato situ distentas*). This is a correct description of Assam, which is an extensive valley surrounded on its eastern and northern sides by lofty mountains, which rise abruptly like a wall to a height of five or six thousand feet above the level of the adjacent plains. The diversified scenery which Serica is described as presenting—*dispar est tractuum diversorum ingenium ; hic patulum, alibi molis diversitate subductum*—corresponds with the varied physical aspect which Assam exhibits in its low ranges of undulating hills, its extensive plains, and the conical-shaped hills which rise from its surface. The luxuriant fertility of Serica refers to the rich productive soil of Assam, which, though now greatly overrun with jungle, appears to have been highly cultivated in former times. Mahomed Cazim describes Upper Assam in A. D. 1661, " as a wide, agreeable country which delights the heart of the beholder. The whole face of it is marked with population and tillage, and it presents on every side charming prospects of ploughed fields, harvests, gardens, and groves." The country extending from Salagireh to the city of Ghergong is further described " as a space of about fifty coss, filled with such an uninterrupted range of gardens plentifully stocked with fruit trees that it appears as one garden. Within these are the houses of the peasants, and a beautiful assemblage of coloured and fragrant herbs, and of garden and wild flowers blooming together."* He states that " the strength and fertility of the soil are such that what-

* As. Res. Vol. II. p. 173.

ever seed is sown or slips planted they 'always thrive.'” Tavernier, likewise describes it about the same date, “as one of the best countries in Asia, as producing all the necessaries of life and standing in no need of foreign supplies;” also “as possessing mines of gold, silver, lead, and iron, and as abounding in silk, and lac.” Speaking of the natural resources of Assam, Mr. McCosh observes: “This beautiful tract of country enjoys all the qualities for rendering it one of the finest in the world: its numerous crystal streams abound in gold dust and masses of the solid metal: its mountains are pregnant with precious stones and silver: its atmosphere is perfumed with tea growing wild and luxuriantly: and its soil is so well adapted to all kinds of agricultural purposes that it might be connected into one continued garden of silk, cotton, coffee, and sugar, and tea, over an area of many hundred miles.” (McCosh’s *Topography of Assam*, p. 133.)

The people or nations mentioned by Ammianus Marcellinus, as inhabiting the most fertile and productive region of Serica, are many of those enumerated by Ptolemy. The *Alitrophagi* are (as Vossius interprets the word) the Anthropophagi of Ptolemy, or the Androphagi of Pomponius Mela: they occupied a mountainous country north of the Annibi or Abor tribes, and are apparently identical with the Tikleya Nagas of Dr. Buchanan, or the Mishmees of Bubbajeea reported to Capt. Bedford, “as being a fierce race of cannibals.”* The *Annibi* referred to a situation on the northern side of the valley of Serica and deriving their name, according to Ptolemy, from their own mountains (*Annibi a suis montibus denominati*, Cellarius), are, beyond doubt, the Abor tribes occupying the hills on the north side of the eastern part of Assam. The *Chardi* would seem, from their name, to be the people of the district of Chardwar: they are mentioned under the name of *Oechardi* by Ptolemy, and as inhabiting a tract of country on the banks of the river of the same name. In the *Rabannæ* (the *Nabbannæ* of Ptolemy—rendered *Rabannæ* by his commentators) are recognized the aboriginal tribe or people of Assam called Rabhas. The *Asmiræ* seem to be the Miris. Ptolemy mentions their country as situated between two rivers and as extending to the mountains of the same name (*inter fluvios Asmiræ gens ad montes Asmireos*, Cellarius). The *Batæ* are evidently the Booteahs: they are erroneously described, as inhabiting a

* *As. Res.* Vol. XVII. p. 533.

mountainous country on the southern, instead of the western, part of Serica. They are the *Betæ* of Ptolemy and are referred by him to the latter situation. The *Essedones* are the *Issedones* of Ptolemy, described by him as a great people. The other nations of Serica mentioned by Ammianus Marcellinus cannot be identified with any people of Assam in the present day. It is probable that they occupied the rich and fertile parts of the valley. That Assam was anciently inhabited by an industrious and civilized people is abundantly proved by the remains of various and extensive works of public utility, as embankments, tanks, bridges, and forts, which are still to be seen. The ruins of temples, also, are scattered over the country. "These temples," says Major Jenkins, "all completely overthrown, speak of long periods of prosperity and great revolutions of which we are entirely ignorant."—From one of the temples at Hajoo being frequented by pilgrims from all parts of Thibet and Tartary he imagines that the Buddhist faith formerly prevailed in Assam and that this may account in part for the destruction of the temples. "That faith," he remarks, "was succeeded perhaps by the Brâhminical under the Pals, i. e. the Pal dynasty: they were swept away by the Koches, who probably were not Hindoos till they ceased to be conquerors, as was the case with the Ahoms, who with the Mahomedans then contended for Kamroop, and both perhaps destroying the temples which fell into their power."*

Amira and Essedon are mentioned, as the largest, and Asparata and Sera, as the most noted cities of Serica. Sera, which was the capital or metropolis of the *Sinæ*, is described by Ptolemy as the city of Serica, situated farthest to the east. It seems, therefore, to have stood in Sadiya in Upper Assam, and as its site is laid down in the map attached to Ptolemy's Geography, as being close to the mountains called *Ottorrooras* which bounded Serica on the north-east, and near one of the rivers which formed the *Bautes*, it would seem to be identical with the site of one of the forts which have lately been discovered by Lieut. Rowlatt, close to the hills east of Sadiya. He has given an account of these forts in a highly interesting Report of his expedition to the Mishmee hills in November 1844; published in the Journal of this Society—(Vol. XIV. p. 477.) He states:—

"Soon after my return from the Mishmee hills I again left Saikwah

* Journ. As. Soc. No. 104. p. 777.

and proceeded by elephant up the Koondil-panee, and after passing the mouth of the Depho-panee, followed up the course of that stream, until I arrived at the foot of the hills; and as the fort I was in search of was said by my Khamptee guide to be between the Depho and Jameesa, I took a direction through the jungle about east, and without much difficulty arrived at the fort five days after quitting Saikwah.

“ This fort is said to have been built by Raja Sisopal, and is situated on an elevated plain at the foot of the hills; the extent of it is considerable, as it took me about four hours to walk along one side of its faces: the defence is double, consisting of a rampart of stiff red clay, which, as the surrounding soil appears of a different nature, must have been brought from some distance. Below this rampart is a terrace of about 20 yards in breadth, beyond which the side of the hill is perpendicularly scarped, and varies from 10 to 30 feet high; the principal entrance, and the defences for some distance on either side, are built of brick, and on many spots in the interior I observed remains of the same materials, so that in all probability the houses occupied by the inhabitants must have been built of masonry. As I was unable from scarcity of provisions to remain more than one day at this place, I could not examine it so minutely as I could have wished. It seemed however to be composed of only three sides, the steepness of the hill at its north face precluding the necessity of any other works. At present the whole of the northern part of it is thickly covered with tea, which extends, according to the Khampteers who know the locality well, in a belt of more than a mile in depth all along the foot of the hill within the fort, and not as marked in my map, which was drawn before I visited the place. More to the west between the Dihing and Dehong is a much larger fort, and, as I believe, entirely composed of brick, as well as a tank of similar construction, surrounding which are numerous hill forts of small dimensions erected by a Raja named Bhishmuk, and the popular tradition amongst the people of this part of the country is, that on the destruction of the empire of these kings by the Hindoo god Krishna, the people who were able to make their escape fled to the hills, and have in the course of time become converted into the present tribes of Abors. Near these forts a great number of wild Methuns* are to be met with, and the whole of the country, from the mouth of

* *Bos frontalis*, or allied species.—*Cur. As. Soc.*

Koondil to the base of the hills, presents many indications of former cultivation. On this expedition I was absent nine days." Major Jenkins remarks that these forts refer to a time of which we have no history or even tradition further than frequent traces of the dynasty of the Pals throughout Assam. Alluding to the destruction of the empire of these kings by Krishno and the conversion of those who escaped to the hills into the present tribes of Abors, he states: "if the Pals were Buddhists, this tradition may allude to their overthrow by the Rajas of the Bráhmínical faith; but all authentic records of those times appear to be lost, at least in this province."

The origin of the name of Sera is involved in obscurity. There is a place of this name, the site of a monastery, in the vicinity of Lassa, which has been supposed by Malte Brun to be the Sera of the ancients. The former, however, was built in the 8th century* and it is obvious, therefore, that it is not the Sera of Ptolemy. Sera is also the name of a town in Mysore. The word is evidently one of Indian derivation, and is probably a corruption of Sri, "sacred." It has reference, perhaps, to the site of Sera in the vicinity of the sacred Brahmakund, from which the Sri Lohit (or sacred Lohit) the Irawaddee, and the Brahmaputra were formerly supposed to issue. The Irawaddee is apparently the river designated "Serus" by Ptolemy. The mountains in the vicinity of Sera, from which one of the affluents of the Brahmaputra is represented as having its origin, were called Serici. It is said that *se* is the name of silk in China, and it is supposed that from this word the name of Seres is derived. It was conjectured by an ancient author, that the name, by which the silk worm was designated, was the origin of the term Seres. "Pausanias, Seres populum a sere vermiculo dictum cencet." (Vide Steph. Thesaur. Ling. Græc.) The name of Seres, however, occurs before it was known that silk is the production of an insect. Virgil, Dionysius, and Pliny mention the Seres, but describe silk, as a substance that is obtained from the flowers or leaves of certain trees. The derivation of Sericum from Seres is particularly mentioned by one author; "Sericum dicitur a Seribus." It is also stated that silk was called Sericum because the Seres were the first who exported it; "Sericum dictum quia id Seres primi miserunt." It is probable therefore, that the Seres derived their name from the city of Sera,

* This information I obtained from the late M. Csoma de Koros.

which stood near the sacred fountain of the Brahmputra. Hence Assam was called *Serica*, and its staple commodity, viz. silk, was designated *Sericum*, while the other articles of merchandize, which were exported from it, were distinguished by the adjective *Seric*, as *Σερικὰ δερμάτα* *Seric skins*; *ferrum Sericum*, *Seric iron*.

Issidon, called *Issedon Serica* by Ptolemy to distinguish it from *Issedon Scythica* which stood in Thibet or Bootan, was the capital of the *Issedones*, who appear to have been the most powerful of all the nations of *Serica*. They are described by Ptolemy, as a *μεγα εθνος*, and by Ammi-
 anus Marcellinus, as “*omnium splendidissimi*,” and from the situation assigned to their territory, it is probable that their capital stood in the vicinity of Ghergong, or Rungpore. Ghergong or Kirganu, as it was anciently called, (*Vide Rennel’s Memoir, &c. p. 299,*) appears to be the *Kangigu* of Marco Polo. Marsden remarks that this country is designated “*Cargingu*” in the early Italian Epitome. It is described as a kingdom situated eastward of Bengal, and as having voluntarily submitted to the authority of Kublai Khan. The people are stated as being idolators and as having a peculiar language. The country is described as abounding in elephants, gold, and many kinds of drugs, but being an inland country distant from the sea, there is no opportunity of selling them. The inhabitants lived on flesh, rice, and milk; and tattooed their bodies.* The Ahoms transferred the seat of government to this place from *Hulagari Nuggur*, but from the architectural remains which are still to be seen in its vicinity, it would appear to have been, before it became their capital, the site of a city which belonged to a people far advanced in civilization.

Asmira was the capital of the *Asmiræ*, whose territory is described by Ptolemy as situated below the mountains of the same name (*subque iis Rabbannæ Asmiræa est regio, supra ejusdem nominis montes, Ptol.*). It probably stood in *Lackimpore*, where the *Chutteeahs*, a branch of the *Shyan* family had possessions, before the Ahoms came into Assam. There are various remains of antiquity to be seen in *Lackimpore*, as tanks, and the remains of an embankment called *Rajghur*, which, *Lieut. Dalton* remarks, “*bears the appearance of having been constructed as a rampart against the inroads of the hill people.*” He describes it as being “*a stupendous work.*” (*Journal Asiatic Society, Vol. XIV. p. 252.*)

* *Marsden’s Travels of Marco Polo, p. 455.*

Asparata (the Aspacara of Ptolemy) appears to be the ancient city of Pora in the district of Chardwar. Capt. Westmacott considers Pora as identical with Pratappur—a splendid city which is described in the ancient manuscript records of the kings of Assam, as having stood on the north bank of the Brahmaputra, a little below Bishnath. The ancient temples and ruins of Pora are described by him in the Journal of this Society, Vol. IV. p. 185. He remarks: “From their massive proportions and the carvings and ornaments being so much worn by time and exposure, the fanes are evidently the work of a remote era: I sought in vain for an inscription, and neither the priests of the district nor the ancient families whom I consulted could assist my researches, or point with an approximation to accuracy to the date of their origin.” He mentions the ruins of six or seven enormous structures of granite broken into thousands of fragments. “Altars of gigantic proportions were the most remarkable objects,” one of which he describes as making a square of forty-six feet and eighteen inches thick. He states: “it is certain from the prodigious number of ruinous and deserted temples, all of which appear to have been dedicated to Siva, being within the circuit of a few miles of Pora (I discovered twelve or fifteen in as many days on the hills and high lands at their feet) that this spot must have been the capital of a sovereign Prince, or a principal seat of the Hindu religion and enjoyed a large share of prosperity at some remote period.”

Besides the four cities mentioned by Ammianus Marcellinus there are eleven others which are enumerated by Ptolemy as belonging to Serica, viz. Damna, Piada, Tharrhana, (*Pal. Throana*) Drosache, Paliana, Abragana, Thogara, Daxata, Orosana, Ottorocorrha, and Solana. There are various places in Assam and in the neighbouring hilly tracts to which the sites of these places might be referred. Ottorocorrha stood in the vicinity of the hills of the same name, and was apparently one of the two forts which are described by Lieut. Rowlatt. Mr. McCosh mentions that there are many extensive forts scattered over the country, and particularises Buddea-ghur, Rajah-ghur, and Gohatti as the most remarkable. Speaking of the latter place, he observes: “A small portion of its former extent and grandeur now remains: its mortar and earthenware constitute a large portion of the soil: its numerous spacious tanks, the works of ten thousands, the pride of its princes, and the wonder of the present day, are now choked up with weeds and jungle or altogether

effaced by a false though luxuriant soil that floats on the stagnant water concealed beneath." Some of its gateways are still standing, and mounds and ditches—the remains of its fortifications—are to be seen for many miles around it. The intervening mountainous country between Assam, Cachar, and Manipore appears to have been cultivated formerly, and as Mr. Torrens remarks, to have been "thickly inhabited by a people far advanced in civilization."* The remains of the fortified city of Dhemapore on the banks of the Dhansiri, built by Rajah Chakardhaj, the fourth king of Cachar, are described by Mr. Grange, by whom they were discovered, in the Journal of this Society.† According to Mr. Crawford, the Burmese Annals mention Jynteah in the vicinity of Sylhet, as the site of a principality called Wethali, which was founded by Susanaga, a descendant of Gautama in the female line. It is stated that the son of Susanaga named "Kalasanka, in the 10th year of his reign and 100 years after the death of Gautama, assembled all the learned men of his country, and made them repeat what they knew of the doctrine of Buddha: for there yet existed no scripture. This assembly is known to the Burmese by the name of the 'Second Council': the First Council having taken place three months after the death of Gautama. From this time, to the year 289 before Christ, a period of 83 years, twelve princes are described as having reigned in Wethali: the last of whom Sri-d'hama-sanka, is a personage of some repute. It was the son of this pious reformer who permanently fixed the seat of government at Prome."‡ These details identify the Wethali of the Burmese with the Wesali of the Pali Buddhistical Annals of Ceylon. Vesali, however, which is considered the same city as Wesali, is referred to a site on the river Gandak, near the Bakra column, or *lat*, discovered by Mr. Stevenson; and according to Professor Wilson there is early authority for identifying it with this locality.

The sedate and tranquil life which the Seres led, their unwarlike disposition and aversion to the use of arms, are characteristic of the indolent Assamese, who, inhabiting a rich and fertile country formerly fenced in, or protected against foreign invasion in the manner described by Ammianus Marcellinus, may be supposed to have enjoyed, in ancient times, the undisturbed ease and delightful tranquillity, which the words of the text,

* Journ. As. Soc. No. 104, p. † Ibid.

‡ Crawford's Embassy to Ava, p. 489.

“utque hominibus sedatis et placidis otium est volutabile, nulli finitimum molesti,” seem to express.

The pleasant and salubrious climate, which is attributed to Serica, seems to refer to the climate of Upper Assam. “Comparatively speaking, Assam enjoys a far more peculiarly temperate climate with a greater equality of temperature than is general throughout India. The warm weather is very moderate, and throughout the year the nights are cool and refreshing. The mean annual temperature amounts to 67·2—the mean temperature of the four hottest months amounting to 80, and that of the winter to about 57.”* Mr. McCosh describes the climate of Upper Assam as “cold, healthy, and congenial to European constitutions.”†

Serica is described as abounding in groves or forests which are designated “sublucidæ,” an expression which seems intended to describe the effect produced by the myriads of luminous insects in the jungles of Assam. These insects appear to be far more abundant there than in Bengal: they are described as being seen to “glitter at night among the dark and leafy recesses of the forest trees, or flit with varied motions around their utmost branches, producing an effect so brilliant as to seem almost the effect of magic.”‡

The substance, the produce of the trees of these forests, which, after being sprinkled with water, is described as being spun out into the finest threads, is evidently the indigenous silk of Assam. There are six species of silk worms found in that country, namely, the *mulberry worm*, the *eria*, the *muga* or *moonga*, the *kontkuri*, the *deo mooga* and the *kaumpottonee*. The mulberry worm is supposed to have been originally introduced into Assam from Bengal, but the other five are indigenous to the country. Silk is one of the staples of Assam, and the material of which the clothing of the greater portion of the population is manufactured. The silk from the *Eria* worm, which is described as being very durable, is worn by the poor at all seasons of the year, and by every class in winter. Dr. Buchanan states “that the native women of all castes, from the queen downwards, weave the four kinds of silk

* Vide Major Jenkins's Account of Assam in the Bengal and Agra Annual Guide and Gazetteer, 1844.

† Journal Asiatic Society, Vol. V. p. 195.

‡ Vide Robinson's Assam, p. 125.

produced in the country, with which three-fourths of the people are clothed. The raw material is seldom purchased; each family spins and weaves the silk which it rears, and petty dealers go round and purchase for ready money whatever can be spared for exportation or for the use of the few persons who have none of their own. Considerable quantities of the two coarser kinds are also exported. There may be one loom for every two women, and in great families there are eight or ten which are wrought by slave girls." The Muga moth is reared on seven different varieties of trees, and the extent of the plantations in Lower Assam is estimated by Mr. Hugon at 5000 acres exclusive of what the forests produce.* In Upper Assam the plantations are still more extensive. Mahomed Cazim describes the silks of Assam in A. D. 1661 "as being of excellent quality and as resembling those of China." He also states that the Assamese were skilled in embroidering with flowers and in weaving velvet and a kind of strong silk fabric called *tautband* for making tents and *khensuts*.† Tavernier states that there is in Assam "great store of silk but coarse," and that there is a sort of silk found under the trees which is spun by an insect like the silk-worm.‡ The nature of Muga silk appears to have been unknown before this time. Methold, who visited India prior to A. D. 1620, speaks of it as being the production of a certain tree. He mentions as the imports into Masalipatam from Bengal, "calicuts, lawns, and divers sorts of cotton cloths, raw silk, and Moga, which is made of the bark of a certain tree;" and he adds "many curious quilts and carpets are stitched with this Moga."§ Muga appears to be the substance which is mentioned under the name of *sericum* by the ancients, and which is described by them as being procured from the leaves or bark of certain trees. It is evident that they regarded it as a different article from the produce of the mulberry silk-worm which they designated *bombycina*. *Bombycina* was the name that was applied to the threads spun by an insect called *Bombyx*, which Aristotle describes as a horned worm that undergoes several transformations in the course of six months, and that produces the substance called "Bombykia." On the other hand, "Sericum" was supposed to be a vegetable production. Theophrastus, Virgil, Dionysius Periegetes, Pomponius Mela, Seneca, Arrian, Claudian, and Jerom

* Journal As. Soc. Vol. VI. p. 21.

† As. Res. Vol. II. p. 174.

‡ Tavernier's Travels. Chap. Assam.

§ Purchas's Pilgrims, Vol. V. p. 1005.

describe it as an article that was obtained from the flowers, leaves, or the bark of trees. Pliny distinguishes between silk, muga, and cotton. The first which he calls *bombycina*, he mentions as the produce of the insect bombyx, which he refers to Assyria; the second, or *sericum*, he describes as a downy or woolly substance which the Seres combed from the leaves of trees, which, he remarks, were different from the wool-bearing trees of Tylos in the Persian gulf, by which he means *cotton* trees. The latter are mentioned as differing from the trees in the country of the Seres in this respect that they produce down or wool, *not on their leaves*, but *in a fruit*, which is described as of the shape of a gourd, and of the size of a quince, and which, when ripe, opens and displays within balls of down or wool, of which fine and costly cloths are made. This substance was the produce of trees called Gosampinæ in the lesser isle of Tylos. (Pliny, Lib. xii. Chap. x. and xi.)

The word *εριον* in the Sequel, which Dr. Vincent has rendered raw silk, is used to designate the woolly substance, which the Seres combed from the leaves of trees. It might be supposed to be derived from *eria*, the name of one kind of indigenous silk of Assam, which Mr. Hugon states was formerly exported to Lassa, but it is evident from other ancient authors who make use of this term, that this is not its origin, and that it is merely the word *εριον*, *lana*, which is employed to express a woolly or downy substance which was procured from trees, and that it is applicable, therefore, to cotton, or to the Muga and other silks of Assam supposed to have been carded from the leaves, bark, or flowers of trees. This word in the passage *ινδοι εριω χρονται η λινω* in Dionysius Periegetes, is rendered by Salmasius the wool not of cattle but of trees. Pulfux mentions *ξυλου εριον* and Theophrastus *εριοφορα δενδρα*—terms which may be considered as referring either to cotton or the indigenous silks of Assam. *Sericum*, or the indigenous silk of Assam, though generally regarded by the ancients as the product of trees, is nevertheless mentioned by Pausanias as being produced by an insect.

The term *Metaxa* (*μέταξα*) which was subsequently applied to *Sericum*, appears to be a compound of the words *muga* and *tassar*, which are indiscriminately applied about Dacca to the muga silk of Assam or moongatassar, as it is frequently called. Raw-silk is mentioned under the name of *Metaxa* by Procopius, Suidas, Theophanes, and in the Digest. It was an article of import into Tyre and Baretus, where it was

woven into cloth. Silk merchants were called "metaxiarii," and the duty that was levied on the raw material was denominated "metaxiatium." It is stated that the price of metaxa was raised by a tax imposed on it in Persia; and that, on the manufacturers, in consequence of this duty, charging a higher price for their cloths, Justinian fixed a maximum and ruined the trade.

From the manner in which Muga silk is produced, namely, by worms found on certain trees in the forests, or reared on trees planted for the purpose, the error of supposing this substance to be the product of the bark, leaves, or flowers of trees, is easily accounted for. The ancients knew that *bombycina* (or the mulberry silk) was procured from an insect, but the indigenous silk of Serica or Assam, which they thence called *sericum*, was supposed, from the accounts they received of it, to be the production of the leaves, the bark, or the flowers of trees.

Ammianus Marcellinus describes the process to which this supposed vegetable product "fetus arborum" was subjected, in order to facilitate the drawing out, or the reeling of the threads of which it consisted. This was performed by means of frequent sprinklings of water (or perhaps by immersing the silk in water and potash as is practised in Assam in the present day). From this mixture of down and liquid (*ex lanugine et liquore mistam*) the Seres combed out a very slender filamentous substance, and spinning it into woof threads, they wove them into the cloths called Sericum. The author mentions that this kind of cloth was originally, or on its first introduction into Europe, worn only by the nobility, but that in his time it was in common use among the lower classes of people. The cloth, which he here alludes to, appears from the woof alone having been made of silk, to have been a mixed cotton and silk fabric, such as is manufactured about Dacca in the present time. These cloths called Kaseedas, consist of two kinds, viz. of Muga silk and cotton woven in the loom, and of cotton cloths embroidered with Muga silk with the needle. The former have been manufactured here from time immemorial. Both kinds are annually exported from Dacca to Bussora and Jidda, whence they are conveyed into the interior of Arabia and Mesopotamia, where they are used as turbans, vests, &c. by all classes of people in these countries. A large quantity is sold at the great annual fair held in the vicinity of Mecca. Formerly, they were an article of export to Egypt and Turkey: and it

is probable, therefore, that they are the cloths of that kind which is designated "subserica" by ancient authors, from being made partly of metaxa or tassar silk, and partly, either of cotton or flax.

It would appear, also, that the ancients imported the strong silk fabric, which the Assamese formerly manufactured for tents. Dion Cassius (L. XLIII.) states, that Julius Cæsar, when he entertained the Romans with magnificent spectacles, covered the amphitheatre with awnings of *sericum* to shelter them from the sun. (Vide Macpherson's Annals of Commerce, Vol. I. p. 138.) This, no doubt, was the cloth called *tautbund*, which Mahomed Caxim states was used for tents and *khenauts* (or the outer walls of tents).

Ammianus Marcellinus describes the Seres, as people of a most peaceable disposition, as most frugal or provident in their habits, and as shunning intercourse with the rest of mankind. Their mode of carrying on traffic, as mentioned by him, is similar to that described by Pomponius Mela, and Pliny. He states, that when strangers crossed the river to purchase thread or other commodities, the Seres carried on trade with them without interchanging words, and estimated the value of the merchandize offered for sale by inspection alone—disposing of their own goods [by bartering them for articles of country produce] but declining to buy foreign commodities in return. Solinus writes, "Primum eorum fluvium mercatores ipsi transient, in cujus ripis nullo interpartes linguæ commercio sed depositarum rerum pretia aestimantes sua tradunt nostra non emunt." The river, on the banks of which the traffic here alluded was carried on, appears to have been the boundary line between Bengal and the country of the Seres. It is apparently the same river, which Pliny designates *the first* in the country of the Seres, and it may be regarded, therefore, as having been the frontier one: (Primum eorum noscitur flumen Psitaras.) It appears to be a river in the Rungpore district, and is perhaps the Tistha. The Seres here mentioned are some of the hill tribes bordering on Sylhet and Assam, and the thread, which the strangers or foreign merchants purchased from them, was, no doubt, the Tassar or Muga silk thread of the latter country, &c.

Ammianus Marcellinus alludes to other articles of merchandize besides the thread which the Seres bartered. They comprised skins and iron, and, in all probability, lign-aloe, musk, lac, hair-chowrees, and rhinoceros's horns.

Skins.—Pliny mentions that the Seres exported skins and iron along with their cloths. These skins are mentioned under the name of *Ξηρικά δερματα* in the Periplus. They evidently refer to the rhinoceros and buffalo hides of Assam, from which the Sylhet shields are made, and which are celebrated throughout India, both on account of their strength, and the fine polish which is imparted to their surface by the juice of the *Semicarpus anacardium*. The Romans in all probability imported these hides for the manufacture of their shields.

Iron.—The iron of Serica was considered the best in India (*Ex omnibus generibus palma Serico ferro est. Seres hoc cum vestibus suis pellibusque mittunt. Secunda Parthico, neque alia genera ferri ex mera acie temperantur, ceteris enim admiscetur*).^{*} Assam and the adjacent countries abound in iron. Dr. Buchanan states that “at Doyang, southwest from Jorhat, a day’s journey, there is an iron mine which is wrought on account of the king. It supplies the whole country with abundance.”[†] Speaking of the places where iron ore is dug out by the *Khassias*, Lieut. Yule remarks: “so numerous and extensive are the traces of former excavations, that judging by the number at present in progress, one may guess them to have occupied the population for twenty centuries.”[‡] Malte Brun mentions that “Assam is celebrated for its steel.” This refers to the *daos* that are manufactured by the hill tribes, viz., the Nagas, Abors and the *Khamtis*.

Chowrees.—The fly drivers made of the long glossy hair of the tail of the Yak (*Bos grunniens*) appear to be the articles mentioned under the name of *Capilli Indici* in the Digest. A chowree was one of the insignia of royalty among the ancient Hindoos, and was used in Persia for the fringed knots called *Kirtas*, which are generally ornamented with gold, and hung round the necks of horses, as a charm against fascination. The Chinese make tufts of it for their caps, and the Turks adorn their military standards with it. Chowrees have always been an article of importation into Rungpore and Assam from Bootan and Thibet, and no doubt, they formed one of the exports from the Gangetic mart of the Periplus. *Ælian* mentions the long bushy tail of the Yak, and it may, therefore, be concluded that it constituted the *Capilli Indici* specified

* Pliny, Lib. XXXIII. C. XIV.

† Martin’s Eastern India, Vol. III. p. 660.

‡ Journal Asiatic Society, Vol. XI. p. 853.

in the Rescript of the Roman emperors relating to the articles imported into Egypt from the east, and contained in the Digest of the Roman Law, Lib. XXXIX. title XV. 5. 7.*

Lign Aloe.—The fragrant wood called Lign Aloe or Aguru in Sanscrit, is the Ahaloth of Scripture, from which term the name of Agallochum given to it in the Digest, is derived. Hence the modern appellation of Agak or Eagle wood which is sometimes applied to it. Aquillaria Agallocha, which yields this substance, is common in the mountainous country between Sylhet and Assam. Speaking of the latter country, Mahomed Cazim observes: “the mountains of Nanac (the Naga hills or Nazavicum of Ammianus Marcellinus) produce plenty of Lign Aloes, which a society of natives import every year into Assam and barter for salt and grain.” The fragrance of Lign Aloe is supposed to be the result of a diseased state of the centre layers of the wood, which is converted into a resinous matter. At Sylhet an essence or *attar* is extracted from it, which, in former days when this article was in great demand, was sold for its weight in gold. Both the wood and the essence or *attar* are purchased by Moghul merchants and are sent to Jidda and Bussora. The *attar* of Lign Aloe, which is of the consistence of thick oil and of a dark brown colour, appears to be the substance called Indian Cinnabar by Arrian. Dr. Vincent remarks in speaking of Arrian’s account of Socotra: “it is remarkable that aloes are not mentioned by the author of the Periplus but he notices particularly the drug called Indian cinnabar which exudes from a certain species of trees. Dr. Vincent says that the confounding of Cinnabar and Dragons blood was a mistake of ancient date, and concludes that the latter is the article that is referred to.”† It would seem, however, that the substance, which Arrian alludes to, was not the produce of Socotra, but of India, and it is likely, therefore, that the *attar* of Lign Aloe is, from its colour, the substance that is meant by the article Cinnabar which exudes from certain trees. It was no doubt imported into Socotra from India. Lign Aloe is highly esteemed as a perfume throughout the east, and is employed for various purposes, as incense in temples, to fumigate apartments, cloths, &c. The Jews used it at their interments.

* Quære, Tit. IV. ? where a long and highly interesting catalogue of oriental imports is given.—*Eds.*

† Vincent’s Periplus.

Rhinoceros's Horn.—This appears to be the article which is mentioned under the term *Ρυοκερωσ* in the Periplus. The Rhinoceros's horn was considered an antidote to poison, and was, therefore, highly valued in ancient times. These horns were no doubt exported from Assam where the Rhinoceros abounds. The horn of the Rhinoceros of Bengal was considered superior to that of every other country of Asia. Linschoten remarks that this was owing "to the herbs which Bengala yieldeth, for in other places they were not near the price of these." The two Mahomedan travellers of the 9th century state that the Chinese purchased the horns of Rhinoceroses in the kingdom of Rami, in the fens of which country they are said to abound (the marshes of Bengal) and that they adorned their girdles with these, some of which were valued at 3000 pieces of gold in China.

Tabasheer.—This is supposed by some to be the *μελι καλαμινον* of the Periplus. It is designated the sugar or manna of bamboos. It occurs in the works of the old travellers under the name of Spodium de Canna. Barrett mentions it as an export from Bengal to Goa in the 16th century. It is also noticed, as an article of traffic in other parts of India. Cæsar Frederick remarks: "From Cambara cometh the Spodium which congealeth in certain canes (bamboos) whereof I found many in Pegu, of which I made my house there, because as I said before they make their houses there of woven canes like mats." Odoricus, who travelled in India in the early part of the 14th century, speaks of canes named "Cassam, of which they make sails (masts) for ships, and in which are found certain stones, one of which stones whosoever carrieth it about with him cannot be wounded with any iron, and therefore the men of the country for the most part carry such stones wherever they go." (Hakluyt's voyages, p. 162.)

Dacca, 16th April, 1846.

APPENDIX.

NOTE I.

SIR WM. JONES mentions "the similarity of some proper names on the borders of *India* to those of *Arabia*, as the river *Arabius*, a place called *Araba*, a people named *Aribes* or *Arabies* and another called *Sabi*." (Discourse on the Arabs, *As. Res.* Vol. ii. p. 7.) Words allied to the latter term occur in Ptolemy's Geography of the countries of India: and were perhaps the names of *Sabæan* commercial settlements. *Supara* or *Sippara* (the *Sefareh* of Arabian

geographers : Vide D'Anville) between the ancient Tyndis and Muziris on the western coast of India, is supposed by one learned author (Lucas Holsterius ad Ortel, p. 137, quoted by Cellarius) to have been the Ophir of Scripture. The *Sabaræ* occupied a country corresponding in situation with Sumbulpore, the river Adamas (so named from its containing diamonds) which flowed through it, being the Mahanudee. *Sabar*, in the vicinity of Dacca, is regarded as a place of great antiquity by the natives ; it is situated in that part of the district which was the original seat of the fine muslin manufactures, and was in all probability an emporium for these fabrics and for the lign aloes, cassia, spikenard, and musk of Sylhet, Assam, and Bootan. *Sabara*, from which the Sabaricus Sinus took its name, is referred by D'Anville to Pegu, where the Irawaddee enters the sea. *Saba* or *Sabana Emporium* was situated at the southern extremity of the Golden Chersonesus, and apparently in Malacca. The *Sabadibe* (or islands of Saba) are perhaps Sumatra and Java. All these places, it may be remarked, are celebrated for their products ; and they were, in all probability, the sites of emporia from which the Sabæans derived the precious stones, the gold, the fine garments, the perfumes, and the spices, with which they supplied Egypt, Judæa, and the countries of the West.

NOTE II.

DR. BUCHANAN supposes that the Hindoo Princes of Bengal continued to govern at Sonargong, long after they had lost possession of the western portion of their kingdom, and that this part of the province was not annexed to the dominions of Mahomedan conquerors of the country until the time of Ferid-Addeen Soor Shere Shah. It is well known, however, that there were Mahomedan governors of the eastern division of Bengal prior to the reign of Shere Shah, and that Sonargong was in subjection to them, as early as the year 1279. It is probable, indeed, that there were Mahomedans in this part of Bengal, at a period long anterior to the conquest of the country by Bukhtyar Khulijj in 1203. We are told that the Arabian merchants of Bussora carried on an extensive maritime commerce with India and China, as early as the 8th century, and that many of them settled in the countries which they visited. Dr. Robertson, in speaking of Mahomedan traders in the east at this time, states : "They were so numerous in the city of Canton, that the emperor (as Arabian authors relate) permitted them to have a Cadi or Judge of their own sect, who decided controversies among his countrymen by their own laws and presided in all the functions of religion. In other places, proselytes were gained to the Mahomedan faith and the Arabian language was understood and spoken in almost every sea port of any note." (Robertson's Ancient India, p. 102.) There is reason to believe from this circumstance, that Bengal was the seat of a colony of Mahomedan merchants at this early period. This may be

inferred from the extensive commerce it enjoyed with countries of the west from early times; from the great value of its products, and above all, from the distinct allusion made to it by the two Mahomedan travellers of the 9th century. It is mentioned by them "as the country of a king named Rami, who possessed a great number of elephants. Its exports consisted of fine cotton garments,* lign aloes,† sable skins,‡ and Rhinoceros horns, all of which were to be purchased for shells,§ which were the current money of the country."

NOTE III.

The city of Bengala is mentioned in the works of geographers in the early part of the 17th century. Cluverius describes it as situated on an island of the river Cosmin, and as a mart from which there was exported valuable merchandize, consisting of silk, cotton, civet, sugar, &c. "*Urbs Bengala magna, celeberrimo imperio insignis, in insula fluvii Cosmin sita est. [Urbs Bengala una ex præstantissimis Indiæ est, ubi omnes reperiuntur delicie quas ceteræ optinæ possident Europæ civitates. Hinc exportantur merces pretiosæ, Sericum, zylinum, zibettum, Saccharum, oriza, cannæ de Bengala, vulgo cannæ Hispanicæ dictæ].*" Vide *Introduc. ad Univers. Geograph. Philip Cluverius*. In the *Lexicon Universale* of Hoffman it is mentioned as a city of Extra Gangetic India, and as a large and celebrated mart frequented by Europeans: "*Bengala urbs Asiæ cum regni cognomine in India extra Gangem, sub imperio M. Mogolis a multis annis, ad ostia Cosmini fluvii non longe ab ostiis Ganges. Ampla et percelebre ab Europæis frequentata.*" That the Cosmin is thé Brahmaputra is evident from the situation assigned to the former in the maps of the older geographers. Cluverius delineates it as running from the north-east, and dividing into two branches, on one of which he places the cities of Bengala, and Chatigan: the other branch, he represents as falling into the sea at Pegu. In a map attached to Bernier's *Travels*, Cosmin is laid down in a situation also corresponding with that of the Brahmaputra. Dacca is placed at its mouth, where the Megna joins the sea: and Chatigan at some distance from it towards the south. In a map by Mandelso, who travelled in India in 1639, the city of Bengala is laid down in the situation here assigned to Dacca; viz. at the mouth of the river. Bengala is described in the *Dictionnaire Historique* par M. L. Morery, as a city lying "sur l'embouchure du fleuve Cosmin, grande, belle, riche, marchande, et comme le centre du commerce des Indes, extrêmement fréquentée par les Européens, Français, Anglais, Portugais, Hollandais, &c. qui y ont tous le libre exercice de leur religion. Elle n'est pas éloignée de l'embouchure du Gange." The author, however, concludes by stating: "Quand j'ai parlé de la ville de Bengale, j'ai suivi le sentiment de presque tous les auteurs qui ont écrit avant

* Dacca muslins. † Aggur wood. ‡ Otter skins? § Cowrees.

moi : mais de nouvelles ? relations m'apprennent qu'il n'y a point de ville de ce nom." The site of Bengala appears to have been confounded with that of Chittagong about the beginning of the 18th century. In some of the French geographical Dictionaries of that period, these towns are described as "Chatigan sur la rivière de Cosmin vis-a-vis Bengal que plusieurs geographes confondent avec elle. Quelques uns ont cru que Bengale n'est autre que Chatigan." Dict. de Lamartine. That they were different places, however, is evident from the circumstance of Bengala, Chatigan and Satigan being severally mentioned as the chief emporia of Bengal. From the city of Bengala being described as situated on an island and opposite to Chittagong, Sundeep would seem to be the locality that is referred to ; on the other hand, Sir T. Herbert mentions this island, but does not allude to any town upon it, whilst he particularly specifies Chatigan, Bacola, Serripore, and Sonargong as the principal towns of the eastern part of Bengal. In a work entitled "Lex Mercatoria," written about the middle of the last century, Dacca is mentioned as identical with Bengala. The mention by Morery of the latter having been frequented by Portuguese, Dutch, English, and French, seems to countenance this opinion ; but on the other hand the insular situation of Bengala, and its being placed opposite to Chittagong prove that Dacca is not the town that is referred to. Rennell, speaking of this city, remarks "no traces of it now exist. It is described as being near the eastern mouth of the Ganges, and I conceive the site of it has been carried away by the river."

Note on an Image of Budha found at Sherghatti, &c. by Capt. KITTOE.

I have the pleasure herewith to transmit a sketch of a small image of Budha at this place, and said to have been brought from a hill near Gaya.

It will be observed to differ in some respects from the ordinary form of these idols ; it appears to hold a cup for offerings, instead of the right hand resting open on the knee, as generally found, but it is common in this district, as well as other forms which I propose treating upon on a future occasion.

It will be observed that on the right beneath the "Sinhasun," or throne, is represented a monkey ? on his hind legs, holding an offering in his fore paws ; on the left, the same animal appears to be jumping down a well. This I have also seen on a fine figure of Budha at Budh Gaya, given in Buchanan, but badly drawn. Probably Licut. Latter, who has already offered the Society some useful observations on Buddhist emblems,



IMAGE OF BUDHA AT SHERCHATTI.

M. Kille del.

JVEL. 128

might be able, with the help of his Burmese savans, to throw some light upon the meaning of this curious representation, as well as of others I hope to furnish.

The workmanship of the figure is superior to the ordinary run; its material is black chlorite. The measurement is 15 in. \times 9 in. and has been worshipped for years past as Bhyrub by the ignorant people of this town; but this occurs everywhere, as remarked upon by Buchanan.

I have given the inscription in a line by itself with the Deva Nágrī context immediately above it for comparison;* it is the same, excepting perhaps orthographical errors, as given in page 133, Vol. IV. of the Journal, and occurs on almost every image in this district, and in various types, down to No. 2, of the Allahabad column, called the Gupta by Prinsep.

I hope soon to have it in my power to offer the Society further specimens of fragments of Buddhist sculpture met with in such abundance in this district, and should you think them of sufficient interest, I would not object to draw them on transfer paper ready for printing and publishing in the Journal.

I beg to announce to the Society that having lately had a few days' leisure I have visited several of the spots held sacred in the vicinity of Gaya, and have made several curious discoveries which may prove of interest to those who make the former usages and religion of this empire a study.

It would take much more space than I can afford or would attempt to fill, in a letter which is intended as a simple announcement, to describe what I have seen, and explain the conjectures it has led to, so as to be well understood—suffice it to say, I have found what I consider to be remains of the famous Chaitya, or temple raised by Asoka at Budha Gaya; they consist of a number of columns on which are very rude though interesting sculptures in bass relief in medallions. I have sketched all that seem worth recording; the subjects are chiefly the worship of the Bo tree, the lotus, the shrine or Chaitya, a goat, a female figure with the head of an ass, &c. There are also winged lions, oxen and horses, and a centaur. The simple bull is oft repeated, and a cow and calf—but this last appears to be of a later date. It is remarkable that these pillars are of the same stone as that of the Asoka columns of Dehli,

* As there is no room to insert this in the plate we here subjoin the Deva-nágrī transcription.—*Eds.*

ॐ येवर्णा चेतुप्रवृत्ता चेतुं तेषां तज्जामना च्च वदन् तेषां च यो निरोध एव
वादी महा त्रमयः ।

PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL,
JANUARY, 1847.

The usual monthly meeting was held on Wednesday evening, the 13th January.

The Hon'ble Sir J. P. Grant, in the chair.

The Proceedings of the previous meeting were read and confirmed.

Dr. Duncan Stewart, Presidency Surgeon, was balloted for and duly elected a member.

The following gentlemen were proposed for ballot at the February meeting:—

Captain Ousely, proposed by Colonel Ousely, seconded by Mr. Piddington.

Captain Munro, Brigade Major, Fort William.

J. Muller, Esq. Mint.

R. Jones, Esq. Professor Hindu College.

W. M. Dirom, Esq. C. S.

Baboo Debendernath Tagore.

Dewan Hurreemohun Sen.

Proposed by Dr. W. B. O'Shaughnessy, seconded by the Hon'ble Sir J. P. Grant.

The Senior Secretary read a Report on the part of the Committee of Papers on the Society's affairs.

Resolved, That the Report be received and printed for circulation among the resident members, prior to the discussion at the February meeting of the propositions it contains.

The following gentlemen were elected members of the Committee of Papers to supply vacancies:—J. W. Colville, Esq. Advocate General,

W. Grey, Esq. C. S., Welby Jackson, Esq. C. S., and R. W. G. Frith, Esq.

Read translation of a letter received from Professor Lassen, as follows :—

To Dr. E. ROER, Co-Secretary, Asiatic Society, Oriental Department.

MY DEAR SIR,—In conveying to the Asiatic Society my grateful acknowledgments for the valuable present they have favoured me with, and for their interest in my pursuits, I would request you to offer to the Society my apologies for the delay in my reply, owing to a severe affection of the eyes, from which I have been suffering during this whole summer, and which prevented me from engaging in any literary undertakings.

I was long since aware of the importance, nay of the indispensability of Radhakant's Dictionary for my labours, without, however, seeing a chance of making use of it, and my gratitude to the Asiatic Society, is the more cordial and sincere, since by their favour I have at last obtained access to this mine of Hindu learning.

Being anxious publicly to record my thanks to the Society, I shall consider it a particular favour, if you will ascertain, whether the Society would accept the dedication of my work on *Indian antiquities* to them. I was by my disease unfortunately compelled to desist during last summer from my labours, but I hope I shall be able to finish the latter half of the first volume in the course of the next spring.

By your translation of the Vedanta Sara, which I already knew from No. 159 of the Journal, you have acquired a lasting merit for the correct interpretation of this work, the meaning of which had been entirely misconstrued by the two former translators. You give, I apprehend, even too much praise to the German, by calling him a good Sanscrit scholar; his grammar and anthology contain many errors, and do not speak well of the critical sagacity of the author; his works are still more perverted by the circumstance, that he mixes up with all his labours Schelling's philosophy which he does not even correctly understand.

I most sincerely thank you for your offer to have, with the consent of the Society, some of the manuscripts of your Library copied for me, and I shall take the liberty to avail myself of it on any occasion I may require it. The works I should wish to have copied before all others, I am afraid, are not in the Library, at least not in the printed catalogue, viz. the Prâtisakhya and the works of Aryabhutta. The latter, I believe, are only procurable in Malabar, since I find only one single notice of one of them in the catalogue of the Mackenzie collection, where mention is made of a manuscript in Grantham writing. The first title includes three works, manuscripts of which are found in London, and in Chambers' collection in Berlin; they are grammars of the Veda dialect, more ancient than that of Panini, and for this reason of great importance. If you will not consider me rude, I shall be much

obliged to you, if you can procure for me the two last Adhyayas of Bhaskara's Siddhanta Siromani. I have the first two Chapters, but never succeeded in obtaining the two remaining parts.

I am, &c.

C. LASSEN.

Read a letter from Dr. Roer, Co-Secretary in the Oriental Department, proposing the removal of the Pundit on the grounds of incapacity for his duties—referred to the Committee of Papers.

Presented a paper on the Coins of the Independent Mussalman sovereigns of Bengal, by J. W. Laidlay, Esq.

Ditto, on the Ovis ammonoides and a new species of Tibetan antelope, with drawings, by B. H. Hodgson, Esq., Darjeeling. Both these papers appear in the present number; the drawings illustrative of Mr. Hodgson's article are in the artist's hands and will be published with the least avoidable delay.

Read the following letter from the Secretary to Government, N. W. Provinces, forwarding drawings of some remarkable cave temples lately discovered in the Mirzapore district.

No. 1182.

From J. THORNTON, Esq. Secretary to Government, N. W. P.

To the Secretary Asiatic Society, Calcutta.

Genl. Dept.

Lieut.-Governor's Camp, the 19th December, 1846.

SIR,—The Hon'ble the Lieutenant-Governor, having heard of certain cave Temples in the vicinity of the hilly tracts south of Mirzapore, has taken steps to procure drawings of them through the Agency of Captain Stuart, Fort Adjutant of Chunar. His Honor has now desired me to transmit to you a copy of a letter received from that Officer, dated 3d ultimo, together with the original plans and sketches which accompanied it, and to request that you will place them at the disposal of the Asiatic Society for publication in their Journal, or for such other notice as they may be considered to deserve.

I have the honor to be, Sir,

Your most obedient servant,

Lieut.-Govr.'s Camp,

the 19th December, 1846.

J. THORNTON,

Secretary to Government, N. W. P.

(Copy.)

To J. THORNTON, Esq. Secretary to the Government, N. W. P. Agra.

SIR,—With reference to your letter No. 1106, of 26th December, 1845, requesting me to procure all the information I could regarding some Cave Temples lately discovered in the Hilly tracts south of Mirzapore, and sanctioning a certain amount of outlay, for their preservation, I have the honor to state that I have this day

forwarded by Dawk Banghy for submission to His Honor the Lieutenant-Governor, a set of plans and drawings executed by Mr. C. H. Burke, late of the Revenue Survey Department, deputed by me to visit the Caves for that purpose, which I feel assured will be considered highly satisfactory as well as creditable to Mr. Burke's industry and talents.

2. The Caves are three in number, called the Bech Mandah Rownah, Mandah, and Chargoodree. They are situated in Talooqah Shapore, Singrowlee, Purgunnah Burdee, which at the period of the Benares settlement was a small independent Raj held by a branch of the Chundels of Agoree Burhur (vide Regulation II. of 1795, Section 17) but was subsequently absorbed into the Rewah state by an arrangement between the Rajahs of Rewah and Burdee, the latter of whom made over his sovereignty to the former in exchange for a pension.

3. The country near the Caves is very inaccessible, being nothing but a succession of rocky hills covered with dense jungle, containing a few miserable villages inhabited by wild aboriginal tribes, from whom no information of a satisfactory nature can be obtained; the Caves themselves are avoided with superstitious dread by the few remaining inhabitants, and are utterly abandoned to the wild beasts of the forest.

4. The only answer given to queries on the subject is that they were constructed by the Balund Rajahs, a family of the Khurwar tribe, who held the sovereignty of Agoree, and Singrowlee, till expelled by the Chundels, who emigrated to this part of the country from Mohobah, somewhere about the year 1190, A. D. and obtained possession of Agoree, &c. by expulsion of the Balunds about 50 years subsequently.

5. The representatives of the Balund Rajahs still reside in a village of Shapore Singrowlee, called Mirwas, and although dispossessed for nearly 600 years, still entertain a hope of one day being restored to their possessions. It is said that they are under a vow never to bind on a turban till the day of restoration.

6. Some ruins of wells and brick buildings, as well as a Fort, are found in the Nilour hills, near a small village called Benowlee, 12 miles N. W. from the Caves, which is said to have been the ancient capital of Shapore Singrowlee, and the last strongholds of the Balunds, before their final expulsion, but no other remains are to be found indicating the former existence of a people capable of constructing such stupendous works.

7. A small sketch map accompanies the drawings, showing the relative position of the three excavated Hills, which are situated from 10 to 14 Koss south of the most remote part of the Mirzapore district.

Chunar, 3d November, 1846.

I have, &c.

(Signed) W. M. STUART.

(True Copy)

A. SHAKESPEAR,

Assistant Secretary to Government, N. W. P.

On the proposal of the Lord Bishop of Calcutta, seconded by Mr. Colville, Advocate General, the respectful thanks of the Society were voted to the Hon'ble the Governor of the N. W. Provinces for the valuable communication and drawings above recorded. The drawings were referred to the Committee of Papers for consideration as to their publication.

Read two letters from Captain Kittoe, respecting Budhistical remains discovered by him at *Gaya*. Referred to the Committee of Papers.

Read the following letter from Captain Kittoe:—

To the Secretary Asiatic Society, Calcutta.

Sherghatti, 28th December, 1846.

DEAR SIR,—Some months ago I submitted a paper on the subject of the Kootub and adjacent ruins, but to this date I have received no reply or acknowledgment.

Being desirous of altering some parts of my paper, I request the favor of its being returned to me.

As an old member, and one who (as long as encouragement was offered by the acknowledgment of contributions) took much pains for the Society, I beg to propose that for the future all communications be formally acknowledged, and that it be considered a rule, secondly, that such papers as may not be deemed by the Secretaries and the Committee of Papers, suited to the Journal or Researches, may be returned to the contributor, with a letter to that effect.

I would, with deference, recommend that as the journal is now (I believe) published at the expense of the Society and is much in arrears, the Numbers should be brought up, if even the number of pages be reduced, for the interest in "proceedings" is lost from their now appearing several months after date—most contributors to Periodicals feel encouraged by the early publication of their papers.

I feel sure that such an arrangement and the publication of the latest proceedings would have a beneficial effect. I, for one, should feel pleasure in affording my mite of assistance in the Antiquarian, or Architectural branches, as well as illustrations in outline, such as I have proposed in another letter, only now forwarded, though mostly written long since.*

I remain, Dear Sir,

Your's faithfully,

M. KITTOE, *Captain,*

Member.

Read a letter from D. C. Mackey, Esq. Danish Consul, forwarding for the acceptance of the Society the *Memoires de la Société Royale des Antiquaires du Nord*, Section Asiatique.

* Captain Kittoe will be pleased to find that his excellent suggestions have been anticipated in the Society's recent arrangements.—*Secs.*

To W. B. O'SHAUGHNESSY, *Esq. Secretary to the Asiatic Society.*

SIR,—I beg to hand you an extract from a letter I have received from the Secretary to the Royal Society of Northern Antiquaries of Copenhagen, and for the aid of your Society in their Researches I am enabled to assure you of their most cordial co-operation in connection with any scientific pursuit in which their services can be made available.

I beg your acceptance of the accompanying three Nos. of the R. N. A. Society's proceedings which have already been submitted to you, and when I receive more they shall be laid before your Society.

I have the honor to be, Sir,
Your obedient servant,

*Danish Consulate,
Calcutta, 13th January, 1847.*

D. C. MACKAY,
Danish Consul.

Extract from Mr. Secretary Chas. Rafor's letter.

“ On the formation of an Asiatic Section in our Society we have had in view the elucidation of the ancient monuments of Asia, which shall be the aim of our earnest exertions. In connexion with this object several works have been already commenced, among which we may here mention the Treatises on the connexion between Sanscrit and Icelandic (old Danish) whereof the first part is already printed, and on the decyphering on the second Achæmenian or Median species of arrow-headed writing by Professor N. L. Westergaard, the author of the *Radices linguæ Sanscritæ*, and the disquisition on the coins struck by the Buids, by the Rev. Jas. C. Lindberg, A. M. which we hope will meet with especial favour in Asia, inasmuch as our Cabinet is in possession of several hitherto unknown coins of this class.”

Read a letter from Lieutenant Strachey, promising a copy of the narrative of his recent tour to the lake districts of Manésarowar, for publication in the Society's Journal.

Mr. Laidlay read a list of coins, received by him from Mr. Torrens. Mr. Laidlay was requested to retain the coins in his charge, depositing a list with the senior Secretary for office record.

Read a letter from Lieutenant Wroughton, forwarding copy of an inscription which has been referred to the Oriental Sub-Committee for examination.

Read the accompanying note from Mr. Heatly, forwarding letters and publications from the Statistical and Ethnological Societies of London.

To W. B. O'SHAUGHNESSY, *Esq. Secretary, Asiatic Society.*

MY DEAR SIR,—I have the pleasure to place in your hand two letters from Mr. King, Honorary Secretary to the Ethnological Society, and Assistant Secretary to

the Statistical Society—together with a packet of publications from those Associations, catalogued in the accompanying lists. The latter are a donation to the Asiatic Society and intended to open friendly relations between the donors, and the cultivators of similar pursuits in this country.

Your's sincerely,

S. G. T. HEATLY.

Star Press, 13th January, 1847.

Statistical Society of London,

12, ST. JAMES' SQUARE,

22d October, 1846.

SIR,—I am instructed to forward to you a complete set of the Statistical Society's Journal, a Volume of its Transactions and six copies of its first series of questions, as well as all the forms we have in print, as a donation to the Asiatic Society of Calcutta.

I have the honor to be,

Your most obedient servant,

RICHARD KING,

Assistant Secretary.

To S. G. T. HEATLY, *Esq.*

27, Sackville Street,

21st October, 1846.

SIR,—I beg to enclose a set of the Ethnological Society's publications up to the present time, with the view of an exchange for those published by your Society.

I have the honor to be, Sir,

Your obedient servant,

RICHARD KING,

To S. G. T. HEATLY, *Esq. Asiatic Society of Calcutta.*

Honry. Secy.

Ethnological Society's Publications up to the present time:—

I. Ethnological Society, pages 1 & 2.

II. Queries respecting the Human Race, pages 3 to 14.

III. The study of Ethnology by Ernest Dieffenbach, M. D. pages 15 to 78.

IV. On the Ancient Peruvians, by Dr. De Tschudi, pages 79 to 102.

V. On the Biluchi Tribes inhabiting Sindh, in the lower valley of the Indus and Cutchi, pages 103 to 210.

VI. Address to the Ethnological Society of London, delivered at the anniversary meeting on the 25th May, 1844, by Richard King, M. D. Secretary, pages 7 to 40.

VII. Address to the Ethnological Society of London, delivered at the anniversary meeting on the 26th May, 1845, by Rear Admiral Sir Charles Malcolm, President, pages 41 to 62.

VIII. The Regulations and List of members of the Ethnological Society of London, 1843, 1844, pages 1 to 14.

Transactions of the Statistical Society of London, Vol. I Part 1, 1837.

Journal of the Statistical Society of London, Vols. I. to X.

**First series of questions circulated by the Statistical Society of London, 1836,
6 Copies.**

16 Forms of Statistical Report.

The Librarian submitted the following list of Books received, and of Donations to the Society's General Museum:—

*List of Books, &c. received for the Meeting of Wednesday, the 13th
January, 1847.*

PRESENTED.

- 1.—**Meteorological Register kept at the Surveyor General's office—FROM THE SURVEYOR GENERAL'S OFFICE.**
- 2.—**Meteorological Register kept at Kyouk Phyou during November, 1846.—FROM THE SURVEYOR GENERAL'S OFFICE.**
- 3.—**The Calcutta Christian Observer for December, 1846 and Jan. 1847.—BY THE EDITORS.**
- 4.—**The Oriental Christian Spectator for December, 1846.—BY THE EDITOR.**
- 5.—**An attempt to explain some of the monograms found upon the Grecian coins of Ariana and India, by A. Cunningham.—BY THE AUTHOR.**
- 6.—**Vedantic Doctrines Vindicated.—BY BABU RAJENDRALAL MITTRA.**
- 7.—**The Hindu Intelligencer, 5 Nos.—BY THE EDITOR.**
- 8.—**Contributions to Terrestrial Magnetism, by Lieut. Col. E. Sabine.—BY THE BENGAL GOVERNMENT.**

EXCHANGED.

- 9.—**The Edinburgh New Philosophical Journal, No. 82.**
- 10.—**Journal of the Agri-Horticultural Society of India, Vol. V. part III.**
- 11.—**Calcutta Journal of Natural History, No. 27.**
- 12.—**The London, Edinburgh and Dublin Philosophical Magazine, No. 194.**

PURCHASED.

- 13.—**Conchologia Iconica, from No. 13 to 36.**
- 14.—**Thesaurus Conchyliorum, by G. B. Sowerby, Jr. Parts 4th, 5th, 6th.**
- 15.—**The Classical Museum, No. XIII.**
- 16.—**The Annals and Magazine of Natural History, No. 119.**
- 17.—**Journal des Savans, Aout 1846.**
- 18.—**The Calcutta Review, No. 12.**

DONATIONS TO THE MUSEUM.

- 1.—**A Steel and Tinder-box used by the natives of Lahl and Kooloo, Donor—H. TORRENS, Esq.**

- 2.—Model of a Chinese Plough, Donor—Major EDIE, H. M.'s. 98th Regt.
- 3.—Chinese arithmetical table, Donor—Major EDIE.
- 4.—Model of a Chain Pump used by the Natives of China, and adapted both for manual and cattle labour, Donor—Major EDIE.

For all the above communications and donations to the Society the thanks of the meeting were unanimously voted.

Dr. W. B. O'Shaughnessy exhibited specimens of explosive paper exactly like *talc*, prepared by dissolving the gun cotton in Sulphuric ether, and allowing the solution to evaporate spontaneously. He described also some singular electrical properties manifested by this paper.

REPORT.

At a meeting of the ASIATIC SOCIETY held on the 13th of January, 1847, the following REPORT on the Society's affairs was read and received, and directed to be printed, for distribution to the resident members, prior to the discussion at the February meeting of the several propositions it contains.

In compliance with the desire expressed by several members of the Society at the December meeting, the Secretaries, on the part and with the concurrence of the Committee of Papers, submit a succinct report on the state of the Society's affairs, and of the views of the Committee regarding the measures they deem best calculated to uphold its character and promote its utility.

The Society at present numbers 136 members, of whom 17 were admitted during the last year. No record exists of the withdrawals, deaths or other casualties by which the number of members has been reduced, a deficiency the Committee of Papers point out as one which the Secretaries should in future supply.

Of the 136 members there are not more than 100 who contribute with regularity to the Society's income. Two members have recently claimed exemption from the payment of subscription on the grounds of having been on the list for 20 years. As much doubt exists as to the expediency of admitting this claim for exemption, the Committee recommend the subject to the immediate consideration of the Society at large.

The Committee of Papers and Office-bearers as appointed in March 1846, consisted of—

Vice-Presidents.—The Lord Bishop of Calcutta, Sir J. P. Grant, Sir H. W. Seton, Lieut.-Colonel Forbes, and H. Torrens, Esq.

Secretary.—H. Torrens, Esq.

Committee.—Rev. Dr. Hæberlin, W. P. Grant, Esq., C. Huffnagle, Esq., G. A. Bushby, Esq., W. Tayler, Esq., Baboo Prosonocoomar Tagore, S. G. T. Heatly, Esq., W. B. O'Shaughnessy, Esq. M. D., and Capt. Broome, H. A.

Of these Messrs. Torrens and Huffnagle have permanently left Calcutta. The Hon'ble Sir H. Seton expresses himself unable from the state of his health to take any active part in the Society's business. Mr. W. Tayler has withdrawn, and Baboo Prosonocoomar Tagore has not been able to give his attendance or attention to our affairs.

In accordance with the long established practice of the Society to supply vacancies by annual election, it accordingly becomes necessary to elect members of the Committee of Papers in the room of Messrs. Tayler, Huffnagle, and Prosonocoomar Tagore.*

In consequence of the resignation of Mr. Torrens, Dr. W. B. O'Shaughnessy and Mr. J. W. Laidley were elected Co-Secretaries at the meetings of August and September, and Dr. Roer, a Co-Secretary in the Oriental Department, in November, 1846. Baboo Rajendra Lál Mitra was also elected Librarian and Assistant Secretary at the November meeting on a monthly Salary of 100 Rupees, and for a probationary period of 6 months.

At the November meeting a Sub-Committee or section, was also appointed for advice and reference to all matters connected with Oriental literature. Of this Sub-Committee Major Marshall, the Rev. Mr. Long, the Rev. Dr. Hæberlin and Dr. Roer were appointed members, and Captain Latter was added to their number at the December meeting.

Finance and Accounts.

The Accounts not having been *published* for some years, the Secretaries and the Accountant have been engaged in the laborious task of examining all the receipts and vouchers since 1842, and comparing these with the abstract Annual Accounts received from the late Accountant,

* The following gentlemen have accordingly been elected at the Meeting of January, 1847, as members of the *Committee of Papers* to supply vacancies. Messrs. J. Colville, Advocate General, Welby Jackson, Esq. C. S., W. Grey, Esq. C. S., and R. W. G. Frith, Esq.

Mr. Bolst. This task is nearly completed and the results will be duly reported. Meanwhile the Committee of Papers recommend the immediate publication of the whole of Mr. Bolst's statements, for the information of the Society at large.

The Committee express their regret that these accounts have not been regularly printed in detail and circulated to the members, a step which would have obviated much misconception which has subsequently arisen.

A resolution having been passed at the September Meeting, directing the immediate payment of the Society's debts by the sale of Company's Paper or other available means, the following sums have been paid accordingly :—

For Mr. Bird's Portrait,	Rs.	1368	8	9
Mr. Blyth's Arrears of rent,		440	0	0
Messrs. Currie and Co. for almirahs, &c.		425	14	0
Messrs. Ostell and Lepage, (for books,)		122	4	0
Mr. Piddington, arrears of salary,		200	0	0
Baptist Mission Press,		418	0	0
Bishop's College Press,		5,867	11	0
Sundries,		2,285	7	2

Co.'s Rs. 11,127 12 11

And in compliance with further resolutions the sum of 3,000 Rs. has been reserved for the payment of Mr. Blyth's contingent claim,* making in all, paid and reserved to meet acknowledged debts Co.'s Rs. 14,127 12 11.

The produce of the back numbers of the Journal it is expected will be available for the liquidation of the debt of Rupees 1,500 due to Mr. Torrens—for the purchase of a Stock of the Journal, to that amount.

The Co-Secretaries having received from their predecessor Company's Paper, Value Co.'s Rs.	13,066	10	8
Cash Balance,	1,309	12	9
And subsequently collected on account of			
Subscriptions,	553	6	0
And received from Government,	2,228	0	0

Co.'s Rs. 17,157 13 5

And paid or reserved as above detailed, .. Co.'s Rs. 14,127 12 11

* See *Proceedings for Nov. 1846.* p. lxxviii.

it becomes their disagreeable duty to announce, that, reserving 3,000 Rupees due to Mr. Blyth and 1,500 Rupees due to Mr. Torrens, the actual Cash Balance in hand on the 30th of December, 1846, is Co.'s Rs. 1,530-0-6, of which 1,000 Rupees, the Government contribution for October and November for Oriental publications, must also be reserved for the special purpose for which it was granted, leaving a net balance of Co.'s Rupees 530 0 6 for the purposes of the Society, and which will be totally absorbed by the payment of the balance due on account of the "Burnes" drawings.

The Society's. monthly income proceeds from the following sources :
The Government allow for

Oriental Publications, monthly, Co.'s Rs.	500	0	0
Museum of Geology,	250	0	0
Contingencies of museum of Geology,	64	0	0
Museum of Zoology,	250	0	0
Specimens,	50	0	0

Co.'s Rs. 1,114 0 0

This sum is clearly only applicable to the special objects for which Government allow it—and whatever misconception or irregularity in this respect may have hitherto taken place, it deeply concerns the character and even the existence of the Asiatic Society to insist on the future application of these grants, being strictly in accordance with the instructions of Government.

The Society further receives annually from Pay- ing Members,	7,808	0	0
Subscription to Journal,	1,616	0	0
Average Sale of Publications according to last year's average,	755	0	0
Annual Co.'s Rs.	10,179	0	0

Monthly Income, ,, 848 5 4

This Income is expended as follows :—

Assistant Secretary and Librarian,	100	0	0
Library Establishment,	52	8	0
Establishment of Zoological museum,	138	0	0
Curator's House-rent.	40	0	0

Secretaries' Establishment,	86	0	0
Contingencies,	10	0	0
Printing of Journal,	350	0	0
Miscellaneous printing,	90	0	0

Co.'s Rs. 866 8 0

Check and Audit.

The next subject to be considered is the regulation of the Society's expenditure, especially of such funds as it may hold in trust for special purposes from Government, from learned Societies, or munificent individuals.

Recent resolutions of the Society have been passed declaring the course the Society should in future pursue, but unless there be adopted a regular system of Check and Audit, we can never be certain but that funds granted for one purpose are applied to another, thereby leading to ill feeling, disunion and consequent loss of character to the Society.

The Committee therefore propose that the accountant be required to attend the monthly meetings with a Dr. and Cr. account, statement of dependencies and vouchers, and that the same be read at each meeting as a regular part of the proceedings of the month—that a balance sheet be published *once* in each year; that one period of payment be adopted and that within the first week after every monthly meeting; that at the monthly meetings all demands on the Society should be produced and the amounts if sanctioned entered on the proceedings, excluding of course the regular Establishments. The signing of cheques as well as the general business of the Society should further be conducted by one Secretary only—the office establishment being under his control, and in his absence by the Co-Secretary next in seniority of appointment. All correspondence moreover on the Society's business in every department should be signed or countersigned by the Senior Secretary and copies filed in his office.

The preceding summary of the accounts points out but too clearly, that the Society from its own means can at present do no more, than maintain the Journal, and provide for Establishments and Contingencies strictly on the foregoing scale—and it seems necessary to intimate to the Curators and other officers that it becomes their duty at present rather

to preserve existing collections than to incur any avoidable expenses in making additions to our Museums,—and that under no circumstances, short of a general vote of the Society, can the scale of “Contingencies” assigned by Government be exceeded in their departments.

Under this head it seems necessary to observe that the European temporarily engaged since November, 1846, as a night watch in the Society’s house, at 40 Rs. per mensem, has been discharged from the 5th inst. The native chokedars are retained; the Committee are of opinion that when the Society’s funds permit the outlay it will be indispensable to have a European keeper or porter resident in the premises. Such a man can be obtained on the guarantee of the Police Authorities for 40 rupees a month. It should be a part of his duty to accompany visitors through the rooms, and he should be entrusted with the special charge of such coins or other moveable articles of particular value as the Society may possess. Had such a person been employed for the last three years, it is not probable that we now should have to deplore the loss of the fine collection of coins and the gold medal of the Emperor of Russia of which we have been lately despoiled.*

PUBLICATIONS.

We have next to notice the important subject of the Society’s *Publications*, of which the *Journal* has first to be considered.

The Committee of Papers are unanimously of opinion that on the maintenance of the *Journal*, the regularity of its appearance, and the judicious selection of its contents, depend chiefly the usefulness and the reputation of the Society. Recent changes among the officers have interfered with its regular appearance, but measures are now complete for its issue in the 1st week of each month. The Committee append a list of the papers now in hand for their periodical, and the varied nature of these contributions and the known ability of the authors, hold out most gratifying prospects of this department of the Society’s labours proving creditable to themselves and beneficial to the public.

The monthly reports of Proceeding having been printed up to the close of 1846, but not issued since March, the Committee of Papers propose to distribute the whole at once this month, as a supplement to

* The members of the Committee of Papers have since this Report was drawn up retained at their own cost a retired European Sergeant strongly recommended to them by the Deputy Superintendent of Police, and who now resides on the premises.

the Journal, in the form of the series herewith submitted.* And in future they think it would be conducive to the utility of the Society to publish abstracts of the proceedings in the daily papers, as was done in former years.

Oriental Publications.

For this valuable object a sum of 500 Rs. per mensem, has been munificently granted by Government in the year 1838, and applied in strict accordance with the directions of Government till the close of the year 1840, and the mode of application duly reported to Government. From this period it appears on reference to the accounts published in 1842, for 1841, in the Journal Vol. XI. part I. p. 198, and rendered by Mr. Bolst, but not hitherto published from 1842 to 1846, that through some misunderstanding of the orders of Government, the greater part of the monthly grant has been applied to purposes which, however useful or important, were not contemplated in the terms of the grant. The expenses of the Zoological drawings by Sir A. Burnes, and of those of Dr. Cantor's Chusan Zoology, constitute the heaviest items of this irregular expenditure, being specified in Mr. Bolst's abstracts, under the head of "Oriental Publications," and amounting to Co.'s Rs. 6833: 14: 9, as follows :

1842. Paid J. Bennett for Sir A. Burnes' drawings, Rs.	650	0	0
Messrs. Ballin and Co. for do. do.....	2145	0	0
W. Rushton for do. do.	643	0	0
1843. Paid Mr. Bennett for Sir A. Burnes' drawings, ..	200	0	0
Drawing paper for do.....	225	8	9
1844. Paid Mr. Bennett for Sir A. Burnes' drawings, ..	18	0	0
Do. for Dr. Cantor's Chusan Zoology,	900	0	0
1845. Paid Mr. Bennett on account of Dr. Cantor's Zoo- logy,	800	0	0
Mrs. Ballin for printing,	261	6	0
Do. balance for Burnes' drawings,	68	4	0
1846. Paid Mrs. Ballin for lithographing Burnes' draw- (To July-) ings,	522	12	0
J. Bennet for Dr. Cantor's Chusan Zoology, ..	400	0	0
	<hr/>		
	Co.'s Rs.	6833	14 9

* This has been done since the January meeting.

During the period in question the Society has published, or paid towards the publication of "Oriental" works:—

Paid for publishing Oriental works,	6,463	1	6
Do. for purchase of Oriental works, &c.	657	10	0
Do. Contingent charges for Do.	561	15	11
<hr/>			
Amount disbursed on account of Oriental Publications from 1842 to 1846,	} Co.'s Rs.	7,682	11 5
Establishment for preservation of Oriental works, &c. from September to December 1846, @ 68 Rs. per month,			
		272	0 0
<hr/>			
	Total Co.'s Rs.	7,954	11 5

Dec. 31, 1846.

While we have received during the same period at 500

Rs. per month for five years, Co.'s Rs. 30,000 0 0
leaving Co.'s Rs. 22,045 4 7.

Due by the Society to the account of the grant in question.*

The Committee of Papers have been led to this retrospective view of the subject of the Oriental publication grant by the circumstances which have followed the resolutions adopted by the Society at their meeting of November, 1846, and which gave rise to the annexed correspondence.

To G. A. BUSHBY, Esq.

Secretary to the Government of India, Home Department.

SIR,—I am directed by the Asiatic Society of Bengal to convey through you their most respectful solicitation that, in the future disposal of the means placed in their hands by Government for the promotion of Oriental literature, they may be permitted to defray from the monthly allowance of Co.'s Rs. 500, the expense of printing in the Society's Transactions and Journal all papers on the subjects named in the subjoined resolution—And also to meet therefrom the cost of preserving the Oriental works now in the Library, for which a monthly allowance of 78 Rs. long awarded by Government has been recently withdrawn.

I have, &c. &c.

(Signed) W. B. O'SHAUGHNESSY,
Senior Secretary, Asiatic Society.

* Of which Rs. 1,500, the amount received on this account since Sept. 1846, are in hand and available for the regular purpose according to the Government order.

Resolution adopted by a General Meeting of the Asiatic Society of Bengal, 4th November, 1846.

Resolved, that Government be respectfully solicited to permit the Society to defray from the monthly allowance of Rs. 500 for Oriental Publications, first, the expense of the custody of the works now in store (for which a sum of 78 rupees per mensem allowed by Government has lately been withdrawn) and 2d, the cost of publication in the Society's Transactions and Journal of all papers on Oriental literature, History, Antiquities, Geography and kindred subjects of research.

The following reply from Mr. Secretary Bushby, dated 21st November, 1846, was received after the meeting of December.

FROM G. A. BUSHBY, ESQ. *Secretary to the Government of India.*

Dated 21st November, 1846. Home Department.

TO W. B. O'SHAUGHNESSY, ESQ. *Senior Secretary, Asiatic Society.*

SIR,—“ I am directed by the Hon'ble the President in Council to acknowledge the receipt of your letter dated the 7th instant, conveying the solicitation of the Society, that in the future disposal of the means placed in their hands by Government for the promotion of Oriental Literature, they may be permitted to defray from the monthly allowance of Co.'s Rs. 500, the expense of printing in the Society's *Transactions* and *Journal*, all papers on Oriental Literature, History, Antiquities, Geography and kindred subjects of research, and also to meet therefrom the cost of preserving the Oriental Works now in the Library.”

2. “ In order the better to be able to decide on the Society's Application, the President in Council could wish to have before him a statement in detail of the manner in which the Government grant of 500 Rs. per mensem has hitherto been appropriated.”

3. “ His honor in Council remarks that the conditions of the grant have not been fully carried out by the Society. One of these conditions was that an Annual Account should be rendered by the Society of the manner in which the Government donation had been expended. This seems to have been lost sight of, for the only account current rendered by the Society is that forwarded with your letter dated the 13th January, 1840.”

4. “ Again it should be shown how the wish expressed by the Hon'ble Court of Directors in regard to the printing of the text of the Vedas, with a commentary, has been kept in mind, and what may be the purpose of the Asiatic Society in regard to the publication of this important Record.”

5. The President in Council will on receipt of the statement above called for, be better prepared to judge of the manner of the past appropriation of the Government grant, and to decide on the present application of the Society.

I have, &c. &c.

(Signed) G. A. BUSHBY,

Secretary to the Government of India.

Council Chamber, the 21st November, 1846.

On receipt of Mr. Bushby's letter the Secretaries, then but recently elected, made the requisite examination of the accounts, with the result set forth in the foregoing sketch, and which correspond with the general statements previously made by the Sub-Committee of Finance, but unintelligible because unaccompanied by details.

The Committee of Papers regret deeply that any portion of the Oriental Publication Fund should have been used for other purposes, and they consider the Society bound to acknowledge the sum so used as a debt to Government, but one of which the present state of their pecuniary affairs, renders it impracticable for them to offer immediate payment. In partial extenuation of the irregularity, the Committee refer with some satisfaction to the magnificent Zoological collections, to the procural of which no small portion of the fund has been directed, to the very large contributions made to the Museum of the India House—and to the additions to their buildings, and the gathering together of suitable monuments in their Hall to the great men by whose labours the Asiatic Society has gained such fame, as the patrons and promoters of Oriental, Literary, and Antiquarian research. The Committee too would represent to Government that for 58 years previous to this grant the greater part of their funds has been expended on the publication of researches of the same, or an allied nature, and in the promotion of every branch of antiquarian investigation. Having at least disbursed more than two lacks of Rupees in this pursuit, the Committee trust that Government will look indulgently on the irregularity which has occurred. They would state that it was in no small degree caused by the indifference of the few Oriental Scholars among us during the period under review to the editing or publishing of works of acknowledged importance. They would express the resolution of the Society—to watch carefully over the future application of the grant, and to refer regarding this on all occasions to the advice of the section of eminent Orientalists already appointed for the purpose.

Meanwhile the question of the mode of publication of the Vedas has been referred to the Oriental Sub-Committee, who are as yet unprepared with their Report. The Rev. Dr. Hæberlin has recently intimated to the Committee that he is publishing the *Smritis* under the Society's authority, and that the whole of the grant for 1847 is thus forestalled. But as the records of the Society contain no evidence of this publication having been duly authorized, and as it appears that the greater portion of the *Smritis* have already been published by a Native Editor, the Committee recommend that the work be not further proceeded with, until the Vedas are finished.*

Lastly, with reference to Mr. Bushby's letter, the Committee of Papers suggest that, should their views meet the approbation of the Society, the Secretaries be directed to draft a reply in corresponding terms and submit the same to the Committee for revision, and that in this reply the Society should, under the circumstances now elicited, beg the permission of Government to withdraw their former application.

The financial difficulties above specified render it obviously impracticable to carry out the Society's resolution to print Colonel Everest's Trigonometrical observations, as a volume of Transactions. It becomes equally impossible to proceed with the "Burnes" drawings.

Of these there were in all. 146

These have been lithographed and coloured, 50

Fishes,	20
Mammalia,	9
Birds,	14
Reptiles,	7

50

Those completed have cost Co.'s Rs. 5682 1 6

Paid, 5,082 1 6

Due, 600 0 0

5682 1 6

To finish the *whole* as directed by the Society in 1841,† would cost

* A proposition on this subject received from the Rev. Dr. Hæberlin on the 28th January will be submitted to the next meeting.

† See Vol. XIII. Part 2d, Proceedings, page c.

at least 12,000 Rupees more, a sum altogether beyond our means, or our reasonable prospects.

The Zoological Curator Mr. Blyth, is engaged in the MS. of the descriptive drawings completed, and the Committee propose to issue the whole in a Portfolio to the members of the Society, as soon as Mr. Blyth enables them to do so.

Regarding Dr. Cantor's very beautiful drawings, the Secretaries have failed to obtain some essential information, and which they cannot hope for, before Mr. Torrens' expected visit to Calcutta in the ensuing month. The Committee of Papers confidently expect that in connexion with the Journal nearly the whole of Dr. Cantor's drawings will be published by the Society within a moderate period.

Alterations in Society's rules.

The Committee next invite the consideration of the Society to a proposal they regard as one of very great consequence. It has lately happened on several occasions that at scanty meetings, measures have been adopted and officers elected without any previous notice or opportunity for deliberation,—or for the expression of the general opinion of the members on the several proposals. The danger to which this exposes the society, is equally serious and obvious. They may at any time find a few members voting away funds or altering their organization so as to favor some particular pursuit. To prevent this the Committee suggest that in future all proposals affecting expenditure, election of officers, changes of organization, and generally all questions of importance, be first duly notified at a general meeting, then referred to the Committee of Papers for report, and not decided on finally, until passed by a general meeting, (after such report shall have been submitted,) at which at least 12 members must be present.

Institution of Sections.

The Committee are further desirous to advert to the strong necessity which appears to exist for forming special Committees or Sections among the members resident in Calcutta and its vicinity, for advice and reference to on subjects demanding peculiar acquirements in the individuals who are consulted.

It may be said that the Committee of Papers are so constituted or so

intended as to represent the different objects of the Society, but experience has proved beyond doubt that it never has so answered. The Committee has been at one time almost exclusively composed of gentlemen who deemed Oriental Literature the paramount object of the Society, and at another period we have seen researches in Oriental philology nearly abandoned in favour of Zoology and kindred sciences.

By the appointment of Sub-Committees or Sections, subject to annual election, for advice and reference, to which their functions should be strictly limited, and to be referred to only through the Committee of Papers, as Council of the Society,—we would have the means of combining in one group men of similar attainments, to whom the Society, through the Committee of Papers, could refer their doubts and difficulties for consideration and advice, and who would, from time to time, themselves suggest the objects to which the patronage of the Society might be profitably applied.

How efficiently this plan works in the French Institute, in the British Association, and in the Royal Society of London, the Committee need not press on consideration. They are persuaded it will prove highly beneficial if adopted by the Asiatic Society. It has already been partially acted upon at the November meeting, by the appointment of the following gentlemen as an Oriental Sub-Committee. *Members.*—The Rev. Dr. Hæberlin, the Rev. Mr. Long, Major Marshall, and Dr. Roer.

It is now proposed to extend the plan by forming for the following year similar Sub-Committees.

1. Geology and Mineralogy.
2. Zoology and Natural History.
3. Meteorology and Physics.
4. Geography and Indian Statistics.

It is recommended that the Secretaries of the Society be the Secretaries of the sections also. The Sub-Committees should be ex-officio Inspectors of the Museums in their several departments, and it should be strongly urged upon the section of Meteorology to take measures for securing for the Society a monthly Meteorological Report of Barometer, Sympiesometer, Thermometer, Hygrometer, also Rain Gauge, Anemometer, and a Register of thunder storms on the plan prescribed by Arago (v. *Annuaire*, Art. “*Tonnerre*,”) such as those which in the

time of the lamented James Prinsep adorned each issue of the Journal, and provided data for Meteorologists all over India, wherewith to compare and correct their individual researches.

The Committee have only further to express their earnest hope that the members of a Society, the oldest in India, and holding a distinguished place in the estimation of the scientific world, will individually as well as in co-operation with each other, make their best efforts to promote the objects for which the Society has been instituted. In every department for research we number members of eminent acquirements. Those residing at distant stations will find in the sections now proposed representatives of their special pursuits with whom to correspond, with whom to compare, or mature the results of their enquiries. The Committee trust that new and efficient labourers will thus be soon induced to join our ranks thereby increasing our funds to such an amount as may enable us with the generous aid at present afforded by Government, to extend efficient patronage to every branch of research, which it is the province of the Asiatic Society to promote.

In submitting the preceding Report the Secretaries desire in justice to their eminent predecessor to republish here the resolution of the Society passed at the meeting of November, 1846, respecting the previous management of the accounts and expenditure.

Extract from Proceedings of Nov. 1846.

A letter having been read from Mr. Torrens to the Co-Secretary regarding the accounts and expenditure of the Society during his secretariat—

It was resolved unanimously and directed to be laid before the next general meeting for record.

That the Committees beg leave to repeat prominently the previous declaration of the Finance Committee, that the confusion in the accounts of the Journal arose entirely from an accidental omission and error on the part of the accountant, and further that they consider that every act of Mr. Torrens, in the management of the Society's pecuniary affairs has been done most openly and with their full cognizance and sanction.

(Adopted by the November Meeting.)

The following Accounts, and documents are appended for the information of the Society :—

- 1.—Mr. Bolst's abstract annual accounts, from January, 1842, to July, 1846.
- 2.—General sketch of account from 1842 to Dec. 1846, compiled by Mr. Muller, from Mr. Bolst's statements.
- 3.—Detailed account of expenditure on Oriental publications for the same period.
- 4.—Statement of the amounts received by the sale of Oriental publications.
- 5.—Statement of the Society's income.
- 6.—List of Members, and Office-bearers for 1847.

Asiatic Society of Bengal, January, 1847.

SUPPLEMENT TO REPORT.

*At a Meeting of the Asiatic Society, held on Wednesday evening, the
10th FEBRUARY, 1847.*

The Hon'ble Sir J. P. GRANT, in the Chair.

The Report submitted to the January meeting was taken into consideration.

Major Marshall objected to the mode in which the vacancies in the Committee of Papers had been filled up at the last meeting, and thought a *bond fide* annual election should take place, which he proposed should now be resorted to.

After some discussion it was proposed by the Lord Bishop of Calcutta, seconded by Mr. Ward, and carried with but one dissentient voice, that a formal election of all office-bearers should be resorted to *in future*, leaving the present arrangement undisturbed.

With reference to the paragraph in the Report which relates to the Rev. Dr. Hæberlin's edition of the *Smritis*, the senior Secretary read the following letter from Dr. Hæberlin, dated the 30th January, 1847.

MY DEAR SIR,—With reference to my proposal to print an entire collection of the *Smritis*, as submitted to the meeting of the Asiatic Society on the 1st of July last, I have the pleasure to inform you, that soon after that date, I addressed a letter to Mr. H. Torrens, then Secretary to the Society, stating; at his request, the probable expense of the undertaking, and requesting to know as soon as possible whether the Committee of Papers had sanctioned the arrangement, and when I might commence upon the work.

In reply Mr. Torrens stated, that I could commence the work whenever I pleased. I send for your perusal his letter to me. A considerable portion of the work has in consequence of this intimation of the then Secretary, been already printed. A specimen of the same I beg herewith to forward to you.

As it now appears that the Asiatic Society is scarcely in a position to carry on this important work, I am ready to take the entire responsibility upon myself if the Society will *subscribe* for 100 Copies. The work will be issued in two octavo volumes, and the price per volume will not exceed 10 Rupees.

I should be sorry, if from any circumstance, the publication of this interesting work should be retarded. Hitherto no attempt has been made to collect these scattered writings. A few of these *Smritis* only were some years ago printed in Bengál characters, and in the form of the usual Native Puthis; but these are not generally known, nor are they at all fitted for common use. I am, therefore willing, with the assistance of the Society, to bear a considerable risk myself, rather than postpone the publication of the work to any future period. Kindly let me know, as soon as possible, whether this proposal meet with the approbation of the Society.

Believe me, yours sincerely,

J. HÆBERLIN.

The Senior Secretary stated on the part of the Committee of Papers, that they recommend to the Society the adoption of the Rev. Dr. Hæberlin's proposal, and a subscription to the *Smritis* for 100 copies, to be paid from the "Oriental Grant." *Agreed unanimously.*

Captain Broome proposed the addition of a section to represent *Numismatics* and *Architectural Antiquities*; this was seconded by Lieutenant-Colonel Forbes, and unanimously agreed to.

The Senior Secretary, on the part of the Committee of Papers, read the subjoined list of members proposed for the several Sections.

March 8th, paid Helál Uddín for copying a Persian book,	9	0	0
June 5th, paid ditto for copying a Persian book, ..	3	0	0
Ditto, paid ditto for copying a Plan of the Town of Amrawatti and a Sketch of Deepauldenna Amrawatti, ..	12	0	0
Jan. 9th, 1845. Paid for 1 ream printing paper for Istalahát Súfia, ..	20	0	0
Jan. 9th, paid Háfiz Ahmad Kabír for printing 500 copies of Istalahát Súfia, ..	210	0	0
March 5th, paid Munshí Helál Uddín for copying 32 pages of Kitáb Umda Darfane Jaráhát, @ 9 pages per Rupee, ..	3	8	9
August 8th, paid Nacoo Painter for painting a Map of Assam, &c. per Bill, ..	44	6	6
Ditto, paid Helál Uddín for copying an Arabic work "Kitáb Umda," ..	9	8	0
Sept. 5th, paid H. M. Smith for printing 750 copies coloured of the Nurbudda River, ..	136	4	0
Nov. 6th, paid for copying Tawárikh Dost Muhammad, with paper, ..	1	12	0
Dec. 30th, paid Maulavi Amánatullah for a printed copy of Burhán Qáte, compiled by Ibn Khalafut Tabrezí Muhammad Husain, ..	18	0	0
Ditto, paid extra Munshí for copying the following works : —a copy of Pusto Dictionary, by Najíbullah Khán, a Gulestán in the same language, by Mir Muhammad Peshawarí, and a poetical Urdu translation of Shaikh Faríduddín's letters, Pandanámah made by Mañnuddin Tabrezí, ..	35	0	0
March 6th to April 21st, 1846. Paid Háfiz Ahmad Kabír for printing 500 copies of the Tawárikh i Nádiri (History of Nádír Shah) 386 pages (@ 2-8 per page. .	965	0	0
July 14th, paid Persian writer for copying the Arabic book Naharul Fáeq Shareh Kanzud Daqáák for June last, ..	5	0	0
August, paid ditto for translating an Arabic work, ..	10	0	0
Sept. 11th, paid Maulavi Qurbán Alí for copying the Arabic work Naharul Fáeq Shareh Kanzud Daqáák for August. .	3	0	0
Nov. 24th, paid Maulavi Qurbán Alí for copying the Arabic work Naharul Fáeq Shareh Kanzud Daqáák for Oct. 1846, ..	6	0	0
Dec. 4th, paid ditto ditto ditto for Nov. ..	4	0	0
Dec. 18th, paid Rev. A. W. Street, Bursar, Bishop's College, for press work and paper of 9 pp. 500 copies of Extra Title and Preface to Abdur Razáq's Dictionary of Technical terms, by Dr. Sprenger @ 3-4 per page, ..	29	4	0

 Co.'s Rs. 6,463 1 6

Statement of Disbursements on Account Purchase of Oriental Publications from 1842 to 1846.

August 8th, 1842. Paid Thacker and Co., for 5 copies of Alif Lailah, vol. 4th,	60	0	0
June 25th, 1844. Paid Bhabánícharan Bánarjí for sundry books per bill,	81	3	0
August 9th, 1845. Paid ditto ditto ditto per ditto,	3	10	0
Nov. 18th, paid Maulavi Masíhuddin for books,	23	8	0
March 5th, paid Dr. Roer for Sprenger's Elements of Hindu Law, Vol. II. 8 Rs.; Crawford's History of the Indian Archipelago, Vol. I. 5 Rs.	13	0	0
Oct. 4th, paid Dr. Roer for sundry books per vouchers,	84	8	0
Dec. 30th, paid Maulavi Badíruddin for a printed copy of Sarfe Urdu, by Maulavi Amánatullah, in Hindustání Poetry,	2	0	0
Feb. 4th, 1846. Paid James Francis Corcoran for 35 copies of the 1st part of the Urdu Translation of Æsop's Fables,	70	0	0
March, paid Bhabánícharan Bánarjí for sundry Bengálí books, per bill,	12	9	0
April 6th, paid ditto for a copy of Bhágabat Gítá,	2	8	0
June 12th, paid Rev. J. Thomas for 30 copies of Dr. Wise's Commentary on the Hindu System of Medicine,	300	0	0
Nov. 24th, paid Ostell and Lepage for a copy of Forbes' Hindu Manual,	4	12	0
	<hr/>		
	Co.'s Rs.	657	10 0

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SECRETARY'S NOTE.—Of the account thus furnished the following items seem to be irregularly charged to the Oriental grant.

|                                                   |         |   |   |
|---------------------------------------------------|---------|---|---|
| Mr. Smith's Bill for map of Nurbudda river, ..... | Rs. 136 | 4 | 0 |
| Crawford's history of Indian Archipelago, .....   | 5       | 0 | 0 |

Co.'s Rs. 141 4 0

*Statement of Contingent Charges on Account of Oriental Publications from 1842 to 1846.*

|                                                                                                                                                                                                                                                                       |           |     |       |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-----|-------|
| Feb. 2d, 1842. Paid Daftari for binding Oriental books, Rs.                                                                                                                                                                                                           | 33        | 6   | 0     |
| July 2d, paid Mackenzie, Lyall and Co., for advertizing                                                                                                                                                                                                               |           |     |       |
| Notice to the Purchasers of Mahábhárata, ..                                                                                                                                                                                                                           | 2         | 10  | 0     |
| August 16th, paid Bengal Hurkaru ditto, .. ..                                                                                                                                                                                                                         | 1         | 0   | 0     |
| Ditto, paid Englishman ditto, .. ..                                                                                                                                                                                                                                   | 1         | 0   | 0     |
| Ditto, paid for Bengal Ink, .. ..                                                                                                                                                                                                                                     | 0         | 1   | 0     |
| Nov. 8th, paid charges for dispatching Index to the Mahábhárata to the Hon'ble the Court of Directors and Monsieur Jules Mohl, .. ..                                                                                                                                  | 7         | 2   | 0     |
| March 7th, 1843. Paid for a tin box for 13 volumes of Oriental works sent to the Pasha of Egypt, ..                                                                                                                                                                   | 2         | 0   | 6     |
| Ditto, paid for 1 quire of Balasore paper, .. ..                                                                                                                                                                                                                      | 1         | 0   | 0     |
| May 5th, paid for binding books, .. ..                                                                                                                                                                                                                                | 9         | 8   | 0     |
| May 12th, paid Allan, Patton and Co., for Bills on London, on Messrs. Gladstone, Kerr and Co., in favor of J. Reynolds, Secretary Oriental Translation Fund, a subscription of the Society for 1842-43, £10 10s per annum, £21 @ 1-11 $\frac{1}{2}$ per Rupee,* .. .. | 213       | 5   | 5     |
| July 10th, paid for binding Oriental works, .. ..                                                                                                                                                                                                                     | 21        | 6   | 0     |
| August 5th, paid for 5 tin and 5 wooden boxes for the Oriental Publications, .. ..                                                                                                                                                                                    | 15        | 0   | 0     |
| Sept. 6th, paid for binding Oriental books, .. ..                                                                                                                                                                                                                     | 17        | 1   | 0     |
| Ditto, paid for Balasore paper, .. ..                                                                                                                                                                                                                                 | 1         | 0   | 0     |
| Oct. 11th, paid for Balasore paper 1, Binding book 1, ..                                                                                                                                                                                                              | 2         | 0   | 0     |
| Nov. 3d, paid for binding books, .. ..                                                                                                                                                                                                                                | 3         | 12  | 0     |
| Jan. 9th, 1844. Paid for Black and Red Ink for copying Nágari work, .. ..                                                                                                                                                                                             | 1         | 0   | 0     |
| May 11th, paid for binding Oriental books, .. ..                                                                                                                                                                                                                      | 43        | 4   | 0     |
| April 5th, 1845. Paid for paper for copying Sanskrit, ..                                                                                                                                                                                                              | 1         | 0   | 0     |
| May 7th, paid S. Martin for binding Persian books, ..                                                                                                                                                                                                                 | 120       | 0   | 0     |
| July 4th, paid Daftari for binding books, .. ..                                                                                                                                                                                                                       | 16        | 12  | 0     |
| August 9th, paid ditto ditto, .. ..                                                                                                                                                                                                                                   | 12        | 0   | 0     |
| March, 1846. Paid ditto for binding a book—Life of Rám-mohan Ray, .. ..                                                                                                                                                                                               | 1         | 4   | 0     |
| Ditto paid ditto sundry Oriental works, .. ..                                                                                                                                                                                                                         | 10        | 4   | 0     |
| Ditto paid ditto ditto ditto, .. ..                                                                                                                                                                                                                                   | 8         | 0   | 0     |
| Sept. 11th, paid ditto for binding books, .. ..                                                                                                                                                                                                                       | 17        | 4   | 0     |
|                                                                                                                                                                                                                                                                       | <hr/>     |     |       |
|                                                                                                                                                                                                                                                                       | Co.'s Rs. | 561 | 15 11 |

\* This item is irregularly charged to the Oriental grant.—Secs.

*Oriental Publications, &c. sold from the 1st of January to the 31st of December, 1846.*

|                                                                                                                          |     |            |          |          |
|--------------------------------------------------------------------------------------------------------------------------|-----|------------|----------|----------|
| Tibetan Dictionary, 1 copy, .....                                                                                        | Rs. | 10         | 0        | 0        |
| Mahábhárata, 18 vols. ....                                                                                               |     | 200        | 0        | 0        |
| Index to ditto, 32 vols. ....                                                                                            |     | 50         | 0        | 0        |
| Harivansa, 10 copies, .....                                                                                              |     | 47         | 8        | 0        |
| Naishada, 7 copies, .....                                                                                                |     | 39         | 0        | 0        |
| Rájatarangini, 3 copies. ....                                                                                            |     | 15         | 0        | 0        |
| Súsruta, vols. I. and II. 4 copies each, .....                                                                           |     | 32         | 0        | 0        |
| Sanskrita Catalogue, 3 copies. ....                                                                                      |     | 3          | 0        | 0        |
| Lassen's Gíta Govinda, 1 copy. ....                                                                                      |     | 2          | 8        | 0        |
| Fatawe Alamgiri, vol. I. 2 copies, vol. II. 2 do. vol. III.<br>3 do., vol. IV. 5 do., vol. V. 6 do. vol. VI. 7 do., .... |     | 200        | 0        | 0        |
| Jawame Ilm Riázi, 1 copy, .....                                                                                          |     | 4          | 0        | 0        |
| Khazanat ul Ilm, 4 copies, .....                                                                                         |     | 32         | 0        | 0        |
| Tawárikh i Nádiri, 5 copies, .....                                                                                       |     | 40         | 0        | 0        |
| Persian Catalogue, 3 copies, .....                                                                                       |     | 3          | 0        | 0        |
| Histoire des Rois du Kachmir, 1 copy. ....                                                                               |     |            |          |          |
| Travels of Ibn Batuta, 1 copy. ....                                                                                      |     | 6          | 0        | 0        |
| Essai sur le Pali, 1 copy, .....                                                                                         |     | 3          | 0        | 0        |
| Leech's Grammar and Vocabulary of the Beloochi and<br>Punjabi Languages, 1 copy, .....                                   |     | 1          | 0        | 0        |
| Edgeworth's Kashmiri Grammar, 1 copy, .....                                                                              |     | 1          | 0        | 0        |
| Journal of the Asiatic Society of Bengal, 84 Nos. ; 6 at<br>Rs. 2, and the rest at Rs. 1-8, .....                        |     | 129        | 0        | 0        |
| Asiatic Researches, vol. XIX. part II. 2 copies, vol. XX.<br>part I. 2 copies, .....                                     |     | 20         | 0        | 0        |
| <b>Total Co.'s Rs.</b>                                                                                                   |     | <b>838</b> | <b>0</b> | <b>0</b> |

*Abstract of the number of books received into the Library, during the year 1846.*

|                  | Works.     | Vols. & Nos. |
|------------------|------------|--------------|
| English, .....   | 81         | 389          |
| French, .....    | 16         | 33           |
| Latin, .....     | 6          | 39           |
| German, .....    | 28         | 56           |
| Norwegian, ..... | 16         | 54           |
| Sanskrita, ..... | 8          | 52           |
| Bengáli, .....   | 3          | 5            |
| Arabic, .....    | 1          | 1            |
| Persian, .....   | 1          | 1            |
| Urdu, .....      | 2          | 36           |
| Hinduí, .....    | 1          | 1            |
| <b>Total</b>     | <b>164</b> | <b>668</b>   |



*Oriental Publications in store at the close of the year 1846.*

Mahábhárata, vol. I. 177 copies, vol. II. 193 do., vol. III. 219 do.,  
vol. IV. 245 do.

Index to Mahábhárata, vol. I. 297 copies, vol. II. 299 copies, vol.  
III. 305 do., vol. IV. 280 do.

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Copies. |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| Harivansa, . . . . .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 428     |
| Rájatarangini, . . . . .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 257     |
| Naishada, . . . . .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 156     |
| Súsruta, vol. I. 235, vol. II. 281.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |         |
| Fatawe Alamgiri, vol. I. 68 copies, vol. II. 77 do., vol. III.<br>86 do., vol. IV. 39 do., vol. V. 77 do., vol. VI. 89 do.                                                                                                                                                                                                                                                                                                                                                                                                                                                    |         |
| Enáyá, vol. II. 21 copies, vol. III. 13 do., vol. IV. 15 do.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |         |
| Khazanat ul Ilm, . . . . .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 361     |
| Jawame Ilm Riázi, . . . . .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 371     |
| Anis ul Musharrahin, . . . . .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 293     |
| Sharaya ul Islám, . . . . .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 309     |
| Tibetan Grammar, . . . . .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 211     |
| Tibetan Dictionary, . . . . .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 191     |
| Points in the History of the Greek and Indo-Scythian<br>Kings, . . . . .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 15      |
| Leech's Grammar and Vocabulary of the Beloochi and<br>Punjabi Languages. . . . .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |         |
| Vocabulary of the Scinde Languages, . . . . .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |         |
| Istalahát Súfia, . . . . .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 377     |
| Tawárikh i Nádiri, . . . . .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 472     |
| Asiatic Researches, vol. I. 5 copies, vol. II. 2 do., vol.<br>III. 3 do., vol. VI. 50 do., vol. VII. 111 do., vol. VIII.<br>43 do., vol. IX. 101 do., vol. X. 53 do., vol. XI. 96 do.,<br>vol. XII. 33 do., vol. XIII. 39 do. vol. XIV. 57 do.<br>vol. XV. 52 do., vol. XVI. 84 do., vol. XVII. 205 do.,<br>vol. XVIII. 42 do., vol. XVIII. part 1st, 61 do., vol.<br>XVIII. part 2nd, 155 do., vol. XIX. 222 do., vol. XIX.<br>part 1st, 19 do., vol. XIX. part 2nd, 90 do., vol. XX.<br>217 do., vol. XX. part 1st, 11 do., vol. XX. part 2nd,<br>121 do., Index, . . . . . | 122     |
| Sanskrita Catalogue, . . . . .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 230     |
| Persian ditto . . . . .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 220     |
| English ditto.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |

*Statement of the Amounts received by the Sale of Oriental Publications.*

|                                              |                                   |       |       |
|----------------------------------------------|-----------------------------------|-------|-------|
| Sale of Oriental Publications in 1842, ..... | 829                               | 8     | 0     |
| Ditto Ditto 1843, .....                      | 696                               | 8     | 0     |
| Ditto Ditto 1844, .....                      | 424                               | 4     | 9     |
| Ditto Ditto 1845, .....                      | 1,047                             | 10    | 0     |
| Ditto Ditto 1846, .....                      | 777                               | 7     | 3     |
|                                              |                                   |       | <hr/> |
|                                              | Co.'s Rs.                         | 3,775 | 6 0   |
|                                              | <i>Average per year</i> Co.'s Rs. | 755   | 0 0   |

*Statement showing the monthly income of the Asiatic Society, from Members, Subscribers to the Journal, and sale of Publications.*

136 *Members.*

|                                                     |       |
|-----------------------------------------------------|-------|
| 83 Members paid for 3d Qr. of 1846 at 64 per Annum, | 5,248 |
| 10 Ditto (new) .....                                | 640   |
| 29 Ditto who have not paid, .....                   | 1,920 |
|                                                     | <hr/> |
|                                                     | 7,808 |
| 14 Ditto who will probably not pay.                 |       |

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132

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|                                                    |       |
|----------------------------------------------------|-------|
| 61 Subscribers to the Journal at 16 Rs. per Annum, | 976   |
| 40 Copies for the Hon'ble Company. ....            | 640   |
|                                                    | <hr/> |
|                                                    | 1,616 |

Average receipts by sale of Publications, .....

|  |       |
|--|-------|
|  | <hr/> |
|  | 9,424 |
|  | <hr/> |
|  | 755   |

Co.'s Rs. 10,179

Probable monthly income, .....

|  |               |
|--|---------------|
|  | <hr/>         |
|  | Co.'s Rs. 848 |

E. E.

*Asiatic Society.*

DEPENDENCIES AT DEBIT.

*Liabilities to meet in all 1847.*

|                                                                                                               |           |       |   |   |
|---------------------------------------------------------------------------------------------------------------|-----------|-------|---|---|
| Mr. Blyth's claim, .....                                                                                      | Co.'s Rs. | 3,000 | 0 | 0 |
| Mr. Torren's claim, .....                                                                                     |           | 1,500 | 0 | 0 |
| Mr. Muir's claim for 500 Rs. to be returned, not having been applied to Original purpose, .....               |           | 500   | 0 | 0 |
| Due to Oriental fund since September, 1846, .....                                                             |           | 2,000 | 0 | 0 |
| Estimated Cost of 4 Nos., of the Journal published for 1846, at the monthly average of 350 Rs. per No., ..... |           | 1,400 | 0 | 0 |
|                                                                                                               | Co.'s Rs. | 8,400 | 0 | 0 |

DEPENDENCIES AT CREDIT.

|                                                                                                                                           |           |       |   |   |
|-------------------------------------------------------------------------------------------------------------------------------------------|-----------|-------|---|---|
| Company's Paper, .....                                                                                                                    | Co.'s Rs. | 3,800 | 0 | 0 |
| Cash, .....                                                                                                                               |           | 2,230 | 0 | 6 |
| Due from Agent in Paris say, .....                                                                                                        |           | 1,000 | 0 | 0 |
| Realizable by Outstanding Subscriptions, estimated at 50 per cent. on the amount of uncollected bills, Rs. 5,104. ....                    |           | 2,552 | 0 | 0 |
| Realizable by Outstanding-<br>ing Subscriptions to }<br>the Journal. }<br>Unknown, the late accountant not having furnished the accounts. |           |       |   |   |
|                                                                                                                                           | Co.'s Rs. | 9,582 | 0 | 6 |

*Report.*

*Calcutta, Asiatic Society, }  
31st December, 1846.*

JOHN MULLER,  
*Accountant, Asiatic Society.*

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he year 1842.

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|          |                                    |       |       |      |
|----------|------------------------------------|-------|-------|------|
| <b>M</b> |                                    |       |       |      |
| To paid  | Hon'ble the Court of Directors     |       |       |      |
| "        | Est for @ 250 per month, ..        | 3,000 | 0     | 0    |
| "        | Comens @ 50 per month. ..          | 600   | 0     | 0    |
|          |                                    | <hr/> |       |      |
|          |                                    |       | 3,600 | 0 0  |
| "        | Reestablishment for the custody of |       |       |      |
| "        | Mr. from the College of Fort Wil-  |       |       |      |
| "        | 2 Ir .. .. .                       | 936   | 0     | 0    |
| "        | .. .. .                            | 829   | 8     | 0    |
| "        | Place of Assistant Librarian, ..   | 20    | 0     | 0    |
|          |                                    | <hr/> |       |      |
|          |                                    |       | 1,785 | 8 0  |
| To paid  | Est for a Portrait of Sir E. Ryan, | 908   | 0     | 0    |
| "        | Box from Government Agents on      |       |       |      |
| "        | their custody, .. ..               | 300   | 0     | 0    |
| "        | Coing Government                   |       |       |      |
| "        | Freder No. 4852 of                 |       |       |      |
| "        | 27, for .. Sa. Rs. 5,000           | 0     | 0     | 0    |
| "        | July to 19th Dec.                  |       |       |      |
| To paid  | .. ..                              | 108   | 5     | 4    |
| "        | .. ..                              | 5,108 | 5     | 4    |
| "        | Mea r. 2 a. per cent. ..           | 57    | 7     | 7    |
|          |                                    | <hr/> |       |      |
|          | Sa. Rs. 5,050                      | 13    | 9     |      |
|          | Co.'s Rs.                          | 5,387 | 9     | 0    |
| To paid  | Assignee to the Estate of          |       |       |      |
| "        | .. ..                              | 127   | 9     | 9    |
| "        | Ests                               | <hr/> |       |      |
| "        | MR-TAL WORKS.                      |       | 6,723 | 2 9  |
| "        | Mr-0 per month.. ..                |       | 6,000 | 0 0  |
| <b>M</b> |                                    |       |       |      |
| To paid  | Or the services of a Joint Cura-   |       |       |      |
| "        | One50 per month.. ..               |       | 2,276 | 12 6 |
| "        | Min                                |       |       |      |
|          | MISSION FEES.                      |       |       |      |
| "        | Sz .. .. .                         |       | 7,038 | 0 0  |
| To paid  | Here on the 31st Dec. 1841. ..     |       | 1,849 | 7 1  |
| To paid  | For                                |       |       |      |
| To paid  | J.                                 |       |       |      |
| "        | Mea                                |       |       |      |
| "        | W.                                 |       |       |      |
| "        | Mo                                 |       |       |      |
| "        | Rev                                |       |       |      |
| To paid  | Bu                                 |       |       |      |
| To paid  | in                                 |       |       |      |

By

Co.'s Rs. 29,272 14 4

E. E.





*the year 1843.*

**ASSETS.**

|                                |                                     |    |    |       |        |      |
|--------------------------------|-------------------------------------|----|----|-------|--------|------|
| <b>To</b>                      |                                     |    |    |       |        |      |
| Hon'ble the Court of Directors |                                     |    |    |       |        |      |
|                                | erator @ 250.                       | .. | .. | 3,000 | 0      | 0    |
|                                | mens @ 50...                        | .. | .. | 600   | 0      | 0    |
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|                                | the College of Fort William @       |    |    |       |        |      |
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|                                | Professor Mill's bust,              | .. | .. | ..    | 76     | 10 3 |
| <b>To</b>                      |                                     |    |    |       |        |      |
| GEOLOGY.                       |                                     |    |    |       |        |      |
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| PRINSEP, Esq.                  |                                     |    |    |       |        |      |
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| <b>To</b>                      |                                     |    |    |       |        |      |
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*the year 1845.*

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| “ Corks, .. ..                               | 60 0 0    | 2,566 0 0                 |
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## RECEIPTS AND ASSETS.

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|----|-----------------------------------------------------------------------------------------|-------|----|---------------|------|
| To | the Honourable the<br>services of a Cura-<br>for the year 1842                          |       |    |               |      |
| "  | " .. ..                                                                                 | 3,000 | 0  | 0             |      |
| "  | specimens ditto at 50                                                                   |       |    |               |      |
| "  | " .. ..                                                                                 | 600   | 0  | 0             |      |
|    |                                                                                         |       |    | <u>3,600</u>  | 0 0  |
|    | ditto, .. ..                                                                            |       |    | 3,600         | 0 0  |
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|    | " .. ..                                                                                 |       |    | 18,000        | 0 0  |
| "  | Captain Phayre in 1845,                                                                 |       | 20 | 0             | 0    |
|    |                                                                                         |       |    | <u>18,020</u> | 0 0  |
| To | Establishment for the<br>s transferred from<br>m at 78 per month<br>Abstract Statement, | 936   | 0  | 0             |      |
| "  | " .. ..                                                                                 | 936   | 0  | 0             |      |
| "  | " .. ..                                                                                 | 936   | 0  | 0             |      |
| "  | " .. ..                                                                                 | 936   | 0  | 0             |      |
| "  | Aug. 1846, .. ..                                                                        | 702   | 0  | 0             |      |
|    |                                                                                         |       |    | <u>4,446</u>  | 0 0  |
| To | r the year 1842 as                                                                      |       |    |               |      |
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| "  | ndence of Assistant Librarian as<br>he year 1842, .. ..                                 |       |    | 20            | 0 0  |
|    |                                                                                         |       |    | <u>8,866</u>  | 0 6  |
| To | for a portrait of Sir E. Ryan as<br>he year 1842, .. ..                                 |       |    | 908           | 0 0  |
| "  | from Assignee to the Estate of<br>.. ..                                                 |       |    | 127           | 9 9  |
| "  | Professor Mill's Bust for 1843 as<br>.. ..                                              |       |    | 76            | 10 3 |
| "  | for an inkstand presented to the<br>s) as per Abstract Statement for<br>.. ..           |       |    | 932           | 0 0  |
| To | overnment Agents<br>Securities in their<br>Statement for the                            |       |    |               |      |
| "  | " .. ..                                                                                 | 300   | 0  | 0             |      |
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| "  | ement for 1842, ..                                                                      | 5,387 | 9  | 0             |      |
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|    |                                                                                         |       |    | <u>26,886</u> | 0 6  |

Carried over, 26,886 0 6





JOURNAL  
OF THE  
ASIATIC SOCIETY.

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FEBRUARY, 1847.

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*Notices and Descriptions of various New or Little Known Species of Birds.* By ED. BLYTH, Curator of the Asiatic Society's Museum.

[Continued from p. 313, ante.]

*Hirundo*, Lin. The following are the Indian Swallows hitherto ascertained.

1. *H. rustica*, Lin. This I have only seen from Nepal.\*

2. *H. gutturalis*, Scopoli: *H. panayana*, Lath.; *H. javanica*, Sparrman; *H. jewan*, Sykes. The most common species of India generally, and of the Malay countries. Fine specimens only differ from the last in their smaller size. By far the finest which I have seen, is one in Dr. Cantor's collection from the Malayan Peninsula; the outer tail-feathers of which exceed the next by two inches and a half; but the wing measures only four inches and three-eighths, or less than in either of eight specimens, young and old, from Nepal and England, now before me of *H. rustica*.

\* During a recent excursion to the Midnapore jungles, I procured a single specimen of *H. rustica*, in company with *H. gutturalis* and *H. daurica*; the last named species much predominating, conformably with Mr. Jerdon's observation of its haunts. Upon quitting the river alluvium, a marked change in the zoology of the country became at once apparent. *Pycnonotus flavivinctus* (the *Criniger Tickelli*, nobis, xiv, 571,) appeared in abundance; and the common Bengal Lark (*Alauda guttula*) was no more seen or heard over the paddy-fields, while *Mirafra assamica* became replaced by *M. affinis*. In the jungles, *Palæornis torquatus* was completely replaced by

No. II. NEW SERIES.

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3. *H. domicola*, Jerdon: *H. javanica* apud Latham and Shaw.—Neilgherries, Malayan peninsula, Java. I was wrong in identifying this bird with the Australian *H. neoxena*, Gould, in XIV, 547: the latter is *H. pacifica*, Lath., and *H. javanica* apud Vigors and Horsfield. In a fine specimen before me, the wing measures four inches and one-eighth, and the outermost tail-feather nearly three inches, exceeding the next by an inch and a quarter; whereas among several specimens of *H. domicola* (from the three localities cited), the wing does not exceed three inches and seven-eighths, and the outermost tail-feather is at most but half an inch longer than the middle pair.

4. *H. filifera*, Stephens: *H. ruficeps*, Licht.; *H. filicauda*, Franklin: *Wire-tailed Swallow*, and the young—*Rufous-headed Swallow*, of Latham. Indian peninsula.

5. *H. daurica*, Lin.: *H. alpestris*, Pallas; *H. erythropygia*, Sykes; *H. nipalensis*, Hodgson. India generally; preferring the proximity of jungles (according to Mr. Jerdon): a casual and irregular visitant in Lower Bengal; but abundant in the Midnapore jungles, at least during the cold season.

*P. cyanocephalus*: *Bucco asiaticus* (v. *cyanops*, &c.) by *B. zeylanicus* (v. *caniceps*): and the common Calcutta Crow (*Corvus splendens*) totally disappeared; its place being supplied by *C. culminatus*. *Picus maharattensis* took the place of *P. Macei*. In lieu of the common Sparrow, the *Passer* (v. *Gymnoris*) *flavicollis*, with precisely the same note and manners, abounded upon the trees even near buildings, but without ever resorting to the latter. In the same trees were found *Piprisoma agile*, with the manners and note of a *Dicaeum*; and *Muscicapula melanoleuca* and *M. acornatus*: also *Athene radiatus*, but less numerous than the common *Ath. brama*. *Phyllornis aurifrons* and *Ph. Jerdoni* occurred, the latter very abundantly; the notes of both being remarkably similar to those of the *Dicruridae*: and their manners at once recalled those of *Iora*, to which genus *Phyllornis* is considerably allied. *Thamnobia cambaiensis* was also common; and the manners and actions of this species revealed its affinity for the Shámah (*Kittacincla macrourus*): its tail is usually carried very high, or rather over the back, displaying the rufous under-coverts. The Shámah was also obtained. *Buceros albirostris* was not rare, in small flocks; and *B. birostris* (v. *ginginianus*), in pairs: *B. pica* (v. *malabaricus*) was also to be met with. In large tracts of coppice jungle, the *Taccocua affinis* (xv, 19,) or Rajmahl Sirkeer, occurred; and *Malacocercus* ? *hyperythrus*, (Franklin,) differing from its representative in S. India, was not uncommon; also a small *Prinia*, of which the young had been previously sent me by Mr. Jerdon. The *Drymoica sylvatica*, (Jerdon,) inhabited more open situations. On the bare 'kunkur' soil, near Midnapore, *Anthus rufulus* was procured, but much less abundantly than the common *Anth. malayensis*: *Lanius Hardwickii* was also obtained in that neighbourhood, with other Shrikes: and about the pretty rocky hill of Gope, in the same vicinity, *Edicnemus crepitans* was particularly abundant. *Turtur senegalensis* was likewise obtained there. Nor was this trip less productive in other classes of animals; but details regarding these must be reserved.

6. *H. concolor*, Sykes. Indian peninsula.

7. *H. rupestris*, Scopoli: *H. rupicola*, Hodgson; *H. inornata*, Jerdon. Himalaya, Neilgherries.

8. *H. urbica*, Lin. Himalaya, Neilgherries.

9. *H. riparia*, Lin. Nepal, S. India. (*Non vidi.*)

10. *H. sinensis*, Gray, in Hardwicke's *Ill. Ind. Zool.*: *H. brevicaudata*, McClelland, *P. Z. S.* 1839, p. 156: *Indian Martin Swallow* of Latham. I think there can be no doubt that both the former names apply to the common little Indian Bank Martin, abundant along all the great rivers of the country, wherever the banks are sandy and high enough for them to perforate their nest-holes with tolerable security. The species is nearly allied to *H. riparia* in form, colour, and habits; but differs in its smaller size, less furcate tail, rather lighter colour, with the upper tail-coverts somewhat albescent, also in the breast being much paler, and in the absence of the downy tuft on the tarse just above the hind-toe, which invariably distinguishes *H. riparia*. Length of wing three inches and a half to three and three-quarters, and of middle tail-feathers an inch and a half. Whether these birds are migratory I am unaware. I have found both newly laid eggs and young ready to fly in the beginning of December, and also at the end of February. The nest-holes vary in depth from a foot and a half to considerably more, according as the banks are more or less hard; and the nest itself is composed of dry grass, with occasionally a few feathers in the lining: eggs pure white, like those of *H. riparia*; and the young have their upper feathers more or less margined with rufous, as in that species.

*N. B.* The *H. brevirostris*, McClelland, described with *H. brevicaudata*, I have identified as a *Collocalia* (XIV, note to p. 548), being the same as *H. unicolor*, Jerdon.

Of the various groups of Saxicoline Flycatchers, one genus makes a considerable approach to the Swallows. This is *Hemichelidon*, Hodgson, *Ann. Mag. N. H.* 1845, p. 203. The bill is absolutely as in *Hirundo*; and the wing reaches to two-thirds of the length of the tail, having the first primary minute, the second nearly equaling the fifth, and the third and fourth equal and longest: rest as in *Butalis*, but the tarse still shorter. Mr. Hodgson describes two species, *H. fuliginosa* and *H. ferruginea*. The former is com-

mon at Darjeeling, and the latter I have not yet seen. *H. fuliginosa* has the wing two inches and three-quarters long, and tail an inch and three-quarters. Colour plain fuliginous-brown above, paler below, albescent towards the vent and lower tail-coverts, and slightly on the throat: bill blackish above, the base of the lower mandible yellow; and feet brown. Young speckled with pale yellowish-brown, like a young Robin.\*

*Butalis*, Boie, founded on the European *Muscicapa grisola*. This is another good genus, the species of which are distinguished by their plain olive or greyish colouring. The beak is more or less elongated and flattened, but in the Indian species is generally somewhat larger than in *B. grisola*: the feet are small and feeble; and the wings reach half-way down the tail, having their first primary short, the third and fourth sub-equal, and the second generally shorter than the fifth. Tail of mean length. All have the larger wing-feathers margined with pale buff externally.

1. *B. terricolor*, Hodgson, *n. s.* Plain uniform earthy-brown above, and whitish-brown below: the upper mandible dark, and the lower whitish except at its extreme tip: legs brown. Length about five inches and a half, of wing two and three-quarters, and tail two inches; bill to gape eleven-sixteenths, and tarse half an inch. The beak of this species is longer, broader, and also flatter, than in *B. grisola*. From Nepal.

2. *B. rufescens*, Jerdon, *n. s.* Very similar to the last, but distinguished by its general rufous tinge, and especially by its white legs and claws. Colour olive-brown above, tinged with rufous on the back, and more deeply so on the upper tail-coverts and margins of the caudal feathers; wing-coverts and tertiaries also margined with pale rufous: throat and fore-neck white, as also the anterior part of the lores, but a longitudinal patch of brown on each side of the throat; the breast, flanks, and under tail-coverts, brown, paler on the tail, and the belly whitish. Beak dark above, and yellowish-white below. Dimensions as in last. From S. India.

3. *B. ruficauda*, (Swainson), *Nat. Libr.*, 'Flycatchers,' *Appendix*. The beak of this species more resembles that of *B. grisola*, but is

\* A species of this genus (apparently) is figured in one of Dr. McClelland's drawings of Assamese birds. Colour brown, paler below, whitish towards throat and vent: the secondaries and tertiaries margined with white, surrounding the tips of the latter.

longer; the feet are dusky-plumbeous; and the tail and its upper coverts are moderately bright rufous or ferruginous, suffused with dusky on the middle pair of tail-feathers, and on part of the outer margin of the next; rump also tinged with ferruginous; the rest of the upper-parts olivaceous, and the under-parts greyish, passing to white on the abdomen and chin; lower tail-coverts white, tinged faintly with ferruginous. Length about five inches and a half, of wing two and seven-eighths, and tail two and one-eighth; bill to gape three-quarters of an inch, and tarse five-eighths: the under mandible of the bill of this species has little trace of whitish. Hab. S. India.

4. *B. latirostris*, (Raffles, Swainson): *Muscicapa pöonensis*, Sykes. The beak of this species is shorter and broader than in the others, and much flattened. Length nearly five inches, of wing two and five-eighths, and tail an inch and seven-eighths; bill to gape eleven-sixteenths, and tarse half an inch. Colour greyish-brown above, sometimes a little tinged with rufescent; lower-parts white; the breast, flanks, and sides of the throat, light greyish-brown: bill dusky, except the base of the lower mandible, which is pale-yellowish; and the feet are dark brown: wing-coverts and tertiaries margined with light rufescent. Hab. S. India and Malay countries.

The following are two very distinct generic forms of Flycatchers, neither of which can be approximated to any other with which I am acquainted.

*Muscitrea*, nobis. Bill of moderate length, somewhat conical, a little compressed, the upper mandible obtusely angulated, with the curvature of its outline increasing to the tip, which overhangs that of the lower mandible, and is slightly emarginated; the extreme tip of the lower mandible also curves a little upward: gonyes straight and scarcely inflected: the nostrils small, with anterior oval aperture, and beset at base with short reflected feathers and some incumbent hairs: a few fine hair-like bristles also at the gape, of moderate length. Tarsi moderately slender, as long as the middle toe with its claw; the toes and claws suited for perching. Wings long and broad, reaching more than half-way down the tail, having the fourth and fifth primaries equal and longest, the third rather shorter, the second equalling the eighth, and the first about half the length of the third. Tail moderately developed, its feathers of nearly equal length. The

general plumage inclines to be dense, and is unadorned with bright colours and glossless in the only known species.

*M. cinerea*, nobis. Length about six inches; of wing nearly three and a half; and tail two and a half: bill to forehead (through the feathers) five-eighths, and to gape three-quarters: tarse three-quarters of an inch. General colour ashy-brown above, greyer on the head, and tinged with fulvous on the exterior margins of the secondaries; beneath albescent, a little brown across the breast: bill light horn-colour; and feet have probably been bluish-leadен. From the Island of Ramree, Arracan, where discovered by Capt. Abbott.

*Anthipes*, nobis. This would probably be classed by Mr. Swainson with his *Fluvicolinæ*, or "Water-chats." With the general form of a *Pratincola*, it combines a Flycatcher's bill, and the toes and claws of an *Anthus* or Pipit. Beak flattened, rather wide at base, and narrowing evenly to the tip; the ridge of the upper mandible distinctly angulated, and its tip considerably overhanging that of the lower mandible, and (as usual in such cases) emarginated: nostrils basal, nearly closed by the membrane, their aperture a narrow lateral fissure: gape armed with fine but firm vibrissæ. Tarse slender, as long as the middle toe with its claw: the toes and claws suited for running, as in the Pipits; the middle front claw greatly exceeding the two lateral ones, and the hind claw as long as the toe, and but slightly curved, as are also the other claws. Wings moderate, rounded; the fourth, fifth, and sixth primaries sub-equal and longest, the third and seventh rather shorter, the second much shorter, and the first half the length of the second. Tail even, of moderate length, or somewhat short, the wings reaching half-way to its tip. Plumage full and dense.

*A. gularis*, nobis. Length four inches and a quarter; of wing two and three-eighths, and tail an inch and three-quarters: bill to forehead half an inch, and to gape five-eighths: tarse three-quarters, and hind-toe and claw the same. Upper-parts fulvescent olive-brown; the wings and tail inclining to dark ferruginous: lores conspicuously whitish, continued as a streak over but not beyond the eye: throat white, forming a large triangular patch, surrounded by a narrow black border; the breast and flanks fulvescent, and middle of the belly whitish. Bill black; and legs and claws pale. From Arracan, where discovered by Capt. Phayre.

The *Dimorpha?* *moniliger*, Hodgson, *Ann. Mag. N. H.* 1845, p. 196, would seem, from the description, to approximate the above species in its markings.

*Zanthopygia*, nobis. This is a genus of Chat-flycatchers, which I am not as yet prepared to approximate to any other. In the form of its beak, it bears much resemblance to the Australian genera *Eopsaltria* and *Petroica* (which branch off from *Pachycephala*\*), and also to the *Pratincolæ*; but of the two species to be described, the bill of the first is vertically deeper than that of the second, which renders generalization more difficult, although the generic identity of the two birds is unquestionable. Bill of mean length, acutely triangular as viewed from above, or much narrower than in the more characteristic Flycatchers; its upper ridge angulated, and the tip of the upper mandible incurved and emarginated: gape beset with fine hair-like vibrissæ. Tarsi and toes moderately small and weak, the tarse as long as the middle toe with its claw; wings reaching half-way down the tail, their first primary short, only a quarter the length of the second, which is shorter than the fifth, the third and fourth being sub-equal and longest. Tail of mean length. Plumage rather firm: the males black above, with yellow rump and under-parts, and a large white wing-spot. From Malasia.

*Z. leucophrys*, nobis. Length about five inches, of wing two and three-quarters, and tail an inch and three-quarters: bill to gape five-eighths, and tarse barely five-eighths of an inch. Colour deep black above, bright yellow below and on the rump; a large wing-spot, continued along two-thirds of the outer edge of the largest tertiary, also a spot before and over the eye, and the lower tail-coverts, pure white: bill dusky-horn or blackish, and legs brown. The female† differs widely in being of a light olive-green above, tinged with grey, especially

\* *Timizos meruloides*, nobis, *J. A. S.* XI, 195, is *Pachycephala olivacea*, Vig. and Horsf.

† *Muscicapa zanthopygia*, A. Hay, *Madr. Journ.* No. XXXI, 162. The above description of the female is from his lordship's specimen; and Lord A. Hay's brief notice of the male in a foot-note, is from a specimen in the Society's museum, of which I have had a description by me in *MS.* for two years at least. His lordship, by a slip of the pen, referred to Dr. Cantor's fine collection of Malayan birds, as containing the male he had seen. Dr. C. has only a female, which accords with the description in the text, except perhaps in having the head less tinged with ashy.

upon the head ; below yellowish-albescent, the feathers of the fore-neck and breast margined with the hue of the upper-parts ; rump, towards the tail, bright and pure light yellow ; the two great ranges of wing-coverts tipped, and the tertiaries externally margined, with white : loral streak and the lower tail-coverts dull white : bill dusky above, below pale ; and the legs pale. From Malacca.

*Z. chrysophrys*, nobis. Differs from the preceding in its more slender and depressed bill ; in having a yellow supercilium continued back to the occiput ; in the white wing-spot not being continued along the edge of the tertiary ; and in the hue of the abdomen passing gradually to white from the bright yellow of the throat and breast. In other words, it may be briefly described as black, with yellow rump, supercilium, and under-parts, passing to white on the belly and lower tail-coverts, and a large patch of white upon the wing. Length of the wing three inches. The female I have not seen, nor am I aware of the habitat of the species ; but have some reason to suspect Australia, in which case it will probably bear a prior name.

A considerable group is formed by the various blue Flycatchers of India and Malasia, minus the *Myiagræ* (as exemplified by *M. cærulea*), which I have already approximated to *Tchitrea* (p. 290). At the head of them may be placed

*Niltava*, Hodgson, *Ind. Rev.* 1837, p. 650. In these beautiful birds, the *Muscicapa* structure is much reduced ; the bill being narrow and scarcely flattened, and the rictal bristles, though tolerably long, are very fine and slender. According to Mr. Hodgson, they "never seize on wing," but their affinities with the following groups are nevertheless obvious. Three species occur in the Himalaya, the two first appearing to be very common at Darjeeling.—1. *N. grandis*, nobis, XI, 189 (which Mr. Hodgson would separate by the name *Bainopus*, but I cannot understand upon what characters).—2. *N. sundara*, Hodgson.—3. *N. Macgregorii*, (Burton), *P. Z. S.* 1835, p. 152, v. *fuligiventer*, Hodgson ; which (as Lord A. Hay informs me) is common at Simla.

*Cyanoptila*, nobis. I found this group on a Javanese Flycatcher, which is just intermediate (both in form and colouring) to the preceding and following divisions, in neither of which it can be placed ; and it thus illustrates the affinities of *Niltava*. Its wings, however, are longer than in either, and more pointed, reaching fully



half-way down the tail ; and the beak is rather broader and flatter than in *Niltava*, but vertically deep, having the tomæ much inflected : rictal bristles small and inconspicuous. Rest as in *Stoporala* ; the frontal feathers deflected from the base of the bill, without any of the reflex velvety plumes conspicuous in *Niltava*.

*C. cyanomelanura*, (Tem.) Upper-parts deep Prussian-blue ; the crown and shoulder of the wing ultramarine ; and nearly half of the base of the tail pure white : lores, ear-coverts, throat and breast, blue-black ; belly and lower tail-coverts sullied white ; and flanks brown. Bill black ; and legs dark-coloured. Length of wing three inches and three-quarters ; of tail two and a half ; bill to frontal-feathers half an inch ; and tarsæ nine-sixteenths.

*Stoporala*, nobis. The type of this marked group is *St. melanops*, (Vigors), v. *Muscicapa lapis*, Lesson (*Rev. Zool. &c.* 1839, p. 104), and the female—*M. thalassina*, Swainson, *Nat. Libr. : Verditer Fly-catcher* of Latham.—A second species, closely allied, inhabits Java ; differing in its smaller size, and deeper blue colouring : length of wing three inches, instead of three and three-eighths, and the rest in proportion.—A third, from Java, is *St. indigo*, (Horsf.), which in its white base of tail, the spreading of the loreal black on the chin and beneath the eye, and a little also in structure, approximates the *Cyanoptila*.—A fourth, allied to the last, especially in the white at the base of its caudal feathers, and in structure much resembling the first species, is *St. albicaudata*, (Jerdon), from the Neilgherries.

*Siphia*, Hodgson, *Ind. Rev.* 1837, p. 651. To this group may, I think, be referred—

1. *S. strophciata*, Hodgson, *Ind. Rev.* 1837, p. 651. Himalaya.

2. *S. leucura*, (Gm.) : *Saxicola rubeculoides*, Sykes ; *Synornis jou-laimus*, Hodgson, *Ann. Mag. N. H.* 1845, p. 197 ; *Muscicapa parva* of India, apud Sundevall : *White-tailed Redbreast* of Latham, whose *Maculate Flycatcher* refers probably to the young. *N. B.*—Comparatively few specimens of this bird are procurable with the rufous throat. It inhabits India generally, visiting the plains in the cold season. From recollection, I should say that the European *Musc. parva*, Auctorum, is very nearly allied.

3. *S. erythaca*, nobis, n. s. Closely allied in form and structure to the last, but the whole throat, breast, and fore-part of the abdomen, bright yellowish-ferruginous; two narrow whitish bands across the wing, formed by the tips of the coverts; and the white on the sides of the base of the tail much reduced (as compared with the two preceding species), occupying only the extreme base of the outermost tail-feathers, and successively increasing in quantity upon the next four: belly and lower tail-coverts pure white; the flanks fulvous-brown: behind the eye a whitish spot: a slight olivaceous tinge on the upper-parts generally; and the tertials margined with whitish. Wing two inches and seven-eighths; tail an inch and seven-eighths; bill to gape nine-sixteenths of an inch, and tarse the same. The female is probably without the rufous on the under-parts, but would be distinguished from that of the preceding species by the narrow whitish bands on the wing, and also by the reduced quantity of white at the base of the tail. Inhabits the Malayan peninsula.

4. *S. leucomelanura*; *Digenea leucomelanura*, Hodgson, *Ann. Mag. N. H.* 1845, p. 197. Length five inches, or a little more; of wing two and three-eighths, and tail two and one-eighth; bill to gape nine-sixteenths; and tarse three-quarters of an inch. Above dark slaty-ash, having a blue tinge, the forehead and over the eyes vivid blue-grey; lores and ear-coverts black; middle of throat and fore-neck white, the rest of the under-parts whitish-grey, passing to white at the vent and on the lower tail-coverts; tail black, its basal half white, except on the two middle feathers, and on the inner web of the next to them. Bill dusky, and feet brown. This bird has somewhat the aspect, at first sight, of *Ianthia rufilatus* (p. 132), but is at once distinguished by its smaller size, shorter bill, duller colouring, the white upon the tail, and the absence of rufous on the flanks. Hab. Nepal.

5. *S. tricolor*; *Digenea tricolor*, Hodgson, *loc. cit.* Length about four inches and three-quarters, of wing two and a quarter, and tail two inches; bill to gape half an inch, and tarse five-eighths. Colour (of female?) olive-brown,\* fulvescent on the rump; and passing to

\* Mr. Hodgson says "olive-green;" but there is not the slightest tinge of green on the specimens with which he has favoured the Society, though these may possibly be females.

rufous-brown on the wings; tail dull ferruginous: under-parts light brown, inclining to albescent on the throat and belly: bill dusky, and legs brown. Young spotted above like a young Robin, or Stonechat, &c. Hab. Nepal.

6. *S. signata*; *Leiothrix signata*, McClelland and Horsfield, *P. Z. S.* 1839, p. 162, v. *Dimorpha*\* (alias *Siphia*) *auricularis*, (Hodgson), *J. A. S.* XII, 240. Himalaya, Assam.

7. *S. moniliger*, Hodgson, *Ann. Mag. Nat. Hist.* 1845, p. 197. (*Non vidi.*)

*Muscicapula*, nobis, XII, 939. This comprises—

1. *M. sapphira*, nobis.—2. *M. superciliaris*, (Jerdon), v. *Dimorpha albogularis*, nobis, XI, 190: *Lucknow Flycatcher* and *Azure Warbler*, Latham.—3. *M. hyperythra*, nobis, XI, 885, altered from *superciliaris*, nobis, XI, 190, and again by an oversight to *rubecula*, XII, 940; *Dimorpha rubrocyanea*, Hodgson, *Ann. Mag. N. H.* 1845, p. 197.—4. *M. melanoleuca*, (Hodg.), a name which will probably not stand, as the Society has received the identical species from Java, from which part M. Temminck also will probably have received and named it.†—In *M. sapphira*, the affinity to *Niltava*, *Cyanoptila*, &c., is still obvious in the colouring; and in *Siphia signata*, the general brown plumage is relieved by a patch of ultramarine-blue on each side of the neck, as in restricted *Niltava*, (or the *Neel-tours* of the Nepalese.) *M. melanoleuca*, as already remarked (XVII, 306), seems allied to *Hemipus*, Hodgson.

5. *M. acornaus*, (Hodgson); *Musc. pöonensis* apud nos, XI, 458. Length four inches and three-eighths, by six inches and three-quarters; of wing two and three-sixteenths to two and three-eighths; and of tail an inch and a half to one and three-quarters: bill to gape nine-sixteenths of an inch; and tarse somewhat more. Colour greyish-olive above, fulvescent on the rump, and rufescent-brown on the upper tail-coverts and margining the base of the tail-feathers; one Nepalese specimen has the upper tail-coverts ashy: lower-parts albescent-greyish, slightly tinged with fulvous in some specimens; the throat, middle of belly, and lower tail-coverts, dull white: axillaries pure white:

\* *Dimorpha* is the name of an old genus in Botany.

† It is not rare in the Midnapore jungles; and Capt. Phayre had sent it from Arracan.

primaries dusky, the secondaries externally margined with olive, and the tertiaries with greyish or whitish-grey, becoming abraded on the worn plumage: greater coverts of the wing whitish-tipped, forming a slight wing-band. Bill blackish, and legs dusky or deep brown. The colour of this bird would ally it to *Butalis*, while its form is strictly that of *Muscicapula*. It inhabits the S. E. Himalaya, and Central India: being not rare in the Midnapore jungles.

*Cyornis*, nobis, XII, 940. To this may be referred—

1. *C. rubeculoides*, (Vig.): *Niltava brevipes*, Hodgson, *Ind. Rev.* 1837, p. 651: *Ethereal Warbler* of Latham, and the female agrees with the supposed female of his *Blue Indian Warbler*. Inhabits all northern India, visiting the plains during the cold season. On the eastern side of the Bay of Bengal, it extends southward to the Tenasserim provinces; but in southern India is represented by the next.

2. *C. banyumas*, (Horsf.): *Muscicapa cantatrix*, Tem. Hab. Neilgherries, Java.

3. *C. elegans*, (Tem.) apud Strickland: *C. Tickellix*, nobis; *Muscicapa hyacintha*, apud Tickell, and the female—*Musc. rubecula*, Swainson. Hab. Central India.—*N. B.* The *Blue Indian Warbler* of Latham would suit this species, except that the colour of the upper-parts is stated to be deep blue, instead of light greyish-blue, brighter on the forehead and shoulder of the wing.

4. *C. unicolor*, nobis, XII, 1007. Described from the imperfectly moulted young. The adult is a larger bird than either of its congeners, a male measuring nearly seven inches long, the wing three and a quarter, and the tail three inches. Colour a light smalt-blue, approaching to verditer above; the lower-parts paler, inclining to albescent below the breast: forehead and over the eye beautiful smalt-blue, as is also the shoulder of the wing: axillaries light rufescent, and a tinge of the same on the lower tail-coverts. From Darjeeling.

5. *C. pallipes*, (Jerdon), *Madr. Journ.* No. XXVI, 15. Neilgherries.

6. ? Probably *Muscicapa rufigastra*, Raffles, *Lin. Tr.* XIII, 312.

*Ochromela*, nobis. Nearly allied to the last group; but the Fly-catcher form of bill more pronounced, and the rictal vibrissæ longer; tarsi also rather longer, the wings more rounded, and the style of colouring altogether different—bright rusty, with black cap and wings,

in the only ascertained species—*Ochr. nigrorufa*, (Jerdon), *Madr. Journ.* No. XXV, 266, v. *Muscicapa rufula*, la Fresnaye. Hab. summit of Neilgherries.

*Pratincola*, Koch. The Chats.

1. *Pr. insignis*, Hodgson, *n. s.* General aspect much that of *Pr. rubicola*, from which it differs in its far superior size, white throat, and much larger white wing-spot. Length six inches and a half, of wing three and a half, and tail two and a quarter; bill to gape seven-eighths, and tarse an inch and one-eighth. Male (in summer dress) above black; the throat, sides of the neck, upper tail-coverts, a large longitudinal patch on the wings, together with the base of the primaries and greater portion of their larger coverts, white; breast bright ferruginous, the belly white, a little tinged with the same: bill and feet blackish. The female I have not seen. From Nepal.

2. *Pr. indica*, nobis, *n. s.* Closely allied to the European *Pr. rubicola*, with which it has been hitherto confounded: but distinguishable by its longer wing, averaging two inches and three-quarters; by the greater development of the white on the sides of the neck, which nearly passes round the nape, leaving a narrow dark interval (instead of a very broad one); and by the rufous-brown of the breast being much weaker, and paling laterally, the flanks being commonly very pale, and the lower tail-coverts pure white, or rarely a little sullied with brown: in winter dress, the dorsal edgings are very whitish in old males. The females, also (judging from memory of the European species), are altogether much paler. Common throughout India.\*

3. *Pr. caprata*, (L.): *Saxicola fruticola*, Horsf.; *S. bicolor* et *S. erythropygia*, Sykes; *Motacilla sylvatica* (?), Tickell, II, 575. Common in most parts of the country, and esteemed by the natives as a cage bird; having a pleasing song, approaching to that of an English Robin, but more uniformly plaintive. It is termed by them *P'hidda*.

4. *Pr. ferrea*, Hodgson, *n. s.* A typical species, except that its tail is longer than usual in this group. Length about five inches and three-quarters, of which the tail measures two and a half; wing two inches and five-eighths; bill to gape five-eighths; and tarse seven-eighths. Upper-parts black, the feathers margined with ash-grey, the latter pre-

\* In *Ann. Mag. N. H.* 1844, p. 410, Mr. Strickland has separated the S. African species previously confounded with *Pr. rubicola*, by the name *Pr. pastor*.

dominating on the rump; lores and ear-coverts black: throat, supercilium, and wing-spot, white; also the fore-neck, but the rest of the lower-parts tinged with ashy: tail black, its feathers narrowly margined with white externally, and the outermost pair (which are half an inch shorter than the middle ones,) for the most part partially albescent. Female rather smaller, and wholly brown above, passing to ferruginous on the upper tail-coverts, and there is an admixture of this colour on the rectrices: under-parts pale brown, rufescent on the flanks and lower tail-coverts, and whitish on the throat. Bill and feet black. Common in the eastern Himalaya.

*Saxicola (?) pallida*, nobis, n. s. This bird is essentially a Wheatear; but is remarkable for its large size, long-bill, and short legs. Length nine inches; of wing four and three-quarters, and tail three and three-eighths; bill to gape an inch and a quarter; tarse the same. Colour (of female?) light isabella-grey above, more fulvescent on the tertiaries and middle tail-feathers, which are shaded with pale dusky along the middle: lores, throat, and belly, whitish; the breast-feathers dusky, with broad whitish margins concealing the dark colour within: central ear-coverts pale, the rest nigrescent: wings internally white on the anterior half, the rest dusky; above the primaries and secondaries are white at base, and the shorter primaries are also white-tipped, the white increasing in quantity to the secondaries, which are broadly white-tipped; greater wing-coverts also white-tipped, forming a bar on the wing; and the small wing-coverts margined with pale fulvescent: tail, except its two middle feathers, dusky, the outermost having its narrow outer web almost wholly white, and the penultimate a narrow white edge to its outer web. Bill pale horny; and legs also pale. Inhabits Scinde (Ullah Bund), and the specimen described was presented to the Society by the Bombay branch of the Royal Asiatic Society of London.

Of typical Indian Wheatears, may be enumerated—

1. *S. stapazina* (?), Auct. Length about six inches and a half, of wing three and three-quarters, and tail two and a half; bill to gape three-quarters of an inch, and tarse an inch and one-sixteenth. General colour pale fawn (or isabelline) above, lighter below, and tinged with greyish on the crown and nape; throat, front and sides of the neck, including the lores and ear-coverts, black; wing also black, the coverts

slightly tipped, and the tertiaries margined with whitish, disappearing in the worn plumage; a considerable whitish patch at the base of the wing, ordinarily concealed beneath the scapularies; also an ill-defined whitish supercilium continued to the occiput, and contrasting with the black adjoining it below: upper and lower tail-coverts buffy-white; and base of tail pure white, its terminal two-thirds black. Bill and feet black. Common in the Upper Provinces, Scinde, &c. If new, *S. atrogularis*, nobis.

2. *S. leucomela*, Tem. Also common in the NW. of India.

3. *S. picata*, nobis, n. s. Merely differs from the last in having the crown of the head black, instead of white. For both sexes of this and of the preceding species, the Society is indebted to Capt. Boys, who procured them abundantly on the march from Scinde to Ferozepore. The present species is figured among Burnes' drawings, from Scinde.

4. *S. leucura*, (Shaw). This, again, only differs from *S. picata* in having the whole under-parts, as far as the vent, of a uniform black with the rest. Together with (supposed) *S. stapazina*, it is common about Agra, from which locality Dr. Stewart has presented the Society with fine specimens of both.\*

*N. B.* The *Darunga Thrush* of Latham, obtained at Cawnpore in November, appears to me (judging from the description) to be a true Wheatear; and it certainly cannot be the *Merula Wardii* of Jerdon, to which that naturalist has referred it.†

Among Burnes' drawings, there is also a rude figure of what is probably *Sax. melanura*, Tem., a species described as inhabiting

\* Stephens refers this to *S. cachinnans*, Tem.; but the latter is, I believe, the species figured by Savigny (*t. v. f. i.*), which differs from *S. leucura*, as *S. leucomela* differs from *S. picata*, in having a white cap. There are thus a white-capped and a black-capped species with white belly—*S. leucomela* and *S. picata*, and ditto ditto with black belly—*S. cachinnans* and *S. leucura*.

† "Length six inches at least. General colour of the bill, legs, and plumage, black; over the eye, from the nostrils towards the nape, a whitish streak, but ceasing before it reaches the latter; breast, belly and thighs, white, also the upper tail-coverts; the greater part of the tail from the base white, the side feathers being only tipped with black for half an inch; but the two middle feathers have their ends black for an inch and a half: the wings reach to more than half on the tail. Another, said to be a female, has the head and neck to the breast, and wings, and the whole of the two middle tail-feathers, dusky brown-black; on each jaw a large patch of deep black: breast, belly, thighs, and rump, upper and under tail-coverts, white; the two middle tail-feathers black; the rest white, except for about half an inch at the end."

Arabia. If rightly identified, however, this would seem to be a very aberrant Wheatear; and its colouring is much as in the female *Siphia leucura* (p. 125 ante).

*Grandala calicolor*, Hodgson, *J. A. S.* XII, 447. This very remarkable and (the male) most splendidly coloured bird, from the snow region of the Himalaya, appears to me to be decidedly allied to the Wheatears.

*Ianthia*, nobis: *Nemura*, Hodgson (a name long pre-occupied in entomology), *Ann. Mag. N. H.* 1845, p. 198. The birds of this division are closely allied to the Robins (*Erythaca*), from which they differ in their more delicate conformation, longer wings (reaching half-way down the tail), much weaker bill, longer and more slender claws—especially that of the hind-toe, and in the sexual diversity of colouring. The males (so far as known) are deep blue above, with lighter blue on the forehead and over the eye; and in the two first species (which are typical), this colour is confined to the rump and tail of the other sex.

1. *I. hyperythra*, nobis. Length about five inches and a half, of wing three and one-eighth, and tail two and a quarter; bill to gape nine-sixteenths, and tarse an inch. Upper-parts of male deep indigo-blue, brightening to ultramarine on the forehead and above the eyes, and upon the shoulder of the wing; the wings and tail black, the feathers margined with blue externally: lower-parts bright yellowish-ferruginous, confined to a narrowish streak on the middle of the throat and fore-neck; the lower tail-coverts and centre of the belly white. Female, a rich brown above, approaching to the colour of *Erythaca rubecula*, or rather the feathers are merely tipped with this colour, shewing more or less of the cinereous-dusky tint within: tail blue as in the male, the rump a lighter and more greyish-blue; there is also a little blue on the shoulder of the wing, and a greyish-blue supercilium brightening posteriorly: lower-parts tawney-brown, or subdued fulvous, except the lower tail-coverts which are white. Bill and feet dusky in both sexes. From Darjeeling.

2. *I. rufilatus*, (Hodgson), and the female—*Nemura cyanura*, Hodgson, *Ann. Mag. N. H.* 1845, p. 198. I suspect that the female of this bird is also the *Erythaca Tytleri* of Prof. Jameson, noticed (but not described) in the 'Transactions of the Wernerian Society,' and also in the 'Edinbro' Philosophical Journal' for July 1835, p. 214, where



it is mentioned to agree in the grouping of its colours with the Robin of Europe, but in the form of the bill to present as it were a link between the genera *Erythaca* and *Phœnicura*. The *Motacilla cyanura*, Gmelin, from Siberia, may refer to the female of either this or the preceding, or to that of some other equally allied species. Size and proportions of last, save that the tail is a quarter of an inch longer. The male has the upper-parts Prussian-blue, brightening and inclining to ultramarine upon the sides of the forehead over the eyes, on the shoulder of the wing, and on the rump: lower-parts white, confined to a narrow streak on the throat and fore-neck, but the flanks bright ferruginous: bill blackish, and legs dark brown. The female has the upper-parts uniform brown, with a trace of blue on the shoulder of the wing, a supercilium greyish-blue posteriorly, and russet margins to the tertaries; tail blue as in the male, and the rump lighter and more greyish-blue: middle of belly, lower tail-coverts, and median line of throat, white; and the flanks bright ferruginous as in the other sex. This ferruginous colour of the flanks, with the hue of the upper-parts, produces a certain resemblance of colouring to the Robin of Europe, sufficient to have elicited the remark of Prof. Jameson. Inhabits the Himalaya generally, at least from Simla to Darjeeling.

3. *I. flavolivacea*, (Hodgson). I have little doubt that this is a female bird, distinguished from the females of the two preceding species by having no blue on its rump or tail. The tarse is longer than in the others, measuring an inch and one-eighth; wing two inches and seven-eighths; total length five and a half, of which the tail is two and a quarter. Upper-parts uniform brown, the loreal region and throat rufescent-white, and rest of the under-parts dilute rusty: bill dusky, the base of the lower mandible pale; and the legs pale. Described from Mr. Hodgson's only specimen.

*Ruticilla*, Brehm: *Phœnicura*, Swainson. The Redstarts. Of the typical members of this genus, the European *R. phœnicurus* was obtained by the late Sir A. Burnes on the banks of the Indus.\*—2. *R. erythrogastra*, (Gould.): *Motacilla aurorea*, Pallas; *Ph. Reevesii*, Gray, described in XII, 963. Inhabits Nepal and Assam, and extends from the Caucasus to Japan (as I am informed by Mr. Strickland, who also favoured me with its synonymes as here given).—3. *R. leucoptera*,

\* The other European species, *R. tithys*, is common in Afghanistan.

nobis, XII, 962. This Malayan Redstart has lately been received by the Society from Java, two males and a female, so that it will probably have been named by M. Temminck :\* the female is plain brown above, paler beneath, with rufous tail, and the same great white wing-spot as in the male.—4. *R. ceruleocephala*, Vigors: a typical species, but remarkable for not having the tail rufous as in the others. Himalaya.—5. *R. atrata*, (Latham): the only Redstart which is diffused generally over the country.—6. *R. frontalis*, Vigors: apparently the most common of the Himalayan Redstarts, from Simla to Darjeeling; and remarkable for its terminal black tail-band.—7. *R. fuliginosa*, (Vigors), v. *plumbea*, Gould. Rather an aberrant species, with small short bill; and presenting a singular diversity in the plumage of the sexes,—the male being uniform dusky-grey, with dark ferruginous tail and coverts,—the female paler ashy, with whitish lower-parts, each feather margined with the colour of the back, and no rufous on the tail, which is white at base, extending over nearly the whole of its outermost feathers, and its upper and lower coverts also being pure white. From the Himalaya generally, and said to resemble the next species in its habits.

8. *R. leucocephala*, (Vigors and Gould), v. *Sylvia erythrogastra*, var. A, Lath., is the type of Mr. Hodgson's *Chæmorrhous*. The sexes are similar; but I can perceive no structural distinction from the true Redstarts. This remarkable and beautiful species is stated, however, by Mr. Hodgson to differ considerably in habit from the latter, keeping always about mountain torrents; and Captain Hutton writes me word, that it is very common in the valley of the Dhoon, and also in the hills along the banks of streams and rivers, "fitting from rock to rock and stone to stone, and eternally shaking its tail and spreading it by turns." The last is a characteristic peculiarity of the true Redstarts; and Lord A. Hay, who has obliged me with a similar account of the habits of this bird, sees nothing in them at variance with the generic habits of other *Ruticilla*.

*Calliope*, Gould. The type of this group is the very Thrush-like (in structure and habits) *C. cautechathensis*, (Gm.), v. *C. Lathami*, Gould, and *Motacilla calliope*, Pallas. This bird is common in Lower Bengal during the cold season, and occurs in central India. A second

\* Unless, as is not improbable, M. Temminck considers it to be a mere "climatal or local variety" of *R. phænicurus*.

species, with less firm plumage and rounder wings and tail, is *C. pectoralis*, Gould, figured by that naturalist in his *Icones Avium*: from the Himalaya. A third, referred by Mr. Jerdon and myself to this group, is *C. cyana*, v. *Larvivora cyana*, Hodgson, and *Phanicura superciliosus*, Jerdon. Also from the Himalaya; and once obtained by Mr. Jerdon in the Neilgherries, and once by myself near Calcutta. In the Himalaya I am informed that it is common.

*Larvivora brunnea*, Hodgson, VI, 102, is probably but the female of *C. camtschatkensis*; and *C. oruralis*, nobis, XII, 933, is a typical *Brachypteryx*.

*Tarsiger chrysæus*, Hodgson, *Ann. Mag. N. H.* 1845, p. 198, and doubtfully referred to *Sericornis* of Gould, in XIV, 549, comes next in order:—and then the *Cyanecula suecica* (?), or Blue-breast, common in most parts of India; but whether absolutely identical with the European bird, I have some doubt, as its pectoral spot is always rufous instead of white. Can it be the species nearly allied to *suecica* mentioned by the Prince of Canino, in *Lin. Trans.* XIV, 754? *Cyanecula* has been merged in *Ruticilla* (v. *Phanicura*) by many authors, though it has little in common with that genus beyond the rufous on its tail. The typical Redstarts are sylvan birds, frequenting high trees, especially in rocky places or about buildings, and fond of singing from the topmost sprays; but which occasionally descend to the ground to feed, hopping about in the manner of a Robin. The Blue-breasts, on the contrary, affect the open country, where there are no trees, and especially reedy places, or plantations of sugar-cane, or growing corn or high grass, or ground covered with the broad leaves of cucurbitaceous plants; and there they are seen generally on the ground, running with alternate steps like a Pipit or Wagtail, and occasionally spreading wide the tail, displaying its rufous base to advantage; seldom perching, but flitting before you as you advance, and disappearing among the low cover; but soon coming forth when all is still, yet without absolutely quitting the shelter of the herbage by going more than a few paces from it. In Lower Bengal, these birds are extremely common in suitable situations. The Indian species is the *Blue-necked Warbler* of Latham, and his *Sylvia sperata*, var. A, is probably the female.

The following three genera are closely allied.

*Sylvania*, nobis. General characters of *Callene* (formerly *Cinclidium*, nobis, XI, 181\*); but the bill much slenderer and straighter, resembling that of *Calliope camtschatkensis*, whereas the bill of *Callene* more resembles that of *Copsychus*, and especially *Notodela*.

*S. phoenicuroides*, (Hodgson).† Length about seven inches and a quarter, of which the middle tail-feathers measure three and a quarter, the outermost nearly an inch less; wing two inches and seven-eighths; bill to gape seven-eighths; and tarse an inch and one-eighth. Upper-parts uniform dark cyaneous, or deep slaty-blue, less deep however than in *Callene frontalis*, or *Brachypteryx montana*; the lower similar but rather paler, passing into white on the middle of the belly; the winglet feathers are also tipped with white: tail black, all but its middle pair of feathers ferruginous for the basal half: bill dusky; and legs brown. Female rather smaller, and wholly brown above, paler brown below, passing to albescent along the middle of the belly; a slight tinge of rufous, but undefined, at the base of the caudal feathers. Inhabits Nepal.

*Callene (olim Cinclidium) frontalis*, nobis, figured in XII, 1010. This form differs from the next in its larger and stronger bill, more developed tail, and the somewhat scale-like character of its plumage;‡ but in other respects is hardly separable.

*Brachypteryx*, Horsfield. The Society having been favoured by the Natural History Society of Batavia with specimens of *Br. montana* and *Br. sepiaria*, Horsf., of Java, I am enabled to approximate very closely to the former species (which is the type of this genus,) the *Calliope ? cruralis*, nobis, XII, 933, which merely differs from *Br. montana* in its somewhat smaller size, the absence of the mass of erect soft blackish plumelets on the forehead, and in the concealed white streak over the eye being continued forward to the nostrils. A second Indian species exists in the *Phaenicura major*, Jerdon, of the Neilgherries, which, however, is less typical, and has the tail considerably more developed. *Br. sepium*, Horsfield, pertains to my genus *Alcippe*, as suggested in XIII, 284, and is very nearly allied to *A. poiocephala*, (Jerdon), and some

\* The name *Cinclidium* was pre-applied in Botany to a genus of mosses.

† Mr. Hodgson refers this bird to *Bradyterus* of Swainson.

‡ Even this, however, occurs on the under-parts of *Br. cruralis*.

others. Lastly, Mr. Eyton, as noticed in XVII, 10, has recently assigned three Malacca species to *Brachypteryx*, all of which I had previously described and referred to *Timalia*, in which genus I would still decidedly retain them; and another of my *Timalia* he has classed in his *Malacopteron*, while he refers also to *Malacopteron* an unquestionable Bulboul, my *Ixidia cyaniventris*: *Br. nigrocapitata*, Eyton, *P. Z. S.* 1839, p. 103, has more the technical features of true *Brachypteryx*; but its affinities would seem to be rather with the *Malacopteron* series.

To *Brachypteryx* must also be approximated the curious little birds first classed by Mr. Hodgson under his *Tesia*, and of which he has since made two genera—*Pnoëpyga* and *Oligura*, in *Ann. Mag. N. H.* 1845, p. 195. These I have also treated of in XIV, 586; and if the two sub-groups are to be separated, the name *Tesia* must be retained in lieu of *Oligura* for the one section (this containing the species at the head of those first described under that name), while *Microua* of Gould (unless pre-occupied)\* must stand for *Pnoëpyga*, Hodgson, inasmuch as it was long previously applied to the same special group.† Three of the species referred to *Pnoëpyga* by Mr. Hodgson are merely varieties of one species, as shewn in XIV, 586.

*T. (v. Oligura) auriceps*, Hodgson, *n. s. (Non vidi.)* "Above flavescent-olive, below pure deep slaty; the cap golden-yellow: bill coral-red below, dusky above: legs dusky flesh-colour. Length three inches and a half; bill six-tenths of an inch; tail nine-tenths; wing an inch and two-tenths; tarse an inch; central toe and nail seven-tenths; head five-tenths. Hab. Sikim. The bill of this bird is depressed; rictus hispid; lateral toes unequal, the hind large; and nails acute: by all which marks, in common with *T. cyaniventer* and [*castaneo-coronata*, v.] *flaviventer*, the type is proved to be different from [*Microua*, v.] *Pnoëpyga*." Hodgson's *MS.*

\* It is, I find, pre-occupied by Ehrenberg, for a genus of *Vermes*.

† *Aipenumia* of Swainson, described in the Appendix to Vol. II of the *Fauna Americana-borealis*, certainly refers to these birds, comprehending, I think, both groups; and it is of prior application by many years to the other names: but which of the sub-groups it should be retained for is uncertain, as Mr. S. refers to undescribed species only. *Tesia* of Hodgson, as originally proposed, would in such case be quite synonymous; and if *Aipenumia* be restored, it might therefore be substituted for *Tesia* in the more limited sense of the latter appellation.

Whether the genus *Horeites*, Hodgson, should accompany *Tesia* and *Microua* in the approximation of these latter to *Brachypteryx*, will admit of considerable doubt.

From the *Brachypteryx* series, we might now pass to what have been called the Myiotherine birds; and thence by the vast series of forms comprised under Swainson's *Crateropodinae*: but some important groups must intervene; and, first, the four following allied genera—

*Notodela*, Lesson. This, I very strongly suspect, is identical with *Muscisylvia*, Hodgson, *Ann. Mag. N. H.* 1845, p. 197.\* The beak, and even the colouring of the head, of the Himalayan species very closely resemble those of *Callene frontalis*; but the rest of the structure approximates these birds to the *Dhyals* (*Copsychus*), and even the beak merely differs in being smaller. To particularize further, the general structure is that of *Copsychus*, but less robust, with a nearly square tail, of which the outermost pairs of feathers graduate but slightly: the bill is smaller, and the tarsi and toes are more slender, than in *Copsychus*, with longer and more gracile claws, especially that of the hind-toe: wings reaching half-way down the tail, and having the fifth primary longest, the first about two-fifths the length of the fifth, and the second, third, and fourth, graduating in a successively decreasing ratio. If correctly brought together, two species will have been ascertained.

1. *N. diana*, Lesson, *Zool. du Voyage de M. Belanger*: respecting which I quote the following from my notes, not having the work to refer to. Length eight inches; bill to gape eight lines; and tarse ten lines. Plumage deep brownish-blue, relieved on the forehead by a satiny-white crescent. From Pegu.

2. *N. leucera*, (Hodgson). Length about seven inches and a half, of wing three and three-quarters, and tail three and a quarter; bill to gape seven-eighths, and tarse an inch; hind-toe three-eighths of an inch. General colour dark blackish indigo-blue; the forehead and over the eyes, and the shoulder of the wing, bright smalt-blue; alars and caudals dull black, except the basal portion of the external web of the three tail-feathers on each side next to the outermost feathers, the quantity of this white increasing outwardly: a concealed white spot on the sides of the neck in the male: bill and feet black. According to

\* This name is, besides, too like *Muscivora* of Lesson.

Mr. Hodgson, it "inhabits the mountains solely: is chiefly arboreal: and feeds on caterpillars, grubs and soft insects, and equally on pulpy berries."

*Copsychus*, Wagler; *Dahila*, Hodgson. The *D'hyals*. Of this genus, the Bengal and common Indian species is *Gryllivora intermedia*, Swainson, and *Dahila docilis*, Hodgson, *As. Res.* XIX, 189. In this the females have, constantly, the whole upper-parts glossy ash colour, blackening on the middle tail-feathers; while the females of the two following have, as invariably, the upper-parts glossy black, though less intense than in the male, and passing to blackish-ashy on the forehead; now this latter agrees with Edwards' description of the female of his 'Little Indian Pie,' which, however, he adds, was sent from Bengal; and upon Edwards' figure is founded *Gracula saularis* of Linnæus. Perhaps, therefore, it will be as well to consider the Bengal bird as *C. saularis*, (Lin.), in conformity with recent systematists. The Ceylon D'hyal would seem to be *Gryllivora brevirostra*, Sw., having a rather smaller bill than that of continental India, and the males of both have the four outer tail-feathers on each side white, the fourth, however, having commonly some slight admixture of black, while in the females the fourth has, generally, even more black than white. The Malayan D'hyal is *Gr. magnirostra*, Sw., having a conspicuously larger bill than in the others, and never more than the tip of the fourth tail-feather white, and a good deal of black often on the third. It will range as *C. mindanensis*, (Gm.), v. *Turdus amœnus*, Horsf., and *Lanius musicus*, Raffles. Mr. Swainson also describes a *Gr. rosea*; respecting which Mr. Strickland writes me word, after examining Swainson's original specimen, that it "is certainly only *C. mindanensis* (v. *magnirostra*, Sw.), with plumage slightly stained by some rufous material, probably the red soil of some locality."

*Kittaocincla macrourus*, (Gm.), Gould: *Gryllivora longicauda*, Swainson. The Shámah. This splendid singing bird seems to be common in the hill jungles of Central India, and those at the foot of the Himalaya; and it is especially numerous in the territories eastward of the Bay, and in the Malay countries generally: but in the south of India it is somewhat rare.

*Thamnobia*, Swainson: *Saxicoloides*, Lesson. There are two species of this genus: that of Upper India, *Th. cambaiensis*, (Lath.), the

female of which is *S. erythrurus* of Lesson, has constantly the head and upper-parts of the male olive-brown; while in that of Southern India, the head and upper-parts of the male are shining deep black, the same as the under-parts,—this latter being *Motacilla fulicata*, Lin., *Ananthe ptygmatura*, Vieillot, *Th. leucoptera*, Swainson, *Rusty-vented Thrush*, and the female—*Sylvia fulicata*, var. A, of Latham. The females of the two species are, however, undistinguishable; and I have observed that the younger males of *Th. fulicata* have the upper-parts more or less brown, as in the northern species, the head more especially; but the dorsal plumage (so far as I have seen) is always shining black underneath, and the brown edgings are cast after a while, leaving a more or less perfect black surface. The northern species, on the contrary, has no black on the interior of its feathers. This bird is the *Motacilla fulicata* of Tickell's list, and it abounds in all Upper India: I have never seen it from below the Rajmahl hills in Bengal, but it is common in the Midnapore jungles.

We may now venture on the great series of Indian Thrushes, which are as follow :

*Zoothera*, Vigers, *Proc. Zool. Soc.* 1831, p. 172.

1. *Z. monticola*, Vigers, *ibid.*; Gould's 'Century,' pl. XXII. The figure cited of this bird is faulty, making the body appear much too large; the legs and toes are also represented too stout and *terrene* in their character; and even the beak is incorrectly drawn, being too deep at base, instead of the culmen rising from the base and becoming deepest about the middle. In the young, the bill is not longer than that of an ordinary Thrush, but there are indications of its future form; and the plumage of the nestling much resembles the corresponding garb of an English Blackbird. In fact, the *Zoothera* is merely a stout Thrush allied to the *Oreocincla* of Gould, with a strangely overgrown bill; but this could never be inferred from Gould's figure of it. A specimen from Arracan is perhaps distinct, or it may be only the ordinary female: it differs from several Darjeeling specimens (males?) in its rather smaller size and less developed bill, in the olive-brown hue of its whole upper-parts, in having a distinct whitish loreal streak and much intermixture of the same upon the ear-coverts, and in the feathers of the under-parts being whitish with a broad olive-coloured border, surrounding the feather more or less according to the part. Inhabits the Himalaya; and



if that of the Arracan mountains prove identical, as is most probable, it may be expected to occur likewise in those of Assam, Munneepore, Sylhet, &c.\*

*Oreocincla*, Gould, P. Z. S. 1837, p. 145. The more characteristic species of this group make a very close approach to the preceding, inasmuch that there is hardly any difference between the bill of the Arracan specimen of presumed *Z. monticola* above described, and that of a Neilgherry near ally to *O. varia*, except that in the latter the culmen scarcely ascends from the base, while in other specimens of *Oreocincla* it distinctly ascends. Again, *O. macrorhyncha*, Gould, (P. Z. S. 1835, p. 145), from New Zealand, is described to be nearly allied to *O. varia*, from which it differs "in the much larger size of the bill, and in the deeper black colouring of the margins of the feathers;" so that it is even probable that the dividing line cannot be drawn between the two groups, especially as the black margins to the feathers of the upper-parts, which are especially characteristic of most of the *Oreocinclæ*, do not occur in all of them, as for example the species which I introduce next.

2. *O. mollissima*, nobis, XI, 188: *O. rostrata*, Hodgson, Ann. Mag. N. H. 1845, p. 326. In some specimens of this bird, the beak appears abnormally grown out, and altogether coarser than in that which I originally described; and Mr. Hodgson's *O. rostrata* is founded upon an example of the kind: but I have recently examined a fine series of specimens, which has shewn their identity beyond a doubt. They commonly measure from ten to eleven inches in total length; and some have the wing-coverts broadly tipped with pale fulvous of which no trace occurs in others. Common in the vicinity of Darjeeling.

3. *O. neilgherriensis*, nobis, n. s. This species was originally sent me by Mr. Jerdon as the *Turdus varius* of his catalogue, which latter he has lately referred to *O. dauma* (*Madr. Journ.* No. XXXI, 127); but he has since obtained additional examples of the present species, which is conspicuously distinct from *O. dauma*. From the Javanese *O.*

\* A second specimen from Arracan accords with the above description, except that its size is fully equal to that of the Himalayan bird; its beak, however, being rather smaller. This disposes me to the opinion that it is distinct, in which case I propose for it the name *Z. marginata*. One or the other of these birds was procured by Dr. McClelland in Assam; apparently the Arracan species, to judge from the drawing.

*varia*, it differs (judging both from recollection of Javanese specimens and from comparison with Dr. Horsfield's figure,) in having much shorter and smaller tarsi. The plumage would, however, appear to be the same: and the beak is particularly long and coarse, having absolutely the character of *Zoothera* but little subdued. Length about ten inches, of wing five and a quarter, and tail three and a half; bill to gape an inch and a half, and tarse but an inch and one-eighth; middle toe and claw one and a quarter: the first primary an inch and three-eighths, and the second three-eighths of an inch shorter than the third, fourth, and fifth, which are equal. From the Neilgherries.

*O. varia*, (Horsfield,) *Lin. Trans.* XIII, 149; *Zool. Res. in Java*, with coloured figure. Malay countries.

4. *O. dauma*,\* (Lath.), Strickland, in *epistola: Turdus Whitei*, Eyton; *O. parvirostris*, Gould, *P. Z. S.* 1837, p 136 (a small female). From the numerous specimens which I have seen, I feel convinced that Mr. Gould's *O. parvirostris* may be referred as above. The species appears to be common in the Himalaya, and can hardly be considered rare in Lower Bengal during the cold season, when it is generally met with among bamboos. It also occurs in central and southern India: and, as a rare and accidental straggler, has been met with in South Britain and Ireland, and some other parts of the west of Europe. The beak of *O. dauma* is that of an ordinary *Turdus*, and its colouring only refers it to the present group.

5. *O. spiloptera*, nobis, *n. s.* Length about eight inches and a half, of wing four inches, and tail three and a quarter: bill to gape above an inch, and tarse an inch and a quarter. Colour uniform rich olive-brown above, inclining to tawney; below white, with black spots nearly resembling those of the Missel Thrush: middle of throat, lower abdomen, vent and lower tail-coverts, spotless: wing-coverts black, margined more or less with the hue of the back, and each conspicuously tipped with a pure white spot. Bill blackish, and very robust: the tarsi brown and slender. Inhabits Ceylon.

*Turdus*, L., as restricted.

6. *T. viscivorus*, Lin. The European Missel Thrush is common in the N. W. Himalaya.

\* Intended for *Dama*, the Hindoostanee equivalent for *Thrusa*.

7. *T. atrogularis*, Tem. : *T. Naumanni* apud nos, XI, 189 : *Rychill Thrush*, Lath., the female. Common in the Himalaya, and I have also seen it from Tipperah.

8. *T. Naumanni*, Tem. A very rare species in the Himalaya. The following appears to be the female. Length about eight inches and a half; of wing five inches, and tail three and a half; bill to gape an inch and one-eighth; and tarse the same. Upper parts ruddy-brown, the crown and ear-coverts dusky, with a whitish supercilium as in *T. iliacus*; throat and middle of belly white, the feathers of the sides of the throat marked with a dusky medial line, and the breast and flanks brown, with a pale margin to each feather; sides of the neck below the ear-coverts whitish; the under-surface of the wing chiefly buff, with the fore-part and the axillaries ferruginous: bill yellow with dusky tip; and legs brown. From Chusan, where collected by Dr. Playfair, Surgeon of the Phlegethon War Steamer, and presented to the Society by Dr. McClelland.

9. *T. ruficollis*, Pallas. Nearly allied to *T. atrogularis*, from which it differs in having the fore-neck and breast, supercilium, fore-part of the under-surface of the wing, and the tail except partially at tip, ferruginous; lores, under the eye-streak, dusky; and under-parts below the breast white, a little sullied with light brown. In what appear to be the females, the throat is albescent, with rufous lines, and striæ of dusky spots on each side; the eye-streak also is whitish; the ferruginous colour of the breast weaker, with pale terminal margins to the feathers; and there is more dusky and less rufous on the tail. Bill dusky, with more or less yellow at the base of the mandibles, the lower being sometimes chiefly of this hue: and legs pale brown. Length about ten inches, of wing five to five and a half, and tail four inches; bill to gape an inch and one-eighth, and tarse one and a quarter. Inhabits the Himalaya.

*T. javanicus*, Horsfield, *Lin. Tr.* XIII, 148 : *T. concolor*, Tem., *p. c.* Java. This and *Oreocincla varia*, are the only true Meruline species included in Dr. Horsfield's long list of Javanese *Turdi*.

10. *T. rufulus*, Drapiez, *Dict. Class. d'Hist. Nat.* X, 443 : *T. modestus*, Eyton, *P. Z. S.* 1839, p. 103. Length eight and a half to nine inches, of wing four and a half to five inches, and tail three and a quarter to three and a half; bill to gape an inch; and tarse one and

a quarter. Upper-parts greenish olive-brown, with a dull whitish supercilium; chin, and generally the medial portion of the throat, with the belly and lower tail-coverts, white; breast and flanks brownish-fulvous, brighter in old males; the throat and fore-neck streaked laterally with olivaceous, which in some specimens crosses the breast above the fulvous hue, and is more or less ashy; others again, evidently the old males, have the entire crown and neck all round, of a dusky-ash colour, mingled with white on the middle of the throat. Bill dusky above, the basal two-thirds of the lower mandible yellow; and legs pale brown. The wings of this species are firm and acuminate, and the tail also is firm. It inhabits the eastern coast of the Bay of Bengal, from Arracan to the Straits of Malacca, becoming more numerous southward; and M. Drapiez mentions having received it from Java, where it is a periodical visitant, and named (as he informs us) *Striée*.

11. *T. unicolor*, Tickell, *J. A. S.* II, 577; also of Gould, *P. Z. S.* 1837, p. 136. Length about nine inches, of wing four inches and five-eighths, and tail three and a half; bill to gape above an inch; and tarse exceeding an inch and one-sixteenth. Colour uniform dark ashy above, paler below, and passing to white on the belly and lower tail-coverts; a tinge of rufous on the fore-part of the wing underneath. Bill yellow; and legs duller yellow. Capt. Tickell describes the female to be "dirty-grey, mixed on the back with olive, tinged on the head with brown. Wings and tail brownish; coverts of tail iron-grey; breast isabella-grey, belly white." What Mr. Gould describes as the young, appears to me to be the female of the next species: and he also states the bill and legs to be livid fuscous: the length of wing he gives, "three inches and a quarter," must be a misprint for five and a quarter; though that would exceed, by more than half an inch, the length of wing of the only specimen before me. The species inhabits the Himalaya chiefly, but occurs sometimes in central India.

12. *T. dissimilis*, nobis: *T. unicolor* et *T. modestus*, nobis, *passim*, as in XI, 460, &c.: *Calcutta Thrush*, Latham, the female. This bird, as well as the preceding one, is very closely allied to the succeeding group, *Geocichla*; and the mature male of the present species has the whole under-parts from the breast, except the medial line of the belly and the lower tail-coverts, which are pure white, of the same bright ferruginous colour as in *G. citrinus*, *G. cyanotus*, &c.

An approach to the same colouration is exhibited by old males of *T. rufulus*. The female, however, shews no sign of this except on the axillaries, and on more or less of the under-surface of the wing : yet, before obtaining the male, I had perceived the affinity of this species for the *Geocichla* ; and it is curious that I procured some eight or ten in the feminine plumage (whether all females, however, I cannot say, for some were only skins), before I succeeded in getting a male, which, as I all along suspected, proved to be clad in not quite so homely a garb as his mate. The male is, indeed, rather a handsome Thrush. Length nine inches, by fourteen and a quarter in spread of wing ; closed wing four and a half ; tail three and one-eighth ; bill to gape an inch and one-eighth ; tarse the same. Colour of the upper-parts plain olive-brown in both sexes, with ashy beneath the surface of the feathers, tending a little to predominate about the rump ; throat, middle of belly, and lower tail-coverts, white ; the sides of the throat with dusky linear spots, more or less diffused, and some often appearing in the middle ; breast light olive-brown, with a few dusky spots, sometimes small and triangular, sometimes larger and more linear ; and the flanks spotless olive-brown in the female, and perhaps in the juvenescent male, but in the old male bright ferruginous, spreading to the white medial line of the abdomen. Beak dusky, with generally some intermixture of yellow ; and legs bright yellowish-brown. As in the *Geocichla*, the bill of a fresh specimen of this species is usually much clotted with mud ; and the bird, like them, is mostly seen on the ground, hopping about among the underwood. It is not rare in Lower Bengal during the cold season. Mr. Jerdon has lately obtained it in the south : and it often occurs in collections from the Himalaya.

*Geocichla*, Kuhl.

13. *G. cyanotus*, (Jardine and Selby), *Ill. Orn.*, 1st series, pl. XLVI. Common in the Indian peninsula.

14. *G. citrina*, (Lath.) : *Turdus Macei*, Vieillot ; *T. lividus*, Tickell, *J. A. S.* II, 577 ; *T. rubecula* apud Horsfield, *P. Z. S.* 1839, p. 161. Bengal, Nepal, Assam, Arracan, Central India. A very common species. The young, received from Darjeeling, has the upper-parts dull olive, with a pale rufescent central streak to each feather ; head and neck dull rufous, the feathers centred brighter, except towards the fore-

head ; under-parts light rufescent, deeper on the breast ; and wings and tail as in the adult, but the feathers centred and margined with rufous.

*G. innotata*, nobis, n. s. Resembles *G. citrina*, but has the ferruginous colour of the head and under-parts, and the ash-colour of its upper-parts, much more intense ; no white upon the wings ; and the lower tail-coverts only (not the vent) are white. From the Malayan Peninsula. What I take to be two females of the same species, from the Nicobar Islands, have the throat white, and some white at the sides of the vent ; the wings, rump, and tail, only, are deep ashy, the back and scapularies being olive-green, much as in the female of *G. citrina*. These are also smaller than the Malayan bird, the wing being but four inches, and the rest in proportion ; whereas the Malayan (supposed) male has the wing four inches and a half. Should the Nicobar bird prove distinct, it might stand as *G. albogularis*, nobis.

*G. rubecula*, Gould, P. Z. S. 1836, p. 7. It is not very clear, from Mr. Gould's description of this Javanese species, in what it differs from *G. citrina* ; except that he states the tarse to be an inch and a half long, instead of one and a quarter, and that the tail is but two inches and a half, instead of three inches ; but from the difference of locality, it will most likely prove to be distinct. Four well marked species of this group are, as Mr. Gould informs us, in the Zoological Society's Museum ; and *T. rufovariegatus*, Drapiez, *Dict. Class. d'Hist. Nat.* X. 465, would seem to belong to it.

*Merula*, Ray.

15. *M. Wardii*, Jerdon, J. A. S. XI, 882 ; Jerdon's *Ill. Ind. Orn.*, pl. VIII. The bird described and figured as above, is the male. The female is very differently coloured, and a specimen was sent by Mr. Hodgson by the name *Oreocinclæ? micropus*. The Society has also since received a female from Southern India, and a male from Almorah ; so that all doubt is removed concerning the identity of the Himalayan bird with that of Travancore, &c. The sexes of this species present the usual diversity observable in most of the black Merles, (as the British *M. vulgaris*, &c.), only somewhat further carried out ; and this particular difference of the sexes confirms the propriety of its allocation in *Merula*, which group, as I formerly remarked, it tends to connect with *Oreocinclæ*. The male is black, with white eye-streak

and under-parts from the breast, except the feathers of the flanks which are only margined with white; and, besides a white wing-patch under the scapularies, the wing-coverts and tertiaries are tipped with the same, and the secondaries and middle tail-feathers, with the upper tail-coverts, more slightly, the rest of the tail-feathers being successively more deeply so tipped, increasing in amount to the outermost. The female has the upper-parts brown instead of black, with slight whitish tips to the upper tail-coverts, and less white on the tail-feathers, which is also less pure; the wing-coverts are each tipped with a triangular spot of fulvous-white, and the tertiaries more slightly; the supercilium is also fulvous-white, and the entire under-parts, except the lower tail-coverts which are purer white, a little variegated with dusky; while the feathers of the throat, breast, and flanks, are each tipped with a transverse dusky spot, more or less triangular on those of the breast; axillaries chiefly pure white: bill and legs yellowish. In fact, if we except the eye-streak and the mottlings of the wings and tail, and also its smaller size, the female of this species resembles a good deal a pale and spotted-breasted hen English Blackbird. It seems to be far from being a common species in this country, though met with from the Himalaya to Travancore.

16. *M. bouboul*; *Lanius bouboul*, Lath.: *Turdus pæcilopterus*, Vigors, *P. Z. S.* 1831, p. 54; Gould's Century, pl. XIV. The black of this species is never so uniformly deep as in the European Blackbird, the under-parts of the old male being more or less brownish: in younger males, there is also a brown tinge above; the rump and upper tail-coverts incline to ashy, and the lower-parts may be termed fuscous-brown: the wing-mark, too, is more albescent in old birds, thus contrasting stronger with the black of the rest of the plumage; while in younger specimens it is much browner. The brown colour of the females is more uniform than is represented on Gould's plate, and the wing-mark is certainly never of the decided rufous hue which is there laid on, having but a faint rufescent tinge, with the margins of the outer coverts dull albescent to a greater or less extent. In the spotted nestling garb, the sexes are already easily distinguishable, from the much darker tone of colouring in the males: besides that, in all the Thrush tribe, the great alars and caudals first put forth resemble in colouring, size, and firm texture, those of the adults, being not shed at the first

moult. This is the common Himalayan Blackbird of the lower ranges, or what is termed the sub-Himalayan region.

17. *M. albocincta*, (Royle); figured by the name *albicollis* on Royle's plate, which name was previously applied by Vieillot to a Brazilian species: *Turdus collaris*, Sorel, *Rev. Zool.*, 1840, p. 2. Size and proportions of the last species: the male black, tinged with brown underneath; throat and fore-neck white, surrounding the ear-coverts, and forming a broad collar round the neck: bill yellow, with dusky tip; and legs yellowish. Female brown, paler below; the collar greyish-brown, and throat white with some dusky spots, and a line of the same from the corner of the lower mandible. The White-collared Blackbird is confined to a greater elevation on the Himalaya than the preceding species.

18. *M. nigropileus*, (de la Fresnaye); described in M. Adolphe Delessert's *Souvenirs d'un Voyage de l'Inde*, Pt. II, p. 27. Length about ten inches, of wing five, and tail four; bill to gape an inch and a quarter, and to forehead an inch; and tarse an inch and three-sixteenths. Cap, including lores and cheeks, black; chin washed with the same: the back and rump, wings, and tail, dark fuscous-ashy, tinged with brown on the interscapularies: the neck all round, and the underparts, ashy-brown, paler on the belly, and passing to white at the vent: under tail-coverts mingled white and ashy: bill, and apparently round the eye, yellow; and legs yellowish-brown. Female altogether paler, the white of the vent spreading over much of the abdominal region, and the cap dusky-brown instead of black. Inhabits the Neilgherries, and is occasionally met with on the eastern ghats.

19. *M. brachypus*, nobis: *Black-crowned Thrush*, Latham, from Ceylon. This bird is almost exactly similar to the female of the last, except that the dark cap is less pronounced, and the abdominal region and under tail-coverts are merely pale: but the tarse is remarkably short, not exceeding an inch; and the tail is perfectly squared, whilst in *M. nigropileus* its outermost feathers are three-eighths of an inch shorter than the middle ones. These two characters are so marked that I have no doubt of its distinctness. It was obtained, I believe, in the Neilgherries, by Mr. Jerdon.

20. *M. simillima*, (Jerdon), *Madr. Journ.* No. XXV, 253. Smaller than the English Blackbird, with longer bill, and yellow legs: the



black of the male much less deep, and tinged with ashy; and the lower-parts paler and brownish. Female paler and browner, as usual, passing to ashy on the rump and upper tail-coverts, and with the lower-parts still lighter-coloured. Proportions of *M. nigropileus*, but the tail-feathers broader and considerably less firm towards their tips; the beak is also conspicuously longer, measuring to gape an inch and three-eighths: and the colouring is much the same as in *M. nigropileus*, but the contrasting ashy and brown are softened down almost to homogeneity. Inhabits the Neilgherries; being the species referred by some authors to the European Blackbird, which it resembles in its song: the latter species is common in Afghanistan.

21. *M. castanea*, Gould, *P. Z. S.* 1835, p. 185. Length about eleven inches, of wing five and a half, and tail four inches; bill to gape one and a quarter, and tarse the same. Colour a bay-chesnut, darkening on the interscapularies, and paler below; the head and neck grey, darker on the crown, and albescent on the throat and fore-neck; wings dusky, the tertiaries partly margined with brown; and the tail blackish, its lower coverts mingled deep black and white: bill yellow, and legs yellowish. The female has all the colours less intense, the wings and tail brown, and the lower tail-coverts mingled brown and white: bill chiefly dusky. Himalaya. This species is nearly allied to *M. albocincta*.

22. *M. leucogaster*, nobis, *n. s.* I only know this from a well executed drawing prepared by the late Dr. Griffith, during his journey from Assam to Ava, and now in the possession of Dr. McClelland: there can be no doubt of its distinctness as a species. Colour slaty-black, the lores, throat, fore-neck, and breast, deep black, and the belly dull white. Length about nine inches and a half, of wing five and a quarter, and tail above four inches; bill to gape an inch and a quarter, and tarse the same.

*Petrocincla*, Vigors. Rock Thrushes.

23. *P. erythrogastra*, (Vigors), *P. Z. S.* 1831, p. 171; Gould's 'Century,' pl. XIII: *P. rufiventris*,\* Jardine and Selby, *Ill. Orn.*, 1st series, pl. CXXIX. The two figures here cited shew what different representations may be made of the same species, provided the true

\* There is also a *Turdus rufiventris*, Vieillot, from Brazil.

colouring be not rigorously adhered to: thus Mr. Gould has coloured it with a black throat and fore-neck, adding a slight gloss of blue; and the other naturalists cited have coloured these parts entirely blue, with a white margin separating them from the blue of the rest of the neck. Now the true colouring of the throat and fore-neck is a dull blue, with occasionally a medial rufous patch on the latter, and the feathers being margined with pale greyish; the latter accounts for the white border assigned by Sir W. Jardine and Mr. Selby: again, the latter naturalists have coloured the tail much too blue, and have also exaggerated the edgings of the wing-feathers, which edging might indeed be erased altogether: the back, too, should have been rendered much darker and more dingy than the head and rump, which, with the shoulder of the wing, are alone bright blue; and the lores, ear-coverts, and sides of the neck, are black, contrasting with the blue of the crown, and passing into the dusky-bluish of the fore-neck. The females vary a good deal, but have always a much greater admixture of black on the lower-parts and sides of the throat, than is shewn in Gould's figure of this sex; the ground hue is often, but not always, much more rufous; and though there is generally a pale mesial space on the throat and fore-neck, even this is in some specimens wholly variegated with the black margins to the feathers. The sexes of the young are conspicuously different in the nestling plumage, from the young males having the wings and tail blue, which in the females are brown, as in the adults respectively; and the pale central spots to the clothing plumage are also much more rufescent in the young males, and albescent in the young females. Common in the Himalaya.

24. *P. longirostris*, nobis, n. s. This species I only know from a female, presented to the Society by Captain Boys, who procured it on the march from Scinde to Ferozepore. It is remarkable for the length of its bill, and for the pale greyish colour of its upper-parts, which would indicate that the blue of the male is considerably paler than in the three following species. Length about eight inches and a half, of wing four and a quarter, and tail three and a quarter; bill to gape an inch and three-eighths, and tarse an inch. Upper-parts light brownish-grey, browner on the wings, and greyer on the tail; the lower-parts pale fulvescent-grey, obscurely marked with dusky; bill blackish, and

legs brown. Very distinct from the females of the three following species.\*

25. *P. affinis*, nobis, XII, 177 (*bis*). Rare at Darjeeling; but common along the eastern side of the Bay of Bengal, from Tipperah and Arracan to the Tenasserim Provinces. The males of this species have generally some intermixture of rufous about the vent and lower tail-coverts, varying in quantity, but seldom nearly so much as in *P. manillensis*; whereas in *P. pandoo*, I believe there is never a trace of this rufous.† The females are altogether bluer than those of *P. pandoo*, especially on the upper-parts; and the under-parts, the feathers of which are margined with black as in the rest of the group, have the ground-tint more or less rufescent. It is decidedly a distinct species from the next.

26. *P. pandoo*, Sykes, the male; *P. maal*, Sykes, the female: *Turdus solitarius*, var. A, Latham. Inhabits central, western, and southern India. The general plumage of this species is always less distinctly mottled than that of the preceding one, both above and below; this distinction being very obvious when several specimens of both are seen together: and in *P. manillensis* the feathers are much more mottled than in *P. affinis*. I allude to the margining of the feathers, which have subterminal blackish bars, edged with whitish; but which in *P. pandoo* are so slight as to be scarcely noticeable, while in *P. manillensis* they may be said to ocellate the whole plumage more or less, and in *P. affinis* they are constantly intermediate. *P. manillensis* is also of a lighter blue than the two others.

*P. manillensis*, (Gm.) Inhabits the Philippines and China. The male of this species appears to have constantly the whole abdominal region deep rufo-ferruginous, the feathers margined as above described; and the female has the pale rufescent hue of the lower-parts more predominant, with a slighter dusky margin to each feather: tail perfectly

\* Can this be *P. cyanea* of Europe? Lord A. Hay has procured a species in Kashmir, which he thinks is the European one; and various other European birds occur there, as *Corvus monedula* and *Coracias garrula*, which (as his lordship informs me) abound in the valley of Kashmir.

† A Tenasserim specimen just received has much more rufous on the abdomen than I ever observed before in *P. affinis*; but its distinctness from *P. manillensis* is nevertheless obvious. This bird likewise inhabits Assam; and the Society has just received a specimen of it from Goalpara.

squared; whereas in *P. pandoo* the outermost rectrices are a trifle shorter than the rest, and in *P. affinis* they are a good deal shorter, the penultimate and ante-penultimate also graduating.

*Menticola*, Brehm: *Petrophila*, Swainson; *Orocetes*, G. R. Gray.

27. *M. cinclorhyncha*, (Vigors): *O. cyanocephala*, Swainson: *Black-collared Thrush*, var. A, Latham. The members of this group are of a shorter make, and more Chat-like, than those of the preceding one, with greater variegation in the colouring. The Indian species is perfectly true to the type of the European *M. saxatilis*, which is the standard of the division. In this bird the sexes, as I have been informed, resemble each other; but such is not always the case, for a female in the Society's collection is very similar to the female of *M. saxatilis*, though differing of course in not having the tail rufous, nor the indication of the white mark on the croup of the male *M. saxatilis*, as also in its under-parts being less rufescent. In both species, the female plumage is of the same general character as in the female *Petrocincla*. The young also are similarly much spotted with pale fulvescent; the young males of *M. cinclorhyncha* being distinguished from the other sex by possessing the white spot upon the wing, the same as in the sexes of the Stone Chat (*Pratincola rubicola*), while also in nestling plumage. The present species is a hill—but not a rock—bird, frequenting the tops of trees in the forests: and it extends its range to all India in suitable localities; being met with occasionally, but rarely, in the plains during the seasons of passage, at which period (that of vernal migration) I once obtained one in the vicinity of Calcutta, which I kept for some time alive. Its song is sweet, plaintive, and tolerably loud; delivered in the manner of a Robin's song: and its manners are very like those of a Stone Chat.

The *Turdus eremita*, Gm., founded on *le Merle solitaire de Manille* of Buffon, would seem to be the female of a species of this division, and not (as I suggested in XII, 182,) that of *Petrocincla manillensis*, both sexes of which are figured in the *Planches Enluminées*.

From the Thrushes, we may pass to the Myiotherine birds of Swainson, leading to his *Thamnophilinae*: a great series of forms, more especially developed in South America. In India, we have

*Cinclus*, Bechst. The Dippers. One species, confined to the Himalayan torrents, and which was originally discovered in the Crimea,—*C.*

*Pallasii*, Tem., figured in Gould's 'Century.' Allied to this is *C. americanus*, Say, of the Rocky Mountains of North America. Of the third and well known European species, *C. aquaticus*, found also in Western Asia, Mr. Yarrell states that the sexes are alike in plumage; but in specimens of this bird in the Society's Museum, from England and Norway, there is a very marked sexual diversity, such as described in Fleming's 'British Animals.'

*Brachyurus*, Thunberg: *Pitta*, Vieillot. There are at least four marked sub-groups comprehended under this genus, as follow:—1. *Paludicola*, Hodgson; a name pre-occupied for a genus of reptiles. To this must be referred *Myiothera cærulea*, Raffles, v. *Pitta gigas*, Tem., from Malacca and Sumatra: and *Pal. nipalensis*, Hodgson, from Nepal, Darjeeling, and Arracan.—2. The group exemplified by *Myiothera affinis*, Horaf., v. *Pitta cyanura*, Tem.; to which, as an aberrant species, may be referred *P. cyanea*, nobis, XII, 1008, from Arracan and Tenasserim. The affinity of these two species is more obvious in the female sex. Fine specimens of *Br. cyaneus* are more brilliant than those formerly described from, each feather of the breast and belly being of a beautiful light blue, with a round subterminal black spot and bars above this. The female is blue only on the tail, but with an admixture of this hue on the dull greenish back.—3. The form of *P. granatina*, Tem., v. *coccinea*, Eyton: with very long tarsi, short wings, &c.—4. The ordinary *Brachyuri*, of which three species are admissible into the *Fauna Indica*: viz. *Br. triostegus*, (Sparman), v. *malaccensis*,\* (Scop.), v. *superciliaris*, (Wagler, after Sonnerat, *Voy. aux Indes Orient.*, pl. 110), also *abdominalis*, (Wagler, after Edwards, pl. 324), and *Pitta brachyura* apud Vigors, Gould, and others, which name applies to an allied species from the Philippines. This is the common Indian species, and the only one found generally over the country from the Himalaya to Ceylon, and which is occasionally to be obtained near Calcutta, as in the Botanic Garden; but I have never seen it from the eastward of the Bay of Bengal.—*Br. cyanopterus*, (Tem.), v. *malaccensis* apud nos, XII, 960: common in the countries eastward of the Bay, from Arracan to Malacca:—and *Br. cucullatus*, (Hartlaub), v.

\* This specific name has the priority; but as the bird does not inhabit the Malayan Peninsula, it is a misnomer that cannot be retained. To Mr. Strickland I am indebted for several of the above cited synonyms.

*nigricollis*, nobis, XII, 960, and *rodogaster*, Hodg., *ibid.* (the young): found in Nepal and Assam, as well as in the vicinity of the Straits.

*Myiophonus*, Tem. Two Indian species, both figured in Gould's 'Century of Himalayan birds.' *M. Temminckii* is indeed common throughout the Himalaya, frequenting the beds of streams in the lower ranges; and its musical whistle (according to Mr. Vigne,) is the sweetest note heard in the hills: but *M. Horsfieldi* is confined exclusively to the mountainous parts of Southern India. Two other species occur in Java, *M. cyaneus*, (Horsfield), v. *glaucinus*, Tem.; and *M. flavivertis*, (Horsfield), v. *metallicus*, Tem. A fifth would seem to exist in *le Merle bleu de la Chine* of Sonnerat, v. *Gracula cærulea*, Scop., and *Turdus violaceus*, Lath. Mr. Swainson also mentions *M. nitidus*, Gray; but this is probably one of the two Indian species already referred to.

The great series of South American *Myiotherinae* seems to grade completely into the *Thamnophilinae* or Bush Shrikes of Swainson, inhabiting the same regions; but presents some forms which certainly approximate the *Brachyuri* of the Old World and Australia; and others again grade into the Wrens (*Troglodytes*), also chiefly an American group, but which comprises a few Old World species, among which are two from the Himalaya described in XIV, 589. I now add a very distinct form, by the name

*Rimator*, nobis. The species upon which this division is founded is a very curious little Myiotherine bird, the immediate affinities of which are not obvious. Bill longer than the head, compressed, a little incurved, the curvature increasing to the tip where the extremity of the upper mandible passes and bends over that of the lower one, but without any well defined emargination; culmen rounded for the terminal two-thirds or more, but becoming angulated towards the base; and the tomæ but little inflected: the nostrils pierced in an ovate basal membrane, their aperture being a little removed from the base of the bill: gape extending to beneath the fore-part of the eye, and unarmed, or having but a few short and inconspicuous hairs: legs moderately strong, suited for progression either upon the ground, or up the slanting bough of a tree; the tarse nearly as long as the middle toe with its claw, and having four long scutæ to the front, and two shorter ones below: toes rather long, the outer a trifle more so than the inner, and reaching to the base of the claw of the mid-toe: claws not much curved, that of the

hind-toe large, being twice the size of the middle front-claw. Wings much bowed and rounded, the first primary reaching to but half the length of the fifth, which equals the two next, and a little exceeds the fourth and eighth. The tail short and weak, its feathers slender and flexible, with soft tips a little pointed. Plumage lax, being excessively so and very copious over the rump.

*R. malacoptilus*, nobis. Length five inches, of which the tail measures one and a quarter, and the bill to forehead an inch; wing two inches and a quarter; tarse seven-eighths; and long hind-claw about three-eighths. Colour of the upper-parts deep brown, with pale shafts to the feathers, forming a central streak on those of the nape and back; scapularies and interscapularies black on the inner web, and brown on the outer; the mass of loose feathers on the rump brown, with light shafts more or less apparent; and the tail and large wing-feathers uniform deep brown with a slight ruddy tinge: under-parts pale brown, lightest on the middle of the breast and on the throat, and becoming whitish towards the chin; a black streak borders each side of the throat, which has also a few dusky specks; and the breast-feathers generally are margined, the lateral more broadly, with olive, which colour prevails and is tinged with ferruginous on the flanks; the lower tail-coverts being dark ferruginous. Bill dark horny, mingled with whitish; and legs light brown. From Darjeeling.

Another very distinct genus of the great Myiotherine series appears to me to exist in

*Enicurus*, Temminck. At least eight species may be enumerated, four pertaining to the Malayan fauna, and four to that of India.\*

1. *E. ruficapillus*, Tem.: *Turdus avensis* (?), Gray, figured from a bad native drawing in Griffith's 'Animal Kingdom,' VI, 530. Inhabits Java. This fine species, while pre-eminently typical of its group, strongly exhibits in the form of its bill, and in the rufous colouring of its head and nape, the Myiotherine affinities of the genus, upon comparing it with such birds as the *Formicarius cayennensis* (Bodd.), v. *Myiocinclla colma*, Swainson, &c. The bill is considerably longer and more slender than in the figure cited in Griffith's 'Animal Kingdom,'

\* *Motacilla maderaspatana* (nec *madaraspatensis*) of Latham is probably a ninth species. It is remarkable that none has hitherto been observed in the south of India.

with the upper mandible conspicuously hooked over at tip: much as in *Cinclus*, minus the hook and nareal orifices; and it is also the same form of bill which reappears in that very curious Malayan bird, the *Eupetes macrocercus* of Temminck. From the figure referred to, it differs in the white of the face being confined to a frontal crescent, each horn of which reaches to above the middle of the eye; in having narrow white tips to the tertiaries; and a forked tail of moderate length, with its two outer feathers on each side wholly white: the rufous of the nape should also spread a little lower down; the black of the fore-neck not so far; and beneath this, the pectoral feathers are each margined with black, as rudely represented in the figure of *Turdus avensis*. Length of wing three inches and a half; of outer tail-feathers three inches; bill to forehead above three-quarters; and of tarse an inch. It is a peculiarly interesting species, as indicating, more than either of the others, the affinities of its group.

2. *E. diadematus*, Tem. Of this species, from the mountainous interior of Sumatra, I have no description. It is probably identical with the only species I have yet seen from the Malayan peninsula, and which is remarkable for a triangular frontal crest of white feathers, evidently erectile, and those forming the apex being longer than the black coronal feathers they impend. Rest of the plumage black, with white lower abdomen, wing-band, rump, and two outermost tail-feathers on each side, the other tail-feathers white-tipped. Dimensions as in the preceding species: the young having the frontal crest much reduced. If distinct and new, *E. frontalis*, nobis.

3. *E. speciosus*, (Horsfield): *E. coronatus*, Tem. Inhabits Java.

4. *E. velatus*, Tem. Inhabits Java.

5. *E. maculatus*, Vigors; figured in Gould's 'Century': *E. fuliginosus*, Hodgson, *As. Res.* XIX, 190 (the young). A specimen forwarded to the Society's Museum by Mr. Hodgson with the latter name, I consider to be decidedly the immature dress of the present species: differing from the adult in the flimsy texture of its clothing plumage, in having the dark portion of its upper-parts spotless fuliginous-brown, with indistinct pale mesial lines, passing into white on the belly: wings as in the adult; tail wanting in the specimen. *E. maculatus* appears to be a very common Himalayan species, and occurs rarely in Arracan.



6. *E. immaculatus*, Hodgson, *As. Res.* XIX, 190. This resembles the next species, except in having the upper-parts deep black, where the other is slaty, and the tail seems to be constantly shorter; its outermost feathers not exceeding four inches and three-quarters in any that I have seen, whereas those of *E. schistaceus* measure commonly five inches and a half. A very rare species in Nepal; but common in Arracan.

7. *E. schistaceus*, Hodgson, *As. Res.* XIX, 191. A common species in the eastern Himalaya, and found likewise in the Tenasserim provinces.\*

8. *E. Scouleri*, Vigors; figured in Gould's 'Century'. Himalaya; rarer to the westward. Remarkable for the shortness of its bill, and for having the tail scarcely furcate.

(To be continued.)

*Bhāsha Parichēda, or Division of Language. A logical Treatise, translated from the Sanscrit, by E. Roxa.*

#### INTRODUCTION.

In the following introduction to a translation of the *Bhāsha Parichēda*, one of the most celebrated works of the *Nyāya* philosophy, it has been my endeavour to subject the logic of the *Nyāya*, as well as the leading ideas of this and the *Vāishēshika* systems, to a critical review, in order to bring the discussion about the merits of the philosophical researches of the Hindus more to a point. Colebrooke's exposition of the *Nyāya* and *Vāishēshika* systems, though founded on the ablest and most exact researches, as well in a philosophical as in a critical point of view, does

\* It is probably Dr. W. Jameson's supposed new species, noticed in *Calc. Journ. Nat. Hist.* 1846, p. 360. I doubt whether many of that gentleman's Thibetan animals will prove so new as he imagines: e. g. his Marmot (p. 361), and the *Lagomys* (?) mentioned with it, &c. &c. The large Hare is doubtless *L. oistotus* (v. *tibetanus*): and I can already pronounce *Ovis ammon* to be distinct from *O. montana*.

not suffice for this purpose, as it is a mere abstract from the works of those schools, and does not enter upon the discussion of the position they are to hold as systems of philosophy.

It is perhaps not impossible to write a history of Indian philosophy, if it be limited to the task of tracing the gradual development of philosophical principles and modes of thinking, without reference to a strict chronological order; but as yet many more materials are required to complete a work, beset with so many difficulties. At the same time we must admit, that even in this attempt, with more ample materials, we can only partially succeed. The doctrines even of those who are considered as the founders of the different schools, bear the marks of a far advanced progress in systematical discussion, and must therefore have been the result of a long series of preceding philosophical enquiries. Hence it would be preposterous to expect, that we should be able to discover the first steps of their researches. We cannot, however, deem this a very great loss, as we have the first philosophical attempts of the Greeks, and we may safely affirm, that a great similarity must have obtained between both of them. We, however, decline here embarking upon any historical research, believing, that under the present circumstances, it is more important to place an original work of Hindu philosophy before the public, and to examine the principles under which it has been constructed. For this end we consider the Nyáya in that shape, which it has acquired by its amalgamation with the doctrines of the Váishéshikas, since we are of Colebrooke's opinion, that both sprang from the same root, and are but branches of the same school; the one being directed more to the explanation of material, the other of logical forms.\* Or to state it more exactly,—to the Nyáya belong the logical doctrines of the forms of syllogisms, terms and propositions; to the Váishéshika the systematical explanation of the categories (the simplest metaphysical ideas) of the metaphysical, physical, and psychical notions, which notions are hardly touched upon in Góutama's (the supposed founder of the Nyáya) Sútras. They differ in their statement of the several modes of proof; the Nyáya asserting four modes of proof—from perception, inference, analogy, and verbal communication; the Váishéshika admitting only the two first ones.

\* Vid. 'Colebrooke's *Miscell. Essays*,' Vol. i. p. 261.

The name of logic, usually applied to the Nyāya, does not correctly define it. It does not treat of the theory of syllogisms and the notions connected with them, as its direct object, but only as a component part of its investigation. It rather aspires to the distinction of giving a complete system of philosophy, based upon the most elementary metaphysical notions, and the division dedicated to the explanation of syllogistical forms, is not even more explicitly treated than other parts of the system. To call the Nyāya logic, would be the same as to assign this name to the philosophy of Aristotle. There is no doubt, however, that the Nyāya has first among the philosophical systems of the Hindus examined the art of reasoning, and shaped it into its present form. This is generally acknowledged, and it has gained by this such ascendancy among the learned Hindus, that all of them refer to it as to their standard in logic, and however they may deviate from other doctrines of the Nyāya, they deem its study necessary for the purpose of giving a firm basis to their reasoning.

It is indeed one of the principal merits of the Nyāya, that its progress is marked by an admirably exact division of the topics, discussed in it, and in this respect it is not only superior to all other systems of the Hindus, but even modern philosophy might, with advantage, study it on account of its clearness and exactness. Though none of its investigations have been carried on to a satisfactory end, the Nyāya has, with the means at its command, fully described the circle within which it moved. We must at the same time bear in mind, that notwithstanding its exactness, there is one inherent fault in its exposition, viz. the neglect of all analytical method, a fault of all systems of the Hindus, which has perhaps, more than any thing else, contributed to the narrow limits of their mental horizon. This fault, however, it shares with many other expositions of philosophy; for instance, to mention a celebrated name, with Spinoza's system. It is a fault rather of exposition than of the system itself. No synthesis (in science) is possible without analysis, and having well understood the leading notions of a system, we can easily trace the analytical way by which they were obtained. This absence of analysis in the construction of the philosophical systems of the Hindus is the reason why so many enquirers have done injustice to their philosophical talent. For want of a clear analysis, unable to understand the aphorisms of the Hindu schools, composed in a language as well in

form as in thought, foreign to them, they thought the philosophical productions of many centuries and of an ingenious people, a web of either abstruse or puerile notions. On a closer examination we shall come to a juster opinion of them, and although we find a limit as well in the range as the depth of their enquiries, we shall come to place them among the nations which advanced the intellectual progress of mankind.

That Hindu philosophy will, however, have any influence upon the development of European philosophy and mediately of European civilization, must be denied. Why should this be the case? Although we must admit, that the philosophical results of the Hindus are as worthy of attention as those of the Greeks, still it is at the first glance evident, that the works of the Hindus are unfit to be transferred to another soil, while those of the Greeks will have always the same influence upon every rising generation in every clime and age. This difference, however, lies not so much in the development of the system as in the form. You are compelled to think by reading the works of the Greeks, they introduce you into the process of their thoughts, and by this, force you to accompany them with your own thoughts, until you arrive as it were by your own mind at the principles of their systems, from which point it is easy either to look back upon the way you have made or to advance further. The Hindus, on the other hand, are dogmatical; it is impossible for any one to understand their writings who has not previously, to a considerable degree, been practised in philosophical enquiries. Thus the want of interest felt in the study of their writings, is the punishment of mystery and exclusion. The same doctrines which might have been instrumental in enlightening thousands, are now forgotten, or in the possession of a few who are hardly able to comprehend them.

Among the general metaphysical notions, the notion of substance is the most important one, as upon it all other notions are either founded or are closely connected with it, and whatever may be the solution of all other metaphysical problems, they must be influenced by the notion of substance.

Substances are, according to the Nyāya, the substrata of qualities and actions, a definition, which is the right one, as *the basis of further investigation*—it is the right one, because founded on experience. Substance, we add, is in so far the substratum of qualities and actions, as the existence of qualities and actions depends upon the existence of sub-

stance; if quality were independent of another, it could not represent another, whose quality it is. The existence of substance must therefore be absolute, that is to say, not dependent upon the existence of another; for in this case, it would not be comprehended by the notion of substance, but by that of quality. And consequently, to think the idea of substance by any notions including dependance, is a contradiction. This contradiction (of comprehending substance under the notion of quality, and therefore) was committed by the Nyāya by its distinction between eternal and non-eternal substances, because the existence of the latter is not independent. In the notion of eternal substance, however, the true notion of substance is included, which is to be independent of time and cause.

Another question is, how a substance is united with its qualities? That a substance should have qualities, appears a matter of course, and to question it, shows a vast progress in metaphysical thinking. Although the Nyāya entered not expressly into the discussion of this subject, it must have felt its weight, as they found it necessary to invent a contrivance for such a connexion. A substance is, according to them, united with its qualities by a relation, called intimate union, which is something real, and is neither in substances, nor qualities, nor actions. We do not intend here to analyze this notion any further (stating, however, that the difficulty is not really removed by it,) but we turn to a third point in the notion of substance. Substance, according to the Nyāya, is not only united with its qualities by the relation, just mentioned, but all substances are united with the general notion of substance, and single substances in the same way with the notion of their own class. This general notion rather is a common property; for it does exist, independent of the mind, in the substances (also in qualities and actions) themselves, and is even eternal in eternal substances, not eternal in transient substances. This notion exactly corresponds with that of the so-called realists among the scholastic philosophers, who maintained the reality of general notions. Duns Scotus, for instance, asserted, that general properties (notions) were not only in objects *potentia*, but *acta*, and that generality was not only formed by the understanding, but that it existed previously to the mental conception *per se* as a reality, viz., The quiddity itself, which was indifferent to general or individual existence. A cause, however, was required to remove this indifference,

viz. Another more extensive quiddity, closely united with the first, and with the principle of inviduity (afterwards called haecceity).\* Substances, as before said, according to the Nyāya, are either eternal or non-eternal. Eternal are space, time, ether, soul, and the atoms of mind, earth, water, fire, and air. Non-eternal are all compounds, or the things which we actually perceive, and which must have a cause of their existence. Thus substances are divided into those which are without cause, and those which have a cause.

There are three causes;—1. The cause of aggregation, or material cause, as yarn is the material cause of cloth;—2. The proximate cause, or the actual union of the parts which are to form a compound;—and 3. The instrumental cause, viz. the cause by which this union is effected.

This is similar to the doctrine of Aristotle, who admitted four causes; a material cause, a moving cause, a formal cause, and an end cause. The instrumental cause includes Aristotle's formal, moving, and end causes.

The notion of causality is certainly well considered, and infinitely superior to the notions which other Indian systems formed of it; for there are already made some steps in advance towards the proper discussion of this notion, if a difference in causes is acknowledged. In the enumeration of causes—the cause of motion appears to have been omitted: it is, however, contained in the notion of instrumental causality. All activity according to the Nyāya is limited to movement, acts of the mind being considered by them as qualities, and as all actions abide in substances, we must consider every substance as a cause of motion. They did not, however discuss, whether motion was necessary to all substances, or only to some or to one, that is to say, whether there is a *primum mobile* or not; they did not discuss the question whether different motions do not require different causes; nor did they lastly enter into an explanation of the notion itself.† They appear in fact not to have been aware of the intrinsic difficulties of the idea of causality,

\* Vid. Tennemann's Geschichte der Philosophie. Kerte Aufl. p. 256.

† The contradictions which Zeno found in the notion of movement, are well known, and without fully acknowledging their weight, it is impossible to obtain a correct notion of it. Aristotle was well aware of this, and endeavoured to remove Zeno's objections to this notion. How important, however, it is, correctly to define this notion, is evident even from the influence, which it exercised on the Nyāya, where motion is considered as an act, and even as the only act.

which undoubtedly is one of the most difficult metaphysical notions.\* The contradictions in the notion of cause and effect appear with especial force to apply to such causes, by which a change in the qualities of a substance is effected, as chemical, animal, and psychical effects. Such effects are, however, denied by the Nyāya. Material causes must be understood as only the substrata, or the materials for a new union, as for instance, the two halves from which a pot is produced, are the material cause of the pot. There are therefore no real changes, but only changes of the accidental form, which substances may assume in their connexion with others; and there should not be changes at all we add. Every compound substance, according to the Nyāya, is ultimately produced from simple substances. Simple substances, however, are eternal, and all their qualities are also eternal. If this is the case, there is also no change of qualities in any compound substance, because by any connexion between them, different from an accidental relation, they would assume changes, contradictory to the notion, under which they are conceived. As the Nyāya, however, admits an actual change in compound substances, in which qualities, not to be met with in the simple substances, are produced, and moreover admits a compound, in which there is a comparatively firm connexion of the parts with each other, it has deviated from its notion of causality, and is hence guilty of the contradiction which it first endeavoured to escape. Notwithstanding these deficiencies of the Nyāya, we still maintain, that it approached nearer than any other Hindu system, to the true notion of causality, causality being, according to Pantheistic, not less than to sceptical idea, a product of habit in the association of our ideas.

In passing from the general metaphysical (ontological) to more special investigations (comprehending natural philosophy and psychology) we may first observe, that the same clearness obtains in the latter as in the former. Existence, or rather to use the Greek term  $\tau\omicron\ \delta\upsilon\nu$ ,

\* Vide Sext. Emp. Adv. mathem. in Ritter's History of Philos. Vol. iv. p. 339. That cause could not be later than effect, is evident; but also the effect cannot be later than the cause; for if so, the cause, being antecedent to the effect, would be without effect, and a cause without effect, is a contradiction. And if the effect would be consequent to the cause, it would be, when the cause is no more, therefore an effect without cause. Both therefore must be necessarily together. If this be conceded, then there is the difficulty, why the one more than the other is producing (or cause). These are only part of the difficulties, and without solving them, the objections made against causality, are quite just.

in its connexion with material and immaterial phenomena, is much more distinctly conceived than in other systems of the Hindus. We find indeed the same material elements as in other systems; viz., earth, water, light, air, and ether with the same qualities; but while in all others they are only generally described, here there is made an attempt to explain the special phenomena as well as the sources of our perception of them, or in one word, we find here the basis of observation, and of the first lineaments of the consequent reflection upon the results of that observation. We meet here also the first remarks about space and time, and even some correct notions about their nature, and although both of them are placed among the substances, we must not forget the intrinsic difficulties of this subject; which in our times only has been more satisfactorily investigated by Kant, Fichte, and Herbart. The error of considering space and time as substances, is a consequence of the notion the Nyāya had formed of substance, viz. as the substrate of qualities and actions. This idea would, indeed, have been correct, had the notion of existence been preserved. The Védānta certainly had a much more exact idea of existence, maintaining, that what exists (*το ὄντως ὄν*) must be simply existent, without any attribute whatever, and should strictly not be even considered by a plurality of notions. The Védānta, however, by denying the reality of phenomena, had nothing to explain, while the Nyāya, retaining the crude notions, given by observation, had no principles whereby to explain them. The most interesting point in this part of the system is the investigation into the nature of matter, an investigation which was indeed entered into by other Hindu systems, although not with the same success. The Védānta for instance, reduced the objects of the senses, or the things, composed of the gross elements, to elements, which are finer and imperceptible to the senses, undoubtedly for the same reasons as the Nyāya, viz. because the origin, the changes, and the destruction of the material things compelled the mind to fix the notion of existence upon some other natures, not affected by those conditions. But according to the Védānta, the simpler elements are only simple, because they are unmixed with others. As regards, however, space, no reduction was made, and their view on this point is very like the doctrine of Anaxagoras, who also started from an original homogeneity of the elements. The Védānta indeed did not confine its thoughts to those elements, but



proceeded to the supposition of a substance, in which there is no difference whatever, but for what reason this supposition was here made, it would be difficult to give a satisfactory reply, and as regards the principal point, space filled out by matter, it was not even touched upon. The Nyāya, on the other hand, has examined matter under this point of view, and arrived at the theory of atoms, in the same way as Leucipp and Democrit. It proceeded even further than either. With Leucipp and Democrit atoms have some, though imperceptible, extent, and also different figures and motions, while the Nyāya held them to be absolute units of space without any dimensions and motions, that is, mathematical points as regards space. They are eternal and unchangeable, and while they are without cause themselves, they are the causes of the material universe. They are imperceptible to the senses, and their knowledge is obtained by inference.

The same clearness and to a certain degree comprehensiveness is met with in their psychological enquiries. The faculties of the soul and its relations to the material things, and other objects of knowledge, are methodically described. The Nyāya draws a marked line between matter and spirit, by distinctly stating the notions, under which either is perceived.

The soul has, according to the Nyāya, qualities, opposite to the qualities of the substances, perceived by the senses, and is therefore distinct from these substances, that is to say, as regards special qualities; for as to qualities, ascribed to substances, as far as they are substances, both must of course agree. Qualities of the soul are the emotions and desires, volition and aversion, etc., and knowledge. Knowledge is produced by intellect, which is one of the (faculties) qualities of the soul. Intellect is again fourfold, it is perception, inference, analogy and verbal knowledge. Perception is the source from which all other knowledge flows, or rather, without objects of perception the other faculties of intellect have no materials to work upon. All knowledge, that is perceived, is perceived through a medium, through an instrument, by which the soul is in communion either with objects from without or from within itself. External objects are perceived through five external senses, these being in contact with the mind, while internal objects, and by them the soul, are directly perceived through the mind. The doctrine of the communication of the soul with external objects is very curious

and interesting, not only because it is original, but because it shows a remarkable acuteness in overcoming difficulties, met with in every system, which considers substances not only as individual beings, but also as a common essence that exists, although dependent upon the individual substances. To perceive individual external substances, and their properties in common with others, it is necessary that the intercourse of the senses with the external objects should take place accordingly, that is to say, that individual substances should be perceived by the connexion of the senses with these individual substances, and the common properties by the connexion of the senses with these common properties. Substances are then perceived by the soul as in their different relations, viz. first, as in relation of this individual substance and this individual quality, of this individual substance and this individual act, further, as in the relation, which this individual substance has with its class (general essence) or with its generality; and lastly, as in the relation, which this individual quality or this individual act of this individual substance has with its class or generality.

This, however is not sufficient; for a full comprehension, there are required also *general notions*, corresponding with those relations. A tree for instance would not be perceived, without the general notion of a tree, by which a tree at any place and at any time is perceived. This general notion requires again a kind of special knowledge, by which the general notion of a tree is referred to a certain tree. This kind of knowledge, though corresponding with the relations of all substances, which have both general and special properties, and though it is (implicitly) contained in every object of perception, still differs from the general properties of the things. It is a conception of the soul, produced by its own activity. This knowledge then is internal perception, that is to say, it is not produced by inference, or analogy, or verbal communication, but it is immediate and complete, as all knowledge by perception. Every perception then, according to this exposition, is based upon two elements, an external and an internal, or as these expressions do not exactly represent their notions, an immediate and mediate, an objective and ideal knowledge. In the same way are the objects of the soul perceived, viz. its different qualities, as aversion, volition, &c. are called. Though the soul is the object of the mind, it is not directly perceived by it, but it is inferred from its qualities. It is not necessary here to explain the other faculties

of intellect, viz. inference, comparison, and verbal communication, as they are discussed in another part of this paper. We here only add, that they must be considered as parts of the quality of knowledge, or, as we would express it, as modified operations of one and the same mental activity.

The mind, by which all knowledge is perceived, is not a quality or faculty of the soul itself, but it is an independent substance, atomistic in its nature. Hence only a single perception or idea is at one time perceived by the soul.

The soul itself is eternal, and therefore so also are its qualities, we should say, also its knowledge, although this knowledge be not perceived by the soul itself. It is at the same time every where, not, however, as an infinite soul, as the universal soul of the Védānta, where all things constitute the pervading soul, be it even a piece of matter, though bound by ignorance to a state of apparent material existence, but according to the Nyāya there are *infinite units* of soul every where present, through all the worlds of material creation. There is a general soul, and there are individual souls. The general soul has the same qualities with the individual souls, with the exception of aversion, pleasure, pain, merit and demerit, because these qualities would involve imperfections. The individual soul is subject to the law of transmigration, and happiness and misery are the consequences of its good or bad actions. It is, however, possible for the individual soul to emerge from the vicissitudes of worldly existence by the attainment of true knowledge.

It would be superfluous to point out the marked distinction, drawn here, between body and soul. Though a higher development of philosophy may destroy the distinctions between soul and matter, that is, may recognise matter, or what is perceived as matter, as the same with the soul (as for instance Leibnitz did), it is nevertheless certain, that no true knowledge of the soul is possible, without first drawing a most decided line of demarcation between the phenomena of matter and of the soul. In the Nyāya there is even an approximation to the doctrine, that soul and matter are as to their principles one and the same, viz. in the theory of atoms, according to which atoms are the negation of space. From this notion we may draw the inference, which has not been drawn by the Nyāya, it is true, but which would have been only a necessary consequence from the premises, that matter, being a compound of atoms, is only a phenomenon, as regards its extension through space. Where then

is here shown the difference between the soul and the true substratum of matter? Let us see then, what is the soul? The soul is different from matter, as this last is perceived by the senses as extended through space. This distinction is true, but further to conclude, that the soul is also different from matter in its real nature, where matter is not extended, is certainly hasty, and does not follow from the premises. What then is the soul according to them? It is all-pervading, infinite, like ether, space and time. This answer, though far from satisfactory, shows, that they felt the difficulty in determining the notion of the soul, when their other notions had undergone a decided alteration. The most peculiar notion in their psychological theory is the existence of the mind independent of the soul, although most intimately connected with it; for through the mind only the soul perceives, as well its own qualities, as the qualities of external substances. How could the Nyāya have made a supposition in which the contradiction is so evident? For it is easy to conclude, that if the mind is independent, its perception is also independent. If the mind perceives, this perception is not in the soul, and if this perception is in the soul, it is not perceived. The soul then has knowledge, which is not real knowledge, because not perceived, and the mind has no knowledge, though it perceives.

We may solve this difficulty at least in some way. The mind was first undoubtedly considered as an internal sense according to the analogy of external senses, in order that there be a unity of perception, and also that, as the external objects are perceived through different media, so the objects of the soul be perceived through an analogous internal medium, a supposition, which has also been made in modern (English) philosophy. So far the Nyāya might have also considered the mind as an internal sense, but they met with a difficulty, which was not felt in the same intensity by modern philosophers. If the knowledge be perceived by the soul through the medium of the mind (the internal sense), why is knowledge not always present in the mind? why does it disappear and give place to other objects of perception? Locke was surprised at the narrowness of the human mind, without being able to account for it; the Nyāya in endeavouring to account for it, invented an independent substance, the mind, which is an atom, and according to its atomistic nature is only able to represent or to perceive one object at one and the same time.

This, I think, is the solution of the difficulty, and though it is certainly only an evasion, because its supposition creates greater difficulties than the former one, it still gives evidence of a spirit of enquiry in the school.

In comparing the psychological theory of the Nyāya with more modern doctrines (with the exception of the latest period) we must admit, that in a metaphysical point of view there is no great difference between them. The same objections are to be made to either. The doctrine of faculties being involved in the same contradictions as that of qualities. In either case, if you are to explain, what the soul is, you have to state, what it is, independent of its qualities or faculties, and also to enumerate the latter. Your explanation will thus point out a quale, which is not a unity, but something defined by a variety of notions. This, however, is not the place to discuss the matter and we wished only to show, that modern philosophy in this respect cannot boast to have advanced one single step beyond that of the Hindus, that is to say, in the metaphysic of the soul, although it would be absurd to deny, that modern psychology, as to the observation of psychical phenomena, has made rapid strides, towards perfection.

In passing over to the strictly logical enquiries of the Nyāya, we have to premise, that we cannot view them with the same satisfaction, and although we make ample allowance for the different forms of language, in which they were explained, we are compelled to confess, that they are neither exact nor complete.

The Nyāya has treated the logical topics in the inverse order of that adopted by us, viz. first inference, then ideas, and lastly propositions. This order is followed, not in consequence of a different method of arrangement, but in consequence of the subjects being based upon different grounds, and flowing from different sources. Logic might undoubtedly be treated analytically and commence with the exposition of syllogistical forms. Considering argument as a fact, we might analyse various arguments, and proceeding to their elements, that is to propositions, gradually arrive at ideas or notions. But the Nyāya, far from following such an analytical course, holds inference to be a quality, different from the quality of forming names and notions, and discusses inference before verbal knowledge, evidently with the purpose of showing, that the latter in some way depends upon the former.

We, however, treat these doctrines in their common order, with no other intention than to make ourselves better understood.

Verbal knowledge is one of the divisions of intellect. The first act or the first condition of understanding words, is the forming of the name! A name is corresponding to a certain object, and this object is connected with the name by the power of the name. A name which has such a power, is a word. The clear and distinct knowledge of what is implied in a word, is produced by a third act, and is the meaning of a word. This latter is in fact identical with idea or notion, as is evident from the examples given, as for instance, a tree is a thing which has root, stem, branches, leaves, etc.

Here again is the order perverted, the name is certainly not, the first operation, and the object to be named, the second, but just the reverse. There must be objects to be named, and though we may admit, that the clear idea of a subject often succeeds a name, still the object, of which the notion is formed, is the first, and we must assert, that what precedes the notion, also precedes the name.

The enquiry, how ideas are formed from a variety of like objects, belongs to psychology, and however interesting this question otherwise may be, logic has nothing to do with the psychical process, by which ideas are produced. If this were the case, we might still have to wait for a logic, as a psychological theory has not yet been established to general satisfaction, while logic as a science has been completed for more than two thousand years. By considering the names and afterwards the corresponding notions, the real character of a notion has been at least obscured. From the given examples we see, that a notion, instead of being defined by the genus, under which it is contained, and the specific difference, is explained by a genus, which is distant from it by a number of intervening notions (for instance, genus of tree=thing) and by a specific difference, which besides its own difference, enumerates properties which it partakes with others (for instance root, stem, leaves, etc.=specific difference.)

The meaning of a word or idea, ought to have been considered in its connexion with other ideas, as made up by genus and differentia specifica, the co-ordination and subordination of ideas, as their compatible, contrary, and contradictory opposition. Here, however, are genus and species raised to categories under the names of generality and particularity,

being there the common properties of substances, qualities, and acts while the opposition of ideas is treated in the seventh category, viz. that of negation. There are notions, which, according to our view, in contrary opposition, placed under the head of absolute negation and notions, according to us in contradictory opposition, in mutual negation.

From this arrangement then did not only result an imperfect exposition of the logical relations among ideas, but an important metaphysical error, by which logical relations of ideas are considered as real properties of substances.

In finding the logical treatment of notions by no means satisfactory, we may at the same time observe, that there are many valuable remarks about some psychological and grammatical relations of ideas which we do not recollect to have found elsewhere. These we have given in a note to the text, where this subject is explained.

A proposition to convey a distinct meaning, must, according to the Nyāya, have four qualities :

1. Contiguity, which, according to some, is the uninterrupted succession of the words pronounced in a sentence, so that for instance, the first word of it be not pronounced in the present moment, and the next half an hour afterwards, according to others, the arrangement of the words according to their grammatical connexion, for instance, that a preposition be placed together with the word which depends upon it, and not with a word, to which it does not refer.

2. Consistency, or the mutual agreement of the words, according to their sense, so that contradictory terms be not connected.

3. Structure, or the grammatical (terminations) forms of the words, which correspond in their meanings (for instance, that the verb agrees with the subject in number and person.)

4. Intention, that is, the meaning which the speaker wishes to convey by a sentence.

There again the logical characteristics of a proposition have been omitted, as all those points, with the exception perhaps of consistency, belong to the grammatical structure of a sentence.

The logical explanation of propositions, as a matter of course, passes over any grammatical form a proposition may assume ; it treats only

of the relation between two ideas, and its simple question is, whether two ideas can be connected or not.

It is evident, that in this way neither quantity, nor modality of propositions could have been discovered. We might, however, dispense with them, as these forms are not strictly logical; but not even the division of propositions according to their quality has been made by the Nyāya.

The theory of ideas and propositions is the weakest point in the logic of the Nyāya; they are more successful in explaining the form of arguments; for though the theory of syllogism is far from exact and complete, we must admit, that they understood the general character of a syllogism.

Goutama, the founder of the Nyāya, thought, that a complete syllogism ought to contain five members (propositions); viz. 1, the proposition, (that is, what is to be proved by the argument;) 2, the reason or argument; 3, the instance; 4, the application; 5, the conclusion, for example—

This hill is fiery

For it smokes.

As for instance a hearth.

This hill smokes

Therefore it is fiery.

We need not expatiate on the five members, although it may indeed create some surprise, that philosophers, who gave an analysis of syllogism, should not have immediately observed the superfluity of two of these members; in more modern times the syllogism was reduced to four members (by others to three), of which we now give a description.

The first act is the statement of a fact (or proposition minor). For instance: this hill smokes. With the idea of smoke is associated the idea of fire, as we know from a former observation, that smoke is connected with fire, as for instance, fire on a hearth. Smoke is therefore the argument, and has the predicate, that fire is to be inferred from it under similar circumstances, as those which were observed concerning the fire on a hearth. The second step therefore is, that the argument (smoke) recalls its connection in a former time with another idea. This second act is called consideration, or to give it in a sentence,

Where there is smoke, there is fire, as for instance, on a hearth.



The third step is, that such a smoke from which fire is inferrible, is on the hill: and the fourth step, the actual connexion of the fire with the hill, that is, the hill is fiery.

The error in this exposition is the confounding logical correctness with truth. The Nyāya perceived very well, that the terminus medius by its being separately connected with two other ideas or denied of one, connected or separated these two ideas,—which is the real operation in arguing; but at the same time they wanted to guard against false premises or a false conclusion, and for this purpose they required a consideration, which was to establish the truth of the preposition major by a reference to an instance, in which the truth of this premise was exemplified. Their investigation was therefore not only directed to the logical operation of arguing, but also to the truth, which may result from it, and both the truth of the conclusion, and the correctness of the argument, should be the result of one and the same operation, which of course is impossible. We would not so much object to this process on the ground, that it is tedious, and useless, as regards the syllogism itself (for it may be good to draw the attention of the beginner not only to the special connexion of the ideas in the syllogistical form, but also to the truth of the premises) but on the ground, that it is considered only valid by giving an instance. Hence arguing is not allowed, where no instance can be given, by which not only an undue restriction takes place, but also, in some cases at least, four ideas are introduced.

Another error is, that by inference not only a new *connexion* of ideas is to be given, but also a new association of an object, which is perceived, with something, that is not perceived, as for instance smoke, which is perceived, with fire, which is not perceived. Here then, it appears, is inference limited to objects, at present in our perception. Though this is denied in the later expositions of the Nyāya, and is expressly stated as an error of the earlier philosophers of the school, still *perception* is not omitted as a necessary condition of inference, which must of course confine syllogisms to a much narrower circle than is according to their nature.

The third error, which has a close communion with the first, is the confounding of the logical relation between argument and conclusion, with the relation between cause and effect. All the examples given to illustrate syllogisms, do not represent a connexion between ideas, in

which the relations are those of notions, that is to say, either excluded from each other, or contained in a higher one, but in the relation of cause and effect, and vice versâ, which may certainly be expressed in a syllogism, but only in one kind of syllogism, viz. in a conditional one. That this error is not owing to the examples, but to the doctrine itself, is proved by Goutāma's division of syllogisms, which are either passing from the cause to its effect, or consequent, passing from the effect to its cause, or from general notions. An inference of the first kind is, when rain is inferred from a collection of clouds, of the second, from the increase of water in a river to rain, of the third, from the notion of earth to the notion of a substance. This latter would indeed answer a relation in the notions themselves, but it is of minor importance, and it has been even omitted in later treatises.

If even the nature of a syllogism be not expressed in its precise logical form by the Nyāya, we much less can expect to find here a complete enumeration of the various kinds of syllogisms. Goutāma's division of syllogisms has been just adverted to, and it is hardly necessary to remark, that this division is not logical. In later treatises of the Nyāya syllogisms are divided into positive and negative ones, and from the examples given in illustration it appears, that the two-first syllogistical forms are represented by them; here, however, is their theory finished, and we find no trace of the different moods the syllogistical forms can enter into.

It is a remarkable circumstance, that the general form of a syllogism should have been found by the Hindus, and yet that they still should not have discovered the different forms and moods, the diversities of which are the result of a mere combination. This is the more remarkable, as in their philosophical arguing we almost invariably find a syllogism expressed in an enthymematical form, where the conclusion and the terminus medius are given, by which the force of an argument is not only forthwith apparent, but even a certain elegance produced, and this even without referring to an instance. We think, that this deficiency was the consequence of two causes especially—first, they were unable to disengage themselves from the grammatical forms in which human ideas are expressed, as shown by their technical logical language, which though as precise as possible, is not clear but cumbrous and not comprehensive, and secondly, from their pious regard for every thing tradi-

tional, be it in political institutions, in religion, or in science. The Sūtras, in which their ancient systems are expressed, have always remained text-books, and any discovery that had been made in theory, did not prompt them to attempt a new exposition of science, but gave only occasion to a new interpretation of the ancient doctrines of the school.

A comparison between the logic of Aristotle and that of the Hindus would be neither interesting nor instructive, and we therefore beg to decline it. With the Hindus, logic is a first attempt, marked with the vestiges of rude workmanship and conception, while with Aristotle it springs forth perfect at once.

The *Bhāṣha Parichéda* itself is considered as a text-book in the Brahminical schools. There is no Pundit of any repute who does not know it well, and many know the whole work by-heart. And indeed it is admirably adapted for the purpose of introduction into the study of the Nyāya and Vaishéshika philosophies. It is a succinct exposition of the principal topics of the whole system, and may easily be committed to memory. It is written in the well-known Anustabh Slókas. The style, however, is not poetical at all, but that of the most sober prose, and nowhere is the attempt made to combine the graces of imagination with philosophical method. The language is as simple as possible, and vastly different from the language of the commentary, which is extremely difficult to understand, not only because it expresses the simplest ideas in the most abstruse language, but also selects terms, which either belong to the Nyāya philosophy alone, or have a different sense in other systems. The difficulties a European first experiences in understanding a work of this school, are less in the subject than in the mode, in which it is treated, so remote from European ideas, and in fact it is only by tracing the connexion of all the ideas that any one will be able thoroughly to understand it. The commentary is certainly a valuable assistant to the understanding of the work, and I have made ample use of it for the interpretation of passages, which I generally did through the very words of the commentary.

The course followed in the work, is very simple. The author gives first the leading ideas of the system, that is, the highest metaphysical notions, which are gradually to be explained in his work. These are the notions of substance, quality, action, generality, (class) particularity, (species) intimate union and negation.

He then enumerates the various substances, qualities, actions, etc., after which he explains the properties, common to all categories, and then those, common to more or less of them. After this exposition the different substances in their relations to themselves and to other substances as well as to their qualities and actions are explained.

In the same way the author discusses the qualities of the substances, and his work is finished, when he has treated on the last quality, enumerated at the commencement of his treatise. The other categories are not especially inquired into, which indeed was not necessary, as they are dependent upon substances, qualities and actions, and their applications have been fully given, whenever the relations of the categories required it.

The first edition of the Sanscrit text of the *Bhāsha Parichéda* appeared in 1827, under the auspices of the Committee of Public Instruction. The Sanscrit text in Bengalee characters was sometime afterwards reprinted with the addition of a Bengalee translation of the text, as well as of the commentary, of this latter, however, with considerable alterations. On the merits of the Bengalee translation I am unable to express an opinion, as I saw this edition but once, and did afterwards not succeed in getting a copy of it. The translation, which I offer to the public, is made as literal as the idiom of the English language would admit, and although it was my endeavour strictly to adhere to the English idiom, I was sometimes forced slightly to deviate from it, in order to convey more precisely the meaning of the original.

In conclusion, I cannot omit gratefully to acknowledge the liberality of the Asiatic Society, which enabled me to add the Sanscrit original to the translation. This text is a mere reprint from the Calcutta edition, free, however, from the few errata found there. There is no manuscript of this work in the Library of the Asiatic Society with which I could have compared the Calcutta edition. I believe, however, that such a comparison would have been quite unnecessary, as an incorrectness of the text must disclose itself in a philosophical work like this by the want of connexion, and can therefore be easily rectified.

*(To be continued.)*

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*Memoranda on Explosive Cotton, by W. B. O'SHAUGHNESSY, M. D.,  
F. R. S., Co-Secretary, Asiatic Society of Bengal.*

Having been permitted to publish the results of some experiments which I have recently conducted by order of Government, with the object of testing the value of explosive cotton for *Military* purposes, I trust the details I proceed to submit may not be altogether devoid of interest.

Soon after the first accounts arrived from home regarding *Schoenbein's* discovery of the new explosive, a small portion of his preparation was received in Calcutta, of which from two sources I obtained altogether about a grain in weight. There was at the same time received from Professor Schoenbein a kind of paper, perfectly transparent and colourless, the preparation of which was believed to be in some manner connected with that of the explosive cotton.

Minute as was the quantity of the cotton I received, it was still sufficient to afford a clue to the nature of the preparation. A particle exploded over mercury in a glass tube, disappeared without residuum—and gave a transparent and colourless gas, but slightly soluble in water and giving red fumes by mixture with common air, and a whitish precipitate when agitated with lime water. The microscope further showed that the structure of the cotton was unaltered by the preparation it underwent. This was sufficient to prove that the explosive cotton contained nitrogen—and rendered it probable that it might be prepared by the action of nitric acid on the vegetable fibre. It recalled to mind too the experiments made by Pelouze in 1833, who found that paper immersed for a moment in the strongest nitric acid, then thoroughly washed with distilled water and dried, became exceedingly inflammable, being transformed into a substance which he named *Xyloidine*.

Working upon these data, I succeeded late in December, in preparing an explosive cotton, and about the same time my friend Mr. Siddons, by independent experiments, arrived at the same result.

That the explosive cotton we prepared is identical with Schoenbein's, seems to be proved by the following circumstances. 1. On microscopic examination there is no perceptible difference of structure. 2. On explosion they yield the same gaseous mixture—and *lastly*, by immersing the best kind of the Calcutta cotton, in pure sulphuric ether, it is

dissolved and the solution evaporated spontaneously on a flat surface, affords a transparent, colourless, glass-like paper, exactly the same in appearance and properties as that which accompanied the specimen of Schoenbein's cotton sent to Calcutta.

Reserving for a moment the description of the process followed by Mr. Siddons and myself, as soon as a sufficient supply was obtained for analytical experiments, I ascertained that the cotton which in its natural state is a compound of carbon, and the elements of water, had by immersion in a mixture of equal measures of strongest nitric and sulphuric acids, parted with its constituent water, and that in the place of this had been substituted one of the series of Nitrogen and Oxygen compounds. The use of the sulphuric acid is simply by its powerful affinity for water to withdraw this from the carbon of the cotton; no portion of this acid or its constituents enters into the composition of the new explosive compound. Ultimately the explosive cotton was found to be a compound of Nitrogen, Carbon, and Oxygen, isomeric with (or of being the same ingredients and proportions as) the old and well known *fulminic or cyanic acid*, the active principle of the fulminating silver, mercury, &c. But here as in many other isomeric compounds, numerous differences in properties became manifest, depending chiefly on the mechanical structure of the different forms of the preparation. I have not as yet completed to my own satisfaction a sufficient number of exact analyses to warrant my expressing the results in figures, but the numerous facts which I have observed, tend to the conclusion that all the isomeric varieties of cyanic acid are represented in the explosive cotton, passing into each other under the influence of slight and often inappreciable circumstances, the general event being the formation of a substance bearing a close resemblance to *Cyamelide* (C. 2. O. 2 + N. H.) being white, neutral, insoluble in water and acids, dissolved in aqua Potassii ammonia being set free, yielding sulphate of ammonia when heated with strong sulphuric acid while carbonic acid escapes. This description applies equally to *Cyamelide* and to the best explosive cotton. (See *Gregory's Organic Chemistry*, p. 295.)

Without entering upon elaborate chemical details unsuited to the object of this paper, it will suffice to say that we found the prepared cotton to be increased in weight by 20 per 100, insoluble in water, unchang

ed in composition or properties by immersion or even boiling in salt water, insoluble in alcohol, oils, acetic acid, ammonia, weak acid and alkaline solutions—such as solution of carbonate of soda or of potash or lime water. When very well prepared it is entirely soluble in anhydrous sulphuric ether, and the solution when evaporated yields the glass-like paper. If the ether contains alcohol or water the paper is opaque and porous, like ordinary filtering paper.

The cotton thus prepared may be exploded over gun powder without igniting it. It explodes by a violent blow on an anvil with the sharp ring of percussion powder, but the explosion only affects the particles immediately struck, and does not ignite the rest, but if gun powder be mixed with it the whole is fired.

It does not explode by the electric spark, or by the discharge of a single Leyden jar.

It explodes on being heated to 375° of Fahrenheit.

It does not explode by friction between wooden or metallic surfaces till the temperature of these rises to 375°; neither does it explode by compression in powerful screw presses. On the contrary, compression exercises some singular effects on its explosiveness and combustibility. The very most explosive kind twisted into a tight cord burns like quick match, and a tight ligature of wire or twine round a portion of this intercepts the ignition. In the same way when compressed into the touch-hole of a cannon it is fired with the utmost difficulty, so that it cannot be used for priming; accordingly in the ordnance trials at Dum-Dum the cotton charges have been always fired with quick match or powder priming.

Exploded in a loose heap its force appears to be exercised almost altogether in the lines of least resistance; thus on two occasions nearly two pounds weight while being dried on a water-bath exploded accidentally on a thin copper tray, which was not injured or displaced—and on both these occasions the plaster of the roof and the loose tiles of a shed within three feet of the cotton remained undisturbed. A man standing close to the tray was uninjured, and several test glasses ranged on a party wall within 4½ feet of the explosion were not moved or broken or their contents spilled.

Regarding the results obtained by my first experiments, in connexion with the valuable properties ascribed by general rumour to the explo-

sive cotton, to be of sufficient importance to warrant more extensive trials, I reported them officially to Government, and was immediately directed to prepare a sufficiently large quantity of this cotton for a series of ordnance trials at Dum-Dum. With the valuable assistance of Mr. Frewen of the Mint Assay office, I have accordingly had manufactured over 100 pounds of the explosive cotton, and the experience thus gained regarding its preparation and properties enables me to state such facts as may enable others to form a more correct estimate of the degree of practical value of this preparation, for Military proposes, than can be obtained from experiments on the manufacture and properties of a few ounces of the explosive.

#### PREPARATION.

In the experiments carried on at the mint, 100 tola weight (3 and  $\frac{1}{4}$ th troy pounds) of cotton was operated on at a time, the cotton having been previously cleaned and loosened out by the native bowstring apparatus.

The acid mixture consists of equal measures (in all 336 fluid ounces) of sulphuric acid, Sp. gr. 1843, and nitric acid, Sp. gr. 1460. The sulphuric acid weighs 840 tolas—to 21 lbs av. and the nitric acid weighs tolas 65 1—to 17 av. lbs. fractions omitted. The mixture when cool is placed in a large shallow porcelain basin, so situated as to permit the fumes to be carried off by a current of air. The cotton is introduced with iron tongs in small portions at a time, pressed under the surface of the acid for about two minutes and moved to the opposite side of the pan. This is continued till 50 tola weight is introduced. When the last portion has been immersed for about three minutes, the cotton should be lifted out, by the tongs, quickly transferred to a screw-press of iron or stone and the excess of acid pressed out. This is continued till the 50 tola weight is pressed. The cake is then rapidly removed to a large vessel of common water, torn asunder by hand, washed and squeezed and thrown into a second vessel of water; again washed and squeezed, and the masses thrown into a vessel containing a solution of 1 pound of carbonate of soda in 20 gallons of water. Well washed here the mass is placed in a large screw-press—the pressed cake again washed with water. It is now fit for drying, which is best done by solar heat on a dry terrace over tarpaulin or sheets of iron, taking the utmost caution to avoid the possibility of explosion by accidental sparks.



Two days' exposure are sufficient in the month of February, to bring the cotton into as dry state as is required for its use with ordnance or small arms.

Steam or hot water heat may be used for the drying with perfect safety with suitable apparatus. But unless this be in every respect properly constructed, the danger of making a large quantity of cotton is too serious to be trifled with. I have also dried cotton successfully *in vacuo*, and by the immediate contact of masses of quick-lime, but it is needless at present to occupy the pages of this Journal with descriptions of the arrangements, by which these facts can be practically applied.

When dry the cotton is next to be carded; or loosened out by the native bowstring apparatus.

The expressed acid may be used for the remaining 50 tolas of the 100. It will however be generally found that after 40 tolas have been immersed, the acid begins to corrode or pulp the cotton, producing a new series of compounds, chiefly oxalic acid, formic acid, and sugar.

The same series of operations above described is gone through with the second acid, and the resulting cotton kept apart.

After drying, it is found that the 100 tola weight of cotton has increased to 114 to 120, according to the care with which the process has been conducted.

The process thus performed affords two qualities of explosive cotton.

The first 50 tolas may be designated 1st or *best quality*.

The product of the 2d expressed acid and the second 50 tolas of cotton should be marked 3d or worst quality.

If these be mechanically mixed by carding or the bow-string, the mixture may be called 2d quality.

The acid mixture which after cooling was Sp. gr. 1667 before use, after once having been used is of Sp. gr. 1687. Twice used its density is 1691. The acid once used measures 180 fluid ounces and by distillation yields  $\frac{1}{4}$  its bulk of nitric acid, Sp. gr. 1480; the acid twice used yields  $\frac{1}{4}$ th its bulk of nitric acid, Sp. gr. 1400. By prolonged boiling in platinum or glass vessels, the pulpy cotton in the mixture is decomposed with copious effervescence of carbonic acid and nitric oxide gases; when this terminates and the acid in the boiler begins to blacken, the concentration has proceeded far enough, and on cooling the original sulphuric

acid is recovered with little diminution either of strength or quantity.

The washings in the several tubs being neutralized with carbonate of soda, yield on boiling down, a large quantity of mixed sulphate and nitrate of soda, which may be used for the economical manufacture of nitric acid, so as materially to diminish the cost of the process.

Reserving an account of the cost of manufacture, I proceed now to show the properties and effects of each of the three varieties of the cotton above described.

*Best Quality, No. 1.*

Snow white, explodes without leaving the least residuum or dampness—does not fire powder if ignited over it. Flashed on the hand causes no pain; is almost entirely soluble in sulphuric ether. One pound weight avoirdupois can easily and safely be compressed into the space of 128 cubic inches\* without diminishing its explosive power for ordnance or small arms.

Exposed to the air in a large room, protected from dust *this* quality of cotton (dried by solar heat for two days) fluctuates in weight according to the hygrometric state of the atmosphere—the maximum increase having been 1.34 per 100, as shown in the annexed Table of observations continued during 26 days.

At this maximum of absorption no diminution of projectile power was experienced in trials made with an epreuve mandril gun, the invention of Colonel Forbes, especially suited to these experiments.† But when the quantity of moisture designedly added exceeded three per 100, the explosive power fell rapidly, but was regained altogether by redrying the cotton.

With this quality of cotton trials were made at Dum Dum on the 19th and 25th of January, and 24th of February, with the results shown in the accompanying Table.

\* The bulk of 4 pounds of ordnance gunpowder.

† Of which I hope to be permitted to give a more minute account in a future number of the journal.

## DUM DUM.

## Ordnance Experiments with Gun Cotton.

| January. | Quality. | Quantity. | Gun used.      | Weight of Ball. | Windage. | Elevation | Ball thrown yards. | Remarks.                                      |
|----------|----------|-----------|----------------|-----------------|----------|-----------|--------------------|-----------------------------------------------|
| *        |          | Ounces    |                |                 |          |           |                    |                                               |
| 19th     | 3d       | 4         | 8 inch Mortar. | 68 lbs.         |          | 45°       | 250                | Mortar somewhat foul.                         |
| "        | 1st      | 2         | "              | "               |          | "         | 331                | Perfectly clean.                              |
| "        | "        | 4         | "              | "               |          | "         | 839                | Quite clean. Recoil 2 inches.                 |
| "        | "        | 6         | "              | "               |          | "         | 1030               | Do. Time 14 seconds. Recoil 8½ inches.        |
| "        | "        | 8         | "              | "               |          | "         | 1186               | Do. Time 15½ seconds, recoil 10 inches.       |
| "        | "        | 10        | "              | "               |          | "         | 1295               | The same as last—Perfectly cool.              |
| "        | "        | 12        | "              | "               |          | "         | 1366               | The same time, 16½ seconds. Recoil 13 inches. |
| "        | "        | 4         | "              | 45              |          | "         | 706                | } Guns clean, and cool; recoil trifling.      |
| "        | "        | 8         | "              | "               |          | "         | 1424               |                                               |
| "        | "        | 4         | 6 pr. brass.   | "               |          | 3°        | 745                |                                               |
| "        | "        | 8         | 6 pr. do.      | "               |          | 6°        | 1550               |                                               |
| "        | "        | 12        | 9 pr. do.      | "               |          | 6°        | 1672               |                                               |
| "        | "        | "         | "              | "               |          | "         | "                  |                                               |
| 25th     |          | 4         | 8 inch mor.    | 45              |          | 45°       | 717                |                                               |
|          |          | 4         | "              | "               |          | "         | 724                |                                               |

The ranges above exhibited are as nearly as possible four times as great as those given in the Woolwich tables of mortar practice in 1838, strength of powder from 21 to 22 $\frac{1}{10}$ ths. With this powder an 8 inch mortar with 46 pound shot gave with 15½ ounces a range of 700 yards which was in all the above trials exceeded by 4 ounces of cotton.

In two trials made of some cotton prepared by Mr. Siddons, corresponding ranges were obtained with the 8 inch mortar and 6 pr. field gun.

Lastly a sample of cotton sent to me for trial by Mr. Scott of the H. Co.'s Dispensary tested by the mandril eprouvette gun gave a range of 110½ feet against 111 of my first quality.

These experiments with cotton made with the utmost care by three different persons, show an extraordinary uniformity in the quality and

\* Present on the 19th January—Lieut.-Col. Lawrenson, C. B., Capts. Whiteford, Broome, Douglas, and other officers of the Artillery Regiment.

power of the best article—and show that this quality is obtainable despite of difference of manipulation in the process, and that it is dependent on the definite chemical composition of the compound itself. The fact is one which affords the most encouraging prospects to those interested in developing the qualities of the article.

The trials made with this variety of the cotton with small arms have been very numerous and satisfactory. The ratio of superior power to that of powder, is evidently much greater than in the cannon and mortar practice, but as the experiments are not capable of being expressed in figures, I will not dwell on them in more detail.

In all the ordnance experiments above narrated there were remarked—

1.—Entire absence of smoke.

2.—As far as could be judged very trivial heating of the guns.

3.—Entire absence of dirt or wetting.

The report, recoil and time of flight of the shot and shells seemed equal, as closely as could be estimated, to these effects from the charges of powder required for equal ranges.

It should further be observed that of this quality of cotton from 6 to 7 ounces on two trials burst an 8 inch 46 lb. shell, but it should be stated that it was with considerable difficulty this quantity of cotton was forced into the shell.

#### *2d and 3d quality of Cotton.*

The 2d is prepared as above described, by mixing together the whole of the 100 tola weight manufactured from the quantity of acids above specified. No. 3 or worst, is the product of the last 50 tolas of cotton and expressed acid.

It was with the 2d quality my first experiments were made ; 4 ounces tried at the Eshapore powder works by Major Anderson and myself gave, with a 68 pound shot, a range of 461 yards, thus :—

Best quality, 4 oz. 68lb. shot, range 839 yards, tried at Dum Dum.

2d quality, ditto ditto. . . . . 461 . . . . . Eshapore.

3d quality, *worst*. . . . . 250 . . . . . Dum Dum.

H. C.'s powder, best ordnance quality 189 . . . . . Eshapore.

The effect of the *mixture* or quality No. 2 it will be observed is inferior to the arithmetical mean of the two forces, the range being 461 instead of 544 yards ; but this variation may have proceeded from

the mixture on trial having been made with cotton of two different days' manufacture.

The preceding experiments show that the worst cotton is superior to the best ordnance powder in the proportion of 250 to 189 in the trials under description, and that the 2d quality is superior to powder in the proportion of  $2\frac{1}{4}$  to 1. But other considerations arise regarding these inferior qualities which we have found to have faults which more than outweigh the value of the superiority of range.

The inferior kind of cotton is of yellowish colour, insoluble in ether—so hygrometric that it absorbs from 5 to 10 per 100 of moisture from the air in 24 hours. It soils and wets the guns and leaves in them a body of wavering flame and large quantities of half ignited cotton, a source of the most formidable danger to the gunners, and likely to lead to explosion of ammunition in the vicinity. It is rendered useless by being compressed or even tied in a cartridge bag. In several instances while the loose cotton of this quality gave a very respectable range, an equal quantity tied up in a cartridge bag, scarcely expelled the ball from the gun.

But the most fatal objection to the use of this inferior sort is, that stored even in hermetically sealed ammunition chests, lined with copper and without the contact of the air, it changes composition, and in less than six weeks becomes totally inert. Thus a box proved at Dum Dum on the 19th January, of which 4 oz. threw a 68lb shot 250 yards from an 8 inch mortar, was re-opened on the 27th of February, and the same quantity barely threw a 46lb shot a few feet from the mouth of the mortar.

The cause of this change is the same as that which affects so many cyanogen compounds, especially the hydrocyanic acid. The cotton under description was most carefully prepared, and every trace of acid left by the process well neutralized and washed out. Still in six weeks it had changed its composition and become entirely useless, and when the chest was opened there was perceptible a strong smell of nitric oxyde gas. This fact is sufficient to show that *it is only the very best kind of cotton which can be depended on for any military use.* It next remains to be considered whether to this kind also there may not exist such objections as may counterbalance the very great ad-

vantages which in point of range, cleanliness, lightness and absence of smoke, I have shown it to possess over ordinary service powder.

It has been stated that the low temperature at which this cotton explodes would render rapid firing impracticable in consequence of the heating of the guns. Now the true exploding point is 375° Fahrenheit. Under this, whatever may be asserted to the contrary, the best cotton cannot be made to explode. Now whether it arise from the greater quickness of the explosion, or the inferior degree of specific heat in the material, the fact is certain that it would take a greater number of rounds of the best cotton than ever could be fired in the sharpest action to bring the temperature of the gun so as to approach the exploding point.

In one set of experiments instituted on this question, 80 rounds of cotton were fired from a gun metal cone of exactly the weight of the whole of the cotton used. The interval was but ten seconds between each round. When the last round was fired, a piece of the best cotton was firmly pressed against the sides of the metal cone in every direction without ignition taking place. On repeating the experiment and taking the temperature of the cone it was found to be below that of boiling water!

The next objection made is the assumed probability of *spontaneous combustion*. Now the combustible material in this compound being already combined with all the oxygen it requires, I can see no reasonable cause for the apprehension of the spontaneous heating, which in raw cotton arises from the absorption of the additional oxygen with which its carbon and accidental oily matters have a tendency to unite.

This process I have most carefully studied with reference to an attempt made some years since to fire the arsenal in Fort William, on which occasion a Court of Enquiry, of which I was a member, had satisfactory proof before them that spontaneous combustion was not concerned in what took place. The experiments then carried on led to our being enabled to produce this kind of combustion with perfect certainty in masses of tow, cotton, cloth, &c. duly prepared for the purpose. Such experiments I have repeated with the gun cotton, but I have never detected the least trace of heating. The objection nevertheless is one which time alone can dispose of effectually.

As to danger in the process of preparation, I do not deny that there is some risk. But this, I know by sufficient experience, is infinitely

less than that is attendant on the manufacture of gun powder. In the preparation of gun cotton there are but two periods of risk—the first is while pressing the cake still full of acid. On one occasion this caused an explosion, but of too trivial a nature to be worth description, and moreover the accident is one which cannot cause injury with a press properly constructed.

The last stage of drying unquestionably demands every precaution. In my late experiments, a stray spark ignited at once ten pounds of cotton which scorched more or less severely two men who, contrary to orders, were quietly seated in the middle of the mass. Had this happened with the same proportionate quantity (40lbs.) of powder, there can be no doubt what would have been the result to the lives of the men, and to the premises where the accident occurred.

I repeat that during the other stages of the manufacture explosive cotton is prepared with the most perfect safety. While it contains as much moisture as can be perceived by the touch, it may be put into a red hot crucible, or penetrated by a red hot poker with absolute impunity. The hiss of steam and a few sparks are the only phenomena observed.

I have next to deal with the cost of the best kind of cotton, and here it is that *in a military point of view* the chief objection arises to its use. The annexed estimate shows in detail that to prepare gun cotton from acids *as sold in Calcutta at present*, 1 pound of the *best kind* costs about 10 Rs. But being fourfold the power of powder, this may be considered as 2 Rs 8 as. for the corresponding quantity of cotton. Now this is at least 8 times the price of ordnance powder, range for range.

But on the supposition that Government made their own acids, using nitrate of soda, instead of saltpetre, economizing the washings, reconcentrating the sulphuric acid, &c. the cost of the preparation would be reduced so considerably, that allowing as above for superiority of power the cost of cotton would be 2Rs. 9as 6pie per av. pound, being within a fraction of double the price of powder, *using quantities of equal power*.\* But this statement of course must be regarded as one resting

\* 10 as. 4 pie for range which would be procured from a pound of powder value 5 as.

on views which further experience may modify or disprove. It would be presumptuous to advance a positive opinion that the process may not be cheapened and improved. Professor Schoenbein may have a method of greater simplicity and economy than those employed by the numerous experimentalists who have followed in the track of his brilliant discovery. I have already tried many modifications of the acid method but without success.\* One plan still remains for experiment which promises better than the rest, and which I shall bring as soon as possible to the test of a conclusive trial. I allude to the employment of nitric acid previously or simultaneously submitted to the influence of a powerful voltaic current, sufficient to decompose the constituent water of the nitric acid, and thus render this more suited to the conversion of the cotton fibre into cyanic acid or cyamelide.

I have to add that I have been enabled by the kindness of Mr. Rogers and Mr. Blechynden, to make adequate trials of the Akundoo and Simal fibres—Manilla and other kinds of Hemp—Jute—Flax—Plaintain and Aloe fibre; and that I have given fair trial to every kind of cotton I could procure. I have also examined the explosive compounds made with wood shavings, saw-dust, unsized paper, &c. The general result is that cotton affords the best preparation—and the better the ordinary quality of the cotton, the stronger and more permanent is the explosive it affords.

I have also tried (but merely for trial sake) the finely divided charcoal obtained by igniting cotton in close vessels—of this carbon 100 parts of the best Banda cotton yield  $17\frac{1}{2}$  to 18. As might be inferred from the theory of the process, no explosive compound was generated—no constituent water having been associated with the carbon, no substitution of a nitrogen compound could take place.

An economical mode of manufacture once discovered, which would, bring cotton and powder to equal prices, range for range,—and the use of the new explosive confined strictly to that of the very best kind,—there remains no objection which I have heard of—no fault which I have myself observed, which may not be fairly found with the best kinds of powder also. Meanwhile although the gun cotton be too costly for military use, and further experiments are required on the effects of long

\* Using for instance Anhydrous nitrous acid, prepared by distilling the dried nitrate of lead—mixtures of dried sulphurous acid and nitric oxide gases.



storing on the powers of even the best kind, I confidently recommend Mr. Siddon's preparation to the sportsmen of Bengal. Those who once try the *smokeless* cotton in a tiger encounter will not readily forego its use for this and similar purposes. I should add that it is not suited for the patent breech, but it answers admirably in the military two-grooved rifle. I have no apprehension about its alleged *bursting* properties. I have now used it with pistols and rifles, and witnessed its use with cannon and mortars to such an extent, as to warrant my expressing the most decided opinion, that regarding the best kind of cotton as 4 times the strength of powder all ordinary proportional charges may be used with but the same risk as would be attendant on the explosion of powder. The extraordinarily effective use of cotton in mining or blasting has been already proved by the extensive trials made in Europe. Here again *cost* is the only objection to be vanquished.

I should not conclude however without stating for the consolation of the powder interest that for the manufacture of rockets the cotton is apparently useless—neither would it produce the effect of powder if fired in bags against a gate, as in the memorable instance of Ghuzni; nor can it be used in the loading of Shrapnell shells.

I have now endeavoured to give an impartial account of the merits and defects of this new explosive. In the hands of the Artillery officers at Dum-Dum it could not but have met a candid and liberal trial—and although the Select Committee with myself may be but of one opinion as to the present inapplicability of gun cotton to military purposes, all must participate in the feeling that the utmost credit is due to Professor Schoenbein for his most interesting and promising invention.

TABLE

*Of observations on hygrometric properties of the best kind of Gun Cotton.*

The cotton used was of the finest kind, 100 grains were dried till it ceased to loose weight, were placed in the left pan of a Kater's balance, sensible to  $\frac{1}{100}$  of a grain. The frame of the balance was perforated so as to allow the air to circulate freely through it.

|                     |         |               |                 |
|---------------------|---------|---------------|-----------------|
| 6th February, 1847. | 4 p. m. | grains 100.00 | <i>Remarks.</i> |
| 7th, . . . . .      | noon.   | „ 100.40      |                 |
|                     | 2 p. m. | „ 100.23      |                 |
|                     | 4 p. m. | „ 100.20      |                 |

|             |                 | <i>Remarks.</i>                                               |
|-------------|-----------------|---------------------------------------------------------------|
| 8th, .....  | 8 a. m. ,,      | 100.47                                                        |
|             | 4½ p. m. ,,     | 100.25                                                        |
| 9th, .....  | ½ p. 7 a. m. ,, | 100.60 Night cloudy, W. S.                                    |
|             | 5 p. m. ,,      | 100.44                                                        |
| 10th, ..... | ½ p. 7 a. m. ,, | 100.67                                                        |
|             | 4 p. m. ,,      | 100.74 Clouded all day.                                       |
| 11th, ..... | 7 a. m. ,,      | 100.84                                                        |
|             | 8½ a. m. ,,     | 100.94 Very cloudy.                                           |
|             | 5 p. m. ,,      | 100.54                                                        |
| 12th, ..... | 9 a. m. ,,      | 100.90                                                        |
|             | 5 p. m. ,,      | 100.64                                                        |
| 13th, ..... | 7 a. m. ,,      | 101.14 A thick mist.                                          |
|             | 1 p. m. ,,      | 100.80                                                        |
|             | 5½ p. m. ,,     | 100.60 Day bright.                                            |
|             | 7 a. m. ,,      | 101.20 Thick mist.                                            |
| 14th, ..... | noon. ,,        | 100.90                                                        |
|             | 2 p. m. ,,      | 100.74                                                        |
|             | 5 p. m. ,,      | 100.63                                                        |
|             | 5½ p. m. ,,     | 100.43 House opened up a few minutes previous to observation. |
|             | 7 a. m. ,,      | 101.07 Thick fog.                                             |
| 15th, ..... | ½ p. 8 a. m. ,, | 101.20 Some rain at 9 a. m.                                   |
|             | ½ p. 4 p. m. ,, | 100.43                                                        |
|             | 7 a. m. ,,      | 100.97                                                        |
| 16th, ..... | 8 a. m. ,,      | 101.00 Sky overcast; Therm. 74°.                              |
|             | 9¼ a. m. ,,     | 100.95 Occasional showers all day.                            |
|             | 4½ p. m. ,,     | 100.83 Ditto.                                                 |
|             | 5½ p. m. ,,     | 100.93 Ditto.                                                 |
|             | 7 a. m. ,,      | 101.23 Clouded all day.                                       |
| 17th, ..... | 8½ a. m. ,,     | 101.33 Ditto.                                                 |
|             | 9 a. m. ,,      | 101.30 Ditto.                                                 |
|             | 5 p. m. ,,      | 100.80 Ditto.                                                 |
|             | 7 a. m. ,,      | 100.63 Sky bright, W. N. W.                                   |
| 18th, ..... | 8 a. m. ,,      | 100.55 Ditto.                                                 |
|             | 5½ a. m. ,,     | 100.40 Ditto.                                                 |
|             | 9 a. m. ,,      | 100.23 Ditto.                                                 |
|             | ½ p. 9 a. m. ,, | 99.96 Ditto.                                                  |
|             | 5 p. m. ,,      | 100.30 Therm. 74°.                                            |

## Remarks.

|             |          |   |        |                                                                                   |
|-------------|----------|---|--------|-----------------------------------------------------------------------------------|
| 20th, ..... | 7 a. m.  | „ | 100.50 | Sky overcast all day.<br>Therm. 72° 4 p. m.                                       |
|             | 9 a. m.  | „ | 100.50 | Ditto.                                                                            |
|             | 4 p. m.  | „ | 100.30 | Ditto.                                                                            |
|             | 6 p. m.  | „ | 100.40 | Ditto.                                                                            |
| 21st, ..... | 7 a. m.  | „ | 100.74 | Sky bright. Wind N. E.<br>Therm. 64°.                                             |
|             | 9½ a. m. | „ | 100.54 | Ditto ditto.                                                                      |
|             | noon.    | „ | 100.54 |                                                                                   |
|             | 2 p. m.  | „ | 100.44 | Scattered clouds. Therm.<br>74°.                                                  |
|             | 5 p. m.  | „ | 100.34 | Ditto ditto.                                                                      |
|             | 5½ p. m. | „ | 100.14 | After opening of the win-<br>dows of the house.                                   |
|             | 7 p. m.  | „ | 100.24 |                                                                                   |
| 22d, .....  | 7 a. m.  | „ | 100.44 | Sky bright. W. N. E.<br>Therm. 63°.                                               |
|             | 9 a. m.  | „ | 100.40 | Ditto ditto.                                                                      |
|             | 5 p. m.  | „ | 100.20 | Ditto ditto. Therm. 73°.                                                          |
| 23d, .....  | 7 a. m.  | „ | 100.50 | Sky bright. W. N. E.<br>Therm. 64.                                                |
|             | 9 a. m.  | „ | 100.40 |                                                                                   |
|             | 5 p. m.  | „ | 100.10 | Therm. 74°.                                                                       |
| 24th, ..... | 10 a. m. | „ | 100.90 | Cloudy.                                                                           |
|             | 5 p. m.  | „ | 100.23 | Clear. Therm. 76°.                                                                |
|             | 7 p. m.  | „ | 100.29 | Ditto.                                                                            |
| 25th, ..... | 7 a. m.  | „ | 100.59 | Thick fog. Therm. 72°.                                                            |
|             | 8 a. m.  | „ | 100.53 |                                                                                   |
|             | 5 p. m.  | „ | 100.23 | Bright.                                                                           |
| 26th, ..... | 7 a. m.  | „ | 101.00 | Fog. Therm. 73°.                                                                  |
|             | 4 p. m.  | „ | 100.63 | Bright. Therm. 81°.                                                               |
| 27th, ..... | 7 a. m.  | „ | 101.20 | Fog. Therm. 74° W. S.                                                             |
|             | 4½ p. m. | „ | 100.73 | Bright. Therm. 83° W. S.<br>doors and windows open-<br>ed just after observation. |
|             | 5 p. m.  | „ | 100.63 | Being a loss of 00.10 in<br>25 minutes.                                           |
| 28th, ..... | 7 a. m.  | „ | 101.13 | Fog just cleared off.                                                             |
|             | 8 a. m.  | „ | 101.20 | Bright.                                                                           |

|                     |             |   |        |                                             |
|---------------------|-------------|---|--------|---------------------------------------------|
|                     | 8½ a. m.    | „ | 101.10 | Therm. 73°.                                 |
|                     | 10½ a. m.   | „ | 100.50 |                                             |
|                     | 11 a. m.    | „ | 100.40 | Therm. 80°.                                 |
|                     | 12          | „ | 100.30 |                                             |
|                     | 2 p. m.     | „ | 100.30 |                                             |
|                     | ½ p. 2.     | „ | 100.34 |                                             |
|                     | 5 p. m.     | „ | 100.30 |                                             |
|                     | 6 p. m.     | „ | 100.24 |                                             |
| 1st March, 1847...  | 7 a. m.     | „ | 100.70 | Partial clouds. W. S. W.<br>Therm. 73°.     |
|                     | ½ p. 8.     | „ | 100.60 | Ditto ditto.                                |
|                     | 4 p. m.     | „ | 100.00 | Ditto N. E. Therm. 84°.                     |
|                     | 6 p. m.     | „ | 100.20 | Ditto ditto. Therm. 84°.                    |
| 2d, .....           | ½ p. 8 a.m. | „ | 99.80  | Bright. N. E. strong<br>breeze. Therm. 74°. |
|                     | 11 a. m.    | „ | 99.40  |                                             |
|                     | 5 p. m.     | „ | 99.56  | Ditto. Therm. 84°.                          |
|                     | 6 p. m.     | „ | 99.70  |                                             |
| 3d, no observation. |             |   |        |                                             |
| 4th, .....          | 6 p. m.     | „ | 99.50  | W. N. E. Therm. 84°.                        |

Estimate showing the actual cost of manufacturing 3 lbs. of Gun Cotton, *mixed* quality. Acids at Calcutta prices.—

| Description of Articles. | Quantity.            | Cost.           | Total cost in Co.'s Rs. |    |    |
|--------------------------|----------------------|-----------------|-------------------------|----|----|
|                          |                      |                 | Rs.                     | A. | P. |
| Nitric Acid,.....        | Tolas 651 = 17½ lbs. | @12 as. per lb. | 13                      | 2  | 9  |
| Sulphuric ditto, ....    | Ditto 840 = 21 lbs.  | @ 2 as. per lb. | 2                       | 12 | 3  |
| Banda Cotton,.....       | Ditto 100 = 3 lbs.   | @16 Rs. per md. | 0                       | 8  | 0  |
| Total, ....              |                      |                 | 16                      | 7  | 0  |

Equal to 5rs. 7ans. 8 p. per lb. *mixed*, = to 10. 15. 4 for 1 lb. of the *best kind*.

An estimate to manufacture 1½ lb. of *best* Gun Cotton, assuming that the cost of Nitric Acid ought only to be 3 as. per lb. and that ¼ of the Acid can be recovered by re-distillation, after use. The Sulphuric Acid not to be charged, as nearly the whole of it is recovered by reconcentration.

| Description of Articles. | Quantity.            | Cost.           | Total cost in Co.'s Rs. |    |    |
|--------------------------|----------------------|-----------------|-------------------------|----|----|
|                          |                      |                 | Rs.                     | A. | P. |
| Nitric Acid,.....        | Tolas 651 = 17½ lbs. | @3 as. per lb.  | 3                       | 4  | 9  |
| Sulphuric ditto, ....    | Ditto 840 = 21 lbs.  | @ Nil           | Nil.                    |    |    |
| Banda Cotton,.....       | Ditto 100 = 3 lbs.   | @16 Rs. per md. | 0                       | 8  | 0  |
| Total, ....              |                      |                 | 3                       | 12 | 9  |

Equal to 2 rs. 9 ans. 6 p. per lb.

*Examination of some Atmospheric Dust from Shanghai, forwarded to the Asiatic Society of Bengal by D. J. MACGOWAN, Esq. M. D. Ningpo Hospital, by HENRY PIDDINGTON, Curator Museum of Economic Geology of India.*

SHOWER OF ASHES OR DUST.

To H. TORRENS, Esq. Vice-President and Secretary of the Asiatic Society.  
Ningpo, June 5th, 1846.

SIR,—I beg to enclose for the Meteorological annals of the Asiatic Society, the subjoined communication from Mr. Bellott, the scientific surgeon of H. M. Ship *Wolf*. I have been unable to obtain any information from men, or books, in relation to showers of ashes (such things readily escaping the notice of Chinese observers) though from the proximity of this part of the coast of China, to the volcanic chain which girds the eastern and southern shores of Asia, and the force of the N. E. Monsoon, phenomena of this description might be occasionally expected. I have however learnt from Dr. Robertson of H. C. Steamer *Nemesis* (stationed at this port) that on the day in question (viz. 15th March,) he and some other officers noticed similar appearances to those described by Dr. Bellott, vegetation being covered with sand, and parts of the vessel, and the atmosphere misty. Wind was N. E. At the time I was absent at Chusan, where I am not aware that any sand or dust was perceptible. If I may presume on an opinion I should refer the phenomenon to volcanic action, and probably emanating from Mount Fusi, on the island of Nippon, the chief of the Japan archipelago. The altitude of Mount Fusi is about 14,000 feet, and it is regarded by the Japanese with awe, and wonder. Kæmpfer says, that "Poets cannot find words, nor painters skill and colours sufficient to represent it as they think it deserves." It is subject to frequent eruptions, accompanied with earthquakes, which have destroyed vast numbers of villages. In the eruption of 1707, cinders were carried ten leagues, and ashes fell several inches thick at Dezima. The phenomenon referred to, although occurring in the remotest field of the Society's domain, is not, I think, without some degree of interest. I forward the small packet of sand transmitted to me by Mr. Bellott.

Yours very truly,

D. J. MACGOWAN.

*Copy of a letter from Thomas Bellott, Esq. Surgeon R. N., Fellow of the Royal College of Surgeons, to Dr. Macgowan.*

H. M. SHIP WOLF, Shanghai, March 16th, 1846.

MY DEAR SIR,—I transmit an account of a descent of fine sand that occurred at this place yesterday. On the 15th, the wind was N. N. E. in

force, No. 1; N. E. No. 2; E. N. E. No. 3; N. E. and calm at daybreak; what was considered an ordinary mist was observed; but those officers who walked on shore at that time, noticed their shoes and trowsers dusty. This also I experienced in the afternoon. After 8 A. M. dust was perceptible on the guns, on the upper works, and other polished surfaces on deck. I collected as much as possible; on gathering the dust on the finger, and holding it in the rays of the sun, which consequently shone with half its brilliancy, the particles glittered, and the sand although impalpable between finger and thumb, was gritty between the teeth. The sand passed the ship in light clouds, when the light airs freshened; it was something like smoke, but not of a blue colour. At 2 P. M. I walked three miles into the country, the whole atmosphere appeared to consist of a light brown dusty colored mist; this was the uniform appearance the whole day. The plants were covered. The sun set, apparently more diminished in his diameter than on a frosty evening, and of a pale white, sickly hue. At 10 P. M. I spread two large newspapers to catch the sand; they were kept spread until half past one *mediâ nocte*; yet although the sand descended and lay on the guns, none fell on the paper; whether from electric attraction or not I do not know. The stars, although the sky was cloudless, Ursa Major in the zenith, were dimly visible. The moon three days past her full was partially obscured, and cast a very faint shadow on my hand; at *one mediâ nocte* the moon and stars resumed their usual appearance, and at half-past one the Quarter Master observed "it was all over." The Barometer 29.88, from 30 inches.\* If you breathed it through the mouth the sand gritted between the teeth. The entire surface of this district is alluvial clay, without pebble, or sand; the nearest sand (coarse and shelly) is 12 miles distant. It was said that the merchantman *Denia* fell in with this descent of sand 308 miles from any land, in the direction of Loo-choo, and also pumice stone was floating. As I did not see her log, I do not certify this fact.

Yours sincerely,

J. BELLOTT.

*D. J. Macgowan, Esq. M. D. Ningpo.*

P. S.—I forward a little of the sand.

I should premise that the entire weight of the minute specimen of this dust forwarded to us did not exceed  $1\frac{1}{2}$  grains, so that all the experiments are performed with less than pin-head specimens, but chemists well know the accuracy with which these microscopic experiments can demonstrate the presence or absence of certain elements, and from

\* So in MSS. I presume that what is meant is, that the Barometer fell to 29.88 from 30.00?—H. P.

the details can judge at a glance if they have been correctly and carefully performed. This is necessarily mentioned because I could only sacrifice such exceedingly minute assays, and have thus been obliged to refrain from further researches, as for example its specific gravity, the proportion of animal to mineral matter, and the hygrometric qualities of the dust, all of which, with many other points, it would be very satisfactory to know. I am in hopes however that I shall receive a report, with specimens, under the Admiralty order to H. M. Ships on the Eastern Station to report on Storms, in which other Meteorological phenomena are I presume included.

The dust is an olive grey powder, cohering much together, like the scrapings from a paper filter, and when viewed with the magnifier is evidently mixed with something like hairs of two kinds, black and rather thick white ones. Under the microscope it is evidently a congeries of very short transparent white, black and brown hairs or fibres, with some reddish, strait spines, and grains of pellucid quartz-like sand adhering amongst them. There was one small grain like a seed, but hard, which when viewed carefully appeared to be an earthy concretion. I unfortunately lost it and could not thus try it at the blowpipe.

It just '*grits*' under the nail on glass, and rubbed between two glass surfaces scratches them but very faintly, felting into a smooth mass from the quantity of fibre. I *think* the taste is slightly saline, but in the very minute quantity taken cannot be sure. Moistened on turmeric paper it distinctly reddens it and is thus alkaline, and contains probably the sub-carbonate of soda, the commonest of the alkaline salts.

#### *Blowpipe Examination.*

*On platinum foil*: held over the lamp it flames up, the fibres are burnt with a strong ammoniacal odour, and a grey coherent powder, like pumice, remains.

2. *On platinum foil alone: before the blowpipe*; this powder fused in the reducing flame but at one point only\* and not at the detached portions. The fused part is a bottle-green glass, and when detached is found to have made a little circular hole in the platinum, undoubtedly from an alkali contained in the assay.

\* Probably at one of the minute concretions noted above, and which are not remarked by the naked eye.

3. *The fibres*, which one would assume to be capillary obsidian, if we supposed the dust volcanic, are not so, but apparently animal! burning up with the common ammoniacal smell and smoke of burnt hair or feathers.

4. *On charcoal* the assay burns up as before, leaving a coherent, olive-grey, granular mass like pumice, which is infusible.

5. *With Soda on charcoal* this fuses to a reddish, dark grey, opaque and pearly bead with violent spitting and throwing up of little globules.

6. *When to this bead is added an equal quantity of Borax*, it fuses on Platinum wire to a transparent bright and colourless, but crackly glass, which is slightly green while cooling.

As far then, as physical and chemical characters are concerned, we may call our dust a congeries of light downy fibre or hairs with siliceous adhering to them and an admixture of an alkaline salt! It appears from Dr. Macgowan's and Dr. Bellott's letters that the mist and dust certainly extended on the same day from Ningpo in about  $30^{\circ}$  N. Lat. ; to Shanghai in  $31\frac{1}{2}^{\circ}$  N. (I use round numbers here) which gives 90 miles of difference of latitude, and that it was noticed with light winds from N. N. E. to E. N. E. from 8 A. M. to 1 A. M. or for 17 hours. Now if we take it to have moved only at the rate of  $2\frac{1}{2}$  miles per hour, as "the sand passed the ships in light clouds," says Dr. Bellott (and this is the slowest rate we can assign to moving clouds,) this would give  $17 \times 2\frac{1}{2}$  or 42 miles in length for it, and without noticing the difference of longitude between Ningpo and Shanghai, which are nearly N. W. and S. E. of each other, we may say that the difference of latitude, 90 miles, was the breadth. We have thus  $90 \times 42\frac{1}{2}$  or 3825 square miles for its extent!

Where could a cloud of 3800 square miles of fibres, alkali, and sand (far this it was by the specimens before us) come from?

We have seen that it is not in the least volcanic, its animal nature putting this wholly out of the question, and all the volcanic dusts upon record are for the most part fusible and pulverulent (like pumice or obsidian) while the residuum of ours is perfectly infusible—for the little globules are, as I have stated, properly the only fusible parts, being the alkaline concretions. I shall now proceed to show that though the wind was from the N. E. and the phenomena occurred while the N. E. monsoon was yet blowing, that in all meteorological probability the dust did *not* come from the N. E. but from the N. W. or W. N. W.



For it is now a well recognised fact that the higher currents of the atmosphere are north, say at the polar circles, and become north-westerly and gradually westerly as they approach the equator, although the trades are easterly and the monsoons alternating in their direction, and we know also that volcanic ashes and other light matters are often carried from the west to the eastward by this great upper stream of westerly wind. The fall of the ashes of the volcano of Cosseguina at Jamaica in 1835, 800 miles to the North-East of it and consequently directly *against* the trade-wind, is a decisive instance of this\* and I do not mention others for brevity's sake.

We are assured moreover that our dust must have come from the land by its semi-animal constituents, and that it must have come therefore originally from some quarter to the westward of the meridian of Ningpo, for to the eastward is the ocean, and as it was brought down by a north-easterly current below, that it must have come from the northward. In the north-west then seems the most probable direction to suppose it was originally carried into the atmosphere, as I shall presently show, that it is improbable it could have come from Corea or Japan. We may also note here, that Dr. Macgowan himself certifies that no dust fell at Chusan; where he was; Chusan lying north-east of Ningpo. Hence it was either too high to fall there or it came at least from the north-west. The report of the ship I do not notice here, her position being uncertain, and no time given, and Loo Choo bears about South-East from Shanghae, which would make the dust come from the N. W.

The volcanic ashes and dust are, it is always supposed, and this is most probable, projected far enough into the atmosphere, or carried up by the whirlwinds which volcanic eruptions undoubtedly create, high enough to enter the upper currents of the winds, but volcanic action is out of the question here, and we must look for other causes.

Frogs, fish, seeds, pollen, &c. are well known to have been carried up by whirlwinds and horizontally to great distances by currents of air before their fall, and on a larger scale we have the fine dust of the Sahara, which is often carried up and falls far out at sea about the

\* Ashes from the same volcano fell also on board *H. M. S. Conway*, in the Pacific, 1200 miles to the westward of it. Jorullo, Tuxtla and St. Vincent, are cases too well known to be detailed, of ashes carried to the N. E.

Cape de Verd Islands. There is nothing extraordinary then in supposing that this dust was originally raised by some such cause as a great storm or whirlwind, and that it might be carried by the superior current to a very great distance before it fell. It was probably also raised in a very dry state, and one cause aiding its fall might be the absorption of the humidity of the air as it approached the ocean, hair being highly hygrometric, and hence the difficulty of supposing it to have crossed any great extent of sea, as it must have done to come from Corea or Japan. It is evidently, by Dr. Bellott's description, so light that (which appeared to him very unaccountable), it obeyed strictly, like a part of the atmosphere, the laws which regulate the deposition of dew; for it was deposited on the guns and other quickly radiating bodies but "would not settle" on his newspaper! He forgot that the paper, being a non-conductor of the highest order, prevented the radiation from the deck in that part, and thus keeping it at a little higher temperature prevented the depositing of the dew, which in this case was carrying the dust with it.

It is a startling thing to say, and I do it with all caution, but it is quite within the limits of possibility, if not of probability, that this dust came originally from the steppes of Tartary! and the presence of an alkaline salt in it is no small addition to the probabilities. The nearest part of Mongolia without the Great Wall is only about 675 miles from Shanghae, a distance to which a light mass, half dust and half fibre, might easily be carried, especially if raised as it would be there, in a perfectly dry state; the dry winds of Tartary, and the Pak-fung or dry north wind of China which splits and cracks up in an hour the most seasoned wood work, are well known.

P. S.—Since this paper was written, the dust has, through the kind assistance of Dr. Cantor and Mr. J. W. Grant, C. S. been examined by much more powerful microscopes than I possess, and these gentlemen, together with Major Munro, pronounce the fibres to be *Confervæ*, and not hair. Some of these bodies may afford the ammonia in combustion of which the smell is so strong and distinct as to lead us to suppose, without this correction, that the fibres are hair.

Assuming then these to be *Confervæ*, we have to the North-Eastward as before, Japan and Correea; and to the Westward and North-Westward the Poyang, Tai-you, Hong-tze and other great inland lakes

of China, some or most of which are shallow (*jheels?*) and might furnish vast quantities of remains of *confervæ* on their inundated banks and flats.

In a paper by Mr. Darwin in the Journal of the Geological Society for 1845, on the fall of the Fine Dust in the Atlantic, which had escaped my notice and which Mr. Laidlay has been good enough to point out to me, mention is made not only of small but of coloured particles of stone  $\frac{1}{1000}$ <sup>th</sup> of an inch square, with some few a little larger, and much fine matter; but all the dusts examined by Mr. Darwin fuse under the blowpipe. Professor Ehrenburg finds that this dust contained no less than sixty-seven forms of Infusoria, that is of their siliceous tissues, but none of the soft parts remain. We may observe too that the whole of the dust falling on the Eastern side of the Atlantic comes from the neighbouring shores of Africa.

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PROCEEDINGS  
OF THE  
ASIATIC SOCIETY OF BENGAL,  
FEBRUARY, 1847.

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The usual monthly meeting was held at the Society's house on Wednesday the 10th of February.

The Hon'ble Sir J. P. Grant, in the chair.

The minutes of the preceding meeting having been read by the Senior Secretary—

Major Marshall objected to the manner in which vacancies in the Committee of Papers had been filled up at the last meeting, and said that election lists for all office-bearers ought to have been distributed. He then moved for a new election of all officers of the Society.

The Senior Secretary stated that it had been the practice of the Society for the past twelve years to do as had been done at the last meeting.

Major Marshall still pressing his proposition, it was moved by the Lord Bishop, seconded by Colonel Forbes, and carried with but one dissentient voice, that at future annual elections lists for *all* office-bearers be distributed according to the early practice of the Society.

The minutes of the January meeting were then confirmed.

The following gentlemen were ballotted for, and duly elected members of the Society:—

Capt. W. Munro, Brigade Major, Fort William; Capt. Ouseley, Assistant Political Agent, N. W. Frontier; Baboo Hurreemohun Sen; R. Jones, Esq. Hindu College; J. Muller, Esq. Mint; Baboo Debendernath Tagore, and W. M. Dirom, Esq. C. S.

The following gentlemen were proposed as candidates for election at next meeting:—

The Rev. William Keane, A. M. of Emanuel College, Cambridge, proposed by the Lord Bishop, seconded by Dr. O'Shaughnessy.

H. Thornhill, Esq., C. S. proposed by G. A. Bushby, Esq., seconded by Col. Forbes.

H. Newmarch, Esq. Professor, Hindu College, proposed by Mr. Heatley, seconded by Dr. O'Shaughnessy.

E. Linstedt, Esq. proposed by Mr. Blyth, seconded by Mr. Laidlay.

Baboo Dwarkanath Bose, of the Royal College of Surgeons of London, proposed by Dr. Stewart, seconded by Mr. Blyth.

W. Kerr, Esq. Principal of the Hindu College, proposed by Dr. O'Shaughnessy, seconded by Col. Forbes.

Lieut. Douglas, Bengal Artillery, proposed by Captain Broome, seconded by Dr. O'Shaughnessy.

Baboo Debendernath Tagore, proposed by Dr. O'Shaughnessy, seconded by Mr. Laidlay.

Rev. A. Sandberg, of Benares, proposed by Rev. J. Long, seconded by J. Ward, Esq.

The Senior Secretary handed in the accounts of expenditure, and receipts, with cash vouchers for the month of January, which were directed to remain on the Library table for general inspection till next meeting.

Read the following letter from Capt. Rigny, Bengal Engineers.

*To the Secretary of the Asiatic Society, Calcutta.*

*Cuttack, 26th January, 1847.*

SIR,—I have the pleasure to enclose copy of an inscription from a stone exhumed, a few days since, from the ruins of the stone revetment against the Kajoorey ruin, a work to which the city of Cuttack owes its continuance, for a period probably but little short of that of its existence.

The work was so seriously damaged during the last rainy season, as to render necessary the preparation of an estimate for a new line of works, giving temporary repairs merely to the old one; and it was in clearing away the ruins for the latter purpose that the stone came to light. From its position when discovered, it would appear to have been concealed, by a facing of stone given subsequently to the work in which it had been fixed as a record.

I may add that the letters on the stone (a basalt) are as sharply defined as if cut yesterday.

I shall be greatly obliged by your favoring me with a translation of the inscription.

I remain, Sir,

Your obedient Servant,

H. RIGNY, *Capt. Engineers.*

اغاز این عمارت در اواخر زمان دولت بادشاه جنت بارگاه نورالدین  
 محمد جهانگیر بادشاه طیب اللہ ثراہ صورت پذیرفت و اتمام آن در اوایل  
 اوآن خلافت ابدقران بادشاه عالیمان پناہ ابوالمظفر شہاب الدین محمد صاحب  
 قران ثانی شاہجہان بادشاه غازی و سال یک ہزار و سی و ہفت ہجری  
 سمت وقوع یافت و بانی این اساس بندہ درگاہ محمد باقرخان نجم ثانی  
 بلدہ باقرآباد •

## TRANSLATION.

The foundation of this building was laid at the close of the reign of the king of heavenly court, Nooruddeen Mohummud Jehangeer Badshah. May sanctity attend his resting place! and it was completed during the commencement of the reign (may it be perpetual) of the king of the world, father of victory, star of religion, Mohummud, second Lord of felicity, Shah Jehan Badshah Gazi, in the year 1037 Hijri, by a servant of the court, Mohummud Bâker Khan Nujumussani,\* inhabitant of the city of Bâkerâbad,—Architect.

Read the following extracts from a letter from Capt. Kittoe, to the Senior Secretary.

*" Shergahatti, 29th January, 1847.*

" By this day's dawh I have forwarded a packet of impressions and copies of inscriptions to Mr. Busaby's office, so pray send there for them that they may be in time for this meeting. I have kept back a good many, wishing to prepare them properly.

" I have I find, four of the most ancient inscriptions, more than had hitherto been noticed, being three from one place and three from another; the first three only differ in the initial name; the next are a pair (with the same difference) and the third entirely so. They are all unluckily mutilated; the pair have the same three letters struck out of each, and the quaint sentence ' Bodhist likha' in an ancient Sanscrit type. This has been translated by Prinsep as Bodhisool ब्रह्मसूत्र. It is certainly as like the one as the other; my version is ' Writing of Budhists'—his ' the root of the Bo-tree;' in another sense the ' root of knowledge,' the letters of the ancient writing have evidently been hammered out purposely. I have satisfactorily made out so much of the sentence, ' The beloved raja in the 12th year of his reign caused this cave,' &c. &c., but I am forestalling a long article I propose editing on the caves. Suffice it to say that I am inclined to give far more remote date to these inscriptions than has been hitherto accorded. I believe the ' Dasarath' named to be the identical person of ' Puranic' fame, the father of Ram, and that ' Devanam-piya-dasa raja' is only a title common to the Gupta rajas and those preceding. Oh, that poor James Prinsep were alive to enjoy the discoveries I have made, how we could have helped each other.

\* " A second Luminary."

"I am preparing tinted drawings on a good-sized scale of all my Buddhist sculptures. It is however hard work. In sketching very fast, I draw more in one day than I can copy and finish up in three or four. I go to the caves again to-morrow; it is 36 miles hence. I hope to have all ready for March meeting, when I shall be in Calcutta myself in all probability."

The inscriptions and paper were laid before the meeting and referred to the Committee of Papers for examination.

Read a letter from Mr. Secretary Melvill.

No. 73, of 1847.

*From P. MELVILL, Esq. To the Secretary to the Asiatic Society.*

*Fort William, the 23d January, 1847.*

SIR,—I am directed by His Honour the President in Council to transmit to you, for such notice as the Society may deem it to merit, the accompanying copy of a Journal of a Steam trip to the north of Bagdad, by Lieut. J. F. Jones of the Indian Navy, together with the sketches therein alluded to, which you will have the goodness carefully to return to this office.

I have the honor to be, Sir,

Your most obedient Servant,

P. MELVILL,

*Officiating Under-Secretary to Government of India.*

The document and drawings were referred to the Committee of Papers.

Read a letter from the Secretary to the Superintendent of Marine, forwarding Meteorological registers from Kyook Phyoo.

Read a letter from the Rev. Dr. Hæberlin respecting his edition of the Smritis now in course of publication.

*(See Report on Society's affairs inserted in Jan. number.)*

The Senior Secretary having communicated a proposition from the Committee of Papers recommending that Dr. Hæberlin's offer be accepted,

It was resolved unanimously that the Asiatic Society subscribe for 100 copies of each Vol. of the *Smritis*, the amount to be paid from the Oriental Fund.

Read a letter from the Baron Melvill de Carnbee, dated the Hague, 21st December, forwarding eight numbers of the *Moniteur des Indes* for the Society's acceptance.

*A Monsieur le Secrétaire de la Asiatic Society de Calcutta.*

MONSIEUR,—Je me rappelle toujours avec plaisir, Monsieur, que lors de mon court séjour à Calcutta, de Mars 1845, j'eus l'extrême honneur et avantage de faire



votre connaissance. J'étais alors en voyage de Java en Europe, et je me serais arrêté plus longtemps en Bengale pour des recherches Scientifiques, si le choléra ne m'eût fait changer subitement de plan. Après avoir éprouvé une attaque de cette maladie et avoir perdu mon domestique européen, j'avoue que je me comptais très heureux de m'embarquer, sain et sauf, à bord de l'Hindostan. Cependant, avant mon départ j'avois eu le temps de m'acquitter d'une commission dont j'étois chargé par la Société des Arts et des Sciences de Batavia auprès de la Société asiatique de Calcutta, ayant pour but de nouer des relations et d'établir une correspondance entre les deux Sociétés ci dessus nommées. Je fus assez heureux d'emporter la conviction quel'on partageait à Calcutta nos vues quant à l'utilité d'un tel rapprochement, et cela me fait conjecturer que mes démarches aient eu le résultat espéré.

Quelques mois après mon retour en Hollande, étant placé au Ministère de la Marine pour achever mon ouvrage sur l'hydrographie de l'Archipelago indien, j'ai fondé en même temps, de concert avec M. de Siebold, auteur de différens ouvrages sur le Japon, un journal, traitant des colonies Néerlandaises au Asie et en Amérique, sous le titre de *Moniteur des Indes*, etc. J'ai l'honneur, Monsieur, de vous faire parvenir par le présent mail les huit premiers numéros de ce journal, espérant que vous daignerez bien les présenter, de ma part, à votre Société comme une faible temoignage de ma profonde estime.

Je serais heureux si le but et l'exécution du *Moniteur des Indes* peuvent obtenir les suffrages de votre Société et que dans ce cas Elle voudroit bien, par sa puissante influence, en favoriser le succes en Bengale.

J'ai l'honneur d'être, avec une parfaite estime Monsieur,

Votre dévoué serviteur,

BARON MELVILL DE CARNEE.

Hollande, La Haye ce 21 Décembre, 1846.

The Senior Secretary submitted the annexed recommendations by the Committee of Papers.

The Committee having considered Dr. Roer's representation of the total incapacity of the Pundit, recommend his being dismissed.

With reference to a letter from H. M. Elliott, Esq. desiring to have certain MS. from the Library sent to him to Agra on depositing the value thereof.

The Committee deeming it impracticable to assign a value to MS. and considering these exposed to great risk of loss or injury in transit, regret they cannot advise compliance with Mr. Elliott's wishes, but they will gladly direct any assistance to be given at the Society's cost by having MS. or extracts therefrom copied by the Library establishment for his use.

The Committee submit a proposal from Mr. Frith for the patronage of the Society to a projected work by Mr. Doubleday on Diurnal Lepidoptera, and recommend that the Society subscribe for two copies and advertise the work gratuitously on the cover of the Journal.

Mrs. Ballin having applied for orders to colour 14 sets of the Burnes' drawings already lithographed and which Mrs. B. states are in danger of spoiling—and it having been ascertained that the cost of colouring the said drawings would be Rs. 1,379 12 annas, the committee advise that no further outlay be made on this account.

All which propositions were unanimously agreed to.

The Report on the Society's affairs, read at the January meeting and subsequently printed and circulated to resident members, having been brought up, was briefly discussed, and a few verbal or typographical alterations having been suggested and agreed to, the Report was unanimously adopted and the propositions it contains thereby voted as rules of the Society. The Report is published in the January number.

The Librarian submitted the usual list of donations, purchases and exchanges.

PRESENTED.

- 1.—Meteorological Register, kept at the Surveyor General's Office during the month of December, 1846.—FROM THE SURVEYOR GENERAL'S OFFICE.
- 2.—Meteorological Register, kept at Kyouk Phyoo, during December, 1846.—BY THE SUPERINTENDANT OF MARINE.
- 3.—The History of the British Empire in India, by E. Thornton, Esq., vol. VI.—BY THE BENGAL GOVERNMENT.
- 4.—The Calcutta Christian Observer for February, 1847.—BY THE EDITORS.
- 5.—Report of the Managing Director to the Board of Directors, &c. of the East India Railway Company, with a map.—BY THE COMPANY.
- 6.—Theodori Gulielmi Johannes Juynboll, Commentaria in Historiam Gentis Samaritanæ.—BY THE CURATORS OF THE ACADEMY OF LEYDEN.
- 7.—The Banks of the Bhagirathi.—BY THE REV. J. LONG.
- 8.—Analysis of the Abbé Dubois' Description of the character, manners, and institutions of the people of India.—BY THE REV. J. LONG.

EXCHANGED.

- 9.—Journal Asiatique, quatrieme serie, Nos. 35,—6 and 7.
- 10.—The London, Edinburgh and Dublin Philosophical Magazine, No. 195.
- 11.—The Quarterly Journal of the Geological Society of London, No. 8.

PURCHASED.

- 12.—The North British Review, No. XI.
- 13.—Journal des Savans for September, 1846.

- 14.—The Annals and Magazine of Natural History, No. 120.
- 15.—The Shah Nameh of Ferdusi, in Oordu verse, by Munshi Moulchund Lucknavi, 4 copies.
- 16.—Gunje Kubil, or an Oordu version of the Akhlak Mohuseeni, 4 copies.
- 17.—The Akhwán ul suffá in the original Arabic, 4 copies.
- 18.—Ditto in Oordu, 4 copies.

Read the subjoined report by Mr. Laidlay on the investigations referred to the Society regarding the Ajunta caves. The Report was directed to be submitted to the Committee of Papers.

*Report upon the Committee of Antiquities.*

Having been honoured at the meeting of December with the command of the Society to report upon the proceedings of the Committee of Antiquities, I lost no time in searching for such documents and correspondence connected with the subject, as might be available: but great delay having occurred in obtaining these, it was not till a few days ago that I was in a position to form any estimate of what that committee had done.

The Committee of Indian Antiquities was appointed, as all present are doubtless aware, in consequence of a communication from Government requesting the assistance and suggestions of the Society in devising the best means of preserving and publishing to the world the interesting monuments of Antiquity scattered over India generally, but more especially and immediately the invaluable paintings and inscriptions in the caves of Ajunta, which from their peculiarly perishable character, claimed the earliest efforts to rescue them from impending destruction.

This communication from so high and influential a quarter, was hailed with enthusiasm by the Society, as presenting not merely the highest encouragement to continue and extend a favourite pursuit, which had already reflected great lustre upon its past history, but also as a rare opportunity of doing so under the auspices of Government, pledged, in a manner, to assistance and co-operation. The Committee in question was appointed accordingly, and its members,—such at least, as like Messrs. Webb, Heatley, Kittoe and Latter, felt earnest on the subject,—entered at once upon their functions with ardour worthy of the Society's best days. The means of preserving and of delineating the precious remains of Ajunta, were discussed in a series of most able minutes, in which,—each member viewing the subject through the medium of his own predilections—a mass of varied and instructive matter was thrown together, which it were well to preserve for the guidance of all such as have kindred researches to prosecute.

But here, I regret to say, the labours of the Committee appear to have terminated! I have not been able to discover that any *active* measures were ever founded upon the suggestions offered in these minutes, or indeed that the Committee ever even met to adopt these or any other means of fulfilling the object of their appointment!

How deeply this indifference is to be deplored may be gathered from a single fact recorded by Dr. Allan Webb, that the invaluable remains of antiquity at Ajunta are daily, nay hourly, being lost to the world, not merely from the inevitable effects of time and exposure, and from the absence of all measures to preserve them, but from the worse than Gothic barbarism of casual visitors, who wantonly destroy the fresco or remove it in fragments for the gratification of the most idle and depraved curiosity ! " Whole yard-lengths of the painted or written inscriptions, says Dr. Webb, were *lying in water on the floor*, but were still legible when I visited these temples in 1836. If therefore written records be most valuable, as the Vice-President and Secretary of the Asiatic Society seem to consider them, how important to lose no time in securing these precious records ! *The rude boar spear of the hunter, or the Gothic curiosity of some casual visitor will strip whole walls for some one favourite head ! I have found in Bombay whole groups that had thus been despoiled !*"

Painful as it is to listen to such details as these, it is yet more so to reflect that on their communication, no active measures were taken by the Committee to stay the work of destruction ! The mouths of the caves are stated by Dr. Webb, to be nearly closed with rubbish, which both directs the water into them and prevents its exit ; and the removal of this at once was strongly urged as the first measure of preservation that should be recommended for the adoption of Government. I am not aware, however, that even this suggestion was acted upon !

Let us not however, dwell with vain regret upon time and opportunity lost, but rather arouse our energies to immediate exertion worthy of the Society that has already achieved so much in Indian archaeology. The question for us this evening to consider is, what can be done now ? And though for the most part made in reference to the peculiar case of the Ajunta caves, there are suggestions in the minutes of the Committee which, I humbly conceive, the Society cannot do better than act upon *at once*. Amongst these the recommendations, that a duly qualified person be deputed by Government to make accurate drawings of the painting, sculpture, inscriptions, and other remains of antiquity scattered throughout the country, and to adopt such measures as may seem essential, for the better preservation of such objects henceforward, is one so obviously appropriate that the Society will, I think, concur in approving it. This point has been very fully considered in an able minute by Captain Kittoe, who I need not remind the Society has already distinguished himself by his zealous and indefatigable antiquarian researches, to which the past volumes of the Society's Journal bear ample and lasting testimony. This officer concludes an excellent minute evincing great knowledge of the subject combined with untiring zeal, by proffering his personal services through the Society to Government, for the investigation and delineation of all objects of antiquarian interest wherever found ; a field too vast, perhaps, as sketched by himself, for any single individual, however energetic ; but to a portion of which his talents and zeal might undoubtedly be directed with the happiest results.

That Captain Kittoe's offer was not acted upon, arose I believe, in part from the circumstance of that gentleman having been appointed soon after to a very important

office, and in part from a feeling of delicacy entertained by the Committee in interfering in any way with the patronage of Government. But certain it is that it were no easy matter to find a person better qualified by taste, experience, and skill for the congenial task he here volunteers. Whether the services of this gentleman are still available, I have no means of knowing: but if so, it may be left to the meeting to consider whether a representation to the foregoing effect should still be submitted to the Government, or what other measures should be adopted to carry out the wishes of the Hon. Court of Directors as expressed in their letter to the Governor General in Council, 29th May, 1844.

The caves of Ajunta are now indeed, under the orders of the Madras Government, being satisfactorily investigated; but the field is yet vast, and with the Society will remain the credit of having improved, or the discredit of having neglected so fair an opportunity of promoting at once its objects and its reputation.

Before concluding this report, I may be allowed perhaps to observe, that the present neglect of Indian Archæology may in a very great measure be ascribed to the interrupted publication of the Society's Journal. For many months little has been known of our proceedings beyond these walls: not to the public only, but to distant members and contributors, have these been a sealed book; a circumstance eminently unfavourable to pursuits such as our's, mainly dependent as they are, upon the free-will offerings of widely-dispersed contributors. This defect will, it is hoped, be remedied henceforward: the arrears of the proceedings have already been brought up, and we may hope to be able in a few weeks to produce a monthly number of the Journal with tolerable regularity.

J. W. LAIDLAY,

*Co-Secretary.*

10th February, 1847.

Mr. Blyth submitted the following Report on the progress of the Zoological department during the preceding months.

*Report for the months of December, 1846, and January and February, 1847.*

SIR,—Having been absent upon an excursion to explore the jungles N. and W. of Midnapore, at the period of the January meeting of the Society, and the pressure of business at the December meeting having necessitated the postponement of the reading of my report for that occasion, I have now to bring before you the results of three months' gatherings, and can scarcely, within moderate compass, do justice to the contributions of our numerous supporters.

1. From the Barrackpore menagerie, I have to acknowledge having received the carcass of a particularly fine female Giraffe, the skin of which is in process of being set up as a stuffed specimen, while the skeleton has likewise been preserved. Also that of a Kangaroo, that has in like manner been prepared as stuffed skin and skeleton.

Two other large animals that have been mounted as stuffed specimens during the past month, are a young Bull Gayal (*Bos frontalis*), which I have the pleasure of presenting to the Society, and the male Saumer Deer (*Cervus hippelaphus*), which had been living for some years in the Society's compound.

2. From R. W. G. Frith, Esq., and

3. From Mr. E. Lindstedt, large and valuable collections of mammalia and bird skins from the Malayan peninsula. These collections have left scarcely a species of the two classes mentioned, known to inhabit that peninsula, of which the Society still requires specimens; and they have contributed a good deal to our knowledge of the rich zoology of the country in question. As some of the desiderata which these collections have supplied us with, may be enumerated—among mammalia, a very fine series of the *Hylobates lar*, also *Presbytis femoralis*, examples of the Marten referred to *Mustela flavigula* in Dr. Cantor's list (xv. 194), and some murine skins,—and of birds, *Buceros comatus*, male and female, *Bucco quadricolor*, *Gecinus rubiginosus*, *Tiya Rafflesii*, series of *Centropus eurycercus*, *Chapita malayensis*, *Brachypodius criniger*, A. Hay, (xiv. 557), *Malacopteron majus*, n. s., *Orthotomus edels*, and *Rhisothera longirostris*, m. and f. Some fishes also are comprised in Mr. Frith's collection, pertaining to the genera *Serranus*, *Mesoprion*, and *Muranesox*, and a *Monitor* (vel *Varanus*) in that of Mr. Lindstedt, as also a small *Crocodilus biporcatus*.

4. The Rev. J. Barbe, to whom we have been repeatedly indebted for valuable donations, has now presented us with a considerable number of specimens, chiefly of birds, collected in the Tenasserim provinces, Penang, and Malacca. From the first named locality, Mr. Barbe has brought a third undescribed species of Squirrel (all from the provinces,) for which we are indebted to his exertions; and from Penang the *Crypsirina varians* (or *Phrenotrix temia*, Horsfield), the male of *Philetona plumosus* and other species of much interest.

5. Mr. O'Ryley, of Amherst, has favoured the Society with an extremely interesting collection of mammalia, birds, reptiles, &c. from the Tenasserim provinces: among which may be noticed the skin of the head of an old female *Rhinoceros sumatranus*, with the horns perfect, and which I have had properly stuffed; also fine specimens of an undescribed Squirrel; and among birds, two examples of the *Euriorhynchus griseus* (vide *As. Res.* vol. xix, pt. i, p. 69. and pl. ix), which has hitherto been considered one of the rarest of the feathered class, but which appears to be of very common occurrence on the Tenasserim coast, as I am assured by Mr. Barbe and others. Mr. O'Ryley has sent also a Teesa Hawk, which seems to be the *Poliornis fasciatus* of Lord Arthur Hay, *Madras Journ.* No. XXXI, 146 (but, if so, very doubtfully distinct from *P. teesa*), a Bulboal, which is the representative of *Pycnonotus hæmorrhous* of Arracan; some rare snakes, &c. &c.

6. Mr. F. Skipwith, C. S., has likewise sent us, from Chittagong, an example of the *Euriorhynchus*, a species which I hope soon to obtain in abundance from Mr. O'Ryley, and so ascertain its seasonal variations of colouring, as well as to receive replies to my various inquiries respecting its habits and mode of life.

7. From Capt. Phayre, the Society has been presented with a large collection of Arracan specimens, chiefly birds, of which the most remarkable is a very large species of *Iora*, in all probability that alluded to in Vol. XIV, p. 602, of the Society's Journal.

8. Major Jenkins has obliged us with numerous specimens of reptiles, insects, &c. preserved in spirit, from Assam.

9. Mr. Thorburn, of Goalpara, has presented the Society with a collection of birds, reptiles, fishes, &c. from that vicinity.

10. From Dr. R. Templeton, of Colombo, we have received a fourth case of Cinghalese specimens of mammalia and birds, comprising various objects of much interest in those classes, and several novelties which I intend to treat of elsewhere; merely mentioning now that Dr. Templeton has sent a second and new species of Jungle-fowl from that island (*Gallus lineatus*, nobis), additional to the *G. Stanleyi* of Hardwicke's illustrations—which latter has, I believe, been first verified from an actual specimen, previously transmitted to the Society by the same gentleman.

11. Capt. Boys left with us, for the Society's museum, a few specimens of birds procured on the route to Calcutta from the Upper Provinces, and the skull of a *Gavialis* from the Ravee river, flowing into the Indus.

12. Mr. Birch, of the Pilot service, continues to collect for our museum such specimens of fishes, crustacea, mollusca, &c. as he can procure in the course of his professional trips to and from the Sandheads.

13. Mr. T. H. Duncan, has sent to the museum a living specimen of *Strix flammea*.

14. Dr. Gurney Turner, of Midnapore, obliged me, when I visited that station, with some Hornbills, snakes, &c. for the Society's museum.

15. O. W. Malet, Esq. Magistrate of Midnapore, also favored me with a magnificent pair of Saumer horns, from Cuttack.

16. From Sir William Jardine, Bart., the Society has received a small collection of British birds, including some that are very acceptable; among which I may mention the common English Sparrow, which I had long wanted to compare with its Indian representative.

And I may conclude by remarking that during the month that I was absent from the museum, I collected above 60 skins of mammalia, (including of course the small species,) 273 of birds, and numerous reptiles, &c.; many of which are either quite new to the museum, or have replaced very inferior specimens of the same.

To treat in detail of these various acquisitions, would require more time and leisure than I can at present command; but the results I hope to embody in future contributions, and indeed have already incorporated some of them in papers which are awaiting publication.

I have the honor to be, Sir,

Your obedient servant,

E. BLYTH.

P. S. The large amount of duplicates that have accumulated during the last few months, have for the most part been distributed in collections now ready to be forwarded to the Hon'ble Company's Museum, to that of the Christiania University, that of the Society of Arts and Sciences, &c. of Boston, United States, and that of the Manchester Institution.

I have the pleasure also of presenting, on my own account, some purchased specimens of rare Himalayan mammalia and birds, of species which I have long required for examination and frequent reference.

For all the above communications and donations the thanks of the Asiatic Society were unanimously voted.





JOURNAL  
OF THE  
ASIATIC SOCIETY.

MARCH, 1847.

*On the Ruins of Anuradhapura, formerly the capital of Ceylon, by  
WILLIAM KNIGHTON, author of the "History of Ceylon," and  
late Secretary, Ceylon Branch Royal Asiatic Society.*

The ruins of the former capital of Ceylon are situated in the northern province of the island, about midway between Aripo and Dambool, on the road or trace which unites the two. It is distant from Aripo about 45 miles, and from Dambool not quite 48. On both sides of it the road passes for many miles through a desolate and unhealthy region, unvariegated by any scenery of interest to take from the monotony of the journey. But a few native huts are now in existence on the site once so densely populated, and were it not for the existence of a District Court, and a Government Agency there, it would probably be entirely deserted. Dense masses of jungle now surround the monuments of ancient civilization, amidst which are to be seen in all directions, granite pillars, varying in height from fifteen to twenty-five feet, and occurring so frequently as to give rise continually to the thought, what could have been their use? But before entering particularly upon any description of the ruins, it may not be amiss to take a brief review of its foundation and history.

Anuradhapura was founded about five hundred and forty years before our era, by Anuradha, one of the followers of Wijeya, who had shortly before invaded the island. It is thus coeval with the earliest authentic facts in the history of Ceylon. The Mahawanso in noticing its

foundation merely relates that it was then but a village, though subsequently a city, and that it was founded on the banks of the river Kadamba, the present Mulwatte Oya. The village thus early formed appears to have remained in its original obscurity for upwards of one hundred years. It was then greatly enlarged and improved by the usurper Pandukabhayo, who, in 437 B. C. made it the capital of the island. His improvements would appear to have been very extensive, inasmuch as the city was divided under him into four parts, over each of which an officer was appointed as conservator. A body of five hundred chandalas,\* we are told, was appointed to be the scavengers of the city, two hundred to be nightmen; one hundred and fifty to be carriers of corpses; and the same number were engaged at the cemetery. For these chandalas a distinct village was appropriated to the north-west of the city. We have here sufficient evidence that at this early period the city was already rapidly advancing to that degree of greatness which it subsequently attained.

We next hear of the advancing greatness and extent of Anuradhapura in the reign of Tisso the first (surnamed Devananpiattisso), on the occasion of the transportation of the sacred Bo-tree of Gotamo from the banks of the Ganges to Ceylon; (B. C. 307,) where it was deposited in the Maha Wiharo, and where, if tradition and the priests are to be believed, it still exists. In fourteen days, the Mahawanso informs us; the pious Tisso had the branch of the sacred tree conveyed from the port at which it landed to the capital. "At the hour when shadows are most extended," proceeds the Singhalese historian, "the monarch entered the superbly decorated capital by the northern gate, in the act of making offerings; and passing in procession out of the southern gate, and entering the Mahameyo garden, hallowed by the presence of four Buddhas, he, with sixteen princes raised up the Bo branch upon the spot where the former Bo-trees had been planted." From this account it would appear that the Maha Wiharo was at that time without the city, although certainly not so, afterwards. From this period till the reign of Dutuyaimono, and in fact till about the period of the Christian era, it would appear that the city gradually advanced in size and importance, till it became the extensive and remarkable place which its ruins at the present day attest it to have been.

\* Low caste people.

That the three centuries preceding and the three succeeding the Christian era, were the years during which Anuradhapura flourished most, is proved by the fact that all the great buildings whose remains at the present day astonish us by their massiveness or size were erected within that period. The remains of the walls of the ancient town, which were erected about sixty years after our era, prove by their great extent the space which the city then covered. They were sixteen miles square, and were built due north and south, east and west, thus enclosing a space of two hundred and fifty-six square miles. Within this vast space, however, we must remember that there were, besides the streets and buildings, extensive gardens, and water-courses, which must have occupied a very considerable extent. It would be futile to endeavor to discover the amount of the population of Anuradhapura at its most flourishing period, no data being afforded in the native histories by which it could be judged. That it must have been very considerable is evident, as well from the accounts given us of its importance, as from the ruins which even now exist.

The first blow to its prosperity appears to have been given by a wavering monarch named Mahasen, who reigned in the third century, and who, at first becoming attached to a small and heterodox Buddhistic sect, employed his power in the destruction of the great buildings occupied by the more numerous and more orthodox community. At a later period his opinions having changed, he endeavored to restore what his fanaticism had formerly defaced. In the fifth century a still greater check to its prosperity was inflicted by a protracted struggle between several Malabar invaders and the royal race, in the course of which the capital fell, sometimes into the hand of one party, sometimes into that of the other, and as the struggle lasted for a period of twenty-four years, we will not find it difficult to picture to ourselves the injury which the city must have sustained in the contest. Towards the close of the same century it was deserted by a usurper for the rock Seegiri, mentioned in my former paper, and from this period till its final desertion by the royal line, A. D. 769, it appears to have been gradually decreasing nearly as fast as its rival Pollonaruwa was advancing in extent, in population and in wealth. In the eleventh century one more attempt was made by a Singhalese monarch to restore the former capital, but without success, and after this period, the notices of it by the native histo-

rians are few and far between, till we reach the period of the arrival of the Portuguese under Almeida in 1505. Indeed for so long a period as two hundred and fifty years previous to that event, I can find not even a passing allusion to it in the chronicles of the island, a proof, I imagine, either of its utter desertion or of its extreme insignificance about that time. Towards the latter end of the seventeenth century it would appear, from Knox's relation, that when he passed through it he found it completely deserted, and nothing left but the ruins of its once magnificent buildings to prove its former greatness.

The reception of the branch of the sacred Bo-tree by Tisso, three hundred years before our era, and its plantation at Anuradhapura, has already been noticed. To attend to this, the chief object of Buddhistic worship there, a college of priests was established, for whom a suitable building, called the Maha Wiharo, was raised ; of this there are now but few remains, the name having been transferred to the Bo-tree itself and to the pile of building or platform by which it is supported and encompassed. This platform is a square erection about twelve feet high, from the summit of which the various branches of the Bo-tree appear issuing, and has nothing about it worthy of particular notice save the sculptures on the steps leading to a rude and recent building, through which the visitor passes in going to the sacred tree. I know not how better to describe the platform by which the Bo-tree is surrounded than by likening it to a gigantic square flower-pot, from the earth in the centre of which the tree springs. The sculptures to which I have referred are exceedingly interesting as a monument of the state of the arts in the earliest ages of Ceylonese greatness. They were evidently a part of some other building long ago destroyed, and replaced by the rude wooden structure to which allusion has been made. On one of the stones, a large, flat step, a number of concentric semicircular arches have been deeply cut in the spaces, between which are admirably represented in deep and bold cutting, the horse, the buffalo, the elephant, the lion, together with birds and flowers. I was surprised at the excellence of these sculptures, having seen nothing before of Singhalese workmanship, at all equal to them. Their spirit, workmanship, design and execution prove incontestibly that those who executed them must have been far indeed from barbarism. They are as superior to the native sculptures which I had seen elsewhere as the massive ruins of

Anuradhapura itself are superior to the paltry remains of Cotta or of Kurneyalle.

The earliest building whose remains still attract the attention of the visitor, is the Thuparamo, or Thupharamaya dagobah, erected by the pious Tisso formerly mentioned, three hundred and seven years before our era. The spot on which it was erected was said to have been hallowed by the presence of Gotamo himself, and the purpose of its construction was to enshrine the right collar-bone of that prophet. Considering the great length of time during which it has stood, (upwards of two thousand years) it is in excellent preservation, and the piety of the present high-priest has lately re-erected the spire which had fallen, without taking from the appearance, or adding anything foreign to the original design of the structure. It is situated a short distance to the north of the road by which Anuradhapura is usually reached, that from Dambool to Aripo. The approach to it is along the ancient north and south street of the city, a broad and well-defined road, now cleared of jungle. On each side of this street large trees and low brushwood extend over the greater part of the adjoining lands, amidst which hundreds of square granite pillars lift their heads in lonely desolation, the silent witnesses of the present desertion, as they once were also of the busy multitudes who thronged these streets. Masses of stone cut into the forms of bullocks and lions are also seen lying numerous about, together with the fragments of sculptured columns, and the blocks of irregular and regular stone, usually seen on the site of deserted habitations. But one object cannot fail to strike the most inattentive in traversing the great and now grass-grown street by which he is led to the Thupharamaya, that is, the towering mass of the Ruanwelle dagobah, rising on his left hand like a pyramidal hill overgrown with trees and bushes. A little further on he crosses what now remains of the east and west street, running at right angles to that on which he stands, and of equal dimensions, both being quite as broad as the widest streets of London or Paris at the present day. Near a bend in the road which leads the visitor in a north-westerly direction, stands one of the most extraordinary monuments of royal Singhalese refinement. It consists of an enormous trough, composed of a single block of granite, about ten feet long at the top, five broad, and in depth four feet—the excavation measures nine feet by four, being also two and a half feet deep. The tradition

is that it was ordered by Dutuyaimono to hold his elephant's food when feeding. I should imagine that six elephants could have fed from it at once without incommoding each other.

The Thupharamaya is certainly the most elegant structure at Anuradhapura, and exceeds in beauty all the others. The rough sketch of it which I annex may serve to give some idea of its present appearance. A very elegant and well-executed view of its aspect before the restoration lately effected by the high-priest may be seen in Major Forbes' account of Ceylon. The dagobah itself consists of the usual semicircular mass of masonry standing on a square platform of flagged brickwork, and surmounted by a tapering spire. The entire height of the building above the plain on which it is situated, and including, of course, the platform on which it stands, I estimated at fifty feet. The columns surrounding it are exceedingly graceful—long, slender and well proportioned as they are, they may give us a very favorable idea of the taste of the artists by whom they were designed. They consist of two distinct blocks of granite, one forming a square base and octagonal shaft, both together being twenty-two feet long—the second forming the capital richly ornamented with small human figures standing round the lower part of the projecting ornament, which may be seen at the summit, and adding about two feet to the height of the pillars. Originally there were one hundred and eight of these pillars divided into four rows, standing round the dagobah and issuing from the platform on which it stands—many of them are now fallen down, some have been removed and others lie in the positions in which they fell.

Six hundred years after the erection of the Thupharamaya a temple was built beside it to contain the celebrated Dalada, or tooth-relic, then first imported into Ceylon. The remains of this temple are still visible, without having any thing about them greatly to distinguish them.

On looking at the Thupharamaya, the question is naturally suggested to us what was the object of those pillars, and for what purpose were they intended? To this question I could never get a satisfactory answer. My own impression, however, is, that if not intended as ornaments, they were designed to support a roof which should stretch from the summit of the spire to the outer line, so as to protect the dagobah from the influence of the weather. It is, however, equally true that such a roof

would also protect them from the gaze of the worshippers, and that it would require only one line of pillars instead of four to support it.

The Thupharamaya, we can easily believe, would follow the fortunes of the city in which it stood. The unbelieving Malabars would show it little respect, although they might consider the trouble too great of levelling it with the ground, whilst the Singhalese monarchs would restore it at intervals to its first condition, or leave it to its fate, as piety or indifference had the ascendancy in their minds.

The ruins which usually strike the eye of the traveller on first entering Anuradhapura from the southern side, are the remains of the numerous pillars which formerly supported the *Lowa Maha Paya*, or brazen place for the priests. This building, one of the largest that ever existed in the east, was erected by Dutugaimono, a hundred and fifty years before our era. One hundred and fifty years before that again, its erection, Singhalese tradition assures us, had been prophesied by Mahindo, the great priest of Buddha, who arrived with the Bo-tree in the time of Tisso. Dutugaimono, having heard of this prophecy, the Mahawanso informs us, searched for a record of it said to have been deposited in the palace. This record, with the assistance of the priests, he at length found in a vase, inscribed on a golden plate. It mentioned his own name we are told, and gave a brilliant account of the palace he should build for the priests. The monarch, unsuspecting of deception, was delighted at the heavenly warning, and assembling the priests in his garden, many of whom were doubtless laughing in their sleeves at him, informed them that if they could but find out what kind of a palace the devas or heavenly spirits had, he would build them one like it. Nothing was easier for the priests than this; so sending off eight of their number ("all sanctified characters," reverently observes the Mahawanso) to the other world, they told them to bring back a drawing of the palace of the devas. It would seem that trees grew in the other world also, for the eight "sanctified characters" returned with a sketch of the palace of the devas drawn on a leaf, with a vermilion pencil. The monarch seems to have asked no impertinent questions as to the road they took or the reception they met with, but at once proceeded with the erection of the *Lowa Maha Paya*. It was one hundred cubits, two hundred and twenty-five feet square, and the same in height, being supported on sixteen hundred stone pillars, having forty on each side.

These with a few exceptions are all standing at present, but not in their original condition, many of them having been split to forward the schemes and lessen the trouble of future monarchs. In the centre they are generally twice the thickness of those on the outside. They are in general about twelve feet high and were evidently intended for being built on—the spaces between them being too small to admit of being separate apartments. As at first erected, the *Lowa Maha Paya* was nine stories in height and contained in each story one hundred apartments. This number seems large, but it will be found on calculation that one hundred apartments (supposing them all of the same size) each twenty-two feet square, could be constructed in the space given, and the cells usually occupied by the priests are much smaller. In the centre of this palace there was a large and splendid ivory throne, on one side of which stood a representation of the sun in gold, on the other a similar emblem of the moon in silver, and above shone the stars in pearl. The account of this building as given by the Chinese Buddhists who visited Anuradhapura three hundred years afterwards, confirms the description of the Mahawanso. Such was the fruit of the visit of these eight priests "all sanctified characters," to the *deva-loka*. When stretched upon his death-bed, Dutugaimono, anxious for his future welfare, asked the attendant priests respecting his hopes of happiness in a future world, particularly reminding them of the palace which he had built for them, and on the ground of this, and his other meritorious works he was promised an immediate entrance to the *deva-loka*, where he was doubtless received into that palace, the architecture of which he had copied on earth. The name of the "brazen palace" arose from its having been roofed with sheets of metal, and not with the ordinary tiles.

Soon after its erection, or in the thirtieth year after the Christian era, the *Maha Paya* required considerable repairs, but it was not till Mahasen's reign in A. D. 286, that it met with any very serious disaster. By that apostate monarch the entire of the nine stories were swept away and nothing left but the pillars which had supported it in the centre. To repair this destruction his son and successor Kitsiri Maiwan in A. D. 302, was obliged to split many of the pillars in two in order to complete the original number. The palace was subsequently reduced to five stories, and gradually fell into neglect and decay until



the removal of the seat of government to Pollonaruwa, which completed its desertion.

The stone pillars on which it stood are a little to the north of the Maha Wihare, on the south side of the trace leading to Aripo, and near them, are shewn the tomb of Gaimono, and the mound of earth on which the kings were usually burnt. A little to the south of the Maha Wihare and about five hundred yards from the remains of the brazen palace, a mound of earth, formerly a small dagobah, points out the place where the action between Gaimono and the usurper Ellala commenced, as also the spot on which Ellala fell.

On the road to the Thupharamaya dagobah I have already mentioned that the visitor sees on his left hand the conical mass of the Ruanwelle dagobah rising like a mountain near him. The entrance to this, as to most others of the ancient buildings, is through an erection of modern structure, chiefly formed of wood. The site on which it is erected is said to have been hallowed in various ways, and the prophecy to which I have referred in the case of the Maha Paya, also mentioned that Dutugaimono should construct a Maha Thupo, or great dagobah. A long and tedious account is given in the Mahawanso of the miraculous manner in which the materials for this erection were formed and procured. When every thing had been obtained which was requisite, the monarch commenced the structure by digging a foundation which, tradition tells us, was a hundred cubits or two hundred and twenty-two feet deep. This is most probably exaggerated, yet as the dimensions are in general given with great exactness, I should hesitate before pronouncing it false. Certain it is that the stone platform on which it stands is massive and of enormous dimensions, being five hundred feet square, thus giving us a superficial extent of solid masonry of 250,000 square feet, or upwards of 27,000 square yards. This platform is surrounded by a fosse seventy feet broad. On the sides of the platform are sculptures representing the heads and fore-parts of elephants as if in the act of emerging from the mass. Unfortunately Dutugaimono did not survive to see the completion of the dagobah which he had spared no pains to erect, and in order that he might have some idea of what it would be when finished, he had a spire of wood placed upon it of a similar form with that intended to be subsequently added of more durable materials. He is said to have expired in the act of gazing on

this building, and the spot on which His Majesty reclined is still pointed out. At some distance on the other side of the ancient street is a large stone slab, which it is said covers the entrance to the interior of the dagobah. Ceylonese history records its having been twice penetrated, once by miraculous power invoked by faith, and on another occasion by the sturdy arms of an usurper's soldiery. It is now nearly completely overgrown with jungle, as will be seen in the accompanying sketch—the original brick-work of which it is composed being only visible in a few detached places. The squared platform on which it stands and which is still well paved with slabs of granite, has been cleared of the brushwood with which it was overgrown by the high-priest, and lying on the southern side of it is to be seen a broken statue of Batyatisso, who reigned from B. C. 19 to A. D. 9, “and appears,” justly observes Major Forbes, “to have been one of those persevering zealots who ‘hope to merit heaven by making earth a hell.’” On the granite pavement are pointed out indentures said to have been worn out by the knees of Batyatisso during his frequent and lengthened prayers. The Ruanwelle dagobah appears to have suffered more from the ravages of Magha, the usurper alluded to, who forced a passage into it in the thirteenth century, than from any of the other revolutions to which the capital was subjected, and it does not appear that any attempt was ever afterwards made to restore it to its former condition. It was originally two hundred and seventy feet high, and would appear to be now decreasing in elevation with the rains of every successive year. When Major Forbes visited it in 1828, he states it to have been one hundred and eighty-nine feet in height, whilst now (in 1846) it is but a hundred and forty—having thus lost forty-nine feet of elevation in 18 years.

The invasion of the Malabars and the flight of the king Walagam-bahu, has already been noticed in the account of the caves of Dambool. It would appear that his first act on his regaining his throne was the erection of a stupendous dagobah as a monument of his good fortune. This he called the Abhayagiri, a title compounded of a surname of his own—Abhaya—and the name of a Hindu sect. It was originally a hundred and eighty cubits, or four hundred and five feet high, and stood on a mass of masonry of even larger dimensions than that particularly noticed as forming the foundation of the Ruanwelle dagobah.

From the great size of the Abhayagiri dagobah, together with the numerous other erections of Walagambahu about the same period (87, B. C.) it would appear that notwithstanding the recent invasion of the Malabars, the kingdom must have been in a very prosperous and flourishing condition. To the Abhayagiri dagobah was attached a wihare and priests' residence, which would seem to have been for a long period the centre of the Buddhistic hierarchy in the island. At length a schism arose in the third century of our era; a small part of the Abhayagiri priesthood joined the heretics,—the king Mahasen favored them, expelled the orthodox followers of Buddha, and spared no pains to raise to eminence and popularity the sect whose principles he had embraced. This was the period of the greatest splendour of the Abhayagiri, but it was destined to be but of short continuance. While the monarch's partiality for the sect continued, however, the spoils of the Lowa Maha Paya, the Ruanwelle, the Maha Wihare and the Thupharamaya, all went to decorate the Abhayagiri and enrich the schismatics. But Mahasen soon found that whatever respect the people might have for his person, they had a greater for their religion, and a popular revolt which ensued on these changes, warned him not to persevere in his schemes. He accordingly gave up the minister (by whose advice he pretended to have been guided) to the fury of the populace, and by his death diverted the torrent of indignation from himself. The unconscious dagobah and wihare shared somewhat of the fate of its supporters, and though not utterly destroyed, they were yet very much reduced in magnificence and importance. After this period we still read of the Abhayagiri wihare as a common resort of the priesthood, till the removal of the seat of government to Pollonaruwa, when it is of course to be supposed, that the ancient capital would lose the greater portion of its sacred inhabitants. There is little to distinguish the dagobah in its present condition: overgrown to the very summit with jungle, it affords, like the Ruanwelle and the Jaitawanarámaya, but a glimpse here and there of the brick-work of which it is constructed. In form it more approaches to the Jaitawanarámaya than to any other of the ruins, a small portion of the spire being still apparent. The Abhayagiri lies to the east of the Ruanwelle and Thupharamaya, being about a quarter a mile distant from the latter. It is at present about 240 feet high

The only remaining dagobahs of which I think it necessary to speak particularly, are the Jaitawanarāmaya and the Sankarāmaya, both of them lying to the north of the ancient city, at a considerable distance from the others. The sketch opposite represents the Jaitawanarāmaya in its present condition. In the Mahawanso it is styled the Jetawanno dagobah, which as the shorter name, although it is now better known by the former, I shall adopt. The Jetawanno was commenced by Mahasen as a measure of retribution to the orthodox for the destruction which he had before caused. It was originally three hundred and fifteen feet high, and is still upwards of two hundred and forty. It is an enormous solid mass of masonry, and some idea of its size may be obtained by reflecting that its cubic contents are upwards of 456,000 yards. Yet so inferior was the Jetawanno considered when compared with the more imposing buildings at Anuradhapura, that the Singhalese historian passes it over with two slight notices, each of a single line's length. The Jetawanno does not appear ever to have attained any considerable distinction either as the scene of any remarkable events, or as a considerable resort of the Buddhistic priesthood. The erections in its neighbourhood would appear to have been at one time highly ornamented from the profusion of carved stones which lie scattered in its vicinity. A massive square pillar lies by the side of the path at some distance from the dagobah, which on being measured, proved to be twenty-six feet long and a yard square, being cut out of a single block of granite. It must be borne in mind that although composed of brick, these dagobahs were originally coated with a white cement, which, when polished, as they were, would give them all the appearance of marble. There can be little doubt that originally they would have a very imposing effect, and that especially as seen from a distance they must have added great beauty and grandeur to the distant view of Anuradhapura.

Of the present condition of the Lankarāmaya the accompanying sketch may afford some idea. It was erected by the enthusiastic and wavering Mahasen between the years 276 and 302 of our era. There can be little doubt that it was modelled on the plan of the Thupharamaya, but although apparently built of more durable materials, it does not at all approach the original in the proportions of its columns or the excellence of its carvings. The Lankarāmaya stands, like all the other

dagobahs, on an elevated platform, paved with granite slabs, and immediately in front of it stands a stone altar about five feet high, which there can be little doubt was intended for the reception of the offerings of the faithful. The Lankarāmaya stands between the Thupharamaya and the Jaitawanarāmaya, a little to the eastward of both—the ruins of a priest's residence are in its immediate vicinity, but of a character so common as not to need any particular remarks.

Other dagobahs there are in the vicinity of Anuradhapura, but greatly inferior in size to those which I have endeavoured to describe. The Mirisiwellia, the Sailya Chaitya and the Ellala Dagobah, with many others of less note, are but shapeless heaps of ruins overgrown with jungle, with but a few pillars, or carved stones to mark their former importance. As I have said before, one of the most extraordinary characteristics of the ruins of the city is the immense number of stone pillars, generally square, which present themselves in every direction in which the visitor may turn his steps. These, with the large masses of the remaining dagobahs, and the immense quantity of carved stones that lie about the paths in all directions, will convince the most sceptical that he is treading on the ruins of a once great and populous city, and that those who inhabited it were to a very considerable extent civilised and refined. One peculiarity, if at all observant, he cannot fail to notice, the great superiority of the more ancient to the more modern structures—a superiority as decided and unquestionable as the greater excellence of Grecian sculpture in beauty and sublimity to the massive but rude masses of Egyptian architecture.

In conclusion, let it be borne in mind that great as must have been the expenditure of labour and power to erect the Lova Maha Paya, or the Ruanwelle, there are monuments of ancient Lanka and its people still more demonstrative of their former greatness. I refer to the embankments of the various tanks scattered in such profusion over the north of the island, and especially in the immediate vicinity of Anuradhapura. To these I would point as the most conclusive evidences of what the power of the Singhalese monarchs once was, and I can only regret that my own observations have been too limited to allow of my entering upon the subject in a manner likely to be satisfactory either to my readers or myself.

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Notes of an Excursion to the Pindree Glacier, in September 1846.

By Capt. ED. MADDEN, Bengal Artillery.

September 10th.—From Almorah to Sutralee, 13 or 14 miles, which occupied us (my companion, Captain Hampton, 31st Regt. N. I.) from 6 till 11 A. M. our progress at first being much impeded by a heavy fall of rain, the termination as we hoped, of the season, but which in fact proved to be only a shadow of what was in store for us. The road lies over the mountain called Kaleemuth, 6,300 feet high, and so called, the Almorah people say, from a coarse kind of black lead which abounds there: the summit is of mica slate and gneiss, in horizontal strata. 2,300 feet below, to the west, is Hawulbagh, now famous like Almorah and Bheemtal, for its thriving plantations of tea; the visiter however, will be disappointed who expects anything picturesque in this cultivation, any more than in the vineyards of France; the shrubs being generally under four feet high, and anything but elegant in form; the tea is made in spring; the plant flowers here at that season, and notwithstanding the extreme plucking it undergoes, produces a profusion of seed in October and November. It may be satisfactory to Drs. Royle and Falconer to know that even at Almorah the plantations suffered not the trace of injury from the snow storms of Jan. 26, and Feb. 2. 1847, the heaviest known to the oldest inhabitant of Keemaon, when about 2 feet fell at Almorah, and lay for many days. Hawulbagh takes its name, "The garden of mist," from the heavy clouds which rest over it almost every morning during the cold season, at about 4500 feet elevation; the Kosilla runs about 200 feet below the station, which has a greater extent of level ground than any other in the N. W. mountains. The river is invariably known to the mountaineers as the *Kosee*, which H. H. Wilson derives from the Sanscrit Kausika, a sheathe, probably in allusion to its generally deep and narrow glen; the Hindustani name Kosilla, may be from the Sanscrit Kausulya, "good fortune." It has become an axiom in the Geography of the N. W. Himalaya, that the Giree is the only river which does not rise in the snowy range: but the assertion is equally true of the Kosilla, and western Ramgunga of Kumaon (the latter known also as the Ruput in Gurhwal); while the Surjoo and eastern

Ramgunga originate in branches of the snowy range which for many months in each year are completely denuded of snow.

Opposite Hawulbagh, at Kutarmul, there is a very large temple dedicated to Aditya, the sun; it is surrounded by a multitude of smaller ones; but all is now forsaken, the main pile having been so shaken by earthquakes as to be dangerous. Many of the large terminal ornamental "Turk's cap" stones have been turned half round. The view from the summit of Kaleemuth is very fine and extensive; to the east, are the dark ranges of Binsur and Jugesur; to the south and south-west the lofty Ghagur completely excludes Kumaon from any view of the plains; from north-east to north-west extend the snowy range, of which the view given in Dr. Royle's illustrations was taken from this point. As might be expected it fails in conveying any just idea of the grandeur of the scene, and is moreover not very correct, most of the groups and peaks being misnamed. What is called the Kedarnath cluster, is really the bastioned mass of Budreenath; his "Juwahir cluster" is properly named "Trisool;" and the peak called Nundadevi, is in fact one to the east of Pindree, commonly known to Europeans in Kumaon as Nundakot, No. XV. of the map. The true Nundadevi, most conspicuous in nature, was perhaps clouded when the artist took his view, being either suppressed, or very imperfectly delineated by the peak marked XIII. which is really the eastern shoulder of the Trisool.

Looking at the snowy range from this and similar points, it appears a matter of no difficulty to reach it; an impression produced by the almost total suppression in the view, of the great spurs and secondary ranges sent off to the south and south-west from the main range; all these, being seen in the direction of their length, present comparatively small points; and it seems to be for this reason that the mountains as seen from Sheharunpoor, Umballah, &c. have the appearance of three or four long ranges, successively rising; but the moment we get amongst them this apparent regularity is lost, and the mountains appear to branch in every direction.

In common with the vicinity of Almorah in general, Kaleemuth is too well grazed by cattle to afford much room for vegetation. In the spring a shrubby *Dipsacus*, with lilac blossoms, is common; and in autumn the warmer declivities abound with the beautiful *Osbeckia stellata*, the *Kookurmakree* of the natives. The *Scilla indica*, *Anquilla-*

ria indica, *Curculigo orchioides*, and *Fritillaria Thomsoniana*, all reach up to this point, and are abundant.

Hence, the route follows the neck which joins Kaleemuth with Binsur; about two miles on, a Cairn, called "Kutputiya," occurs on the left hand; these heaps of stones are raised where three ways meet, many of the people considering it meritorious to add a stone; a custom well known to this day amongst the Celtic tribes of western Europe.* Soon after passing the Cairn, the road quits the Binsur route, and after passing Jak village, crosses by a rocky ascent the western spur of Binsur, called Bhynsooree Cheena; the northern aspect of this is covered with pretty thick woods of *Rhododendron*, *Andromeda*, &c. through which we descended to a glen, extensively cultivated, where a stream from Binsur joins the Takoola from Gunnanath. The united stream is a rapid burn, which joins the Kosilla above Hawulbagh: our route lay sometimes on one, sometimes on the other bank, and not unfrequently in the stream itself. Rice is abundantly produced along the banks, and the Kodah on the higher grounds. This is a late crop, and suffers much from the bears; it is now infested by a considerable number of locusts, which we found daily hence to the snows.

Sutralee is the name of a district belonging to the astrologers of Almorah; and in the midst of abundance, the traveller finds himself like Sancho Panza, in danger of starving; for these "gods of the earth" are infinitely more liberal with their horoscopes and predictions of good weather and fortune than with their supplies of grass, ghee, and flour. We encamped in a confined but pretty spot, surrounded by woody spurs from Binsur and Gunnanath, neither of which is visible; a rivulet from the former has cut a deep perpendicular gorge in the rock, on the brink of which are some old temples dedicated to Umba Debee, from whom the place is called Umkholee. A

* One is constantly struck in India with the identity of the customs and ideas of its population with those of Europe, ancient and modern. A few years since at the Jeypoor Durbar, the sitting was prolonged to so late an hour that it became necessary to introduce lights, on which all the chiefs got up and saluted each other, as if they had met for the first time in the morning. One of them told me it was a common custom. Thirlwall incidentally mentions the very same as having been usual amongst the ancient Greeks.

few cedars overshadow the temples, which are not remarkable. Water boils at 208°, or with correction of thermometer, at 207½°, giving about 4700 feet as the elevation. The pretty white *Barleria dichotoma*, the *Photinia dubia*; a shrub which I took for *Ligustrum Nepalense*; and *Kadsura propinqua*, “Sindrain,” are common on the banks of the Takoola.

The mountain of Gunnanath, near this, is said to be very beautiful; the Ghoorkas had a stockade there; and on the advance of our troops toward Almorah in 1815, they were attacked from this point by a body of men under the command of Hustee Dhul; he was killed by a random shot, his men retreated, and the fate of Kumaon was decided. This chief was uncle to the rajah of Nepal, and had been employed in the unsuccessful attempt on Kot Kangra. The contrast of our speedy capture of that celebrated fortress, is to this moment very unpalatable in Nepal: and the story goes that fakeers and other travellers are warned under penalty of a severe beating, to conceal or deny the fact of Lahore being now a British Garrison!

Along the borders of the fields here, as at Almorah, the *Perilla ocimoides*—“Bhungera,” is extensively cultivated for the sake of the oil expressed from the seeds: it is now in flower, and will be ripe in October and November.

September 11th.—To Bagesur, 12 miles; at one and half miles, up a pretty valley, by an easy ascent, but over a rocky road, we reached the crest of a ridge, called the Kurngal ka Cheena, which separates the affluents of the Kosilla from those of the Surjoo. It may be about 5,500 feet high, and like all the hills in the neighbourhood, is well clothed with Pines, (*Pinus longifolia*,) as the north side is with *Rhododendron*, *Cornus*, &c.—The *Quercus annulata*, “Funiyat,” (the “Bane” of Simlah,) is a common tree on the ascent, and is large and abundant on the Surjoo above Bagesur, mixed with trees which one scarce expects to find with an oak. From the Kurngal Pass, a steep descent through shady woods, brought us to the beautiful valley of Chonna Biloree, watered by a large brook, the Jynghun, which flows round the north side of Binsur to the Surjoo. Biloree, a pretty hamlet, with a small temple amidst a clump of firs, on a conical knoll, much resembling an Irish *Rath*, lies to the right of the road, and a short distance above, to the left, is Chonna, another village, near which is a group of the Cheoorra

tree—*Bassia butyracea*, which does not appear to extend more to the north-west. It is common at about 4000 feet elevation, near Bheemtal, and on the Surjoo near Ramesur; and I have even found it on the low outer range of hills to the north-west of Kaleedonghee: the seeds furnish the so called butter, or Phoolal, of Almorah. Near Biloree several large specimens of the *Castanea tribuloides*—“Kutonj” or Chestnut, were in full flower; this tree is another instance of the approximation of the vegetation of Kumaon to that of Nepal; it occurs sparingly in the glens of Binsur, and becomes abundant east of the Surjoo, but is unknown I believe in Gurhwal, &c.

At Chonna Biloree the soil and rocks are deeply colored with red oxyde of iron: here the road quits the Jynghun, and turning to the left, soon reaches the base of the “Ladder Hill,” so called from a good, but long and steep flight of steps constructed nearly to the summit, by Toolaram, the Treasurer of Almorah. The total ascent is about 800 feet, 150 or 200 short of which we halted to breakfast, at a spring called the Bhoomka Panee. This pass is known as the Palree or Kurrei Cheena, and may be about 5,500 feet in height; on the left the ridge rises many hundred feet higher in a bold rocky bluff, on which is a temple to the Mychoola Debee. Close above to the east is the rounded “Nynee” summit. With the exception of a little clay-slate, the whole range is of limestone, and stretches far down to the south-east, crossing the Surjoo near the Seera Bridge, and every where presenting to the south-west successive tiers of cliffs. This limestone forms the glen of the Surjoo up to the Sooring, where as at Landour, it is capped by a granular quartz. The view of the Himalaya from the top of the Ladder Hill is considered one of the finest in Kumaon; but was entirely eclipsed to-day by dense clouds, which bestowed some sharp showers on us while at breakfast. An easy descent of three miles hence brought us to the Dhurmsala of Mehulee, near the village Patulee, erected by one Debee Sah, the bráhman in charge, being endowed with a monthly salary of less than three rupees;—this he ekes out by the cultivation of a garden, which he entertained a not ill-founded fear would be plundered by our followers should he accompany me to the Soap-stone quarries about a mile distant; this difficulty overcome, we started, and after a slippery walk from one terrace to another, reached one of the five or six quarries in this vicinity. So far as I could

observe, the rock lies in large detached masses, but the mine had been apparently neglected for several years, and was choked up with rubbish. The steatite is called "Khurree;" and at Almorah is turned into a variety of cups, &c. less durable and useful than if of wood. From the Dhurmsalá to the Surjoo, the descent is very long and steep, through woods of superb pine; the soil is a red clay, which with the fallen pine leaves, we found so slippery as with great difficulty to keep our feet. At the base the Cheer Gungá, a rattling stream, flows to the Surjoo, along the right bank of which lies the rest of the route, about $2\frac{1}{2}$ or 3 miles, to Bagesur. The Surjoo is here a large and rapid river, the water of a whitish tinge, and perfectly impassable except on rafts supported by gourds. Wilson gives us the etymology of the name from *eri*, to go: Gunga, from *gum*, to go, to *gang*; and Pindur, probably from *pud*, *pundute*, of the same import; so strongly must the primeval Hindus have been struck by the extreme impetuosity of these rivers.* The elevation of the valley here is between 2,500 and 3,000 feet; it is narrow, with here and there a partial expansion, carefully cultivated with rice. The scenery is exceedingly diversified and verdant. In such a valley to the north-west, as that of the Sutluj, we should have little but arid rock; here all is grass, wood, and swelling hills of the deepest green and most beautiful outline. As a drawback, the climate is considered very unhealthy at this season, and in the months of May and June the winds are said to be nearly as hot as in the plains. The vegetation is nearly that of the Tarai and Dehra Dhoon. *Robinia macrophylla*, (Goujh,) *Rottlera tinctoria*, (Rolee,) *Phyllanthus emblica*, (Amla,) *Pavetta tomentosa*, (Pudera,) *Murlea begonifolia*, (Toombre,) *Sapindus acuminata*, (Reetha,) *Mucuna atropurpurea*, (Buldaka,) *Zizyphus*, (Bair,) *Sponia*, *Toddalia aculeata*, (Khuseroo,) and a species of *Adelia*, are common as trees, with the *Photinia dubia*, called Gur-mehul or Soond, which is also found north-west of Kumaon; where it occupies a zone reaching from 3,000 up to 7,500 feet. Among lesser plants I observed *Centranthera hispida*, *Ipomoea muricata* and *pes-tigridia*, the *Lygodium* or climbing fern (abundant in all the valleys of Kumaon),

* The word Pindur also denotes a *feeder*; while *Pindul* is a *bridge*, a *causeway*, a *passage* over a river or ravine, &c. and might refer in this sense to some early structure at Kurnprag to facilitate the passage of pilgrims to Budureenath.

Costus speciosus, *Zingiber capitatum*, *Curcuma angustifolia*, and most abundant in the meadows the "beautifully blue" *Exacum tetragonum*, "Teeta-khana."

We found the heat in the valley oppressive, and were enjoying the idea of shelter in one of the deserted houses of Bagesur, now at hand, when to our dismay, we reached the right bank of the Gaomutee Gunga, which here joins the Surjoo from Byjnath, and was so swollen and rapid from late heavy rains as to be perfectly unfordable. While crouching under some thickets to avoid the sun, and most sincerely desiring that the original Pontifices maximi, Sin and Death, who built the first bridge, according to Milton, had exercised their "Art pontifical" at Bagesur, we perceived certain naked savages appear on the opposite bank, armed with a multitude of gourds, (toombas,) which they forthwith commenced fastening in rows about their waists, and then committed themselves to the deep, as buoyant as so many corks. A sufficient number being attached to our charpaees, we were ferried over in security, but not very pleasantly; our very unsailor-like rafts sink so deep that it became necessary to strip. The process of crossing is a simple, but very tedious one, and above two hours elapsed before our scanty baggage was passed over. We afterwards saw the men plunge with perfect indifference into the "angry flood" of the Surjoo itself, and "stemming it aside with hearts of controversy," reach the opposite shore with ease, but with great loss of distance. They even promised to convey us over, an offer which was declined. Falstaff justly abhorred a watery death, even in the placid Thames. The town of Bagesur stands immediately beyond the Gaomutee, on the right bank of the Surjoo, in a very confined spot, being closely backed by a precipitous hill. It consists of two or three irregular lines of houses, one of them now washed by the river, and about 200 yards in length, some of the houses are very respectable, adorned with tastefully carved wood work; but the place is a mere depôt, where in the cold season the Almorah merchants, who chiefly own the houses, resort to traffic with the Bhoteeahs, who meet them for this purpose. This, rather than any particular insalubrity, seems the cause of the town being deserted at other seasons; it has no other resources. True, we Europeans found the temperature disagreeably warm, but the site did not seem malarious, and there was little fever amongst the few inhabitants. The

cases however were more numerous on our return, and it is certain the mountaineers look on a residence here with dread.

At the junction of the two rivers are a couple of stone temples of Mahadeo, where Bruhma also is adored *sub invocatione* Bagesur, Sanscrit Vageeswur, the Lord of Speech, and gives his name to the town. There is an inscribed slab at one of these temples, in a character not seemingly very ancient; the import I understand is given in one of the Journals of the Society. The brahmuns have a legend that the Surjoo could not find its way through the mountains till the present channel, a devious one enough, was opened by a Rishi; ever since which time bathing here is justly considered nearly as efficacious in removing sin as the pilgrimage to Budreenaarain itself.* "Bagesur" was perhaps in the first instance indebted for this title to the Tigers which abound in the valley; the brahmuns give both etymologies; these brutes (the tigers), roam up as high as Sooring, but from numerous enquiries I am induced to believe that Bishop Heber was misinformed when he was told that they habitually frequent the snows. They are extremely destructive in the district of Gungolee, along the Surjoo, S. E. of this, where during the present autumn and winter, 25 persons are said to have been destroyed; this with an equal number of victims in the Bhumouree Pass, leading from the plains to Almorah, forms a serious item in the Kumaoon bills of mortality, and goes to prove that the Mosaic penalty of blood for blood is no longer in force; indeed a celebrated writer observes that "the lions, the tigers, and the house of Judah" scarce ever observed this covenant. The mountaineers are firmly persuaded that the worst tigers are men, who transform themselves into this shape by means of the black art, the better to indulge their malice, envy, and love of a flesh diet. The superstition reminds one of the lycanthropy of the old Greeks, and the Louf-garon of the French in modern days.

* It is an extraordinary instance of an attempted fusion of the creeds of Brahma and Muhammed, that the brahmuns of Bagesur in relating this legend, identified Mahadeo with "Baba Adam," and his wife Parvutee with "Mama Hhuwa," or Mother Eve. They were probably indebted for this curious association to the circumstance of "Adim" denoting "first" in Sanscrit, so that "Baba Adam" is "First Father." Had they selected Brahma, who as Viraj, divided himself into male and female for the production of mankind, the parallel would have been still closer.

We were told that up near Sooring a tiger was killed within these few years by a pack of the wild dogs, here called Bhonsla; but even our informant seemed to doubt the truth of the story. Of the boldness of these dogs, however, we had no doubt; they are considered to be Bhugwan's* hounds, and no Shikaree ever thinks of shooting them.

Mr. Lushington, the Commissioner of Kumaon, has a bungalow on the bank of the Surjoo opposite Bagesur; a little above this, the mountains on that side recede in a deep bay, leaving a spacious tract of level ground, on which the fair is held in January, at which period the whole of the Bhoteah pergunnahs are deserted by their inhabitants, who descend with their flocks to the central portion of the province for warmth and pasture. These people in mien, make, and features, bear a striking resemblance to the Chinese. It is a curious feature in the agricultural economy of Kumaon that during the same season, almost the entire population of the mountains between Almorah and the plains, descend to the Tarai, where they have cleared very extensive tracts, which are carefully cultivated with wheat, barley, mustard, &c. irrigated with no mean skill and industry by cuts from the various torrents which there debouche on the plains; while the forests swarm with their cows and buffaloes, which supply them with vast quantities of ghee, the sale of which greatly overbalances the occasional loss of their cattle by wild beasts. The presence of these herds in the forest may be said, to form a sort of safety-valve to the botanist or other explorer of its solitudes, the tigers seldom molesting man when he can obtain beef. The appearance of the young leaves on the Seesoo in April, is the signal for the mountaineers to ascend to their natural homes, where they arrive just in time to cut a second rubbee crop, sown in November; the only instance within my knowledge of the same farmer enjoying the advantage of two harvests in one season. I may

* If the mere English reader should ask "who is Bhugwan," he will not be more in the dark than was one of the Secretaries to a certain Board in 1824. Carriage and supplies were required for the troops in Arrakan, and a native dignity in Bengal was required to say how much would be forthcoming from his district. "As much as it pleases *Bhugwan*" was the reply. "Who is Bhugwan," writes the Secretary. "You will be pleased to inform Bhugwan, that if he withholds the requisite aid, he will incur the censure of Government, and assuredly be put down."

remark here that the Gooya or Gweeya of Mr. Traill's Report, which he calls the Sweet Potato, is in fact the edible Arum or Colocasia.

September 13th.—To Kupkot, 14½ or 15 miles. The river above, Bagesur bisects the open tract of ground before alluded to; and then till within two or three miles of Kupkot, winds its impetuous way through a gigantic ravine rather than a valley, the entire floor being frequently occupied by its bed, now reduced to half the width it has below. This narrow channel is exceedingly deep, and in some places the waters flow more quietly for a space, in black pools, the whole not a little resembling the Findhorn in Morayshire. Over one of these, three or four miles from Bagesur, a single spar is thrown for a bridge, from which the passenger, at a depth of 30 or 40 feet below him, may see the water swarming with large Muhaseer.* The river flows in a channel of live rock, from which the mountains rise precipitously; and in one place the road has to be carried for a hundred yards or more, along the face of the cliff; in general however, the rise is that of the river, only interrupted by the many feeders from the mountains to the left; on which occasions, for some unknown reason, the Puha-rees always make a dip, involving a troublesome ascent on the other side. At three miles, we crossed one large affluent, and at about seven a second, the Kundilgurh nudee, a furious torrent, which a few days since carried away its bridge; this was only replaced yesterday, which compelled a reluctant halt of one day at Bagesur, where Messrs. Hort and Powys, H. M. 61st Regiment, overtook us in the afternoon, from Almorah. We found the glen of the Surjoo here almost without habitation—wholly given up to jungle, luxuriant grass, deer, and tigers, the latter much dreaded. On the opposite bank, a little above the Spar Bridge, the river receives a large tributary, the Balee Gunga, and, two or three miles short of Kupkot, ceasing to rage through the narrow gorge which contracts it below, pursues its course along some open, but strong and uncultivated dells, covered with dwarf Zizyphus,†

* The presence of a large fish, apparently of the Shark kind, is well attested, in the Surjoo, from Bagesur downwards; reported to grow 6 feet long, to be devoid of scales, and to have teeth like those of a dog.

† The famous shrine of Budureenath derives its name from this shrub, the Buduree (now Ber) or Jujube, Vishnoo being there invoked, like an apothecary, as the "Lord of Jujubes." All the synonymes, Budurecsail, Budureebun, "the

to these soon succeeds the beautiful glen of Kupkot, splendidly cultivated with rice, mundooa, &c. in the centre of which we halted at noon, in a grove of tall Silung trees—but had not time to pitch our tents, or put the camp kettle in trim for breakfast, when the exceedingly sultry forenoon was succeeded by a heavy storm of wind and rain, which poured down for two hours, and made us excessively uncomfortable, the ground being already swampy from the rice fields close by.—When the clouds cleared off, we found ourselves in a most romantic little valley, the Bingen of the Surjoo, from one half to two miles long, and about half as wide, from 4,000 to 4,500 feet above the sea, enclosed by a belt of gently swelling and diversified mountains, covered with a beautiful vegetation, the Cheer Pine feathering the summits. The village is on its western edge, close under the sloping mountains, about 150 feet above the river and half a mile from it; several smaller hamlets are scattered over the plain, each with its groves of trees, among which the plantain is conspicuous, producing large and excellent fruit. The more solid supplies are also abundant; and the people, the most civil and obliging in the hills, instructed by the example of Chintamun, the old Putwaree, a more perfect gentleman than whom it would not be easy to find. The climate he represents greatly better than at Bagesur. A bold peak called Chirput, raises its head on the north side of the valley, on this bank of the Surjoo, and to the right of this, up the glen of that river, there is a near view of several snowy peaks the most prominent among them being the so-called Nunda Kot, east of Pindree. The Surjoo, now falling, was rather muddy. On our return though unfordable, its waters were clear as crystal, blue as sapphire, and sparkling in long reaches under a brilliant sun it seemed the most beautiful as it is one of the most sacred of Himalayan rivers.

rock, forest of Ber," point to the same fact: but as no Zizyphus could exist in that climate (they scarce reach Almorah), the spiny tree, Hippophae salicifolia, may be intended: or the name has been altered from *BAWdr*; "Happiness, prosperity, *Mt. Meroo*." I once suggested these difficulties, with my own solutions, to a brahman who had visited the spot. He honestly avowed, that so far from Ber trees growing there, there were, as far as he saw, no trees or bushes of any kind; but with an orthodoxy worthy of a better cause, he insisted that the genuine Ber must be there, since the Poorans said so, to doubt which would be Nastikee (Atheism). The deceivers have merged into the deceived!

The rock between Bagesur and Kupkot is almost exclusively limestone, here as elsewhere, forming the most bold and varied scenery : and bearing a most exuberant forest, festooned with innumerable climbers. A gradual change may be perceived in the nature of the plants, and as we approached Kupkot, the *Origanum* and white thorn, *Cratægus crenulata*, "Geengaroo," indicated a less tropical climate. Lower down the dwarf date tree springs from every cliff. The *tejpat*, *Cinnamomum albiflorum*, called *kirkiria*, abounds in the shady glens. The *Didymocarpus macrophylla*, *Loxotis obliqua*, &c. cover the dripping rocks ; a flesh-colored *Argyreia*, and the *Cucumis Hardwickii* "air-aloo," climb over the bushes, with *Tricosanthes palmata*, "Indrayun," and its brilliant-red, but fetid fruit. *Coix lacryma*, "Loochoosha," "Job's Tears," grows by every stream, and in several places I observed the *Æginetia indica*. The pretty lilac *Osbeckia angustifolia* is very abundant amongst the grass, and *Clerodendron serrata*, *ternifolia*, and *grata*, amongst the thickets, as is the "Poe," *Boehmeria tenacissima*. The splendid *Abelmoschus pungens*, grows in abundance on the damp shaded slopes ; it is called "Hou" or "Kupusya ;" the fibres afford a good cordage. The more common trees are the *Photinia* and *Quercus annulata*, *Kydia calycina*, "Puti," *Ebretia serrata*, "Poonya," *Dalbergia Ongeinsis*, "Sanun," *Terminalia bellerica*, "Byhura," *Grislea tomentosa*, "Dhaee," *Flemingia semi-alata*, *Wendlandia cinerea*, *Callicarpa macrophylla*, "Ghiwalee," *Saurauja Nepalensis*, "Gogunda," *Engelhardtia Colebrookiana*, "Moua," *Bauhinia variegata*, "Kweiral," and *Bauhinia retusa*, Roxb., "Kandla," this last being identical with *B. emarginata* of Royle. Lastly comes a most abundant shrub of the *Euphorbiacæ*, a species of *Sapium* apparently, called "Phootkia" by the natives, who occasionally employ the root as a cathartic, but describe its effect as dangerously violent. It grows from 4 to 10 feet high, with tender green foliage, which has, on being crushed, a disagreeably sour odour ; like all or most of the plants just mentioned, it accompanied us to our highest point in the valley of the Surjoo. At Kupkot I first (on our return) met the *Silung* tree in flower ; the trees quite covered with the small light yellow blossoms of the most exquisite fragrance, which is diffused (with the least wind) several hundred yards, the mountaineers say a *kros*. It grows to be a large umbrageous tree, and appears to be the *Olea grata* of Wallich. In this

province it is commonly found near the temples and on the mountain passes, called Benaiks, where a few stones are piled and rags tied up in honor of the Deotahs. It is most likely the tree called *Olea fragrans* in the Darjeeling Guide: no notice of it occurs in Dr. Royle's illustrations.

Kupkot is the first village in the pergunnah of Danpoor, which includes the remainder of our route; as comprising Nunda Devee, the loftiest mountain on the globe hitherto accurately measured; it would probably now have occupied the niche in the Temple of Fame filled by Santa Fe de Bogota, Popayan, &c. had Humboldt carried into effect his plan of investigating the Natural History and structure of the Himalaya. That his attention was diverted to the Andes must ever form the subject of regret to the Anglo-Indian.

September 14th.—To Sooring or Sring, 11 miles in 5½ hours, including much delay in passing above and through a spot where a great landslip of white talcose calcareous slate, due to the late rains, had annihilated the road, and nearly obstructed any further advance. Except at this spot, the rock on this day's route consisted chiefly of the usual stratified limestone, forming many abrupt brows and lofty walls, and sometimes contracting the Surjoo to a few yards in breadth. The river is now reduced to a mere torrent, and from Sooring appears, at a profound depth, a narrow streak of foam. Its source is on the south face of a huge spur from the eastern precipitous shoulder of "Nunda Kot;" this spur forks to south-west and south-east; the south-west range separating the valley of the Surjoo from that of the Pindur. At this fork there is not a vestige of snow in September and October.

Our path kept to the right bank of the river, with much more ascent and descent than heretofore. In one place a cliff is passed by scaffolding, with the Surjoo perpendicular beneath, altogether somewhat difficult for ponies (which are of little or no use beyond Sooring to a good pedestrian), and rather trying to nerves which have not been case-hardened in Kanawar and the Bhoteah pergunnahs. Four streams large enough to require bridges, occur in to-day's march, besides an infinity of rivulets, often converting the road into a swamp, where the leeches were most numerous and voracious. I picked 16 off my feet at once, and found the bites not a little venomous; it moreover

requires all one's resolution not to scratch them, as in that case they are apt to form bad sores. The only security against these pests consists in soaking the stockings in brine; but where one wades for miles through "fresh-water formations" the salt is soon washed away. The idea prevails in the mountains that these leeches possess the power of springing on their prey: this requires verification, but is not altogether improbable. It is only too certain that by getting into the nostrils of sheep, goats, ponies, &c. they do much mischief by keeping them lean and unhealthy. We also found the small round fly or gnat very troublesome here: they give no fair notice of their approach as does the mosquito, and inflict a very irritating bite, for which death is a poor revenge.

About three miles above Kupkot, there is a good Sanga bridge of two planks, 66 feet long, across the Surjoo, leading to Moongharee, Milum, and the Oonta Dhoora Pass. The river here receives a large affluent on each bank. At one and half miles from Sooring, the path quits it, and mounting 800 or 1000 feet, we found ourselves at our camp with, as at Kupkot, a number of convenient sheds for the servants and coolies, a most welcome piece of hospitality confined, I think, to Kumaoon, but well worthy of introduction elsewhere. Our camp occupies an open spot above Sooring, and below a village called Lohagaon. As water boils at 200°, the elevation is somewhere near 6,700 feet above the sea. A colony of agricultural Bhoteeahs is established in the mountains, which rise steeply above this to the west; unlike the rest of their race, they never quit their villages, and had never even descended to Bagesur they told us. "The world forgetting, by the world forgot," their talk is of bullocks and bears; their only visiter is the tax-gatherer, who ferrets out the most determined hermit; but in this respect the burden of the Kumaoonees is light.

The scenery across the Surjoo is fine. The Lahour ka Dhoora, so named from a village visible to the north-east rather higher than Sooring, is bold, lofty, green, and wooded to the summit; it extends from north to south, and beyond it is the valley of the Ramgunga. From two P. M. we had smart showers for a couple of hours, with a drizzling cloudy afternoon, and more rain at night. It is wonderful how a little experience in Himalayan meteorology opens the understanding with regard to certain doctrines of Hindu Theology: e. g. Vishnu sleeps

on the serpent Sesha during the rainy season; but the shastras which affirm the fact, omit the reason; this can be no other than that the earth is concealed from the skies by so dense a canopy of clouds that even the Lotus-eyed himself cannot pierce it; and hence, unable any longer to observe and preserve his *very* peculiar people of India, he even goes to sleep like Baal of old, letting every man go to the devil his own way. So also it would appear that their representations of Kylas, Bykunth, Uluka, and Soomeroo, glittering with gold and precious stones, are derived from the glorious tints which light up the Hemakoot, or "Peaks of Gold," when "the god of gladness sheds his parting ray" on its snows; aided perhaps by the reality that gold, rock-crystal, &c. are found there, especially near the sacred Lakes of Mansorowur, the *neighbourhood* of which is now ascertained by Mr. Strachey actually to originate four great rivers, flowing to the cardinal points, viz. the Sanpoo, east; Sutluj, west; Indus, north, and Gogra, (Kurnalee) south. Lastly, the shastras affirm that the Ganges, &c. fall from heaven, and, just touching the crests of the Himalaya, flows along the earth: a representation not so utterly ridiculous to those who have seen the sources of these rivers chiefly fed by innumerable cascades, pouring down their sheets of water from the unseen plateaux above the glens. But enough of Hindoo Geography!

I made some inquiries here concerning the Ma-murree, a very deadly fever, which annually devastates whole villages in north-west Kumaon and south-east Gurhwal, but though the reverse is believed at Almorah, could not hear that it had ever penetrated to any place in our line of route. It is chiefly prevalent in the hot season, and is accompanied by buboes under the ears and armpits, and on the groin, exactly as in the plague; attacking for the most part the population clad in woollens, and unquestionably originating in the extreme filthiness of their persons and villages. The disease is mentioned as a typhus fever in Mr. Traill's report; and has lately excited a more lively interest from its having last season approached within 14 kros of Almorah, and included the cotton-weavers amongst its victims. Such is the consternation caused by its appearance, that the village is immediately deserted, and the patient left to shift for himself, which, considering the Sangrado simplicity of native prescriptions, such as violets in cholera, &c. may

perchance deduct little from the otherwise small hope of recovery. The rank cultivation of hemp close to the doors of the houses, may very likely be connected with the origin of this pestilence, which should be investigated. As to goitre (gega) the people of Kumaon appear less afflicted by it than those of Bissahur, and amongst the Bhoteahs it appears to be unknown; a fact, if it be one, strongly corroborative of the opinion now received in Switzerland, that it has nothing to do with snow or other water, but is induced by the infected air of close valleys liable to abrupt transitions from heat to cold, a removal from which is often followed by cure. The people of Kumaon employ a remedy, sold in the Almorah bazar, and called *Gelur-ka-puta*; on procuring a bit of this, and steeping it in warm water, it speedily developed into an unmistakable fucus or sea weed; a fact on which Dr. Royle (Illustrations, p. 442,) expresses some doubt, and desires information. All that the druggists of Almorah know is that it comes from the west, and is taken internally. It may be assumed as an illustration of the small intercourse between England and Switzerland (at all events, its interior), in the age of Shakspeare, that the poet makes Gonzalo ask in the *Tempest*—"When we were boys, who would believe that there were mountaineers, dewlapp'd like bulls, whose throats had hanging at them wallets of flesh?" and then proceed to adduce as equally authentic, the "men whose heads do grow beneath their shoulders;" not yet discovered.

The vegetation between Kupkot and the base of the Sooring Hill, though less luxuriant than yesterday's route, exhibited most of the same forms, but as we rose, the *Anemone vitifolia*, *Berberis lycium*, "Kilmora," *Erythrina arborescens*, (coral-bush,) "Roongura," and latterly the *Parochetus communis* and *Quercus incana*, become the substance of things hoped for in the way of a better climate. In Don's *Prodromus* we find this last tree, the "Banj," (Ban of Simlah,) confounded with the *Reeanj*, or *Quercus lanuginosa*, which is very distinct, the latter, common on the Ghagur range, is unnoticed by Dr. Royle, as well as the *Quercus annulata*, common everywhere. Another plant common along the Surjoo to-day was the *Æchmanthesa gossypina*, abundant also on the hills between Bheemtal and Mulooa Tal, and very remarkable for the dense, thick, and pure white coat of tomentum which invests the branches and stem; it is called "Jounde-

la." Bees are said to be particularly fond of the honey afforded by the flowers, and to make it in large quantities when these are most plentiful. On the sunniest quartz rocks above Sooring, the *Vitis macrophylla*? creeps along with its stems 5 or 6 feet long, and great cordate leaves from 18 to 20 inches each way. The people call it "Umlee," "Assonjee," and eat the fruit in November: it is not uncommon near Almorah, and Dr. Boyle mentions it as climbing over trees at Mussoorie; where, however, I never saw it; nor if this be his *macrophylla* as it should be, has it at all a climbing habit.

September 15th.—To Khatee, $12\frac{1}{2}$ miles, over the Dhakree (or Thakooree) Benaik. There is a bitter proverb that if you want to know the value of money, try to borrow some; so to realize the height of these mountains, you must walk up one of them. Such an experience will also go far to reclaim one from the intellectual system of the most honest, able, and amiable of bishops since Synesius, Berkeley, who endeavours to reason us out of our senses, and persuade us that all which we see, hear, feel, touch, and taste has really no external existence—all that we perceive being only ideal—and existing therefore only in the mind. The brain itself, as a sensible thing, exists only in the mind, and not the mind in the brain, as the materialists vainly allege: if full of such sublimated cobwebs, one commences such an ascent as to-day's, he speedily begins to waver; what, have all these rocks, forests, torrents, snows, this "brave o'erhanging firmament"—"immense, beautiful, glorious beyond expression, and beyond thought;" and still more, these wearied legs and craving stomach, no absolute being? If so, it is quite surprising how these two latter ideas are burnished and stimulated by other ideas, such as an easy chair and a pleasant glass of ale. The higher we mount into the atmosphere, the lower we fall in the region of metaphysics; and on the summit of the mountain will generally in practice be found pure materialists, adopting with full conviction the moral enjoined in the apologue of Menenius Agrippa.

We left Sooring at 6:20, and reached Tantee, a chalet, about 200 feet below the Dhakree Benaik Pass, at 10:10. Here we breakfasted. Water boils at about $192\frac{1}{2}^{\circ}$, giving the elevation about 10,700 feet, and the actual ascent 3000, not half what one has to climb on many other routes. The path rises at once from Sooring, and is in parts very steep and rocky, interspersed with occasional undulating meadows. The

streams passed are inconsiderable, but a large one, rising between the pass, and the Chilt ka Dunda flows down the spacious wooded glen on the right hand towards the Surjoo, and in one spot forms a fine waterfall. The limestone rock ceases at Sooring, and is replaced by quartzose rocks, and finally by gneiss. The views across the Surjoo are very grand, and from the pass we enjoyed, not to-day, but on our return, a near and magnificent, though contracted prospect of the snowy range :—extending from the Nunda Kot Peak on the east to Mauntolee ka Dhoora (Trisool) on the west. The eastern peak of the Trisool (No. XIII. of the map) faces the west in a great bluff (which our guides affirmed to be Nunda Devee), from which a long easy ridge, presenting to us an unbroken sheet of snow, slopes down to the east, connecting the Trisool with the Nunda Devee cluster. Strange to say that here, within 20 miles of the two great rocky peaks of this cluster, and elevated 10,800 feet, they are invisible, being concealed by the two beautiful pinnacles of pure snow, which from Almorah, &c. are seen to be merely the abrupt terminations of two immense spurs, the easternmost of which, apparently with a large Loggan stone on its summit, is there known as Nunda-khat, "Devee's bed." From this point of view it rises into so fine and lofty a spire that our ignorant guides insisted it was the Darcoola (Panch-choola). In the hollow between the Trisool and Nunda groups rises the Soondur-Doongee or Redinga river, which flowing nearly south down a narrow and most profound glen, joins the Pindur a little above Wachum, affording probably the best and easiest route to the traveller desirous of penetrating to the core of the Nunda Devee mass. This stream, we were assured, has its source in a glacier like that at Pindree. East of Nunda Devee, in a deep col is "Traill's Pass" supposed by him to be 20,000 feet high, leading NOBODY to Milum ; its eastern portal formed by the N. W. shoulder of "Nunda Kot"—which mountain closes the view in a colossal rectangular summit of pure snow, with the glen of the Pindur easily made out. The line of perpetual or at all events of unmelted snow, was very well defined along the whole extent of the range, certainly 2000 feet below the crest of Traill's Pass. It is unfortunate for the hurried tourist that to the east of the Dhakree Benaik the range gradually rises, and three or four miles distant, in the Chilt ka Dunda, a bluff woody summit with a temple to Devee,

attains full a thousand feet additional elevation, completely excluding the Panch-choola, &c. from the prospect. To reach this point which probably commands the loftiest peaks of Nunda Devee, would require a whole day, which we could not spare. The path is very practicable according to Puharee logic—"our *goats* traverse it," a consolation we received more than once. On the whole, I would say, let no one who has no other object, fash himself by coming so far to look at the snowy range. Partial masses are indisputably very grand, but far finer in my opinion is the main line, stretching from Jumnoo tree far down into Nepal, as we see it from Binsur and the loftier points of the Ghagur—always indeed, excepting one snowy range seen from another; e. g. the Ruldung group from the Roopia Pass.

We remained nearly two hours at Tantee and then continued our march leisurely towards Khathee, where we arrived at four P. M. and found Messrs. Ellis and Corbett encamped, employed in bear-shooting, after a very pluviose visit to the glacier above. The Mohroo (Tilunga) and Kurshoo oaks are abundant on the eastern exposure of the Dhakree Benaik, but no pines. The descent on the western side is rapid, first through Kurshoo, which soon becomes blended with abundance of Pindrow (Ragha) fir, forming boundless forests on this fine range. Below these, we passed down, through luxuriant meadows, nearly to the Pindur, opposite to a large village, Wachum. Here a path strikes off to our left to Chiring; and when passable, which it is not now, enables one to vary the return route to Almorah. This long, but in general not very steep descent, led us to a torrent, from which the road again ascends considerably towards Khathee, three miles or so further, the road lying amongst horse-chestnut, Maple, Sumach, mountain Bamboo, Banj, &c. Mohroo oak, Hornbeam, (Carpinus, "Geesh,") Ash, &c. The last hour we walked under a heavy fall of rain, which continued drizzling more or less all night.

Khathee has no permanent village, and at best only a few miserable sheds; the only cultivation half a dozen fields of Chooa, (*Amaranthus anardana*;) supplies must be obtained from Soopee, six kros distant, on the upper Surjoo, a flourishing village, under the Putwaree Mulgoo. This gentleman forwarded none till the afternoon of the 16th, which compelled us to rest here for a day.

Khathee consists of some beautiful, open, and swelling lawns, closely

hemmed in by exceedingly steep and lofty mountains, either covered with grass or enveloped in dark forest. On the N. W., about 300 feet below, the Pindur roars along its narrow gully, up which, whenever the clouds cleared a little, several high snowy and black rocky peaks of the great range appeared close at hand. Water boiled at $195\frac{1}{2}^{\circ}$, making the elevation about 9,000 feet; but as the thermometer gave the same result at Diwalee, 10 miles up the valley, and certainly 500 feet higher, 8,500 feet is perhaps the true height of Khathee. The place is a perfect bear-garden; we had not been an hour in camp, before one appeared on the opposite bank of the river, feeding quietly on the locusts. Messrs. Ellis and Corbett have seen half a dozen daily, and on the afternoon of the 16th bagged one of them about half a mile from camp. The mountaineers hold them in great dread and are unanimous in asserting that they not only devour sheep and goats, but even their own species when found dead. They are very fond of the mountain Ash, or Rowan fruit.

The species found here is the common black bear, called indifferently Bhaloo and Reech, terms which Mr. Ogilvy (in Royle's Illustrations) is inclined to think mark two kinds.

The argus and other pheasants are also common in the woods.

The vegetation on our route this day, and about Khathee, is wholly different from that which we have just parted from in the valley of the Surjoo. About 500 feet above Sooring, the *Hemiphragma heterophylla* began to show itself, scarcely as long as its own name; its godfather was fond of such, and Don observes justly of another of his appellations "Nomen Spermadietionis nimis auris terribile est servandum." My friend Pilgrim was not so far out, botanically at least, when he compared the Nynee Tal mountains to the Himalaya. On Cheena we find the Kurshoo oak, (*Quercus Semicarpifolius*), and on the flat summit of the mountain, this very *Hemiphragma*; lower down the *Pyrus baccata* is common by streams, as it is about Khathee and in the Beans country, everywhere under the same name, Bun-mehul, or wild pear. As we advance to the S. E. in these mountains, the various plants, &c. seem not only to occur at lower elevations, but to approach the plains more and more, till in Assam, some of them descend to the valley. In the mountains of Busehur, this *Hemiphragma* is scarce found under 10,000 feet; here it is common at 8,000. *Primula denticulata* and

Quercus dilatata, both comparatively rare at Simlah, abound on the crest of the Nynee Tal range almost overhanging the plains at the foot of these hills, reaching to Kalaputhur. We find the Bengal Mudár, *Calotropis gigantea*, both the purple and white varieties, in profusion; while, as Dr. Royle observes, the *C. Hamiltonii* only is found to the N. W. It is curious to mark the exact line of demarcation between different species: the Tree ferns reach to Burmdeo, where the Kalee leaves the hills; *Plex excelsa*, unknown in Gurhwal and Sirmoor, is common in Kumaon, where also I lately found many plants of the *Chamærops Martiana* on the Ghagur range, two or three miles S. E. of the Ramgurh bungalow, at about 5,500 feet elevation. The Thakil, a mountain 8,000 feet high, near Petorahgurh, takes its name from this palm. On the Ghagur, Binsur, &c. we also meet as a timber tree, a *Michelia*, perhaps the *Kisopa* of Nepal, and in the Dikkolee and Bhumouree Passes, *Didymocarpus aromatica*, called "Puthur-loung" "Rock-clove," by the natives. But, probably owing to a milder or a damper climate, not only do plants grow lower down, but also much higher up, in Kumaon than to the N. W. Thus the *Rhododendron arboreum* (Boorans), and *Andromeda ovalifolia* (Uyar), which in Busehur we lose at about 8,500 feet, flourishes in the valleys of the Pindur and Goree fully 2,000 feet higher, reaching the lowest limit of *Rhododendron campanulatum*, and flowering till June. On the west side of the Dhakree Benaik we first meet the *Rhododendron barbatum*, about the same size as the latter, or rather larger, and known by the same name "Chimool;" it is common above Diwalee. Here also occur *Pyrus lanata*, "Gulion," *crenata*, "Moul, or Moulee," and *foliolosa*, "Sulia, or Hulia;" the "Moulee" is now ripe, and, though small, is the sweetest wild fruit I know of. At about 7,500 feet, on the eastern side of the mountain, a procumbent species of raspberry, perhaps the *Rubus foliolosus* of Don, made its appearance, and gradually became more abundant, covering every rock, bank, fallen tree, &c. and reaching up to within three or four miles of the Pindur glacier. It has large white flowers and excellent orange fruit, here called "Gungoor;" the Sinjung of Beans. Should this be identical with the "Ground Raspberry" of Darjeeling, it affords another instance of the approach of species to the plains as they extend S. E. along the Pindur above Khathee. Another *Rubus*, the *rugosus* of Don, grows to be a large and very handsome shrub,

affording copious panicles of large and excellent blackberries. *R. concolor* is found above Diwalee. The *Viburnum nervosum* and *cotinifolium*, "Ginnia" and "Gweea," *Millingtonia dillenifolia*, "Gwep," *Cotoneaster affinis*, "Rous or Reooush," with black, not bright red fruit, which Loudon gives it in the Arboretum, a smaller shrub, with fruit of this color, is common, and is called "Koocus," the *C. acuminata*? the *Elæagnus arborea*, "Gheewae;" the *Kadsura grandiflora*, "Sillungheete," *Panax decomposita*, *Sabia campanulata*, *Rhus Teeturee*, *Fraxinus floribunda*, "Ungou," the finest I have met, *Acer villosum* and *cultratum*, the Alder, *Alnus obtusifolia*, "Ooteesh," *Cornus macrophylla*, "Ruchia," *Betula cylindrostachya*, "Haour," or "Shaoul;" and several more trees and shrubs, abound on the mountains of Khathee: with the plants *Gaultheria nummularioides*, "Bhaloo-bor," *Anemone discolor*, "Kukreea," *Parnassia nubicola*, *Strobilanthes Wallichii*, *Euphrasia officinalis*, *Geranium Wallichianum*, *Veronica chamcedrys* or *Teucrium*, *Halenia elliptica*, *Pedicularis megalantha*, *Sibbaldia procumbens*, the beautiful club moss, *Lycopodium subulatum*, "Toola-mooka," 6 to 10 feet long, *Roscoea spicata*, *Hedychium spicatum*, *Spiranthes amoena*, &c. &c.

The *Pœonia Emodi* abounds in the woods and glades here and higher up, and has as often two carpels as one; the natives call it "Bhooniya madeen," ("Yet-ghas" of the Bhoteeahs,) to distinguish it from the "Bhooniya nur," *Lilium giganteum*, common in the forests along the Pindur; these being considered the male and female of one species; a very humble approximation to the Linnæan system! Among the bushes opposite to Wachum there is abundance of a twining campanulate plant called "Gol-ghunna,"* with large greenish yellow and purplish blossoms, which, as well as the capsules, are eaten by the inhabitants; it is a species of *Wahlenbergia* or *Codonopsis*.

September 17th.—After rain all night, and fresh snow on the mountains above us, we left Khathee at 10½ A. M. and reached Diwalee, about 10 miles distant, in four and quarter hours. A drizzling rain fell nearly the whole way, rendered doubly disagreeable by the dripping of the thick forest, and especially the luxuriant and most abundant *Nigala* bamboo,

* All these words are spelt according to Dr. Gilchrist's system nearly, which seems best adapted to the English reader; one must protest, however, against its being introduced into names intended for Latin, where *u* for *a*, and *uo* for *au* are horribly barbarous.

(*Arundinaria falcata*.) which, from 20 to 30 feet high, overhangs the path in the most graceful but to-day unwelcome clumps; it reaches up within a few miles of the glacier, and is also common on the western face of the Dhakree Benaik; it is very generally in seed, now ripe and ripening. The mountaineers assert that this only takes place every twelve years (a suspicious period), and that then the plant dies. They are certainly so far borne out in this that all the fruit-bearing specimens *do* seem fading away, and that for several years past I have in vain tried to procure the seed. The Nigala is of infinite use to them for mats, baskets, &c. some of which are very neatly and strongly made. Our route lay first on the left, then for a short distance on the right, and finally returned to the left bank of the Pindur, keeping nearly its *level*, with the exception of a few short but steep ascents and descents; the two bridges good. The scenery is of the sublimest description—the valley somewhat of the character of the upper Roopin, except that it is much more narrow, the mountains rising like *walls* to a vast height on each side, broken into great buttresses, and universally invested with the densest forest. Three or four beautiful cascades poured down their *boiling* water from the woody heights, their volume doubly augmented by the late and present rain, but one can scarce appreciate the beauty of these things when wet and hungry, and all around with faces expressive of despair. The last of these falls, nearly in front of Diwalce, pours down amongst the ledges of slate rock from a *maidan* or table-land, which must reach up close to Nunda Devee, and is a favorite beat of the Shikarees. Thar, (wild goat,) moonal, argus, pheasant, &c. being in great numbers. Diwalce, perhaps named from the wall-like cliffs of the Pindur just above, stands in the angle where that river receives on its left bank the Kushinee or Kuphinee river, a stream as large and turbulent as itself, rising in the south-east recesses of Nunda Kot mountain. Their waters are of a dirty milk colour, and the bed of the combined stream is obstructed by some great boulders, against which the waters dash at the pas de charge. We found a good spot for our tents in the angle between the river; above this are several successive terraces, all well adapted for the same purpose, shaded by yew and sycamore trees, but the forest soon terminates upwards in the great bluff snowy spur which separates the rivers. The left or south bank of the Kuphinee is formed by the “Kotela” mountain, the

summit of which, far above the forest region, commands the Pindur from this to its source, and communicates by a goat-path with the Dhakree Benaik.

We were accompanied here from Khathee by Ram Singh, the accredited guide to the glacier; an athletic mountaineer of Soopee, with the limbs of Hercules and the head of Socrates, but scarcely his honesty: this last quality having been perhaps sullied by a three years' abode at Almorah; we found him however, with some disposition to make the best of them, very useful in our subsequent difficulties, and ultimately parted well pleased with each other.

The trees, &c. on the route to-day include all those near Khathee, except the Banjoak; to these may be added the Elm, *Ulmus erosa*? "Chumburmaya," of great dimensions; *Juglans regia*, "Akor," *Cerasus cornuta*, "Jamuna," *Spircea Lindleyana*, *Leycesteria formosa*, "Kulnuha," *Hippophae salicifolia*, "Dhoor-chook," the "Turwa-chook" of the Bhoteeahs, in abundance all along the banks of the river from Dewalee to Khathee. *Ampelopsis Himalayana*, "Chehpara," the climbing and the arborescent *Hydrangea*, the latter called "Bhoo-chutta" and "Bhoojhetta," the hazel, "Bhoteeah-budam," and "Kapasee," *Corylus lacera*, *Piptanthus Nepalensis*, "Shulgurree," on which the Thar is said to feed in preference: *Ribes glaciale* and *acuminata*, black and red currants, "Kokulia;" *Berberis Wallichii*, and the only fir, *Picea Pindrow*. *Picea Webbiana* is pretty common above Diwalee; both known as "Ragha;" but not a vestige of *Pinus excelsa* (which however, Mr. H. Strachy found common in Beans) nor of *Abies Smithiana*, which from Captain Raper's account, is not to be met on this side of Joseemuth. There is a thick undergrowth with the above, of *Strobilanthes*, Balsams, *Rubus*, *Cucumis Himalensis*, *Cuscuta verrucosa*, *Polygonum runcinatum*, molle, and others. *Oxyria elatior*, *Tricholepis nigricans* (Edgeworth), *Senecio nigricans*, *alata*, *canescens*, and *chrysanthemifolia*; *Aster ferrugineus* (Edgeworth), a shrub which also occurs in Kunawur, *Aster alpina*, *Inula Royleana* (*Aster inuloides* of Don), *Jussilago*, very abundant on rubble, &c. Doubtless these form but a moiety of the vegetable riches of this region, which I could only partially examine from under the auspices of an umbrella.

On arrival at Diwalee we seized the opportunity of a partial cessation of the rain to pitch our tents; but it soon recommenced, and continued

to fall from this time for no less than 75 hours without a break! This deluge came from the east, and prevailed over all Kumaon, and no doubt much farther; it made us prisoners in our narrow tent till 5 P. M. on the 20th, when the clouds cleared away before a west wind. During this period, the smallest rivulets became unfordable, and the Pindur and Kuphinee were swollen into the most turbulent, turbid and ungovernable torrents. Up near its source I afterwards observed that the former had risen from 15 to 20 feet, and lower down where the bed is more contracted, and had received countless accessions, it was probably double this; accordingly at 2 P. M. on the 20th we were not surprised by a shout from our people that the Kuphinee bridge was swept away; and in a few hours, our worst fears were confirmed that both bridges over the Pindur had shared the same fate, after standing uninjured for the last 4 or 5 years. This Ram Singh was pleased to call "burra tum-asha," but it was death to some of us, and would have placed us in a most serious dilemma as to provisions, had not a flock of sheep and goats, returning from the summer pastures, been fortunately arrested in the same spot as ourselves, utterly cut off from any escape to the south by two savage rivers, and with no means of advance to the north except over the hopeless pass to Milum, barely practicable in the best weather. It was an unlucky emergency for the flock, as during our imprisonment in this slough of despair, we and our followers ate six, and the bears seven of them. The destruction of the bridges isolated our party in three distinct groups: one in the peninsula, a second on the left bank of the Kuphinee, while the third, driven thence on the night of the 18th by the waters invading their oodiyar or cave, had crossed to the right bank of the Pindur, and taken up their residence in a cave between the two bridges. These, when the bridges went, were intercepted from all aid; those across the Kuphinee were supported by "fids" of mutton and goat flesh, which we flung over; but without salt or flour; this food disagreed much with all our people, and when supplies reached us, it was curious to observe how every one eagerly demanded *salt*. On the 21st, the eight men across the Pindur, contrived to clamber down the right bank, till at a spot about two miles short of Khathee, they found a place where its force was somewhat diminished by the current being divided into three streams: these, four of them determined to cross, and had actually got over two, but

the third and last separated them, and three of the unfortunates were instantly carried off and drowned; the fourth, a very strong swimmer, reached the bank, but was so bruised and chilled, the water being at 42°, that he could not lay hold of the rocks, and was rapidly drifting after his luckless companions, when Messrs. Hort and Powys, ignorant of the fate of the bridges, came to the spot at this critical moment, on their way to Khathee, and dragged him out. Mr. Hort *might* have addressed him in the words of Pythagoras, O Genus attonitum—*gelide* formidine *mortis*, Quid Stygias, quid tenebras, quid nomina vana timetis; Materiem vatis, falsique pericula mundi? but he did much better: he clothed him, and restored the circulation by brandy, and had him carried back to Khathee. For having his life saved by this unlawful medicine, the poor man soon became an outcast, and it required all my persuasion, and not a few menaces, to induce his accusers to make the amende, on our return to Khathee; this was only accomplished by the chief of them publicly drinking water from his hands, which was not done without much hesitation and many a grimace.

September 21st was a glorious day, and was passed in various devices to throw a plank over the Kuphinee, to expediate Ram Singh to Khathee, to which, once over this torrent he said there was a track passable for goats and Danpoorees, but all our inventions and exertions failed for want of a felling axe and some thirty yards of strong rope, without which no one should intrude into these regions; during the course of the next day, however, we received a communication from our friends below, with some supplies; and what was better a detachment of the bold Soopee men appeared on the other bank of the Kuphinee, and with some assistance on our side, soon laid a tree or two over that stream, which by noon on the 23rd were so secured and planked as to be passable to us; and our coolies being so starved and paralyzed as to be utterly useless, we sent them all back to Khathee. By the 24th the upper Pindur bridge was partially restored, but as there appeared no probability of the lower one being completed for some days, I determined to make a push for the glacier.

We had smart rain from 2 till 6 P. M. on the 23rd. The Pindur river, about 60 feet below us, was invisible from our tent during our "close arrest;" not so the Kuphinee, which, though actually as far down, was right before us, and bounding down its inclined bed at such

an angle as to threaten us with apparent destruction. So great was their combined roaring that all conversation was kept up by shouting, and with the party over the water by gesticulations only. At night, one could not help fancying one's self on board a colossal steamer, with the thunder of the machinery and the incessant plash of the paddles deafening one; but there all is guided by skill and design: here the wild war of the elements seemed to terminate in destruction merely. They afforded a fine study for the action and resistless force of large bodies of water in motion down steep planes. Everywhere the lateral torrents had heaped up on each of their banks enormous *bunds* of mud, gravel, and huge rocks. When we passed, the waters of course had greatly subsided, and perhaps in their utmost force could never move such blocks; these must be owing to the landslips and great *debauches* of mud, in which the specific gravity of the stones is reduced almost to nothing. When subsequent rains have washed away the mud, there remain those immense couleés of rocks so prevalent along the mountain slopes as we approach the Himalaya.

September 24th.—With Ram Singh as guide, one of my own followers who wished to see the glacier, two Danpoor coolies, tea apparatus, and a column of ready-made chupatees, I started at 10:20 A. M. for Dooglee, and reached at 1 P. M. distance about five miles. The rise is gradual but continuous, and except near Diwalee, though the road was much cut up by the innumerable torrents and rivulets still rushing across it, I did not experience much difficulty; *there*, one or two formidable landslips had fallen, which compelled us to rise and get round them—not very pleasant work, when all was still tottering. The “still-vexed” Pindur raves close on the left hand during the route, and at about two miles from Diwalee becomes most savage, leaping down its rocky bed and among the birch-covered boulders in a series of the most *Cambrian* rapids and cataracts. It flows from 150 to 200 feet below Dooglee, whence, and indeed from the glacier, its course towards Diwalee, is nearly straight, and due south. At about one mile from the latter place, there is, across the Pindur, a very fine waterfall: and higher up, on the same side, where the crags fall precipitously to the river, three or four more, all equally beautiful, fed by the snows, and trembling over the bleak bare rock above the line of vegetation in copious sheets of spray. On the left bank the cliffs and shivered pin-

nacles are more remote, and rise from a tract of undulating ground strewn with great rocks and covered with forest and brushwood. At two miles from Diwalee passed a hut and grazing ground, called Toon Paehurree, a little to the east of which a superb cascade falls from the heights in three distinct leaps. One advantage of the late rain and snow is that these falls are now in perfection.

Approaching Dooglee the glen becomes very narrow, and the wild crags and bluffs above the forest across the river, now mantled in an unbroken sheet of snow, are but a few hundred yards distant! The accommodation provided here by nature for the wayfarer consists of a most enormous mass of mica-slate, a little above the road to the east: its western face projects gradually so much as to afford a tolerable shelter in the worst weather, as I had soon an opportunity of testing; for the heavy clouds drifting up the valley turned to rain at 3 P. M., which continued for an hour and a half; but though it was bitterly cold, the Oodiyar remained waterproof. Several similar rocks are grouped here and there in the vicinity, on which the spreading Juniper grows freely: the site also being just at the highest verge of the forest, must be about 11,500 feet above the sea. The wild goat is said to be very numerous hereabouts: and I noticed several flocks of the "Snow Pigeon;" higher up, amongst the cliffs at Pinduree, the Chough is common. The vegetation towards Diwalee comprises the trees before specified, with Silver Fir (*Picea Webbiana* and *Pindrow*); Birch (*Betula Bhojpatra*), *Rhododendron arboreum* and *barbatum*, Maples, Jamuna Cherry, with coppice of *Viburnum nervosum* and *cotinifolium*, *Rosa Webbiana* and *Sericea*, "Sephula" of the Bhotiahs, *Berberis brachystachys* (Edgeworth), *Jasminum revolutum*, *Syringa Emodi* ("Gheea,") *Lonicera obovata* and *Webbiana*, several shallows, the red and the white fruited mountain-ash, *Pyrus foliolosa*, "Sullia," "Hullia," (the letters s and h are interchangeable here, as in Latin compared with Greek;) and extensive thickets of *Rhododendron campanulatum*; while the pastures and streams abound with alpine plants, such as *Spiræa Kamtchatkika*, *Cynoglossum uncinatum*, "koora," *aplotaxis aurita*, *Carduus heteromallus* (Don), "Sum-kuniou," *Swertia perfoliata*, "Simuria," *Cyananthus lobata*, *Impatiens moschata* and *Gigantea* (Edgeworth,) *Rhodiola imbricata* (ditto,) *Saxifraga parnassiæfolia*, *Caltha Himalensis*, *Elshottzia polystachya* and *Strobilifera*, *Podophyllum Emodi*, Sal-

via Moorcroftiana? *Delphium vestitum*. At Dooglee, the *Potentilla atosanguinea*, "Bhooi-kaphul" commences, and is common towards the glacier, and near the latter only, occurs *Aconitum heterophyllum*; "Utees;" both plants being-common-on Muhasoo at Simlah, at about 8500 feet. Are these anomalies of the retreat of the alpine plants and the advance of the temperate ones, in these vallies, to be explained by the fact of their thorough exposure to the sun, from their nearly exact north and south direction? Amongst the rocks above Dooglee I found a shrub which the people called, from its bright red berries, "Dhoor-bank," *mountain arum*: the *Triosteum Himalayanum*, I believe; and if so, the most north-west locality in which it has yet been found.

Either from the hardness of my bed and "dampers," or the wild sublimity of the scenery, and perpetual war of the cascades, "deep calling unto deep, at the noise of the waterfalls," finding sleep impossible, I passed a good portion of the night in conversation with Ramsingh and his companions, and amongst other things endeavoured to convince them, but without much even apparent effect, of the propriety of eating beef; not all their deference and adulation could make them admit its innocence! and yet they are well skilled in the most ready flattery. When we first met Ramsingh, we asked him whether he had ever been to Budreenath, and his reply was—"No! why should I? *you are my Budreenath.*" Enquiring now a little into his history and the affairs of his village, it soon became too evident that even in these sequestered glens—where one might expect to discover an Arcadia—the very same bad passions are at work as in the nether world,—envy, hatred, malice, jealousy; in short the complete "Black Battalion" of human frailties and passions. If my informant spoke truth, Mulkoo, the Put-waree of Soopee, by the grossest oppression, had despoiled him of house, lands, and flocks; while, according to Mulkoo, Ramsingh, by engrossing the glacier as his peculiar property, robs *him* of his lawful quota of the rewards which accrue from the visitors. Truly of all "the fables of the ancients" that of the Golden age appears to be the most unnatural and incredible. "Croyez-vous, dit Candide, que les hommes se soient toujours naturellement massacrés, comme ils font aujourd'hui; qu'ils aient toujours été menteurs, fourbes, perfides, ingrats, brigands, foibles, volages, lâches, envieux, gourmands, ivrognes, avarés, ambitieux, sanguinaires, calomnieurs, débauchés, fanatiques, hypocrites, et sots?"

Croyez-vous, dit Martin, que les éperviers aient toujours mangé des pigeons quand ils en ont trouvé? Oni, sans doute, dit Candide. Eh bien, dit Martin, si les éperviers out toujours en le même caractere, pourquoi voulez-vous que les hommes aient changé le leur?" My companions, however malicious, were intelligent enough, and listened eagerly to my details of railways, steam-vessels, electric telegraphs, &c. the last a difficult matter to explain to them; they were also very curious to know what the "Sahib-log" did with the sacks and boxes of stones which they carry down to the plains with them! They must surely contain gold, silver, precious jewels, or very probably the Philosopher's stone, in the reality of which they implicitly believe, may be amongst them! In the uses of plants they are more at home, but as to anything beyond tangible and present utility in the way of food or medicine, every man of them is another Jeremy Bentham. Ramsingh informed me that if the honey of the upper Himalaya be eaten fresh or unboiled, it produces continued intoxication, severe griping, &c. Can this be caused by the abundance of Rhododendrons, and the bees feeding on their flowers? The *Ten Thousand* in Pontus were apparently affected from this cause.

September 25th.—Clear morning and the snows of Pindree in full view ahead, called two pukka kros, about four miles. Leaving Dooglee at 6 A. M. I reached the base of the glacier in two hours; the ascent very gradual, and for the most part over sloping lawns, bounded on the east by high crags, and covered with *Geranium Wallichianum*, *Potentilla atrosanguinea* and other species, *Ligularia arnicoides*, *Morina longifolia*, *Primula glabra*, *Parochetus communis*, *Cyananthus*, *Saxifraga spinulosa*, *Polygonum Brunonis*, and others, *Sibbaldia procumbens*, *Ephedra Gerardiana*, several species of *Gentian* and *Pedicularis*, &c. The only bushes beyond Dooglee are the *Rhododendron campanulatum*, *Lonicera obovata*, Willow, Birch, Rowan, all diminutive, and ceasing wholly about a mile short of the glacier, except the Juniper and the *Cotoneaster microphylla*, both of which flourish on its edges; the latter hardy little shrub seeming equally at home here as on the hottest banks at Almorah. The west bank of the Pindur is precipitous for about two miles above Dooglee, where a Gopha or cave is pointed out, said in days of yore to have been tenanted by the Pandoo, Bheemsing, not, however, till after the manner of St. George and St. Patrick, he had

expelled and slain certain dragons and serpents, the original occupants.* Above this cave, the right bank also becomes undulating, and exhibits the trace of a road which formerly led to the glacier, till the bridge was carried away; the slopes there are covered with low thickets, probably of *Rhododendron lepidotum*, but the unfordable river forbade all examination. In the north-west Himalaya, the passes, contrary to the fact here, are all gained by the north-west banks of the streams; here in general the eastern bank is most accessible. One circumstance remains constant, which is the comparatively level bed of the river below the glacier; from its source to the cave nearly, the Pindur flows along a wide channel, overspread with gravel and stones, the product doubtless of the glacier, which has no terminal moraine; its waters are exceedingly turbid, and though diminished above by the dozens of cascades, which of all sizes, and at all distances, rush down from the snow, are quite impassable. The spot called Pinduree is rather an open, undulating piece of ground, covered with grass, docks, and the ubiquitous Shepherd's Purse, in an amphitheatre of crags, with many snow-beds along their bases. Here I found the remnants of a hut, which supplied fuel, and at 10 A. M. started for the head of the glacier and the source of the Pindur (this last about 10 minutes' walk distant, but visited last,) which took me exactly three hours to accomplish. From the breakfasting ground the ascent is rather steep, over rough, and occasionally pasture land, covered with *Sibbaldia*, *Salix Lindleyana*, a low shrubby *astragalus*, the yellow aromatic *Tanacetum*, the dwarf white *Helichrysum*, an *Iris*? a garlic-like *allium*, and two most abundant and beautiful blue *Gentians*. The glacier lay to the west, and between us and it, rose a lofty moraine, along the hither or east base of which flows a considerable stream, the source of which is much more remote than that of the Pindur, which it joins one or two hundred yards below its exit from the ice. Having ascended perhaps a thousand feet, we struck off to the left, and crossing the moraine, which is here about 150 feet high, descended to the glacier, and with infinite

* During the heavy snow which fell in Kumaon in February 1807, from 40 to 50 *Kakur* are reported to have taken refuge in a cave near Loba, when they were killed by the peasantry. Had the bad weather continued, and these deer been starved, we should probably have one illustration of the manner in which *Bone Caverns* have been stocked.

difficulty, advanced a few hundred paces towards its head, where it commences in huge broken tiers of the purest snow. The glare from this was intolerable, and the warmth of the sun now began to tell on the snow; the consequences soon made themselves heard and seen in the avalanches which, one in about every three minutes, commenced falling from the lofty crest on our right—the northern shoulder of Peak No. XV. generally known as Minda Kot or Nunda Hosh. The ridge of this was capped by a wall of snow, apparently 40 or 50 feet thick, from which stupendous masses were constantly detached and fell with the noise of thunder, spreading out in their descent like a fan, and tumbling in great blocks to the base of the moraine. Though perfectly safe where we stood to gaze, my Almorah servant was terribly frightened by “Devee’s opera.” Having crossed the glacier we kept for a short distance along its western side, as I hoped to reach the source of the Pindur that way; and return to the *camp* by crossing it at its source: both objects Ramsingh assured me were now impracticable; and as heavy clouds began to collect to the south, any delay became dangerous; and therefore returning to the glacier, we endeavoured to steer down its centre, so as to look down on the river from the southern escarpment; but this was also impossible, from the tremendous fissures (the veritable Davy’s locker) which crossed our path. Nothing remained but to regain the moraine, which we only did by passing along some very awkward isthmuses between these fissures. The moraine is constituted of gravel, mud, and blocks of stone imbedded in ice; the stones much smaller than I should have expected. It conducted us, latterly by a very steep descent, to where the river issues from a cave in the face of the glacier, about 20 feet high, by perhaps 90 wide; the impending roof is riven into four or five successive thick ribs of ice, the lower members of which promise a speedy fall. I found the water extremely cold and muddy, and, as my guide had declared, too deep and impetuous to be crossed. Mr. Hort found the water to boil at $190\frac{1}{4}^{\circ}$, which, allowing half a degree too high for the error of his thermometer, would make the elevation very nearly 12000 feet.

It is most surprising that with such a beautiful and unquestionable example of a glacier within seven marches of Almorah, the existence of this phenomenon in the Himalaya should have been considered doubtful! Having within these five years visited the Mer de Glace and seve-

ral of the glaciers of Switzerland, I can most confidently state that there is not in Europe a more genuine instance, and Mr. H. Strachey, after much more experience, in Gurhwal and Kumaoon, assures me that it is by no means a singular one. Captain A. Broome many years ago penetrated to the cave source of the Bhagiruthee, which he found to be formed of pure ice ; so that little doubt can remain of the enormous "snow-bed" at the head of that river being also a true glacier. Captain Weller, who traversed the glacier near Milum (J. A. S. No. 134, for 1843) was struck by the fantastic castles, walls, &c. of its higher portion ; this appearance would denote the junction of a lateral glacier ; but in no part of his journal does he appear to be aware that at Milum there was such a thing as a glacier ; at least he never employs *the word*. Certainly the recent heavy rains had thoroughly washed the Pinduree glacier, and its surface exhibited a sheet of the purest ice, except on and near the terminal escarpment, which being covered with rubble, resembles, at a short distance, a steep bank of mud ; and such, I hear, is the appearance in May and June of the Milum glacier. But to make quite sure, I carried a hatchet, and frequently broke off fragments, which *everywhere* were perfect ice, the only difference perceptible, or that I can remember, between this and the Alpine ice, being a coarser granular structure here. It is intersected by the same fissures, has the same *ribband* texture, and from its origin in the snow to its termination above the cave, falls in a series of the most beautiful curves, which appeared to my unscientific, but unbiassed eye, a striking illustration of the truth of Professor Forbes' *Viscous Theory*. That the mass is moving downwards seems confirmed by the form of the snow at its head, viz. a succession of terraces, with steep walls, just such as clay, &c. assumes on its support being removed. The Bhotiahs of Milum affirm that their glacier has receded from the village two or three miles to its present site, and Ramsingh assured me that the same is true, in a less degree, at Pinduree. The glacier may be about two miles long, and from 300 to 400 yards broad, and probably occupies the interval between the levels 12000 and 13000 feet above the sea ; owing its existence to the vast quantities of snow precipitated from Nunda Devee and the other lofty mountains above, which, melted by the noon-day sun, is frozen at night. It must be observed too, that in spite of theory and observation elsewhere, the perpetual snow appears here to

descend to the level of 13000 feet: for from the head of the ice to the crest of "Traill's Pass"—the *col* which may be considered as the *root* of the glacier,—there is an uninterrupted surface of snow, and that, from its low angle except for the lowest thousand feet, evidently in situ. In short no one in Kumaon can doubt the existence of *permanent* snow, when he contemplates daily the faces of Trisool, Nunda Devee, and others, exposed to the full blaze of the meridian sun, and yet preserving in many spots, and those by no means the highest, spacious fields of snow without a speck or rock.

None of the culminating pinnacles of the Himalaya are visible from Pindree; though the great Peak, No. 15, 22,491 feet, is *immediately* above on the east—but its northern shoulder, a massive snowy mountain, forms a grand object to the north-east, and this, passing the depression forming Traill's Pass, is continued in glorious domes and peaks to the left, where a beautiful pinnacle terminates the view, apparently the easternmost of the two lower peaks of Nunda-Devee. The adytum of the Goddess herself is utterly concealed. By many she is irreverently confounded with THE BULL of Siva; but H. H. Wilson gives us Nunda and Nundee as epithets of *Durgá*, the *inaccessible* goddess." The largest temple at Almorah is dedicated to her, and though several hundred years old, is there very generally believed by the credulous mountaineers to have been built and endowed by Mr. Traill, the late Commissioner, in gratitude for his recovery from temporary blindness from the snow glare, when crossing the pass now named from him. An equally lying tradition purports that, like Heliodorus, he was struck blind at Almorah for forcing his way into her temple, and only restored on endowing it handsomely. These legends, credited against all evidence on the very spot and in the very age where and when they were invented, reduce the value of tradition, and even of contemporary testimony, unless assured of the witness' judgment, considerably below par! Amongst some great rocks on the east of the moraine, I found numbers of the curious *Saussurea obvallata*, here called the "Kunwul," or Lotus of Nunda Devee; near it grew the *Dolomisea macrocephala*, another sacred plant, bearing the strange name of "Kala-Tugur," or Black Tabernæmontana; and the common Rhubarb, *Rheum Emodi*, here called "Doloo." The rocks in situ about the glacier are mica-alate and gneiss, but on the moraine, the fragments consist

also of crystalline and slaty quartz, the latter often considerably colored with iron between the layers; hornblende rock is also common; and masses of the same granite which forms the great range at least up to Gungootee. Though it exhibits quartz, felspar, and mica, the felspar is in such excess to the other minerals, and large crystals of black schorl are so abundant, that Captain Herbert probably did not recognize it to be granite, and hence his denial that this rock is found in the snowy range.—It certainly differs much in appearance from the more authentic granite which we find north and south of the Great Chain, in Kunawar and Kumaoon.

My investigations were cut short by the very threatening appearance of the weather, and to his great relief, I at last commanded Ramsingh to retreat. At one period, he had evidently lost his way, and become confused on the glacier, and on quitting it, he turned round, joined his hands, and made a low reverence towards Nunda Devee; on the intensive principle invented by Puff in the critic of firing six morning guns instead of one, I own I was strongly tempted to imitate and even surpass my guide by making six vows in the same direction, but there was no time for formalities, and the goddess who is pacified for a million of years by the sacrifice of a man, is not to be bearded with impunity in her own den; so, without further ceremony, we started, and passing Dooglee, in one hour reached Diwalee, in an hour and a half more, under pelting showers the whole distance. Messrs. Hort and Powys had arrived from Khathee an hour before me.

The existence of alternate diurnal currents of air to and from the Himalaya, the first of which I experienced to-day, resembles in its regularity, the land and sea breezes of many tropical coasts, and is a fact which all travellers in these mountains must have remarked, though none that I am aware of, has recorded or attempted to explain it.* All along the exterior ranges we find that during the warm season, at least, about 9 or 10 A. M. a strong gale sets in from the plains, well known at Mussooree as the "Dhoon Breeze," and equally prevalent and grateful at Nynee Tal, &c. from 2 to 3 P. M.; it reaches the snowy range, blowing violently up all the passes from the Sutlej to the Kalee;

* Mr. Batten informs me that the Rev. J. H. Pratt has written an essay on this subject in a literary Journal of Cambridge; which I have not had the advantage of consulting.

and so furious in Hoondes and upper Kunawar as to preclude the use of pitched roofs, and to render it necessary to secure the flat ones by heavy stones. On the other hand, along the base of the mountains at Hurdwar, Dikkolee (on the Kossillah), Bhumouree, and Burmdeo, we find, so far as my own experience goes, that from November till April, from perhaps 2 till 7 or 8 A. M. a perfect hurricane rushes down the great vallies *from* the mountains, and being greatly cooler than the surrounding air, and soon followed by an oppressive calm, is perhaps the cause of much of the insalubrity of the tarai; as the reverse gale probably originates *much* goitre in the mountains. The explanation which suggests itself is as follows: Sir J. Herschel states that at 10,600 feet about the sea, one-third of the atmosphere is below us, and at 18,000 feet, one half. For the sake of round numbers, let us assume the attenuated stratum of air resting] on the Himalaya and Tibet, to be deficient by about half the weight of the whole atmosphere; during the day time, owing to the heat reflected and radiated from this elevated plateau, and the rocks and snows of the Main Chain, (a source of heat wanting of course to the corresponding stratum over the plains,) this is further expanded or rarified, so that it becomes specifically lighter, and ascends. Hence, owing to the great pressure of the whole mass of the atmosphere incumbent on the plains, the air thence is forced to flow upwards, to fill the comparative vacuum, and the current is generated, which commencing at the outer range, reaches the higher one in the afternoon, laden with vapor, which is there condensed by the cold, and astonishes the traveller by those storms of rain and snow which succeed, and are indeed a necessary result of the serene morning. It is for this reason that the guides are always so anxious to set out betimes, so as to cross the passes by noon. It may be objected that as the process of rarefaction commences at the summit of the mountains, and must be gradually communicated to each stratum beneath, where it comes in contact with the heated ground, the current should begin instead of ending at the highest elevations; but it would appear probable that the movements of the air from this cause is trifling; the main agency being the pressure of the atmosphere on the plains, which necessarily commences its operation with the outer ranges. During the night, the atmosphere, like Penelope, undoes what it did by day. From the absence of the sun, the mountain air is cooled and condensed,

and, recovering its former bulk and weight, descends, to restore the equilibrium by forcing the aerial invader back to the plains, the process being no doubt greatly aided, or rather caused, by gravitation as well as by the expansion and consequent diminution and negation of pressure which the plain atmosphere has itself experienced from the intense heat of the earth and sun's rays by day, the former of which is dispersed into the air during the whole night, and till about sunrise, when the gale from the mountains attains its maximum of intensity.

Both "up and down trains" must be much modified and complicated by the direction of the mountain ranges and great vallies; these last determine of course their usual route, and by their narrowness and depth tend greatly to augment the force of the wind. At Bheemtal, 12 miles from the plains, its effect is but too sensible; but at Ramgurb, as much farther in, it is unknown; the Ghagur serving as a most efficient screen in this direction. The entire career is run out in about 100 miles; this distance is so short, and the anomalies from the irregularity of the ridges so great, that the effect of the earth's rotation may be unappreciable; if not, the day breeze coming from the south, where the velocity of rotation is greater, ought to blow from the south-west and the night one from north-east: and this is certainly true at Almorah of the first.*

* The climate of Ludakh, 11,000 feet above the sea, as observed by Moorcroft, fully bears out the above theory. Frost and snow continue from the beginning of September till that of May. "In May, the days become warm, although early in the morning the rivulets not unfrequently present a coat of ice, and this may be observed in some spots even in June, whilst on the loftiest mountains, snow falls occasionally in every month of the year. During the summer months, the sun shines with great power, and, for a short part of the day, his rays are intensely hot. At Lé, on the 4th July, the Thermometer in the sun rose at noon to 134°, and on the march to Piti, it stood ten degrees higher. At night the temperature was 74 degrees. Even in the depth of winter, the heat of the sun is very considerable for an hour or two, and the variation of temperature is consequently extreme. On the 30th of January, the thermometer shewed a temperature of 83° at noon, when it was only 12½° at night. The great heat of the sun in summer compensates for the short duration of the season, and brings the grain to rapid maturity. Barley that was sown in the neighbourhood of Lé on the 10th of May, was cut on the 12th of September; and at Pituk, five miles from Lé and about 800 feet lower, in a sheltered angle of the valley, the same grain is ready for the sickle in two months from the time of sowing. (Travels, I. 268) Much further eastward, Captain Weller

The trade and similar periodical winds are of no mean benefit to the navigator ; the use of their mountain counterparts is unknown, unless it be to scour the deep vallies of their malaria. One abuse of them was too evident ; the locusts were everywhere taking advantage of them to penetrate into the mountains, and were in considerable numbers, living, dying, and dead, at the very head of the Pinduree glacier. How strong must be the instinct of wandering and self-preservation in these scourges, when, in search of sustenance (which they would scarce find in Tibet,) it thus leads them, as the moth in the case of light, to their own destruction amongst the ice and snows of the Himalaya ! But so long as rational men are found to resort to Sierra Leone, &c. on the same errand, and with the same fate, though from an opposite cause, we have not much room to boast of our superior discretion. The natives of Kumaon consider that the flights of locusts, which have in late years, done immense damage to their crops, are produced from the sea. I know them to be produced in Rajpootana ; on our return to Almorah on the 2nd October, we found vast swarms of them settled on the fields and fresh ones coming from the south and south-east ; fortunately the harvest was too advanced to admit of much injury.

September 26th.—Walked to Khathee in 3½ hours, with soft showers at intervals ; and heavy rain from 4 to 6 P. M. ; at one of the bridges we met the Putwaree Mulkoo, or Mulkih Singh, a regular short, thick-set, mountain savage, not unlike one of his own bears.

September 27th.—To the Tantee chalet (now deserted) on the Dhakree Benaik, which we walked in 3½ hours. From half-past 12 till 6

was told that in May and June "it is hot below Dhapa (Daba,) that sealing wax melts if carried on the person during the day," a significant hyperbole. Moorcroft suffered severely from fever in the same district, probably from these rapid extremes.

During the rainy season of the Indian Himalaya, the prevalence of clouds and moisture, by equalizing the temperature, must in a considerable degree, neutralize these currents : but to solve the problem satisfactorily, careful and extended observations are requisite, with the comments of an experienced meteorologist ; several necessary elements, evaporation, electricity, &c. probably playing no mean rôle in the phenomena.

In the Arctic regions, Dr. Richardson found the radiation of heat from the snow in spring to exceed greatly that from the soil in summer : and in the Himalaya, the "Dhooa Breeze" is most regular and powerful from April till June.

P. M. we endured a heavy storm of rain, hail, and thunder, from the west, followed by a clear and very cold night; our tent, which withstood the 75 hours rain at Diwalee, leaked in half a dozen places at once to-day, such was the deluge that fell. Our people fortunately had the huts to shelter them, for, notwithstanding every precaution, several fell sick every day with fever, so that our march resembles the retreat from Walcheren.

September 28th.—After enjoying the view from the Pass, we descended to Sooring in $2\frac{1}{2}$ hours; slight rain in the evening.

September 29th.—To Kupkot, in $4\frac{1}{2}$ hours, breakfasting at a hamlet about half way, called Dooloom. Some very large species of orchideae, probably *Dendrobium*, *Phaius*, *Cœlogyne*, &c. grow on the rocks and trees in this stage. The road at the landslip not yet replaced; but after the paths above, it was trifling; one's feet seem gradually to acquire a sixth sense from practice over dangerous ground; a portion of the mind descending and taking up its temporary abode in the toes; as the bat is said to have a sensibility in its wings which enables it to avoid walls, &c. in the dark. To-day was fine till 4 P. M. when a strong cold wind blew down the valley accompanied with light showers for about an hour. The rice-crop is now being cut here.

September 30th.—Walked to Bagesur in $5\frac{1}{2}$ hours, breakfasting half-way at the Mundilgurh Torrent, where we met Messrs. Norman and Weston on their way to Pinduree. The Puharees are quite aware of the value of a *mid-way* meal. A friend once asked one of them how far such and such a place was off; and the reply was—"Two kros if you have dined, three if you have not."

The Surjoo has fallen six feet since we left Bagesur; the temperature of the town is considerably lower, but the people look sickly and sallow from fever. No rain to-day, for the first time since we started, 21 days since.

October 1st.—To Sutralee in $4\frac{1}{2}$ hours, of which $2\frac{1}{2}$ were expended in reaching the summit of the Ladder Hill, exclusive of a full hour's delay in crossing the "infamous" Gaomutee, now just fordable, mounted on a ferryman's back, who was obliged to have a second man to steady him. That such an obstacle on the main line of commerce between Kumaon and Tibet should remain without a bridge, is accounted for by the circumstance that little communication takes place in the rainy

season; and that during the rest, the stream is only ankle-deep; but when the iron-mines and foundries of the province are once in operation under the management of the new company, let us hope the traveller will be expedited on his way to Pinduree or Milum by one of the Suspension Bridges, the glory of Kumaon above all the rest of the Himalaya taken together.*

We breakfasted at the Dhurmsala, under a very elegant arbor of Jessamine, but clouds again disappointed us of the desired view of the snowy range. Noticed the *Vitex negundo* in various places to-day; indeed it is common in Kumaon, as in all the outer hills, and is here called Shiwalee. An intelligent bráhmán of Almorah assures me that THIS is the Sephalica of Indian poetry, and brought me the Amurkosh to prove his point, where it certainly was explained by "Soovuha"—"Nirgædee" and Neelika; with *niwar* as the Hindee. For Nigoondee, H. H. Wilson gives us "*Vitex negundo*," and "*another* plant, Neel-sephalica," but does not say what this is. "Neelika" though denoting "blue," he follows Sir W. Jones in explaining by *Nyctanthes arbor tristis*, though no blue *Nyctanthes* was ever heard of. Sir W. Jones was assured by his Bengali pundits that this tree was their Sephalica, though he quotes the Amurkosh as stating "WHEN the sephalica has white flowers," &c. which the *Nyctanthes* always has. It grows wild abundantly in Kumaon, but Roxburgh could never find it so circumstanced in Bengal; the original name is therefore more likely to be preserved in the mountains, where so far as the bráhmans are concerned, *Parjat* is the only one extant, and this also Sir William Jones was aware of in respect to other parts of India. He also gives *Nibaree* as the vulgar (Bengal) term for the *Nyctanthes*; but in Dr. Voigt's catalogue, this is annexed to *Cicca disticha*. The Puharee "Shiwalee" is an easy and regular corruption of Sephalica, and Sir William describes it in terms which might well attract the praises of the poets—"a most elegant appearance, with rich racemes or panicles (of odoriferous, beautifully blue flowers, Voigt,) lightly dispersed on the summit of its branches." "Soovuha" 'bearing well,' may allude to these, or to the aroma of the bruised leaves; but the experimentum crucis of try-

* These bridges are constructed of iron manufactured in Calcutta, and probably smelted in England. The abutments of one over the river Khyrna near Nynce Tal are absolutely built on an iron-mine!

ing whether the "bees sleep in the flowers"—for that is the significance of *Sephalica*, remains yet to be made.

October 2nd.—To Almorah in 5½ hours: total hours from the glacier 32; road distance 83 miles, (in a direct line 52,) giving an average rate of walking, 2 miles and 5 furlongs.

In the preceding notes, the popular name of each tree and plant, where any certain one exists, is commonly added, with the view of enabling those who visit the same or similar localities, to acquaint themselves, if so disposed, with the more prominent characteristics of this department. "The naturalist," says Sir William Jones, "who should wish to procure an Arabian or Indian Plant, and without asking for it by its learned or vulgar name, should hunt for it in the woods by its *botanical character*, would resemble a geographer who, desiring to find his way in a foreign city or province, should never enquire by name, for a street or town, but wait with his tables and instruments, for a proper occasion to determine its longitude and latitude."

Account of the process employed for obtaining Gold from the Sand of the River Beyass; with a short account of the Gold Mines of Siberia; by Capt. J. ABBOTT, Boundary Commissioner, &c.

It has long been known that the sand of the river Beyass yields Gold Dust to the sifter. A description of the process and of the value of the produce may possibly be interesting; and if it should lead to search for the original veins of this precious metal, the result may be valuable as well as curious.

From the mountain district of Teera to Meerthul, where the Chukki joins the Beyass, and the course of both is nearly southward, gold dust is found in the sands of the latter pretty equally distributed. The boulders and pebbles in the river channel from Ray to Meerthul (the greater portion of this interval) are generally siliceous, quartz, porphyry, sandstone, gneiss, with occasional granite—and oftener pebbles of jasper. These appear to be debris of the Brisna cliffs and hills bordering the river, with exception perhaps of the gneiss, which I suspect is carried down from the older formations. My impression is

Vertical section through the Aoorahl Mountains at Lathacoost showing under what succession of strata

the Gold occurs.



Washing for Gold at the River Boyafo.

that the gold is originally deposited in the gneiss and quartz rock, and separated with the sand itself by attrition of the boulders together. This would account for the extreme minuteness of its particles, which are literally dust. All my enquiries however failed to ascertain the discovery at any time of a particle of gold adhering to any fragment of rock.

At Teera the course of the Beyass lies between mountains. At Ray it emerges into the plain, having hills on its north-eastern brink. Here it divides into many streams scattered over a cultivated channel more than a mile in breadth. The gold finders are a few poor natives who have no more lucrative subsistence. The labour is severe and the profits poorly remunerate them.

Process.

The spot selected for the washing was close to the main stream of the Beyass. The larger boulders and fragments being thrown aside, the coarse sand to the depth of a foot is abraded and carried in baskets to a trough upon the brink of the stream. This trough, which is a hollowed block of timber about four feet in length by a foot in depth, and a foot and four inches in breadth, is made to slope toward its outlet in front, a cleft an inch wide, extending from top to bottom. A sieve of bamboo staves is laid over the posterior portion, and the sand is laid upon the sieve; water is then poured upon the heap, which the pourer stirs about with his hand, until all the sand has been carried through the sieve into the trough, when the remaining coarse particles are rejected. This is repeated until the trough is nearly filled. Water is then poured into the sand, which is agitated by the hand. The water carries off the lighter particles. The man who stirs the sand, rakes it back incessantly with his left hand, whilst he pours upon it water with his right hand. In about half an hour there remains only $1\frac{1}{2}$ or 2lbs. of black sand, very fine and sparkling. This appears to be either the hornblende, from granite and gneiss rocks, or corundum. It is used by cutlers in conjunction with lac or rosin or pitch to form the wheel with which they sharpen tools and weapons.

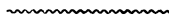
This black sand, which is very heavy, is found upon examination to contain a few small particles of gold dust. It is carefully scraped out of the trough in its wet state, placed upon a plank one foot square and slightly hollowed. Mercury of the size of a large drop of rain is poured into it, and the whole is carefully kneaded with the hands for

twenty minutes. More water is then added, until the mass is fluid. It is shaken with a circular motion, which causes the water and lighter particles to fly off at the circumference. This process is continued, with the continual addition of fresh water until only a small heap remains in the centre, in which the gold and quicksilver appear together as a small globule. This is washed, taken out and put upon a piece of ignited cowdung. The mercury flies off and leaves the gold yellow. In order however that the utmost weight be given to the mass, it is taken from the fire before the whole of the mercury is evolved.

The quantity of gold obtained from a trough half filled with sand, and containing therefore about $2\frac{1}{2}$ cubic feet, is about $1\frac{1}{2}$ rutties. This employs nine men for about 45 minutes. It is obvious to me that much gold is lost in this imperfect and expensive process. For the outlet of the trough extends to the very bottom, without any ledge to arrest the heavier particles.

Any enterprising native who would work these sands upon a larger scale with machinery turned by the river current, might find it pay handsomely, but only by personal supervision.

I have the pleasure to forward a specimen of the gold dust collected in my presence, and also of the sand previous to washing, and the black sand in which the gold is ultimately found. This still contains its gold dust.



It strikes me that as an accompaniment to the foregoing description of the process of washing for gold in the Beyass, the particulars of my visit to the richest gold mines in the world, (those namely, of Siberia) may be acceptable. And as, in Siberia, a particular succession of strata is considered presumptive evidence of the presence of gold, the same phenomena may possibly prove of similar significance in the regions lately added to our empire.

During my mission to Russia, I was detained at Oxenburgh awaiting an answer to my despatches. General Perroffoki, the enlightened governor of the province, anxious to amuse me, afforded me the means of visiting the celebrated fabric of Mines at Zlataoost and the gold and platinum mines of that neighbourhood.

As far as Ufa, a considerable town of a military station, the road lay over an undulating steppe, and at that season of the year the jour-

ney is delightful, the horses cantering lightly over the springing turf, and the temperature by day and by night being equally pleasant. But after quitting Ufa, the undules swelled into hills, generally of easy ascent, partly forest and partly cultivation, and over these we had reached the summit of the ridge of the Oorahl mountains, without any of the appearances of rock, ravine or precipice, which so usually token the proximity of any considerable mountains. From this height we descended a few hundred feet to the valley, and pretty little artificial lake of Zlataoost, celebrated for its fabric of arms and for the gold mines in its neighbourhood: but much better remembered by myself, for the courtesy, the kind hospitalities, the engaging manners, and traits of patriotic feeling which distinguish its inhabitants.

From Col. Anosoff, a practised geologist and a man of science and sagacity, I gathered the following particulars, which may form a useful introduction to my visit to the mines.

The gold mines of the Oorahl mountains are very different from our ordinary notion of metallic mines of any kind. For they are not excavations of the rocky strata of plain or mountain, but mere exfoliations of the superficial soil, varying in depth from one to four feet. Their gold is unmixed with any matrix, being almost pure gold in its metallic form. There is nothing in the appearance of the valleys yielding gold to distinguish them from such as yield none: and the first discovery of the mines was purely accidental, grains of gold having been washed down by the torrents. But by a careful comparison of phenomena, a geologist may now seek them with increased certainty, for, in every case, the gold is found to occur under the following succession of strata, which presents a Geological section across the Oorahl range at Zlataoost.*

The morning after my arrival I mounted the vehicle prepared for me by the attention of Col. Anosoff, and in company with his whole family proceeded to the gold mines. We passed through a forest of small firs and cedars feathering the high ground above the lake, and after coursing over some 8 or 10 miles of undulating steppe clothed with rich grass and beautiful wild flowers, entered a very extensive but shallow valley, bounded on all sides by scarcely perceptible acclivities of the same steppe. The abundance and beauty of the wild flowers enamelling the turf redeemed the monotonous character of the landscape.

* See plate.

It was one of the poetical phases of the steppe, oftener spoken of than encountered, and probably never seen south of the Oorahl river. At some distance onward we came upon a party of diggers for gold.

There was nothing in the spot they occupied to distinguish it from the steppe around. It was covered with turf and wild flowers springing from a black vegetable soil. It was not even the bed of a water-course; although such are very generally selected, owing to the gold being there brought to light by the action of torrents. The workmen dug away the superficial crust of black soil, working very carefully as they neared the bottom and leaving a layer about three inches thick untouched. When a considerable space had been thus prepared, they commenced excavating the soil to be washed for gold. This was done by digging through the thin layer of black soil not hitherto disturbed and to the depth of about one foot into the substratum, which is a hard table of clay and sand with fragments of schists and serpentine. The gold appears generally to lie upon the surface of this, but is sometimes found beneath. The whole of the earth now excavated is carried in barrows to the washing-house, where sieves of different degrees of fineness are shaken by water-work under the current of the stream. From the residue the gold is carefully extracted. It is generally of such size as to need no aid from mercury. The machinery appeared to me simple and well adapted to the process. It was not possible for me to make notes: but my impression is that the profits amount to about 75 per cent. in these the good washings: and the small price of labour, and the richness of the masses exhibited, as that year's collection, made me easily credit the account. These are the richest gold mines in the world, and appear to be inexhaustible, every year leading to the discovery of fresh riches, although they are supposed to have been worked from very ancient days; the name *Zlataoost* signifying mouth of gold.

The phenomena of these golden debris (for mines they can scarcely be called) are peculiar and lead to speculation. The gold dust so often found in the sand of rivers, streams and torrents, is generally attributed to some rocky veins in the higher sands. Here, there is no appearance of such an origin. Previous to the growth and deposit of the present black vegetable soil, the gold seems to have lain strown like pebbles, over the surface of the hard clay and schist stratum: not particularly in the channels of torrents, but as if it had fallen in a general shower.

The higher sands are very remote from the spot. The ascent to them is scarcely perceptible, and at the foot of those heights are valleys and ravines which would have caught and detained any debris washed down from their sides or summits.

The gold itself is of almost virgin purity. A small quantity of silver alloys it. It lies in granules, precisely similar to those formed by pouring upon water molten lead; and immediately suggests the idea of having been cast molten upon the hard stratum on which it is found. The strata however, hereabouts have no volcanic character, and it is evident that the gold has been cast in its present position, since the deposit of the clay on which it rests; its own great specific gravity otherwise giving it a lower rest.

When the gold has been worked it is laid up in heaps, which are transmitted to St. Peterburgh. The average size of the grain is that of a barleycorn: but masses of the size of pistol and gun bullets are not uncommon, and much larger masses are occasionally found. The appearance of all will be familiar to any one who has thrown fused lead upon water. When the late Emperor Alexander visited these mines he turned up a spadeful of the earth by way of example. We had scarcely quitted the spot, when an immense mass of gold, larger than a man's foot was found beneath the imperial footprint. The very genuineness of such a natural mass in such a position becomes doubtful.

Several of these gold mines are the property of or farmed by individuals who sometimes make immense fortunes upon the profits.

Col. Anosoff spoke confidently of the uniform succession of the strata on which gold is found, and as gold occurs in many and distant portions of the Oorahl chain, this circumstance is very remarkable, there being no imaginable connection between the gold itself and any of the substrata.

The supply does not seem to cease with the Oorahl mountains, for at the north-west foot of the Altai range it is gathered in considerable quantities. There however it is found in quartz, which is pulverized for its extrication. If I recollect right a few of the masses of gold of these washings was found adhering to fragments of quartz.

After examining these works we proceeded with fresh horses to Mias, where there are other gold mines. Platinum was here shown me in

the form of a black flattish grain, bearing the pure metal slightly corroded. It occurs here, but more commonly at Ekaterinburgh. Not having witnessed the search for it, the particulars are less fresh in my recollection. I was told that it was found under much the same circumstances. Platinum coin is commonly current in Russia for about half the value of the same weight in gold, although it can be obtained cheaper. Of course the circulation is limited to the Russian Empire. But the extent of this is so great that not much inconvenience accrues.

*Notes on the Viharas and Chaityas of Behar, by Capt. M. КИТТОВ,
6th Regt. N. I.*

The perusal of notices on the Buddhist annals by Hodgeson and Turnour, and of the inscriptions so ably translated by Prinsep, as well as my own observation of the many curious things I have occasionally met with, particularly in the vicinity of Gyah, have afforded me much room for reflection and speculation.

Although no benefit to science may be derived by search for, or discovery of, the ruins or sites of the 18 Viharas mentioned in the Pali Buddhistical annals of Ceylon, nor of the 83,000 Chaityas which the Burmese believe to have been built by Asoka, still our interest or curiosity is excited in the search, and if successful in any degree, it must be admitted that a greater value becomes attached to these records than they might otherwise seem to deserve.

Partial success increases our desire, and in following out one research, others suggest themselves, light is thrown on what formerly seemed darkness, truth on that which appeared but childish fable, and when such is the case, it must be accorded that history has gained a prize, hence it is that antiquarian research is not altogether an useless or idle one, it becomes interesting and instructive; acting upon this reasoning, I have taken advantage of my leisure after two years' hard though ill-requited labour in an official sphere, to drown unpleasant reflections thereon by resuming a study I had been obliged entirely to sacrifice to the calls of duty, and great will be my gratification if the result of my

Throne of a figure of Buddha at Goonerria



at Goonerria.



on a crowned figure at Dooba

यवर्मा कृतप्ररुवाकसां कृतकथापकअवचक
सांलंयाविशापोएवंयादीमदशुमल्लो॥

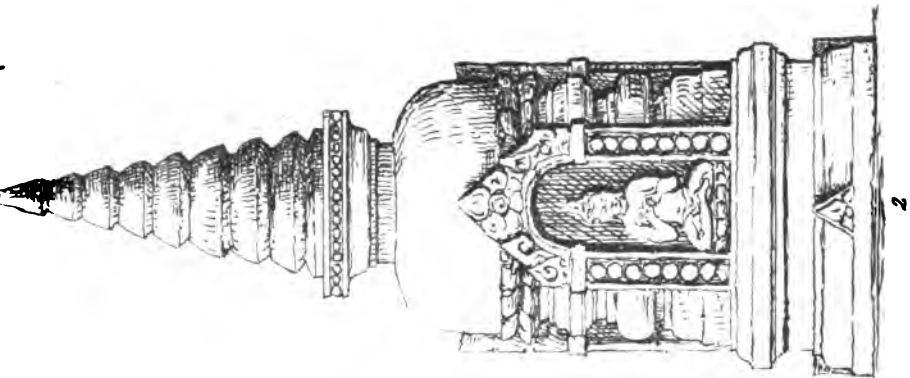
on an ancient Buddha

अथ व श्रेयं वलं विकृत मत्सुक सु ॥

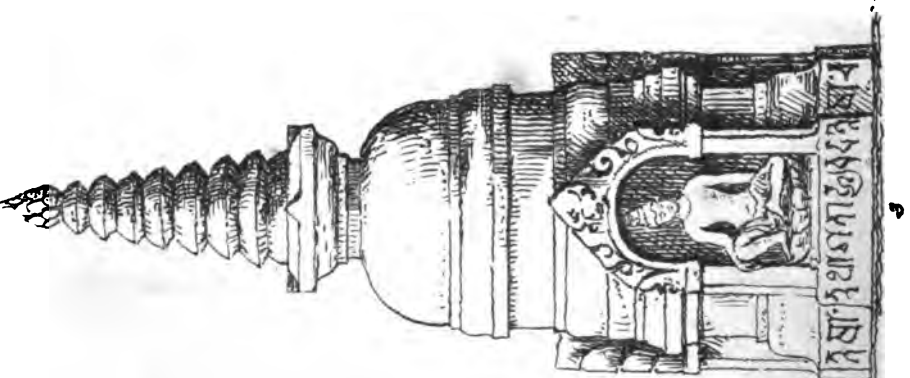
on a Jain relic at Amheté.

वस कधर्षं च उक द्वाश् रुमदयति
४

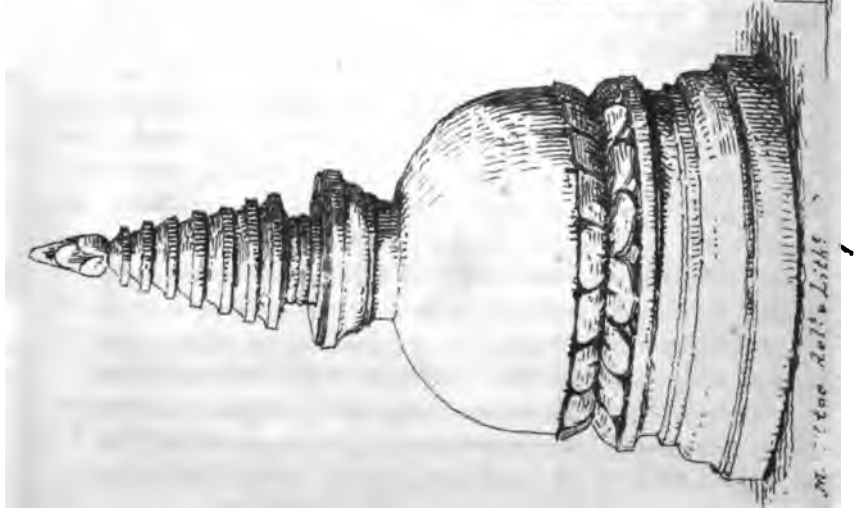
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Dr. J. C. Dasgupta

travels prove interesting ; at any rate I feel that I am partly carrying out the wishes of my late amiable and learned patron, James Prinsep, who oft expressed a wish that I should ramble over the district of Behar and cater for him. To be thus able (even at this late period) to carry out the views of my benefactor, is in itself delightful, but I hope that I am at the same time partly meeting those of the Honorable the Court of Directors, and of the Royal as well as of the Parent Asiatic Society. I however labour under great disadvantages, viz. want of means and want of an establishment of good draftsmen and a good pundit. I have only one of the former and of the latter none. Accurate drawings occupy much time, and a single idol will require a whole day, a group will take more, for all those which are worth drawing have most elaborate ornamental details. A complete and interesting portfolio could be filled either at Gyah or Bodh Gyah ; to copy these again fairly, takes an equal if not longer time, indeed I have in a few days sketched more than can be reduced to order in as many weeks.

To enable me to do the subject of this paper justice, it would be requisite to visit the whole of the country included in ancient Behar or "Vihara," for the name has undoubtedly been derived from the numerous "Viharas" or Monasteries of which the present town of Behar, was probably the principal, though Bodh Gyah was perhaps the most sacred of the whole on account of its being the site where Sakya's miracles are supposed to have been performed ; the term of doubt I apply to the miracles only, for, that such a lawgiver as Sakya existed, I see no reason to question, the accounts of his life and death when sifted of their fabulous interpolations ; are too circumstantial for us to take a different view, and of such the Ceylon books seems particularly free—in this respect the Buddhist works are far better than the Bráhmical ; the best of these perhaps is the Mahabharat, which if likewise parted from its impurities, would prove a history of real and great events of however less remote date.

In page 517, Vol. VI. of the Journal Asiatic Society, in Turnour's examination of the Páli Budhistical annals, mention is made of a dispute about the repairs of the "eighteen great Viharas surrounding Raja-griha." The question is, where were these said Monasteries, which, from their requiring repairs, may be supposed to have existed for a long period, even before the advent of Sakya himself,

shortly after whose death this took place? This is what I shall try to show.

Within a circle of 30 or 40 miles round Gyah, I have traced the following, of what I suppose to be the remains of Viharas, viz. Nagarjuni, Koorkihar, (Bodh Gyah,) Bukrour, (Gyah proper,) Murghat, Chilor, Booraha, and Gooncherit, Pawapuri, Burgaon or Koondilpoor, Behar, Raja-griha, Giryek, Patna, or as I find it called in an inscription, "Pataliputra," Poonaha and Dharawut: here are seventeen, of these places I have visited eleven; the great antiquity of five of them is unquestionable; of those named which I have not seen, there are five, also doubtless; therefore we may assume that we know of ten out of the eighteen of Sakya's time.

Behar, or more properly speaking "Magda," is acknowledged ever to have been the chief seat of the Buddhist religion, and of its heretical offshoots; the exact extent of this kingdom is unknown—and I fear must ever remain doubtful, though it would seem to have included (to the north) Benares, Allahabad and Ajudhia (or Oude) and to have extended to Ganjam, (Kalinga Desa) to the south, and Arracan to the south-east, at least the inscriptions, cave temples and the mention made in the Buddhist works would seem to warrant such a conclusion, though the former clearly point to the king of Magda having supreme power over all India from Caubul to Ceylon. Such must have been the case in Asoka's time and in that of Chundra Gupta. The 83,000 temples supposed to have been built by the first named were scattered all over India, and raised or repaired by command at one and the same time, upon the occasion of his conversion to the Buddhist faith. Of these perhaps the Tope of Manikyala, the caves of Bamiyan and of western India formed part; however I have here to treat of the "Vihars around Raja-griha," ten of which I have shown to have been traced with tolerable certainty.

I have given the names of seventeen sites: I will now describe those I have visited.

First of all Bodh Gyah. The extensive mound of brick, mud and hewn stones bear evidence of there having been perhaps more than one establishment, and that a great Chaitya or tope existed, the masonry of which was of brick and stone, the latter from the same quarry as all the pillars, bearing inscriptions in the ancient Pāli, and supposed to

be the work of Asoka, though I think there is reason to assign even a much earlier date to them. One of these formerly stood at Bukrower, the site of another city, and of a Vihara directly opposite to Bodh Gyah, likewise on the banks of the Lellajun, on the neck of land above the junction of the Mahana or "Mahanada," between both rivers; part of this pillar is set up in the town of Sahebgunge (Gyah) and two fragments remain at the original spot; of a fourth fragment, containing the inscription, various stories are told, but suffice it to say it is missing.

Proceeding further down the river, we come to Gyah proper; that this was originally a place of Buddhist and Jain worship, I believe there is little room for doubt, and that the worship of the Linga or Siva at this and all the Viharas, was practised for ages in conjunction with that of Budha, I think is equally clear from the innumerable Linga stones of every shape and variety found scattered about. I could wish that I had time to draw the whole variety, from the simple round stone to the richly sculptured four-headed kind called "the Chowmoorti," and "Chowmookhi" Mahadeva, though some would be unfit for our pages.

Still following the river, which is now called the Phulgoo, and at a distance of 15 miles, we reach Nagarjuni hills, the site perhaps of the chief Vihara or of several, for we read in Turnour that after the death of Sakya, the first great convocation was held before the Sutta punni (Sutgurba)? cave on the south of the hill, &c. which I think there is every reason to believe was the very spot now called Barabur as I have attempted to show in my notice on the caves. On the north-west end of these hills is Dharawut, and Chundowk tank, also the site of a Vihara.

Crossing the river and proceeding some 12 or 14 miles to the south-east, and after passing the range of barren rocks which extend from near Gyah to Giryek and Raja-griha, we come to a vast mound of bricks and rubbish, called Koorkihar, undoubtedly the site of a great monastery and large town, indicated by the potsherds and the many fine wells and tanks. Koorkihar is perhaps a corruption of "Korika," and Vihara the ancient name, is said to have been Koondilpoor, but this honor is claimed also for Burgaon, the site of another large city and monastery, Chaityas, &c. to the north of the hills, distant 10 or 12 miles.

The outer enclosure appears to have been 180 paces square; the wall (of bricks) was about three feet in thickness; there must have been an

inner inclosure half the width and considerably less in length ; the court yard thus formed appears to have been filled for ages with Chaityas or Budha temples of every dimension, from 10 inches to perhaps 40 or 50 feet, and to have been built one upon the other, the first being buried or terraced over to receive those of later date. There are great varieties both in form, size and materials, some of granite, others of basalt, pot-stone or chlorite, also of plain ground bricks.

There have been several rows of large images (and I should think of temples, covering them) of the Gyani Budhas, also of female figures ; all have the creed " Yé Dhurma hétu," &c. engraved on them ; some of the sculptures are very beautiful and perfect, and of colossal size ; the whole country is strewed with images and fragments : excavation and search in this mound would enable us to fill our own and other museums, and no doubt lead to some rational conclusion as to the progress of Buddhism up to its annihilation, for whilst digging out a miniature Chaitya I found the plynth of one with an inscription (No. 3 of my late notice of Inscriptions) which proves it to belong to one of the Pál Rajahs of Bengal who were known to be heretics. Buchanan and other travellers have noticed these innumerable small temples or models (figs.) heaped under every fig-tree throughout the district, the like also occur (though belonging to the Jains), at Agrahat in Cuttack, but for what purpose they were intended no one had ventured to conjecture ; chance however, at this place, has discovered the secret. The inscription abovenamed as well as other brief sentences I have found, show them to have been funeral monuments, our learned fellow-member Mr. Hodgeson of Nepaul has kindly communicated much valuable information to me, which has served to confirm my views ; he mentions that in the valley of Nepaul these numerous small Chaityas, surrounding a larger, is by no means uncommon. If again we look to Rangoon, we find the same to exist, but I shall advert more particularly to this subject in a separate paper and give some illustrations.

Quitting Koorkihar to return towards Gyah, and after travelling three miles to the south-west, the hamlet of Poonaha is met with, situated between two rocky eminences, and having a large tank to the north ; to the south of the village is a handsome Buddhist temple, the most perfect of any I have met with ; indeed the only one save that of Bodli Gyah which is of comparatively modern date, it possessed the most striking

picture of the style, viz. a solid round tower with a niche to each of the cardinal points, formerly ornamented with figures of four of the five Budhas, fragments of which are strewed about, and there are likewise many others and much brick rubbish, denoting the existence of some large building in former times; on the rock to the west is a fine shaft of granite, in the north face of which is an empty niche; there appears to be no inscription.

Taking Gyah again as a starting point and proceeding to the southwest four miles beyond Chirki, and on the right bank of the Morhur, we come to the site of a large city and citadel, &c. and no doubt of Buddhist and Saiva monasteries, on the two hillocks or rocks by the river side, which are covered with bricks, this place is called Murhut.

After crossing the river bed and directly opposite, is a high mound called Chillor, on which is a mud fort; this mound is the site of an ancient city of great extent; a quarter of a mile to the south are several mounds of earth and bricks; two are very conspicuous; one seems to have been a Dagope, the other has lately been opened for the bricks and several Buddhist idols of beautiful workmanship found; one of Siva is of great beauty, large dimensions, and quite different from any other figures I have ever met with. I hope to give an illustration of this figure hereafter; it took me many hours to draw. There are other mounds which it would be well worth while to open.

About two miles to the north is a small hill called "Matka," where there are the remains of a Chaitya; it was from this spot, I am told, that the small image of Budha, I sent a drawing of last month, was brought.

Proceeding due west for four miles, we come to a place called "Booraha." Here are several sites where there have been Chaityas, and a large Vihara, there is a natural curiosity which has no doubt been always a place of sanctity. There is a hollow spot beside a nullah where there are many powerful springs of apparently mineral waters, which come up vertically through the soil and discharge gas, the same as hot springs; the temperature of these is said to vary, much as well as the volume of water and gas discharged.

Two miles or less to the west of this place is a small cluster of hills called Manda, around which pottery and bricks are strewed for a great distance; this is the site of another large town. There have been

Budha and Siva temples on the rocks, of which traces only are left ; under a tree are heaped fragments of idols of all ages, amongst them were two small figures of sows with seven sucking pigs on their hind legs ; one of these sculptures I have secured for the Museum.

Leaving Manda and proceeding south-east towards Seerghatty for three miles, we reach a place called "Goonerria," the site of a large town and of a Vihara, the name of which appears from inscriptions to have been formerly "Sri, Gooncherita." There are numerous small Budha and Siva idols collected around a very fine figure of Budha of large size, on the throne of which is the annexed inscription plate.* In the same plate I have given some shorter inscriptions from smaller idols : there has been a fine tank to the north of the town and several Linga temples near it.

One of the inscriptions is written on the lotus leaves of the throne of a Budha ; it seems to be what is termed a Muntra, and reads perhaps three ways.

From this place we return to Seerghatty, which is six miles to the south-east, passing on our way a large tank and mound called Kurmaine ; a mile further south of which are two other mounds ; one is very extensive and elevated, but there is neither name nor tradition to guide us to any conclusion.

Such are the sites I have visited. I must here remark with reference to ancient sites, that it is much to be regretted that when the revenue surveys take place accurate notes should not be made of all the sites of ancient towns and villages, the high mounds of which are every where to be seen in India—this province in particular, where the most important events of early history have occurred.

In the north-western provinces above Agra, and as far as Lahor, there are many remarkable spots, but of all of these some legend more or less absurd, though instructive in a measure, exists. In the Jallunder Doaub might not this plan be adopted as a survey is being made ?

Before I conclude this brief notice, I must not forget to mention Pawapuri, which I am told is the site of a very large city. The present village is inhabited chiefly by Surrawucs or Jains, who claim the place as a seat of that sect ; according to a clever Bengálí pundit, Pawapuri was the capital of Magda in Chundra Goopta's time, and it was here

* We have been obliged to omit this inscription in the plate for want of space.

he received Alexander's ambassador Antiochus; this is strange, and if correct, we shall again be at fault as to Asoka and the pillar inscriptions. I beg to invite attention to this subject.

I shall never feel satisfied till I shall have seen Pawapuri, Burgaon, Giryek, Raja-griha and Behar, and several other places which have been pointed out to me. I hope the time is not far distant; until then I must take leave of the Viharas.

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*Geological Notes on Zillah Shahabad, or Arrah.—By Lieut.*

W. S. SHERWILL.

The southern portion of Zillah Arrah, or Shahabad, is occupied by an elevated plateau of table-land, forming the eastern extremity of the Kymore range of sandstone mountains. From whichever side it is viewed, it presents a series of high bluffs, or precipices, similar to those so often seen on sea coasts; these precipices, varying from 300 to 1500 feet in perpendicular height, are supported by bulging buttresses covered with almost impenetrable bamboo forests. The summit of this extensive plateau is covered with forests of Ebony, Saloogunje, a few Saul, and a variety of other trees, and has several ranges of low hills traversing it in various directions; many rugged and deep valleys indent the northern face, which is of a much less elevation than the southern face. These valleys, extending for ten or twelve miles into the body of the table-land, gradually contract in width from one mile to a few hundred yards, similar valleys branching off from them laterally. The ends of these valleys terminate abruptly in mural precipices, down which, during the rainy season, mountain streams are precipitated with a deafening roar. These valleys present to the traveller views of exceeding beauty: in many spots where they happen to be only a few hundred yards across, the deep shade at mid-day caused by the dense foliage and perpendicular walls a thousand feet in height, is quite a phenomenon for India. The most extensive of these valleys, or as they are styled by the natives k'hohs, is that through which the Doorgoutee river flows; a more beautiful spot it is difficult to imagine; at the spot where the Doorgoutee falls from the table-land, the valley named Kudhur-k'hoh, is only a few hundred feet in width, dark, deep and cold; immediately

below the falls the valley is darkened by an immense grove of mango trees, which extends for two miles along the bosom of the valley. Proceeding to the northward the valley deepens rapidly from 700 to 1,000 feet, sometimes expanding to a mile in width, sometimes contracting to a few hundred yards; diverging from this valley are numerous smaller k'hohs, almost impenetrable to man, but all affording excellent shade and pasture to large herds of buffaloes, which help to supply the Mirzapoor and Benares markets with Ghee. After having traversed about eight miles of this valley the Soogeea-k'hoh strikes off west and extends into the mountains for about ten miles; in this valley are situated the extraordinary limestone caves, a surveyed map of which appears as a vignette on the accompanying map.

*Sandstone.*—This mineral forms the grand mass of the table-land, and I am inclined to think overlies an equally extensive bed of mountain limestone. It is to this sandstone that the mountains owe their grand appearance, displaying as it does the most tremendous precipices; it varies in color in almost every specimen; it is exceedingly hard, strikes fire with a steel readily, is ponderous and tough, fracture conchoidal; that it is of a durable nature is proved by the buildings at Sasseram, Rhotas and Shergurh. The sandstone in some of the buildings in the two last named places cannot have been quarried and used for building less than 800 years ago and yet is still as perfect as the rock from whence quarried. It is universally quarried wherever a town or village requiring stone happens to be near the hills. The colors are principally white, red, pink, striped and grey, and is used for all sorts of building purposes, handmills, sugarmills, pestles, mortars, steps, door-posts and a variety of other domestic purposes: to it, the fortresses of Rhotas and Shergurh are beholden for all their palaces, and battlements; Sasseram for the greater part of its city, the tomb of Sher Shah is built of it, as also the bridge over the Kurrumnassa river at Musehee; on the northern face of the table-land it is of a softer texture; here it is extensively quarried for a variety of purposes.

The vast precipices exhibited in this sandstone admirably display the horizontal formation of the mass; one of the precipices in the fort of Rhotas I found by measurement to be 1,300 feet, a sheer mass of stone without a bush, or tree on its surface; it is situated close to an overhanging mass of building known as the Hujjam's palace, a few minutes'

walk from the gateway leading up from Rajghat. The echo at this spot, which is a complete amphitheatre of precipices, is very distinct and grand, giving seven distinct responses to several syllables; the report of a gun reverberates like thunder; the sandstone at this spot is of a dark red, an overhanging rock at this spot enabling a person to look over and to fully contemplate this fearful abyss. At the foot of a small detached hill at Sasseram a very curious apparently horizontal column, or formation in the sandstone appears, which has been described by me in the 163d No. of the Journal of the Asiatic Society at pp. 495—497.

*Mountain Limestone.*—Next in order, is the limestone, and from the fact of its appearing in so many places, though far apart, separated even for many miles and yet always appearing of the same structure, I am inclined to think that it penetrates in an unbroken stratum under the sandstone. Start, for instance, from the eastern face of the table-land, where the limestone forms an unbroken bed from the foot of the Fortress of Rhotas to the village of Dhowdand, a distance of 30 miles north, and proceeding in a north-westerly direction at the distance of thirteen miles we meet with the same limestone in the valley of Soogeea-k'hoh at the depth of a thousand feet below the summit of the table-land and in company with the limestone Gupta caves; nine miles further in the same direction, it again appears at Buranoon in two low detached hills, much lower than their sandstone neighbours; four miles further north it again appears in a low hill at Nowhutta, then turning nine miles to the west, it again appears at Musehee; beyond that, I lost all trace of it, but I have little doubt that from the fragments that are washed out of the numerous k'hohs, that it will be shown to exist wherever the sandstone has been deeply penetrated. To the west of Rhotas limestone appears cropping out as two small hillocks situated in the forest under the lofty sandstone precipices bounding the southern face of the mountains. It also appears at the foot of the sandstone at the western entrance of the large valley named Doomur-khar, on the northern face of the hills about 12 miles south-west of the town of Sasseram. This limestone is extensively quarried wherever it appears, and from Tilo-thoo on the banks of the Soue, large quantities are burnt for lime and taken down the river in boats to Dinapore, Patna, Arrah, Chupra and to other large towns.

Specimens of this stone were sent by me to Calcutta in December 1844, hoping they would prove useful as Lithographic stones, but they were declared to be too siliceous and too thin for any practical purposes ; but I feel convinced, that any one who could command time and had the inclination, would be rewarded by finding some good and serviceable beds of this most useful article.

In the valley named Soogeea-k'hoh, in a jungly and wild spot, are situated the Gupta limestone caves, which penetrate to a great distance into the mountain ; the hill Khyrwars insisted that the low passages which are met with after penetrating the hill for about 300 yards and through which it is almost impossible for a human being to penetrate, communicate with the other side of the spur of the hill, which is about half a mile broad, (vide map) and upon going round to the eastern side I saw the opening, but masses of rock fallen from the roof having blocked up the entrance, I was content with viewing it from the distance of a few hundred yards across a deep ravine. The cave is about ten or twelve feet in height, eighteen or twenty feet in width, and has a few stalagmites and stalactites, worshipped by the Hindus at particular periods of the year. I penetrated these caves for about 500 feet. The strata of limestone in the caves are very narrow and flinty, much waved and contorted, and in some parts of the roof appear to have been forcibly torn asunder, or as if the sides of the cave had sunken into the earth, the roof splitting in the middle to allow of such an arrangement.

The general appearance of this limestone is of a dark blue slate color, fracture conchoidal, strikes fire, difficult to break ; when burnt forms the best lime, is quite free from any animal exuviae, and impalpable in texture. In a few cases it is nearly black, also of a pale yellow or buff ; the latter appears to be in a state of decay and is not burnt for lime.

*Chalk.*—Associated with the limestone, chalk is found in a great many spots ; wherever known to exist it is extensively quarried and exported. By the natives it is known as Khari Muttee, but is very different from the English chalk. It is found in thin strata of a few inches thick, is unctuous to the touch ; has a shiny appearance, but soils the fingers ; a small detached hill at the foot of Rhotus is composed almost entirely of this mineral.

*Hornstone.*—This mineral is found in several spots underlying the sandstone ; it is met with at a waterfall named Tootala Koond, on the

eastern face of the table-land, four miles west of Tilothoo, also in the Sone river, eight miles west of the Koel river, where jutting into the river its causes rapids; and again at Jadonathpoo, four miles from the Mirzapoor and Shahabad boundary.

*Iron Ore.*—This is found in large quantities at and near to Soorkee or Sirkee, so named after the red appearance of the soil, which for miles round about is highly impregnated with the red oxide of Iron, and which is situated on the southern edge of the table-land. The ore lies scattered over a large surface of ground, extending for about four miles east and west, what may be under the surface remains to be seen. The principal manufacture of iron from this ore is at Sunda, a village two miles from the edge of the table-land. Specimen 115 is the ore pounded and broken ready for fusion; 116 is the iron as produced after once smelting, in which state it sells for its weight in rice; 117 is the ore three times smelted, and now sells for one and a half ana for a kucha seer, or three anas for a pukha seer. Iron ore appears scattered all over the table-land but in small and insignificant quantities generally. At a spot named Sulya, at the head of the Mukree-k'hoh valley, are immense heaps of iron slag, scattered here and there amongst the hills and in the jungle, and by the hill men said to be remnants of the extensive iron founderies in the days of the now almost extinct races of Khyr-wars and Cheeroos, a peculiar and now scattered race, but who profess once to have been a powerful people, having their own kings and princes ruling over them; in appearance these men are very like the Kols, Bheels and Gonds of central and western India; in their customs, religion and roving habits they also resemble them, and living in the same range of mountains, the Viudhyan range, as their confrères, there is little doubt that they are one of the scattered remnants of the races who formerly inhabited the Gangetic plain long since driven from that fertile tract by a more civilized race.

*Indurated Reddle*—Geru, (Hindustání.)

Large beds of this mineral are situated on the summit of the table-land, the principal ones being at Mundpa and Chuthans; great quantities are carried away by the Pussarees on bullocks and exported to Benares, Patna and other large cities; it is used in dyeing, as a pigment, and for a variety of other purposes. The beds extend for about two miles north and south, and the spots from whence extracted are

usually six or seven feet below the surface. The value of a bullock load at the spot costs about three anas.

*Laterite.*—Large quantities of this curious mineral are seen scattered about on all parts of the table-land, but nowhere did I find it forming strata or beds.

*Alum ore—Martial pyrites—Sulphate of Iron—Potstone.*

Beds of the above mentioned minerals, occur associated together in five different spots in the hills, viz. two mines in the Koriyari-k'hoh, under the Fortress of Rhotas, one at Telkup four miles north of Rhotas, one in the valley of the Doorgoutee river, and one in the Soogea-k'hoh ; these two last mines, I believe are totally unknown to Europeans, and would be well worth exploring. A description of one mine will suffice for the whole, as neither in quantity, quality or relative situations, or in arrangement of strata do they differ in any one respect. At the foot of the sandstone precipices, from eight hundred to a thousand feet in height, these mines appear as dark burnt masses of horizontally stratified rocks, of several hundred feet in length and from fifty to two hundred feet in vertical thickness. The arrangement of strata is as follows : sandstone a thousand feet, indurated potstone thirty feet, dark schistose rock or ore of alum ten or twelve feet ; what may be under this, remains to be discovered. The ore when exposed to the air becomes covered with a yellow spongy efflorescence, which has a small trace of sulphur in its composition ; associated with this ore is another, mostly in small irregular masses, similar to the odds and ends of stone lying about a stone cutter's yard ; it is a black, heavy martial pyrites or sulphuret of iron ; the saline crystals on this ore, some a quarter of an inch in length, are of a beautiful pale blue color, deliquesce upon the slightest exposure to moisture, and when shut up in a box or bottle, the crystals dissolve, and re-crystallize into soft and light masses resembling snow, which under a lens display a most elegant assemblage of delicate and perfectly formed white crystals. These crystals dissolved in a decoction of galls or black tea make an excellent clear writing ink.

These mines are not worked to any extent ; only a few maunds of sulphate of iron, under the native name of Kussis, being made during the year and exported to Patna and Dinapore, where it is used as a dye for Calico, and in the manufacture of leather.

I was informed by the zemindars at the mines of a curious circumstance connected with this ore, which is, that the ore never loses its qualities of yielding the sulphate, though washed and rewashed year after year, during the process of extracting the salt; like the Soda lands in Behar, it appears to have the power of re-producing what, to all appearance, had been expended.\*

*Potstone.*—Large quantities of this useful stone are found associated with the alum ore; also in spots where the alum does not exist. At the village of Pitteean, on the northern face of the hills, a very fine potstone of a dark blue colour is quarried and exported to Benares for the manufacture of Linggas, images, pestles, mortars, bowls, &c. It underlies the sandstone, and extends for about two hundred yards along the base of the hills. In the valley of Doorgawtee I picked up a considerable quantity of dark black stones used by goldsmiths as touch-stones in testing gold.

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*Queries on the Archæology of India.*—By the Rev. JAMES LONG.

In my occasional researches into the Archæology of this country, the following subjects have frequently presented themselves as requiring elucidation—perhaps through the medium of this Journal light may be thrown on them by correspondents in various parts of the country—some of them may afford a very useful theme for Essays.

1. What are the grounds for believing that the aborigines who now occupy the Hills of Birbhúm, Rajmahal, Shergatty, &c. ever lived in the plains of Bengal?

2. Any historical documents giving a description of the cities, population, &c. formerly in the Sunderbunds.

3. When was the temple of *Kali Ghat* built? What circumstances led to its being established in that particular locality?

4. What accounts are there of the condition of *Dacca* in the time of the Romans?

\* This admits of easy explanation. The one is a sulphuret of iron, which by exposure to air and moisture, gradually absorbs oxygen and is partially converted into the sulphate. On washing out the latter, the remaining insoluble sulphuret, exposed to the same influence, will continue to yield repeated supplies of the sulphate till the whole be exhausted.—Eds.

5. What was the state of Bengal about the commencement of the Christian era?

6. Why was *Nudiya* selected as a seat of Sanskrit learning? What accounts have we of it before the time of Lakhman Sen in the 13th century?

7. *Tamluk* was a seat of Buddhist learning in the 4th century—have we any other traces of Buddhism in Bengal proper at that period? Was Buddhism then in the ascendant at the court of Gaur?

8. The causes by which *Tirhut* became such a seat of learning?

9. What were the reasons of the degeneracy of the Bengal bráhmans before the time of Adisur? Was it in any degree owing to their being infected with Buddhist notions?

10. What language was spoken at the Court of Gaur previous to the Musalman invasion? Was it Hindí or Bengálí or Sanskrit?

11. What is the earliest authentic account we have of Bengal?

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*Specimen of the Language of the Goonds as spoken in the District of Seonee, Chuparah; comprising a Vocabulary, Grammar, &c., by O. MANGER, Esq., Civil Surgeon, Seonee. (Communicated by Lieut-Col. SLEEMAN).**

<i>English.</i>	<i>Goondi.</i>	<i>English.</i>	<i>Goondi.</i>
Head,	Tulla.	Eyes,	Kunk.
Forehead,	Kuppar.	Nose,	Mussúr.
Eyebrows,	Kunkúnda.	Ears,	Kohi.
Eyelids,	Mindi.	Cheeks,	Korir.

* A short vocabulary of the Goond language was published in the Journal, No. CXLV; but the present is much more copious and valuable. It is greatly to be desired that gentlemen engaged in ethnological researches among the Hill tribes, whether of Central India, or of our Northern or Eastern frontier, would concur in the adoption of a uniform and well selected vocabulary of English words for translation into the languages of these interesting people. This would confer great additional value on such collections, which would thus admit of ready comparison one with another; whereas from the absence of any such system, it is often no easy matter to find in any two independent vocabularies half a dozen words that admit of collation. We purpose publishing a vocabulary of the kind for circulation among such as have the opportunity of prosecuting these researches, the value of which can scarcely be overrated, and shall be thankful in the meantime for any hints upon the subject that we may be favoured with.—Eps.

<i>English.</i>	<i>Goondi.</i>	<i>English.</i>	<i>Goondi.</i>
Lips,	Sewli.	Fire,	Kis.
Mouth,	Túdhi.	Firewood,	Kuttia.
Tongue,	Wunja.	Huldi,	Kúmka.
Teeth,	Pulk.	Salt,	Sowur.
Chin,	Towrwa.	Oil,	Ní.
Throat,	Gúnga.	Ghee,	Pální.
Neck,	Wurrur.	Milk,	Pál.
Shoulders,	Sutta.	Butter,	Nenú.
Nails,	Tirrís.	Mare,	Krúp.
Armpit,	Káukli.	Cow,	Múra.
Stomach,	Pír.	Heifer,	Kullor.
Loins,	Nunni.	Calf,	Paia.
Entrails,	Puddú.	Bullock,	Koda.
Back,	Múrchúr.	Udder,	Tokur.
Arms,	Kayik.	Horns,	Kor.
Thighs,	Kúrki.	Buffalo,	Urmi.
Navel,	Múd.	Horse (large),	Perrál.
Knees,	Túngrú.	Tattu,	Chúddúr.
Legs,	Potri.	Wheat,	Gohuc.
Feet,	Kál.	Otta,	Pindi.
A male,	Mánda.	Bread,	Gohuc sari.
A boy,	Perga.	Sujee,	Jowha.
An infant,	Chowa.	Chenna,	Hunnain.
A young man,	Pekúr.	Dol,	Kúseri.
An old man,	Séna.	Rice,	Paraik.
A woman,	Maiju.	Cooked rice,	Gáto.
A girl,	Pergi.	Water,	Er.
A young woman,	Rayah.	To drink,	Udána.
A married wo- } man,	Lunguriar.	Bring water,	Ertera.
A chulah,	Saidál.	To bathe,	Erkiana.
A towa,	Pinka.	To wash hands } and feet,	Núra.
A hundi,	Kúrwi.	To eat,	Tindana.
A ghurra,	Mullah párah.	Male buffalo,	Urmi.
A cup,	Múché.	Female buffalo,	Bodé.
A chumcha,	Súkkúr.	He goat,	Buckrál.

<i>English.</i>	<i>Goondi.</i>	<i>English.</i>	<i>Goondi.</i>
She goat,	Peti.	A mango flower,	Irú.
A dog,	Naie.	A mango tree,	Irú murra.
A cat,	Bhongal.	A bear tree,	Ringa.
A wild cat,	Wurkar.	A tamarind tree,	Chitta.
Fowls,	Kúr.	Sagun tree,	Teka.
Cock,	Gungúri.	Peepul,	Ali.
Chickens,	Chíwar.	Not, no	Hillé.
Eggs,	Mesuk.	Yes,	Hingé.
Mice,	Uli.	Near,	Kurrún.
Serpents,	Turrás.	Before,	Nunné.
Fish,	Mink.	Within,	Rupper.
A tiger,	Púlliál.	Between,	Nuddúm.
Come hither,	Hikké wurra.	Behind,	Pija.
Stop,	Udda.	Above,	Purro.
Sit down,	Ud chíhun.	Beneath,	Sídi.
Go on,	Dut.	On account,	Lané.
Go,	Hun.	Hither,	Hikké.
To kneel,	Múrsána.	Thither,	Hukké.
To go to bed,	Nurmána.	Now,	Indéké.
To walk,	Takána.	When,	Boppór.
To run,	Wittána.	Here,	Iga.
To laugh,	Kowána.	Thus,	Ital átal.
To sing,	Wúrána.	Daily,	Dink.
To dance,	Yendána.	One,	Undí.
To speak,	Wúnkana.	Two,	Rund.
To fight,	Turritána.	Three,	Múnd.
To beat,	Jittána.	Four,	Nalo.
To weep,	Urtána.	Five,	Saiyan.
Bamboo,	Wuddú.	Six,	Sárún.
Buckul,	Murrús.	Seven,	E'ro.
Grass,	Jari.	Eight,	Armúr.
Leaves,	Aki.	Nine,	Urmah.
Posts,	Serrák.	Ten,	Pudth.
A tree,	Murra.	Twenty,	Wísa.
A root of a tree,	Sír.	Fifty,	Punnás.
A flower,	Púngar.	Hundred,	Núr.

Singular nouns form their plural by the addition of *nk—as*,

Kora,	a horse,	Koránk.
Konda,	an ox,	Kondánk.
Múra,	a cow,	Múránk.
Mánda,	a man,	Mándsánk.
Maiju,	a woman,	Maijúnk.
Neli,	a field,	Nelnk.
Rún,	a house,	Ronk.

Gender.—There is nothing to distinguish the genders except that the females of certain animals have a different name from the males—
as

Bílál,	a she cat,	Bokál,	a tom cat.
Yeti,	a she goat,	Buckrál,	a he goat.
Puddhi,	a sow,	Ikundál,	a boar.
Kor,	a hen,	Gogorí,	a cock.

Nouns are thus declined.

1st Declension.

	Singular.	Plural.
Nominative,	Kora, a horse.	Koránk, horses.
Genitive,	Korana, } of a horse.	Koránkna, of horses.
	or, Korada, }	
Dative,	Korát, } to a horse.	Koránkún, horses.
Accusative,	or, Korátún, }	
Ablative,	Korátún, by a horse.	Koránkún, by horses.

2d Declension.

Nominative,	Gohk,	wheat.	} No Plural.
Genitive,	Gohkna,	of wheat.	
Dative & Accusative,	Gohkún,	to wheat.	
Ablative,	Gohksún,	by wheat.	

3d Declension.

Nominative,	Pindi,	otta.	} No Plural.
Genitive,	Pindina,	of otta.	
Dative & Accusative,	Pinditún,	to otta.	
Ablative,	Pinditsún,	with otta.	

Adjectives and Participles are indeclinable.

PERSONAL PRONOUNS.

Singular.

Nák or nunna	I,	Imma	thou,	Wúr	he.
Nowa	my,	Niwa	thy,	Wunna	his.
Nakun	me,	Nikún	thee,	Wúnk	him.
Náksún	by me,	Niksún	by thee,	Wúnksún	by him.

Plural.

Mák	we,	Imát	you,	Wúrg	they.
Mowan	our,	Miwan	your,	Wúrran	their.
Mákún	us,	Mekún	you,	Wúrrán	them.
Máksún	by us,	Miksún	by you,	Wúrránsún	by them.

*Demonstrative.**Interrogative.*

Singular.

Yirg	this,	Búr	who.	Ud	he, she, it.
Yenna	of this,	Bona	whose,		
Yenk	this,	Bonk	whom,	Ten	} him, her, it, them.
Yenksún	by this,	Bonsún	by whom,	Táne	

Plural.

Yirg	these,	Búrk	who.		
Yirran	of these,	Boran	of whom.		
Yirkún	these,	Bonk	whom.	Tunna	his, hers, theirs.
Yirrúnsún	by these,	Bonsún	by whom.		

Indefinites—Bore, some one, Bara, something.

Singular—Bora, what? Plural Barauk, what?

VERBS.

Imperative,	Wunka	speak.
Infinitive,	Wunkunna	to speak.
Present Part.	Wunki	speaking.
Past Part.	Wunktúr	spoken.
Conjunctive Part.	Wunksi	having spoken.

Present Tense.

Nunna wunki,	I speak.
Imma wunki,	thou speakest.
Wúr wunki,	he speaks.
Már wunki,	we speak.
Imar wunki,	ye speak.
Wúrg wunki,	they speak.

*Imperfect Tense.**Future Past.*

Singular.

Nunna wunkundán,
Imma wunkundi,
Wur wunkundúr,

} I was speaking, &c.

{ Nunna, wunksi howe,
Imma, wunksi howe, &c.
same for all persons.

Plural.

Mar wunkundúm,
Imar wunkundir,
Wurg wunkundúrg

} I shall have spoken.

Perfect.

Singular.

Nunna wunktán, I spoke
Imma wunkti.
Wúr wunktúr.

Imperative Mood.

Wunka, speak thou.

Plural.

Már wunktúm.
Imar wunktir,
Wúrg wunktúrg.

Wunkar, speak ye.

Pluperfect.

Singular.

Nunna wunksi,
Imma wunksi,
Wúr,

} I had spoken, &c.

Plural.

Mar, &c.
Imar,
Wurg,

Future.

Singular.

Nunna wunkfka,
Imma wunkfki,
Wúr wunkanúr,

} I shall speak.

Plural.

Mar wunkfíkúm,
Imar wunkfkir,
Wúrg wunkanúrg,

Future Indefinite.

Singular.	}	I shall be speaking.
Nunna wunkundán howe,		
Imma wunkundi howe,		
Wúr wunkundúr howe.		
Plural.		
Már wunkundir howe,		
Wúrg wunkundúrg howe,		

Second Example of a Verb.

Jim,	beat thou.	jimpt, beat ye.	„ Jíndán howe, I shall be beating.
Jiána,	to beat.		„ Jísi howe, I shall have beaten.
Jítúr,	beaten.		
Jía,	beating.		
Jísi,	having beaten.		
Nunna jía,	I am beating.		The verbs seem to be conjugated alike, whether transitive or intransitive, and to have no passive voice, nor is there anything corresponding to the Hindustání particle <i>نی</i> . No aorist tenses or subjunctive mood.
„ jindán,	I was beating.		
„ jífán,	I beat.		
„ jísi,	I have beaten.		
„ jeka,	I shall beat.		

THE LORD'S PRAYER.

Mowa Dowiál budrut purro muddár-warré ; Níwa purrol dhurmát-mál
Our Father heaven above inhabitant ; Thy name hallowed
 aie. Niwa rájpát waie. Niwár bichar itál budrít purro mundar atál
be. Thy kingdom come. Thy will as heaven above is, so
 durtit purro áud. Mowa piálda sarín neut mak punkiút : unde
earth on be. Our daily bread to-day to us give : and
 bahún már upnún reina dherrúm kisia-turrúm, atal imma mak dherúm
as we our debtors forgive, so thou to us trespasses
 kisiút, unde mákún miwa jhara-jherti te niuni wátnát unde burrotsún
forgive, and us into thy temptations do not throw, and from evil
 mak pisihát, hárfke niwa rájpát, unni níwa bul, unni niwa dhurmát
us deliver, for thy kingdom and thy power and thy glory
 mal sudda mund ital ánd.
established remain, so be it.

THE TEN COMMANDMENTS.

Purmesúr itál iltúr.

God thus spake.

1. Kodawund níwa Purmesúr nunna ándúr, namúnné níwúr Deo bore
The Lord thy God I am, besides me thy gods not

hillé audúr.
any shall be.

2. Apun láne kítál penk, bore budde ai jius itál budráte
To yourselves graven images, any sort of creature such as in heaven
nupi dhurtile, unni yeté mundar, atál miuni kemút imát wúrea kál
and on earth, and in sea are, such do not make—you their feet
minni kurmát, unde wúrrún rámakisní minni kemát; iden laine lainé mák
do not embrace, and their obeisance do not perform; because to me
án mundur, únde dourana pápún sáte ohawún purro sásiut dusta-tona,
jealousy is, and father's sins for children on, punishment inflict,

natá uani punti-lor purro, wurg admirun bor nowa
grand children and great-grand children upon those men who my
bairi munda, unde mák awén—mén sun hazarón nakún mink
enemies are, and I from among those a thousand (who) me as
púndatúrg, unde nowa wunktán purro taki-turg, nunna wurrún
a friend take, and my commands according to walk, I on them
purro durmi kia tona.
my shadows throw.

3. Purmesúr-da parrol labarit purro minni yeumát, tin-lainun papi
God's name in falsehood do not take, for guilty
ainún wúrg mánwál bór Purmesúr-da parrol labarit purro
will be that man who God's name in falsehood
yetanúr.
shall take.

4. Purmesúr-da piál purriát unde tan swáf irát sarrún piálk bunni
God's day remember and it holy keep; six days daily
búta kimppt, unde sub miwa kám kimppt, át ernúda piál Purmesúr-da
work do, and all thy labour perform, but seventh day God's

piál mundur, ud piál imma buttiái kám kemut, imma
day is, that day thou any kind of work do not make, thou
 unni níwa pergál unni níwa pergól, unni níwa rútkawál unni níwa kúnda,
and thy son, and thy daughter, and thy servants, and thy cattle,
 unni niwa pownalúr rún mundúr; tin laine Purmesúr sarún piáik
and thy stranger (thy) house dwelling; because God six days
 né budra unni dherti unni sumdúr unni cheitkunné jinsk iwité
in, heaven, and earth, and sea, and each creature in them
 mundatán, awén kítur, nude yerrún piál rúm túr, Tuilaine id piáltún
existing, them made, and seventh day rest took, therefore that day
 Purmesúr dhurmát-mal tane kítur.
God hallowed established.

5. Imma upnón babonna unni awunna sewa kimpt, teu sún niwa
Thou thy father's and mother's service perform, therefore thy
 yarbúl durtit purro Purmesúr níkún sítúr, parál aud.
life, the land upon, God to thee has given, prolonged may be.

6. Imma máuwán minni jukmát.

Thou a man not kill.

7. Imma pép minni kema.

Thou adultery not do.

8. Imma kulwein minni kema.

Thou theft not do.

9. Imma upnón biganún purro labari gohai minni sena.

Thou thy neighbour against false witness not give.

10. Imma uponon biganún-ta rota lob minni kema. Imma upnón

Thou thy neighbour's house covet not. Thou thy

biganún-ta maigú-na lob minni kema, únde wunna rútkawál únde
neighbour's wife covet not, and his house-servants, and

wunna kúnda, innui wunnal guddál unde buttié-jins, uponon biganún-na
his ox, and his ass, and any thing, that thy neighbour's

mundar tan purro lob minni kema.

is it upon covetousness not make.

Sandsumjee-na sáká.

Sandsumjee's Song.

Sandsumjee-na sáka kuyát, ro Bábán,
Sandsumjee's song hear, O Father.

Sark ask kítur, Sing-Baban hillé púttúr,
Six wives he took, Sing-Baba not born,

Yirrún ask kítúr, awíté Sing-Bábán autarietúr.
Seventh wife took, by her Sing-Baba was conceived.

Aulár yétana Baban púnwaké.
Of her pregnancy Father was not informed.

Taksítún Baban, tunwa pari sumpté kiálé
Departed Father, his kinsfolk being assembled together

Bariké bouke aie penk putta sika.
For this reason to some one it happened to offer a sacrifice to a God.

Hikké Sing-Baban putti-lé-ai latur.
Hereupon Sing-Baba began to be born.

Loro askna sowatí, sarún mutta.
Small wife was sleeping, the other six were there.

Awítun, koti aunáté tulla dúrissi, "assun inga cha^wa putti,"
Said they, grain basket's mouth into, her head let us introduce in our house child is born,

Ud it, ahé kint annáté tullatún durrítún,
So said, so done, into mouth her head introduced,

Unni Sing-Baban púrtúr,
And Sing-Baba was born,

Sing-Baban techi urmí sarté michítun,
Sing-Baba having taken up, into Buffaloe's stable threw,

Unni nai-píla taniga dussítún,
And a puppy instead placed,

Unni ittúr, nai-júla wattoni,
And said, a puppy is born,

Nai-pílla misáte ; tánk kawál kédé kiáté taré kítún,
A puppy having brought forth, thence crows to frighten they set her,

Sing-Baban, urmi ittún, ké yenk borré minní jemát,
Sing-Baba, buffaloes said, that him let none hurt,

Na tokar jemát, umni tordé pál púrsi ten úhát.
Nor blow strike, and into his mouth milk having poured him suckled.

Au sarúngé ásk whúr setún, pistúr ka sátúr ?
The six wives said, let us go and see him, is he living or dead ?

Sing-Baban gursundúr.
Sing-Baba was playing.

Augrul úndé téchi múra na sarkté muchitun.
Thence indeed having taken him into cow's stable threw.

Múrai ittún Sing-Baban boré jarniut
The cows said Sing-Baba let no one hurt

Natokar jemát tordé pál pírsi ten úhát,
Or blow strike, into his mouth milk pouring him suckled,

Agra kubbér tullick sétún, satur ke píslúr ?
Therefore information they sent to seek, is he living or dead ?

Sing-Baban gursundúr.
Sing-Baba was playing.

Agrál téchi kuán ruppa nuchitan.
Thence having taken well into threw.

Tisro díán hur sétún, satur ka pistur ?
On the third day having gone to see, is he living or dead ?

Sing-Baban aga úndé gursundúr.
Sing-Baba there indeed was playing.

Agrál úndé túnsi púllíá-na surrit purro.
Thence indeed having taken, Tiger's path upon.

Nuchíchi situn, Púllíál ásk mándsál wandurg ;
They threw him, Tiger's female and male were coming ;

Sing-Baban na arana kinchturg.
Sing-Baba's cries they heard.

Pullial mian trás lakt, naur murri aúdur,
Tigress compassion felt, " my child it is."

Ingi techi yét, Tunwa rúnd wet unni tunwa pilásún niaro írt,
*Having said so, took him away. Their den came to and their pups from
 apart set,*

Khandk tullana tanwa pilásún thitana
Meat bringing their pups to feed

Pillán hotíta, pál Sing-Babán uhnud
Their pups weaning, with milk Sing-Baba suckled,

Thé kína kína ké, Sing-Baban húsíar atur.
So continuing to do, Sing-Baba grew up.

Undí dián wúnna avari tunwa pilánstá
One day his mother her whelps

Miláf kissichísí, unni pilánán indalat
Together brought, and to whelps began to say

Inamer urpa mandana turrimát minni
Yourselves among together stay, fight not.

Tisro diáú Sing-Baban ittúrke, mowa kaia déáta
The third day Sing-Baba said, my body is naked

Makun patchial, kor, pheta tuchim
To me a dhoty, dohur, and pugrey give.

Adungí hattúm surde ucchi rainmát
She going Bazar road seated remained.

Punkatur unni marratur maralur agdol passiturg
A muslin-maker and cloth-maker that way came

Techi wit, wurg tunwa guttri pótri nuchi surritarg
Having got up ran, they their bundles having thrown away fled,

Ud téchi tucchit, Sing-Baban tumsi kursi yétún
She having taken up brought Sing-Baba took and put on

Unni tunwa awarinna kál kurtúr,
And his mother's feet kissed,

Munna munnaké úndé dián unde indalatur
Staying staid then one day indeed began to say

Ki nak gúlléle tuchim ud hénhud
That to me a bow give. She again went

Ucchi raimát, Wúrrúr sipahi gullele-warré agdol pussitúr
Seated remained a sepoy armed with a bow that way came.

Ud vit ktissi, Gúlléle nuhi surritúr.
She ran having cried out. Bow thrown away, he fled.

Ud techi urriwat Sing-Baba sít ;
She having it came and to Sing-Baba gave ;

Sing-Baba tunna tummúr singné gursi latur,
Sing-Baba big brother little brother together played.

Pittun púdúr tunna tummur tán tindúr
Birds shot big brother little brother to them gave to eat

Thé kina kina ke, Sandsumjí niga subé wátúr
So continuing to do, Sandsumjí home returned with his friends

Unni Sandsumjí nída latur peuk bouk wandum ? lour ehat
And Sandsumjí began to say has any one become inspired, let him arise ;

Penk bóuké waiyun ? aga Sing-Baba úmhén kítun
God into any one not entered ? Then Sing-Baba inspiration received.

Sing-Baba taksítúr tunna tummur sungue muttur
Sing-Baba was coming, big brother little brother together were

Wasi autúr, uddam atur wúrrúr Bummenál
Coming came, in the midst was a bráhman

Wún Sing-Baba teta latur, Wur tedúr ;
Him Sing-Baba required to get up, he refused ;

Tunnarán gussalakt wur Bummenál tingietúr
Big brother became angry, the bráhman eat up

Sing-Baba penk techietur.
Sing-Baba the image took up.

Sube indalatúr ke imma boni andi ?
All began to say, that you who are you ?

Wur ittur ke immer urmiúun unni múramúr keat
He said that you the Buffaloes and cows ask

Unni tunwa tummán indalatur, hun dain kési terah
And to his little brother said, mother go and call.

Wur vittar kesí tuttur.

He ran and called.

Yen múnté jins unde punchatité puná atur

These three species before the punchaité assembled came.

Jub Sing-Baba indalatur ké iwén puche kimpt

Then Sing-Baba said that them question,

Awen sun púché kial latur, yir búr áudúr?

From them they asked, this one who is he?

Múnne urmi wunktun yir Sandsúmjeénúr murri audur.

First the buffaloes said this Sandsumjee's son is.

Wúrg indalatur, imma bane putti? Awittún

They said, you how understand? These said

Maiga rundidían mungi muttúr. Bahur mungi muttur

In our house two days staid. How did he remain?

Awittún niwa sarúnge ask tuttchi maiga pikkílé nuchi angi

These said thy six wives having taken into our house to kill threw

Unni igga hillé saiúr, to murana sarte nuchiche sitúr

And there not injured, then cow's house into threw

Awen púche kial atúr, Maiga Baban át?

From these asked, How into your house Baba came?

Múraitún ké, Maiga rund dián mungi muttur

The cows said, At our house two days stayed.

Awen sarúngi ask agral wosi kúánte nuchi sitún

These six wives thence having taken into well threw,

Aga úndé hille saiúr. To agrul tunki kójane bewatun

There indeed not injured, thence taking I know not where took.

Sing-Baban púché kial atúrké agrál imma behuth?

Sing-Baba they questioned that thence you went where?

Wúr ittur id nowa awan púche kimpt

He said of my mother ask.

Wúnna awál púllían púché kia latur

They mother-tigress asked

Imma bugga punné máti? Ud it

You where found? She said

Mowa surde awe sarúngé ask muchiché mutta

On my road these six wives threw away ;

Nunna techi urri watán, nowa pílán notíta

I having taken brought, my whelps weaning,

Pál yén úhthán unni hinda húnda bala buttir

Milk him suckled and here there with prey

Nowa chowanún thetán sube jánk púlliána

My young fed. All-understood, tigress'

Kál kúrtúr unni táne penk thaira kítúr.

Feet embraced, and her a God established.

Unni awé sarúngé asknún áden púllián sitórg.

And these six wives to this Tigress gave.

Udnetí tál Sing-Baban puttál atúr

That day Sing-Baba illustrious became

Unni pulliál núdé penk thairí mat

And Tigress indeed as a God established became.

Sandsumjee Babána id saka áud

Of Sandsumjee Baba this song is,

Bhirri bánís-Bhirri-ta sáka áud.

Of Bhirry bamboo-jungle Bhirri the song is.

JOURNAL

OF THE

ASIATIC SOCIETY.

APRIL, 1847.

Journal of a Steam Trip to the North of Baghdad, in April, 1846, with notes on the various objects of interest met with. By Lieut. JONES, I. N. (Forwarded by P. MELVILL, Esq. Officiating Under Secretary to the Government of India.)

Three years having elapsed since our former ascent of the Tigris above Baghdad, and anticipating from the early rise of the water a more favorable season and better success than we experienced before, arrangements were made accordingly for ascending the river early in March, but the presence of the vessel being again required at Basra, our departure was delayed until the 2d April, when the river had become considerably more rapid from the high rise having already set in. We however left Baghdad on the above day, with one month's provision, 12 tons of coal, and 9 tons of fire-wood fuel. Draught of water with the above stores on board, 3 feet 10 inches, aft, and 3 feet 5 inches forward; weighed from our moorings at 9-55 A. M., with two boats in tow, and passing through the Bridge of Boats, reached Triunba and Kathemein, the former at 10-35, the latter at 10-55.

The banks of the river at this time present a beautiful appearance, the gardens exhibiting a diversity of trees of variously tinted foliage, and a delightful fragrance pervades the air from the now opening orange blossoms. The day is cool and pleasant, but a moderate north wind, though very refreshing, somewhat retards our progress. The river too is rising. At 1-45 arrived at Sheri at el Beitha on the right bank—2-33

Tel Goosh,* a mound on the right bank, bore west. The country to the north of Tel Goosh between Khán Suweidiyah and the river, is known by the same name as the Khán, but the Khán is also sometimes termed Tarimyah, from a lake situate in an old bed of the Tigris called Sh'taitha. This is now dry and is reported to be of the same width as the present river. 5 P. M. Khán Suweidiyah bore west, and Jedidah E. N. E. Many mounds of considerable size are to be seen south of Khán Suweidiyah, probably the Tel Kheir of Lynch's Map, but I searched in vain for the south end of the Sh'taitha † (or as it is misprinted in Arrowsmith's copy of Lynch's Map, the Shat Eidhia) which is represented to join the present river near this spot. I am informed however that it is lost in the desert near this. Arrived at the Khán of Jeddiah at 5-3, but finding the stream very rapid near it, proceeded on for 20 minutes and anchored near the old Khán of the same name. The gardens to the north of Baghdad terminate abruptly about two miles above Kathemien on the right bank, but on the left, after leaving Móádhem, scattered villages and date groves are seen, as high as Tel Goosh; from whence to Jeddiah the country, at present, is highly cultivated with wheat and barley.‡ On both banks, mud enclosures are met with every two or three hundred yards, in which the cattle used for the purposes of irrigation are kept, and numerous round isolated towers affording shelter to the cultivators from marauding parties, attest the imbecility of the present Government. The old adage of the sword in one hand and the plough in the other is here literally verified.

* Several mounds and lines of canals exist in this neighbourhood. According to Baillie Fraser, Mr. Ainsworth conceives that he has discovered in them the site of the Sitace of Xenophon. Major Rawlinson however, deems the present suburbs of Baghdad on the west side of the Tigris, to stand on a part of the ancient Sitace; indeed the recent discovery of large masses of brickwork on this spot, bearing the Babylonian cuneiform character, in October last year, when the river was lower than it was ever remembered to have been, would seem to identify it as the site of some very large city. The great extent of the ruins, the size of the bricks, the great depth at which they are found (24 feet below the surface of the soil) justify, in my opinion, Major Rawlinson's conclusions and above all the cuneiform characters on each alternate layer of bricks, point out, clearly the pains taken in the construction of the buildings, rendering the supposition that they had been brought originally from Babylon highly improbable.

† Could this name, although at present an Arabic term signifying the "old river," be a corruption of the early Arabs, from the name of the Town or district of Sitace?

‡ The land adjoining Jedidah, Howeiah, Mansúriyeh, Sadiyeh and several other villages, although washed by the Tigris, is irrigated by cuts from the Khalis canal.

Received a visit this evening from the Governor of Sámarráh, who has been summoned to Baghdad on business, but has obligingly given me a letter to his vakeel.

Strength of the current where we are at anchor was found $2\frac{1}{2}$ knots per hour, though a few hundred yards lower down it probably amounts to double this rate.

April 3d.—Left our anchorage at 5-38 A. M., the river having risen during the night 8 inches, with a cold northerly wind. Thermometer 43° ; passed the villages of Howeish and Mansúriyeh, the former at 6-40, the latter at 8-15, when it bore east on the right bank and west of Mansúriyeh; the Tarmiyeh ancient canal leaves the Tigris, and another large canal bearing the same name, and said to be of more ancient date, is seen about one and a half miles below. This has now been long dry, but the northern canal, during the high state of the river, still receives a portion of the Tigris and is lost in the marshes west of Kathemein. Its direction by compass was observed to be 244° . The river near Mansúriyeh is very broad, but broken by islands. A khiyat* or wall is situate a little to the north of the Upper Tarmiyeh, having an old Khán in ruins close to it. 9-11 passed Sadiyah village and grove of date trees; the country every mile becoming more elevated, and the valley of the Tigris beginning to assume a distinct form. Reached the village of Sindiyah at 10-33 and received 12 hours' fuel. Remained here until noon to obtain observations, which place the village in Lat. $33^{\circ} 52' 50''$. The whole of the gardens and date groves, from Jeddiah to this place are irrigated by the Khalis† canal, which and the Dejeil, are the only canals of importance that the Pachalic can now boast of. A sad picture for

* This is represented as resembling the Khali sidd 'I Nuurad, or Median Wall, in construction. It is stated to run in a S. W. direction and to be lost in the marshes near Akr-Keif. I think it very probable from the information obtained, that many walls of the same description as that "par excellence" termed "the Median" will be found to exist in this part of the country. The term Khiyut or "lines" is here universally employed for "ramparts or walls" and differs materially from that of Nhar adopted in reference to canals. The Khali is however the longest and most northerly and therefore the most important.

† This canal is a cut from the Diyála where it breaks through the Hamrín range. It pursues a S. W. course a short distance north of and nearly parallel to the river Diyála; many villages are situated on its banks and numerous fine date groves are watered by it in its course to the Tigris, which receives its superabundant waters after a severe winter only. At other times it is lost in irrigating the country around Sadiyah, Mansúriyeh, Howeish and Jeddiah.

contemplation is afforded by the remains of so many noble works of the same order lying scattered around neglected and abandoned; showing at a glance without the aid of history, the once flourishing state of this classical province.

Left Sindiyah at 12-10 P. M. and at 1-35 observed it to bear 137°. At this spot the high cliffs forming the valley of the Tigris abut on the left bank of the stream, and the large canal Nahrwán is seen above them about half a mile distant, bending to the S. eastward. From this point the river runs in a more westerly direction, and at 3-10 passed some high cliffs (assumed at 50 feet) on the summit of which a part of the Nahrwán is observed to have been cut away by the force of the current encroaching on and undermining the soil on which it stands. The cliffs forming the right bank of the river are distant from this spot about five miles. A long alluvial Hawi* projects from them to within 100 yards of the left bank. This space only is now occupied by the river. The tomb of Imam Syed Mahomed bears from this point 262°. This also is the general direction of the river to the mouth of the river Atheim. The Nahrwán is also known here by the name of El Dojin. 3-35 anchored off a small branch of the Atheim to obtain observations.† The western branch is larger, and is two miles distant from this. It now appears a considerable stream, but when I passed it in March 1843, it

* Alluvium deposits in the valley of the Tigris are thus styled.

† The western or larger mouth of the river Atheim is 7' 9" west of Baghdad by these observations. Its sources are in the Seghimeh range of Kurdish mountains. The Kiseh Sirat Kerkuk, the stream at Táú and the Safdrud unite their waters in about Lat. 34° 40' north, and in the meridian of Baghdad from whence, under the name of the Atheim it pursues a course a little to the westward of south, through the Hamria range, and finally falls into the Tigris in Lat. 34° 00' 80". Where the Atheim breaks through the Hamria, the remains of a strong "Sidd" exists, of great antiquity. This "Sidd" formerly blocked up the natural course of the stream, diverting it into two ancient canals, named the Nahr Batt to the north, and the Nahr Rathán to the south. These canals irrigate the country between the Hamrool and the Nahrwán, and contribute materially to swell the waters of the latter.

There can be little doubt, but that the Atheim is the Phyeus of Xenophon, but the position of its junction with the Tigris in the days of the learned Greek, must be sought for, I think to the south of its present confluence. A line carried south a little westerly from the present delta of the Atheim, to the dry bed of the Sh'taitha, would in all probability not only mark the site of its former confluence with the Tigris, but might pass over, or near to some extensive ruins, in which might be traced some features that would identify them with the lost Opio.

deserved little notice, but the heavy rains experienced this winter throughout the Pachalic, have increased its importance. After passing the Atheim, the river becomes more tortuous, a long reach extending to the S. W. leads you to an opening of considerable extent, which I am told is the mouth of the Sh'taitha, and supposed to be the old bed of the Tigris (see note of April 2nd). We passed it at 6-15 and stood towards Khán Tholiyah, in a northerly direction. Anchored for the night at 6-32 near two islands which here bisect the stream.

The alluvial soil now gives place to banks of pebbles and shingle, occasionally mixed with conglomerate masses, but the high cliffs still exhibit alluvium, mixed with many strata of sand, and in some places red clay. A salt stratum is observed near the present margin of the stream, in which sprigs of the Tamarisk flourish, but the rest is bare and much eroded, not only by the Tigris, but from the numerous torrents that find their way from the high lands contiguous to the Hamreen range. The Hawis, or alluvial deposits, formed in the valley of the Tigris, are now in a high state of cultivation. Obtained observations both for longitude and latitude, the latter deduced from the M. A. of* Antares was found to be $34^{\circ} 00' 19''$ N.

Sunrise, April 4th, from the masthead observed the true bearing of Khán Tholiyeh to be $N. 00^{\circ} 45' W.$ At the same time the following angles right and left of it were taken by sextant; angle right, high peak of Daláhee on the great Lagros range $14^{\circ} 25'$; angles left of the Khán, Minaret in the village of Beled on the Dejeil $87^{\circ} 32'$; Malwujeh, or spiral tower above Samarra $53^{\circ} 16'$; Tomb of the Imams in Samarra $55^{\circ} 54'$; Khán Mazrukji $63^{\circ} 21'$; Imam Syed Mahomed subtended an angle of $43^{\circ} 34'$ left of Beled, and the Minaret of Sumeichah village $52^{\circ} 9'$ left of Syed Mahomed. From this station,† the mouth of the old bed of

* Both Dr. Ross and Capt. Lynch place the northern mouth of the old bed of the Tigris about 20 miles further to the west; but I am assured from very good authority, that its true position is where I assigned it. There may however have been a branch further to the westward, and it is hazardous to differ with two such observant travellers as those I have quoted, but the nature of the soil changing from hard sandstone to alluvium in this vicinity, it is natural to infer that a deep and rapid stream like the Tigris would select the first yielding soil it met with for a bed to convey its pent up waters to the sea.

† Observations (for longitude) of α Orionis, place this station $11' 16''$ west of Baghdad, and as Khán Tholiyeh bore north, it also lies on the same meridian.

the Tigris or El Sh'taitha bears S. S. E. one and half miles distant, which would make the bottom of the reach south of Khán Tholiyeh, in latitude $33^{\circ} 59'$ nearly, consequently if my latitude be correct (which I have no reason to doubt) the delineation of this part of the river in Lynch's Map is scarcely carried far enough south. It is difficult however to speak with certainty, as the map in my possession is on a very small scale, deduced by Arrowsmith from Lynch's original of 12 inches to a degree. Capt. Lynch's fixed stations are however very accurately determined. During the night the river rose 8 inches, occasioning the banks to fall in with loud reports. Thermometer 42° at day-break.

Left our anchorage at 6-9 A. M. and crossed over to the Hawi on the left bank and received some fuel; completed at 9-15 and pursued a northerly course towards Khán Tholiyeh.* I may here mention a trait of Arab rapacity and general character. Some of the Jebour had been assisting us in carrying our fuel, and I presented them with some ball cartridge in return; scarcely however had they reached the party to whom they were to have been presented, when one and all made a general scramble.—The person to whom I entrusted them finding it now impossible to distinguish those who had earned the cartridges, threw them down, and such a scene ensued as could only be told by any unfortunate traveller who might fall into such hands, as assuredly his garments or any other property he might possess would be thus contended for; swords were drawn, and sticks of no ordinary dimensions whistled through the air, and when we left, the excitement appeared as if it would last the entire day.

The stream is now becoming more rapid from the increased declivity of its shingly bed; as we approached the neighbourhood of Khán Tholiyeh, our progress therefore was proportionably slow. At 9-50 the Khán bore N. E. one and half miles. From this the river pursues a westerly direction to Khán Mazrakji, and from thence to El Ghaim,† a little more northerly. At noon, Beled on the Dejl bore 182° , Tholiyeh Khán 89° . At 1h. a tomb in the body of Nahrwán, called Imam Syed Hussain, bore north one and half miles distant. A small branch of the Nahrwán is also called

* A caravanserai on the road to Samarrah from Baghdad.

† Properly El Káim, but is pronounced as I have written it.

here Siél el Azeec ;* at the above time Beled bore 169°, and Tholiyeh 99°. Khán Mazrakji, a place of accommodation for pilgrims on the road to Samarrah north, and at 4 P. M.—N. E. This is the nearest point to the Khali Sid'l Nimrud or Median Wall. I visited it in 1843 but it is so well fixed and described, both by Capt. Lynch and Dr. Ross in the Journals of the Royal Geographical Society, that I need not further allude to it. 5-45 came to an anchor for the night in exactly the same spot as we spent the night on three years ago. I was not sorry when the declining rays of the sun obliged us to stop, for I felt much fatigued, having been on my legs the whole day ; indeed nothing but the greatest perseverance and attention to the steerage of a steam vessel through such intricate navigation as we have had to-day, could ensure her making any progress. From Khán Tholiyeh, the bottom has changed to a hard shingle, over which the current runs, by trial, at the rate of 6½ geographical miles per hour. The bed of the river is full of numerous islands and shingle flats, and as there is in this season of the year, but one channel of sufficient depth which receives the whole stream, it occasions, where it is thus confined, a considerable fall or rapid, some of which, notwithstanding, a heavy S. E. wind set in, enabling us to make sail, we could scarcely surmount. The engines indeed appear to be paralyzed, when on the summit of a rapid, as the revolutions decrease from 29 to 23. This I can only account for by the weight of the vessel in her ascent, acting against the momentum of the paddles ; in fact the small diameter of the wheels is not calculated to lift, as well as to propel, the vessel up an inclined plane.

The country passed through to-day has been beautiful in the extreme. The undulating hills forming the valley of the Tigris are now clothed in their spring garments, waving grass intermingled with flowers of every hue, forms a rich landscape, which the eye is unaccustomed to meet in the alluvial plains below. Perpendicular cliffs, composed of masses of conglomerate, laid bare by the abrasion of the stream, seeming to threaten the destruction of the vessel should they fall, are happily contrasted with their carpeted summits. The Hawis of alluvium projecting from the various points of the valley of the Tigris are highly

* This is the south branch or feeder of the Nahrwán. It is now much broken by the encroachments of the river. I have throughout erroneously termed the branch at El Ghaim the south branch.

cultivated, by the Jebour Arabs on the east and Mahjamma on the west. Obtained the following bearings and angles from the masthead when at anchor. True bearing of the Maluryeh near Samarrah 328° . El Ghaim,* at the head of the south branch of the Nahrwán 19° left of the Maluryeh. Tombs of the Imams at Samarrah $3^{\circ} 20'$ left. Khán Mazrakji right $110^{\circ} 40'$. S. W. angle of the old fort of Qádésiyeh left $15^{\circ} 33'$. Shortly after sunset the south wind fell and heavy rain followed with thunder and lightning, but before morning the sky again became clear.

At sunrise, on the 5th resumed our route, contending against a heavy stream of 6 knots an hour, and occasional slight rapids in the narrow channels. Reached our fuel at Qádésiyeh at 7h. 48m.

While taking in wood I visited the remains of the old fortress and city of Qádésiyeh,† situate about one mile from the river. I never had so agreeable a walk. The country is literally covered with wild grass of every description in full blossom. Flowers of every tint and hue were crushed beneath our footsteps, and the very air was impregnated with their odour. It is of an octagonal form, with round towers at each angle, between which 16 buttresses or bastions are placed, 37‡ paces distant from each other. A gap exists in the centre of either side, which no doubt, held the gates of the fortress, but all traces of them are now gone. The wall by measurement was originally 50 feet in thickness, and is at present about 25 feet high. Its interior face must have comprised an entire range of vaulted chambers, one of which is still entire and affords a good specimen of the whole structure. It is built of sun-dried clay bricks 18 inches square and 5 thick. No buildings, at present, exist within its area, but on minute examination, at one-third the distance across the interior from its western side, I discovered the traces of a wall, which extended from the southern ramparts, in a line due north, for 1240 paces. This line of wall at

* See note page 305. This I have erroneously termed the south branch instead of the one referred to in page 305.

† A rough plan accompanies these notes.

‡ Fraser in his *Mesopotamia and Assyria*, describes the distance as 10 to 12 yards. How he has fallen into this error I am at a loss to conceive. If his distance were correct the circumference of the walls of this large fort would be, in round numbers, but 1400 yards, whereas from actual measurement by pacing, I made its diameter alone 1500 yards, its circumference therefore as a regular octagon would amount to nearly 4500 yards, or above two and half English miles.

the distances along it of 700 and 790 paces, and at its termination, had other walls connected with and extending from it, at right angles, or due east, for 450 paces, where they break off abruptly, for I could trace them no further. A perfect oblong enclosure of 250 paces long from north to south and 100 broad, occupied the space between the northern parallels. A high mud rampart appears to have surrounded the town, leaving a space between it and the outer defences of 70 feet wide. The great canal of the Nahrwán is seen stretching far to the eastward and passing within 200 yards of the north-east angles of the fort. A canal or cut from the Nahrwán, about one mile north-west of the city, watered the country between it and the Tigris and ran along the west face of the fortification, throwing out a branch in a S. S. E. direction at a short distance below its junction with the Nahrwán. This offshoot entered the fort at its N. W. angle and ran in a S. S. E. direction to the angle of the city wall, where it bifurcated, one branch passing along the north face of the city, while the other, running parallel with the western wall for 640 paces, suddenly turned to the east through an opening in it. After supplying the town, I presume, both this and the northern branch must have been employed in irrigation. It is probable indeed, that the whole space between the walls of the city and the outer defences contained gardens, for no mounds of any size or extent are to be met with which could lead us to conclude that buildings of any importance existed there.

From the S. W. angle of Qádésiyeh* observed the following bearings. Malwújuh Tower 328°, Khán Mazrakji 97°, Ghaim Tower 307°, Istabolat ruins and mouth of the Dijeil canal 267°. There can be no doubt, I imagine, that this city was one of importance during the flourishing period of the Nahrwán, and probably owes its decline and subsequent abandonment to that vast canal being allowed to fall into decay. A small oblong enclosure, termed El Sanam, existed too on the summit

* Qádésiyeh is 26' 27" west of Baghdad. Mr. Rich, in his *Kurdistan and Nineveh*, quoting from Gibbon, imagines this to be the Assyrian city of Cardesia, but Col. Taylor, a profound Arabic scholar, deems it the site of an early Arab town. Mr. Fraser in alluding to it in his *Mesopotamia and Assyria*, wrongly terms it a Septagon instead of an Octagon, and has unaccountably placed it on the west side of the Tigris, whereas it is on the east bank. I presume him to have confounded Istabolat, which is on the west bank, with Qádésiyeh, though his description in other respects certainly appertains to the latter. See his work, p. 159.

of the cliffs, now washed by the Tigris, but half of it at present remains, the river having swept the remainder away—the walls however on the face of the cliffs are plainly distinguishable, and unlike Qádésiyeĥ itself, are built of fine kiln-dried bricks, but bear no inscription or characters. The lower half of a statue (whence its name) of black stone similar to those of Egypt, was found here some years ago, and is now in the possession of Dr. Ross. Lat. of Qádésiyeĥ by a meridional observation of the sun, $34^{\circ} 4' 38''$.

On the high land forming the western valley of the Tigris and immediately opposite, or due west of Qádésiyeĥ, the remains of a neat square town of some extent are met with. It is called Istabolat. The streets and buildings can be traced by a multitude of mounds and broken brick walls in well designed order, running parallel to, and at right angles from each other. A ruined wall of kiln-dried bricks and a ditch surround it. I had not time to visit this interesting spot, but the note here given is from memory, having previously examined it in 1843. The Dijeil* canal leaves the Tigris close to this. The northern and more ancient mouth is now dried up. This canal pursues a S. E. direction and passing the end of the Median Wall, the villages of Harbah and Sumeichah, is finally lost near the Tarmiyeh water. The country is now considerably more elevated.

Having obtained the noon observation, continued our course at 12 hours 15 minutes, passing the head of the Dijeil and Istabolat, and 12-45 El Ghaim,† a solid quadrangular tower situated at the head of the south branch of the Nahrwán. It is certain that this magnificent canal had two large branches from which it received its supply of water, and by some it is imagined that a smaller canal, called the Nahr Hafú, having its mouth at the foot of the Hamrin range, where it is severed by the Tigris, might be called a third. The Nahr Hafú however, is much smaller than the other two branches. It joins the centre one near the Kantara el Resasa‡ from whence this main branch pur-

* The Dijeil and the Khalis are the only canals of importance now existing in the Baghdad Pachalic. They exhibit a lamentable contrast with the numerous catalogue of antiquity.

† See note, p. 305.

‡ This gigantic canal has long since fallen to decay. It can still be traced for 300 miles, and the ruins of former cities, met with on its margin, attest the flourishing state of Irak during its existence. Vast swamps and extensive lakes, in all probability origi-

sued a S. E. direction, meeting the branch from El Ghaim which flowed in a more easterly direction, a little above the junction of the Atheim with the Tigris. From this spot they became one united stream, considerably more elevated than the surrounding country, and pursuing an uninterrupted course to the S. eastward over the "Atheim," the Diala and the present bed of the Tigris, it formerly fertilized the immense plains of Irak by its many ramifications to the neighbourhood of the Persian Gulf, and opening* to the south of El Ghaim, I have since heard is a duct of this splendid work. In March 1843, I visited the spot marked out as the junction of the two larger branches, where the remains of a "sid" or "band," still exist. A town must also have stood on this site formerly, for the ground was strewed with the remains of buildings, glass and pottery.—Opis is represented by some to have occupied this position, but I hardly think that opulent city could have left no further traces of its existence than the insignificant remains to be here met with at present.

From El Ghaim to Samarrah the ascent of the river is very difficult. The fall or inclination of the surface of the stream is plainly distinguishable to the eye opposite to El Ghaim; a single fall took us 40 minutes to overcome, and I fear, had we not been assisted with a westerly wind which enabled us to make sail, our further progress would have been stopped.

Reached Samarrah,† April 6th, at 7 A. M. and remained until 9-35 to arrange about our fuel. I did not however receive any more on board as the vessel is already much too deep, purposing to use coal to the next station at Dúr, when the fuel we have at present on board is finished.

The modern town of Samarrah, situate on the cliffs forming the left

nally caused by its own decline, surround it in every direction, converting this once luxuriant and highly cultivated province into hot beds of malaria and fever. Its dry bed is now used as a high road by travellers and caravans on account of the protection afforded in the recesses of its mutilated banks, from any of the numerous parties who may be out in search of plunder.

* Sidet Aziz. See note, page 305.

† In the ninth century Sumere or Samarrah became with a slight change of name, the royal residence of the Khalifs of the house of Abbas. Gibbon, Vol. 3, p. 225.

The Roman army under Jovian encamped here after marching and fighting a long summer's day.—*Ibid.*

bank of the Tigris, is now encircled by a strong wall built at the expense of the influential Shiáh population of India. When I visited it in 1843 this wall was just begun. The town was before open and suffered much from the demands of the Bedoins. They used to encamp outside and threaten to pillage the place if their demands were not complied with. It however is now secure and free from such visits. But a great oversight has been committed in not extending the walls to the margin of the cliffs overlooking the river, for the Bedoins could at any time destroy the aqueduct which conveys the water to the town, and thus by cutting off the supply of this necessary article, compel the inhabitants to come to terms. It is however on the whole a miserable town and owes its importance chiefly to two handsome tombs;* surmounted by cupolas, the larger being that erected over the remains of Imam Hussain Askarí. It has recently been repaired, and, I believe, was formerly covered with gold similar to the cupolas of Kathemein, Kerbella and Nejáf, but is now perfectly white, the present funds not being sufficient to give it its former splendour. The smaller cupola, or that of Imam Mehdi, is a very neat cupola, beautifully enamelled with yellow and white flowers on a bluish green ground. Imam Mehdi was the last of the Imams revered by the Shiáhs, and is said to have disappeared from the earth at this spot. A large hole over which this edifice is erected points out the locality, and from which it is believed he will at some future period present himself. It is therefore much venerated by Mahomedans, especially by the Shiáhs. Pilgrims† from all parts of Persia resort to this place annually. I am informed that 10,000 is the yearly average of the number of devotees to this sacred spot, but am inclined to believe this amount is even now under-estimated. No tax is here levied on the Pilgrims, but the proprietors of the Kháns and houses in which they reside, pay to Government 2 Riego Piastres for each individual. The modern town comprises about 250 houses, with a Sunni population slightly under 1000, who possess among them barely 100 stand of arms.

* See sketch accompanying these notes.

† Since the occupation of the holy cities of Kerbella and Nejaf, by the Turks in 1843, the influx of pilgrims into the Baghdad Pachalic has much decreased. The security afforded at present by the mild government and toleration of Nejib Pasha, will however soon restore the confidence of the Persian devotees, and moreover materially add to the annual revenue of the province, which diminished considerably after the supposed ultimate policy of the Pasha.

The town is farmed by Government this year to the present Zâbit Seid Hussain, for 280,000 Riego Piastres, or a sum nearly equalling to £660 sterling.

To the north of the modern town, about half a mile, a curious spiral tower is situated. It is called the Malwiyeh.* Ascertained its height to be 163 feet, as near as possible. From its summit a fine view of the extent of ancient Samarra is obtained. Heaps of bricks, glass, pottery and scorise are strewed in every direction, and the alignments of many edifices are plainly distinguishable from this commanding position.† The former town is said to have been watered by a tunnel cut underground, having its mouth in the neighbourhood of the Hamrin. Traces of this tunnel are still to be seen in the remains of wells, (named Kan-nats or Kharees) descending into it. Both the Malwiyeh and the remains of an oblong building (the Jammah or Medressah) close to it, are built of fine brick, with a neatness not to be equalled in the present day. The Medressah is about 810 feet in length and 490 broad, having 12 buttresses between the corner bastions on its N. W. and S. E. faces, and 10 on its N. E. and S. W. side. The great entrance faces the Hebla and shows at once its Mahomedan origin; a fountain appears to have existed in the centre of its area. The walls at present are about 30 feet high, and on the S. W. side the remains of Gothic windows are discernible. To the N. N. W. of the Malwiyeh, about two and half miles distant, are the remains of the Khalifa or Palace of Motassem, the 8th Khaliph of the Abbasides.‡ The entrance is now all that is left standing. The ruins around occupy a large space and have vaulted chambers beneath them; many an idle tradition is attached to these subterranean apartments by the Arabs, and moreover "Beckford's Vathek" owes its origin to this locality. During our visit to it in 1843, we descended into the

* See sketch of this town and the modern Samarra, with a bird's eye view of the surrounding ruins.

† A spiral road on the outside of the tower conducts to its summit. Fraser, in his description of this tower, states the existence of a staircase in the interior of the building. I think however he is in error, as I deem it, from close scrutiny, a solid mass of brick-work. Large holes, similar to those observed at the Birs, Nimrud and the Mujelibe, perforate the pile at right angles, but for what purpose unless for ventilation I am ignorant. All the Babylonian ruins indeed, are thus pierced through, and the architect of the Khalifs in this peculiarity, appears to have copied the more ancient models.

‡ He quitted Baghdad on account of the rebellious disposition of its inhabitants. Note in Rich, Vol. 2, p. 251.

vaults by means of a rope and block much to the dismay of the frightened natives, who would not trust themselves near the spot, but awaited the termination of our enterprize with a superstitious dread. They firmly believe that a Lion has chosen this place to hold his court in, and when we again made our appearance on "terra firma" scathless, they thanked God for our deliverance. The vaults are of some extent, and are cut out of the limestone rock, but have brick roofs. A few scraps of old and much rusted iron and a fathom or two of decayed rope rewarded our labours.

The site of the ancient Samarrah was undoubtedly well chosen. The broad and rapid Tigris bounded it to the west, the main branch of the Nahrwán extending from the Kantaratel Resásá to the river "Atheim," on the north; and the south branch of the Nahrwán extending from El Ghaim in an easterly direction to its junction with the north branch, on the south; thus enclosing a triangle of rich land, whose longest side was 35 English miles and the remaining two 20 miles in length. Many towns occupied its area, and the numerous canals, offshoots from the great Nahrwán, crossing it in a diversity of lines, attest its former fertility. At this time not a blade of grass or a single tree breaks the monotony of the extensive view from the top of the Malwiyeh. A death-like silence prevails around the fallen city, interrupted only by the howling of a jackal, who has just issued from some of its deserted vaults.

W. by N. of the Khalifa and on the undulating mounds forming the right boundary of the valley of the Tigris, another ruin, apparently of the same order and date is seen. The buttresses which are met with at regular intervals along the wall, are partly standing, giving to the whole ruin, when viewed at a distance, from whatever quarter, the resemblance of a group of pillars. These buttresses are circular or square pedestals, and are neatly built of fine brick work. It is called "Ashik, or the Lover." Some high mounds about half way between the Khalifa and Ashik, or near the latter, in the valley of the river, mark the site, I think, of some very old ruin (probably Babylonian) of much earlier date than that above mentioned. The Arabs however call them "Máshuk, or the Beloved," and a bridge over the Tigris is said formerly to have connected them with Ashik, notwithstanding which, tradition assigns to this place a tale, similar to the well known but doubtful feat of the Leander of Hellespontic notoriety.

About four miles north of the modern town of Samarra, a high tumulus stands on the plain. It is called Tel Alij* or the "nose bag round," and is said by tradition to have been raised by some former ruler ordering his troops each to bring the nose bag of his horse full of earth for this purpose. It exactly resembles the tumuli to be met with in Syria and in the plains of Shiragoor near Suleimanieh.

* This highly curious and interesting mound, in all probability marks the site of the "Ustrina" or pyre on which the body of the Emperor Julian was burnt previous to the removal of his ashes to Tarsus.

We learn from Gibbon in his *Decline and Fall*, chap. 24, that the Roman army under Julian wandered many days to the East of Baghdad and afterwards countermarched in the direction of the Tigris, that the Emperor received his mortal wound and died within a few days march of Samarra, and that his body was embalmed amid a scene of terror and distress; we are informed also that Anatolius, master of the offices and the personal friend of Julian, with three tribunes met their death on the same day. That the army, after having elected Jovian Emperor, resumed its route at the next dawn in the direction of the Tigris and after marching and fighting a long *summer's* day encamped in the evening at Samarra. On the next day the second after the death of Julian, it appears the Roman legions remained encamped at Sammariah as instead of being harassed on the march, the Persian troops attacked the camp which was pitched in a sequestered valley. On the evening of the third day, it is related the Roman army encamped at Carche (see sequel) tolerably secure from assault in the protection afforded by the lofty dikes of the river; and that on the fourth day after the death of Julian they pitched their tents at Dina where they remained a considerable time occupied in vain attempts to cross the Tigris and finally accepted after four days' negotiation, the humiliating conditions of peace.

The circumstances attending the death of Julian and the subsequent marches of the army to Dina are here so clearly related that any one conversant with the geographical detail of the country between Samarra and Dur would trace, at a single glance, almost every footstep of the worn out and incessantly exposed legions. It will be seen therefore that the site of Tel Alij must have been the very ground on which the army encamped on the second day after the demise of the Emperor, and it is presumed that the act of encamping, under such circumstances, was one of duty and not of choice. The heat of a Sammariah summer cannot have materially changed since the time of Julian, the interment or burning of the dead therefore within 36 hours was imperatively necessary. The reason for embalming his body I conceive was only a compliance with universal custom (vide Digest 14, Ed. 3, S. 5, E. 8), or for the purpose of enabling it to accompany the army until the passage of the Tigris was effected, when comparatively secure, more time would have been afforded them for performing the sacred rites, than in the presence of an active enemy. But the insufferable heat, if such was the intention, I conjecture prevented its execution and caused either the interment of the body or its reduction to ashes on this very spot. The delay had already been extended to its farthest limits, for the time above stated is the utmost that can be accorded to the non-interment of the dead on the sultry plains of Irak or Mesopotamia, the army therefore was

At 9-55 A. M. April 6th, left Samarra, and had hardly proceeded an hour before we grounded on a shingle flat. From Samarra to this place we had been struggling hard against the violence of the stream and had nearly surmounted a fall of water over a shoal spot when the engines losing their power, the vessel's keel touched the ground and in an instant she was thrown on the bank, with her port broadside expos-

compelled to encamp for the performance of the inviolable rites of the "funus publicum" over the corpse of the departed Julian. This may reasonably, I think, be inferred; for any delay, otherwise than on an occasion like the present, would not have been resorted to in the distressed position the army then occupied, and moreover, at such times, we are informed a total cessation from business was enjoined (called *Justitium*) which was usually ordained by public appointment. The soldiers were then freed from their military duties even. (Tacitum. I. 16—82; L. W. IX. 7) and in this case no doubt enjoyed a repose they had long been strangers to.

It may be said that the act of embalming the body on the night of his death implied its removal into the Roman territories; but it can hardly be supposed that such an idea was ever contemplated by a famished army surrounded and harassed by barbarians at every mile, and amid such distress as Gibbon states, shortened the moments of grief and deliberation, even did the fierce heats permit such a proceeding.

The circumstantial detail however, of the funeral obsequies of Julian, which took place afterwards at Tarsus, as related by Gibbon, if literally true will, I confess, invalidate all that I have advanced, for he distinctly states in Vol. III. p. 236, that the *corpse* of Julian was transported from Nisibis to Tarsus in a slow march of fifteen days; but again in the next page, in speaking of the sophist of Antioch, he esteems his general zeal for the cold and neglected "*ashes*" of his friend, this in some measure leading us to conclude that the body was previously burnt. Whether this was the case or whether the heart alone sufficed for Jovian to bestow the last honours to the manes of the deceased sovereign, will for ever perhaps, be attended with some doubt; but we cannot at the same time, reconcile Gibbon's description of the great distress of the army, their famished and wearied condition, the factions existing amongst them, the anxiety of each individual to secure his present safety at the passage of the Tigris (where the loss of the army is stated as equalling the carnage of a day of battle), the subsequent sufferings both from hunger and thirst on their dreary march through the wilderness of Mesopotamia, when the beasts of burthen were slaughtered and devoured and the arms and baggage of the soldiery strewed the desert for want of strength to carry them, with the statement that his *corpse* reached the frontier town of Nisibis; indeed, the slow march of fifteen days which were occupied in transporting the remains of Julian from Nisibis to Tarsus will not, I think, coincide with the geographical distance between the two places of 400 Roman, 366 English, or nearly 25 miles daily march, and that too, through the hilly country situated at the foot of the Taurus.

These discrepancies certainly afford grounds for suspecting the general consistency of the historian, even did not the stern fact, which I have previously advanced of the almost impossible transaction of carrying the *corpse* for such a distance over the densely heated and sultry plains of Mesopotamia, negative such a procedure.

ed to a stream running nearly seven geographical miles per hour. I have been many times aground both on the upper Euphrates and on this river, but a worse position than this I scarcely ever occupied. The shore was 290 yards distant, and the dropping of anchors in the stream, from long experience, was known to be useless, as from the hard nature of the bottom they came home with the slightest strain. After six hours hard labour we succeeded in getting an anchor buried on shore, and a

I think therefore we may fairly infer that, either the body of the apostate Julian, or the funeral pyre in which it was consumed, formed the "Nucleus" of this antiquated pile, and that either his heart, or his ashes conveyed in an urn, received the "last honours of Jovian and the mournful lamentations and clamorous insults of the hostile factions" on the journey to Tarsus. The stately tomb erected to commemorate his virtues, on the banks of the Cydnus, has long ere this passed away; but the imperishable monument of earth raised by a devoted army over the remains of a beloved general, on the margin of the Tigris, will endure for ages yet to come.

For an interesting description of Yet Alij or Walijah, consult Dr. Ross's paper on a journey to Apis in the *Journal of Roy. Geo. Society*, part II. vol. XI. act IX. p. 121. He describes it as about 100 feet high, but I consider it at least 150. Its present singular appearance may be accounted for, by subsequent rulers having fortified its summit as a place of refuge from sudden attacks during the ever-varying and disturbed stages which have swept over the country.

The Arab tradition in itself, is not a little curious, and shows that a large body of troops were employed in the construction of the mound.

In Gibbon's *Decline and Fall*, Vol. 3d, p. 225, we find in a note that M. D'Anville has demonstrated the precise position of Sumero, Carche and Dura. I have not M. D'Anville's work by me, nor am I acquainted with the situation he assigns to Carche. From my own observations however, I am inclined to identify this spot with the position the Roman army encamped in, under Jovian, the night previous to its reaching Dur. The "lofty dikes of the river" can be no other than the high embankments of the gigantic Mahrwan, and by "the hills from which the archers of Persia insulted and annoyed the weary legionaries," I presume it meant the high conglomerate cliffs which here bound the east valley of the Tigris. These are diversified into a multitude of heaps caused by torrents from the highlands forming deep ravines ("sequestered valleys" of Gibbon) on their passage to the Tigris; unless it be as I have premised, it is certain that no other "Hills" exist within 35 miles of this vicinity. The eye wanders over a vast and magnificent plain, relieved only by the twin monuments of antiquity known as the Zellal Benat and Alij, which in all probability, were not only erected by the distressed legionaries over the ashes of their late Emperor and comrades, but remain to this day a sad memorial of the sufferings they endured.

The geographical distances of each day's march will be found to correspond with the movements of a large army, and the precise spot on which Julian fell must be looked for about 10 miles to E. N. E. of the ancient Samarrah. The true bearings of the various objects of interest in this neighbourhood will be found in another part of this Journal. taken from the summit of the Maluryeh, on the site of the ancient town.

chain of 150 fathoms attached to it, brought off across the heavy stream to the vessel. We now thought the heaving off certain, and were congratulating ourselves on our success, when the chain snapped in two and the vessel swung round with a heavy crash, as if her bottom was stove in, her head down and the starboard broadside now receiving the whole weight of the stream. Tried in vain to connect our chain again during a heavy squall of thunder, lightning and rain, and desisted for the night. During the night the stream forced the lee-side of the vessel higher up on the bank, while the weather-side heeled over to starboard, into deep water, occasioned by the heavy current acting against the vessel, cutting or abrading away the bank below us. At daylight the port side of the vessel was nearly dry, while the water was within 18 inches of the starboard scuttles, and had we remained much longer in this position she might have turned over or perhaps filled when the water reached them; at day dawn, however, we were again at work and happily succeeded in connecting the chains. From this time till 1h. 20m. P. M. on the 7th we had at intervals a heavy strain, by which the vessel righted and eventually came off the ground by allowing the stream to catch her on the opposite quarter. Employed the remainder of the afternoon, after securing in a good berth, in picking up our anchors and cables. Had we grounded on the lower Tigris a few minutes would have sufficed to have again set us in motion, but on the upper Tigris and Euphrates, it is the labour of hours, if not of days.

Part of the Shammar Arabs under Nijiris are roaming about this part of the country, as are the Al' Bu Hamed. Large herds of their camels are grazing around and enjoying the rich grass which abounds every where at this season. Some of the tribe approached the vessel when aground, and a Bedoin I have with me was sent to them, to offer no molestation to our crew, while burying the anchors on shore. Two of the party were present at the affray in which Suliman Mirza lost his life, and in which our friend Timour was severely wounded by a spear through his lungs. They inform us that the person who slew Suliman Mirza by severing his head from his body at one blow, met his death a few days afterwards from an Ajail Arab, when they attacked a caravan. They also profess to regret the circumstances attending the attack on the princes, and say they have not known "good" since. "Their chiefs have been killed and their children have died; their

favorite mares are barren and suffering from disease, and happiness has left their homes." Some English iron, I believe belonging to Messrs. Lynch and Co. of Baghdád, was offered to us for sale, for a mere nothing. This had been plundered from a caravan a few months previously, and a common bottle taken from some of Suliman Mirza's party was tendered for the exorbitant price of two Ghazees.* The former offer, I replied, I could not accept, as I too, had iron for sale, and pointed to the 9lb. shot, which Syed told me caused some amusement. The latter, I did not want and offered them as many as they wished for, which soon lowered the price of their commodity. These people appear to be the terror of the Jezira from their lawless habits. The Shammar, though feared, are much less dreaded.

April 8th.—River rose three inches last night; weighed at 6h. with cloudy weather and a south wind which, should it freshen, may assist us. At 7-17 Ashik bore west three quarters of a mile distant, Cha'afel Kelb† some high mounds south of Ashik 201t. Sammariah 137t. Mahirgeh 129t. with the mounds of Máshúk nearly in a line with it, Khalifa 112t. The river from this bends more to the N. E. for a short distance along the cliffs, forming the east boundary of the valley of the Tigris, thence north to Shinas, some modern ruins which extend a considerable distance to near Abri Delif, a miniature resemblance of the Maluryeh, which we passed at 11h. a moderate south wind materially assisting our progress. At 1h. 10m. arrived opposite the mounds of Mehjir and the Kantarat el Resásá, or main branch of the Nahrwán already alluded to. The former is the scene of a great action fought by Omar, Pasha of Baghdad, against the large tribe of Majainmah (Dr. Ross's *Journal Roy. Geo. Society*, Vol. IX.) on the east side of the Tigris, about two miles inland from this, to the eastward is the upper "Sidd" or "band" across the Mahrwan, constructed of large masses of stone, held together by leaden clamps. From this it derives its name Kantarat el Resásá, literally signifying "the bridge of lead," and although not actually a bridge in our acceptation of the term, but a dam to confine the water in the low season, it might have answered both purposes, or with more probability, the name may be modern and come into use only since the decay of the canal.

* About 8 shillings.

† Mounds of the Seven Sleepers and their Dog.

Passed many encampments of the Shammar on the right bank near Haweisilat. They extend nearly up to Mosul. These people are however, migrating towards Baghdad, as Suffok, the chief Sheikh, advances to the south. The parties of Nejiris and Suffok, are now not on friendly terms owing to Nejib, Pasha of Baghdad, having invested the former as Sheikh of the tribe, while the latter claims it as a right. Ahmed el Kode (a connection by marriage of Suffok) informed me this morning that the Abeid once possessed the whole of Northern Mesopotamia, and that the present Shammar usurped the country in rather an original way, but a way nevertheless adopted even by more civilized nations than the predatory Arab races. He says "Two Shammar families with their tents originally wandered from Nejd, and after some time encamped with the Abeid. Among the chattels of the new comers a wooden bowl of extraordinary dimensions was observed, but it excited no further curiosity until the strangers invited some of the then holders of the soil to a feast, when the bowl was set before the guests, filled with the carcasses of sheep, butter, and the usual ingredients of Arab-fare. The dinner was duly discussed and the Abeid on returning to their tents were talking of the munificence of the strangers and the unusual dimensions of the wonderful bowl. A grey-beard of the tribe, who had not been at the feast, listened in silence for some time, and starting up to the dismay of his friends, demanded that the newly arrived strangers should be immediately put to death, adding with the air of a prophet, that the famous bowl told a story in itself, and that ere long, many strange fingers would be dipped into it. It literally happened as the old man had foretold. His voice was overruled in the assembly and the strangers' lives were spared. A few months afterwards, Shammar after Shammar arrived and feasted from the much dreaded bowl. A few years sufficed for the total expulsion of the Abeid, and from being lords of the soil, that once powerful tribe became fellahs and slaves to the formidable Shammar." Such was Ahmed's account of the origin of the Shammar in Mesopotamia, but nevertheless the Abeid are still powerful enough to render themselves obnoxious to the Government. They at present occupy the country opposite Tekrit and, I believe, now never cross into Mesopotamia.

At 3 hours 15 minutes the tomb of Imam Mahomed Dur at Dur*

* Dura was a fortified place in the wars of Antiochus against the rebels of Media and Persia. Note in Gibbon from Polybius, Vol. 3, page 226.

bore east. In shape it is a cone similar to that of the tomb of Zobeidi in Baghdad, on a square base. The village is a collection of miserable houses on the undulating mounds forming the east margin of the valley of the Tigris, and boasts of a small minaret. Rich appears to identify this spot with the "plains of Dura" of Scripture. The river opposite the village is disposed into numerous channels, much contracted, through which it flows at a very rapid pace.* Having with difficulty ascended beyond the numerous islands, came to an anchor above the village about one mile to receive our fuel which is piled on the bank awaiting us.

The inhabitants soon collected. The Pasha's letter was presented and received with every mark of respect. After a short consultation, a boisterous fellow was called for, with hands stained with indigo, and who followed the calling of a dyer as well as Moollah and teacher to the "young ideas" of Dur. The letter was handed to him to read aloud for the satisfaction of his auditors, who formed a circle around. Diving his right hand into his pocket, which was capacious enough to hold any one of his scholars, he produced a pair of barnacles, and fixing himself in a commanding position, vociferated forth the contents of the missive, at the full pitch of his stentorian voice. When he concluded a buz of applause signified the approbation of the assembly, and their willingness to act in any way I might require.

To the east of Dur, about one and half miles, a high tumulus named Tel Benat† or the "girl's mound" is situated. It is similar to the Tel

* On the fourth night after the death of Julian the army under Jovian encamped at this place, and experienced much difficulty in vain attempts to cross the Tigris. The ignominious treaty between Sapor and Jovian was here concluded. The impregnable fortress of Nisibis and the stronghold of Singara, were acquired by the Persians in a single article and a disgraceful peace of thirty years' duration consented to by the "obscure domestic," as Gibbon terms the newly elected emperor. Gibbon, Vol. 3, page 228. Great difficulty would no doubt be met with at the present time in crossing a large army at this particular spot. The River is here more than usually rapid from the great declivity of its bed.

† This resembles Tel Alij in appearance. It is about the same height, and evidently of equal antiquity; much care has been taken in its construction and the remains of a ditch and covered way are still discernable. The "tumulus" is no doubt of Roman origin, and copper coins bearing Roman characters but too much corroded to render them decypherable, were found in its neighbourhood. We know that both the Greeks and Romans erected conspicuous mounds or piles over the ashes of their celebrated Generals, and it is presumed they would have resorted to this mode of burying their illustrious

Alij, and can be seen some distance off from its isolated position on the plain. Between it and the village are many lime kilns. Lime is here found in great quantities, and Baghdad is chiefly supplied from this place. It is conveyed in rafts down the Tigris.* I remarked that the

dead in a country where stone is not available for monuments. The sacred nature of the tomb amongst the nations of antiquity which preserved these structures inviolate in former ages, has equally defended them from the ruthless hand of the superstitious Arabs. Time also, instead of demolishing adds to a fabric of this nature, as every blast of wind that sweeps over the desert, carries with it clouds of dust which accumulates on and enlarges the original structure, rendering it the most durable and imperishable of all monuments.

If Tel Alij be admitted as the tomb of the ill-fated Julian, we may conclude that Tel Benat covers the remains of the legionaries who fell in the repeated attacks made by Persians, and of the many who lost their lives in the ill-conducted attempts to cross the Tigris at this spot.

* The rafts in use on the Tigris at the present day have in no wise altered since the days in which Herodotus, the author of the *Analysis*, and the Historian of the Emperor Jovian, compiled their works. They are composed of the branches of trees supported on the inflated skins of sheep, and are capable of carrying a load of from 30 to 40 tons. These rafts are admirably adapted for the descent of the upper Tigris. Possessing but a small draft of water, they are enabled to float over the numerous dikes and shallow spots met with in its course to Baghdad. Floating with the stream, two or four paddles, according to the size of the raft, are capable of retaining it in the fair channel, and accidents therefore very rarely occur. On the raft being unladen at Baghdad the timber it is composed of is sold for what it will fetch, and the skins after being dried are conveyed back to either Tekrit or Mosul by land. In this manner the whole of the immense blocks comprising the Khorsabad marbles lately excavated from a village of that name in the neighbourhood of Mosul, by Monsieur Batta, the French vice-consul, at the expense of his Government, were conveyed to Baghdad and there shipped into native boats, consequent generally on some ill-timed measures resorted to by the Government for their coercion, they fail not in stopping and plundering any rafts or passengers that may chance to come within reach of them; indeed, I am informed, that on one occasion, a British officer happened to be journeying in this manner and was thus waylaid; my informant added that notwithstanding the over-confident individual was armed to the teeth, and had hinted a determination not to be taken alive, he was stripped of every thing he possessed, even to his nether garments. I have since met some of the party who helped to denude the unfortunate traveller. It was both ludicrous and amusing to witness the delight with which they imitated his piteous supplications to be allowed to retain only his shoes.

Travelling by raft as a matter of convenience, is far preferable than by the land journey from Mosul to Baghdad. A tolerable-sized tent sufficient to protect one from the sun can be pitched on this original conveyance, and a few books, with the varying scenery, will tend to while away the few days, (not exceeding six and sometimes only two) that may be occupied in the descent of the river. It is however not at all times a safe route, for when the Arabs are in a disorganized state, consequent generally on some ill-timed measures resorted to by the Government for their coercion, they fail not in stopping and plundering any rafts or passengers that may chance to come within reach of them; indeed, I am informed, that on one occasion, a British officer happened to be journeying in this manner and was thus waylaid; my informant added that notwithstanding the over-confident individual was armed to the teeth, and had hinted a determination not to be taken alive, he was stripped of every thing he possessed, even to his nether garments. I have since met some of the party who helped to denude the unfortunate traveller. It was both ludicrous and amusing to witness the delight with which they imitated his piteous supplications to be allowed to retain only his shoes.

inhabitants here generally appear sickly, and sore eyes seem to afflict the greater part of the community. Some of the women were very pretty and fair, and evinced no alarm at coming near the vessel.

Having completed wooding by 7h. 45m. April 9th, we continued our ascent. The river above this is new to us, the vessel not having reached beyond Dur when we attempted the ascent in 1843. Indeed,

This was however denied, and he was compelled to walk barefooted through the prickly camel thorn from the encampment back to the raft. His gait and gestures under this indignity were inimitably personified by his ruthless captors. I have since heard that had it not been for the vaunting display of so many weapons by a single individual, that he would have met with better treatment, and been allowed to retain his habiliments instead of being forced to appear "in puris naturalibus."

The display and injudicious use of arms in a case like this cannot be too strongly reprobated: a single pistol or a sword is sufficient to intimidate a few petty robbers, but with the lawless tribes of the desert, who attack generally in overpowering numbers, the exhibition of offensive weapons by a disparity of force, serves only to irritate and is likely to lead to bloodshed which the Arab in most cases wishes to avoid. Blood however being once drawn, the result is easily conceived. The fate of Messrs. Taylor, Asperiall and Bowater, is fortunately I believe a solitary instance recorded of massacre having followed the rash act of injudiciously using arms, amongst Europeans; but such occurrences are frequently heard of as happening to the natives of the country, and indeed the "law of blood" universally admitted in the Arab code, in some measure sanctions the indiscriminate taking of life as an indemnification for the loss of either friends or relatives by strife or feud. This law, though possessing its disadvantages, is morally a good one amongst the barbarous tribes of Arabia, for murders would become of more frequent occurrence did not the fear of revenge tend to restrain the animal passions. A family having what is termed "Durn" or "blood" on its hands, is generally shunned by the rest of the tribe, who dread being involved in its consequences. The same rule affects individuals. The penalty however of "blood for blood" can be commuted for a sum of money paid by the offender to the tribe of the injured party, only a part of which the latter shares. It is collected from the whole tribe to which the culprit belongs, provided he is too poor to pay it himself, and the offence is not of a very aggravated nature. The "price of blood" varies in different parts, and is moreover not at all times accepted. In the towns, a small sum, according to the degree of the party, suffices, and may be reckoned as about £20 to 30. Among the desert tribes it is much more, amounting in some cases to nearly double these sums, paid partly in coin, and partly in camels, oxen, or sheep. On settling these affairs a good deal of form is gone through. The heads of the tribe and the relations of the parties concerned assemble at a fixed spot, and after payment of the penalty, witnesses are called to swear on the Koran to the nature of the settlement; a hole is then dug in the ground, in which the feud is considered to be buried. It is then filled up and a curse pronounced on the head of any party who might happen to revive the quarrel. The parties then separate. This contract is not however at all times binding; in a few cases a thirst for revenge predominates, and whole tribes are then involved by the breach of faith of a single man.

had we not been favored with a strong south wind, I fear our present attempt would have been attended with the like disappointment. At 10h. 50m. a small enclosure in the Hawi on the left bank bore east two miles. It is called Khán Jozani, and affords protection to the cultivators when threatened by plundering parties of the Abeid or Shammar. The tomb in Dur bore at the above time 157° . The river from Dur to this is known by the name of the Khán, and is much cut up into islands, rendering the main channel extremely sinuous. Our ascent to this has been one continued struggle against a heavy stream, and a rapid every half mile, which the vessel barely manages to overcome. Progressing steadily against the difficulties, arrived opposite Sheri at el Aouja, a landing place formed by a gap in the cliffs on the west side of the Tigris. From this Dur bore 149° . Caravans here halt to water. At the time of our passing, a Ghazu or plundering party of the Shammar were lying in wait for any opportunity that might present itself, of enriching themselves at the expense of others. Long before we reached Tekrit, the inhabitants had turned out and the adults of the population even met us several miles below. At four P. M. anchored at Tekrit, and received a visit from its Governor, Mustafa Effendi, who put the resources of the town at our disposal, and rendered us much service by placing at our command several Cavasses without which we could scarcely hope to complete the vessel with fuel, the crowd around being so great.

In the evening, I walked to the top of the cliff on which the old citadel stood. It bears evidence of former strength and, being naturally nearly inaccessible, must have been entirely so when fortified. The front facing the river is quite perpendicular, and exhibits horizontal strata of stiff clay, red earth, fine sand and conglomerate in successive layers from the water's edge to its summit; indeed, this is the general formation of the cliffs bounding each side of the valley of the Tigris from Samarrah to Tekrit. This isolated cliff is about 130 yards long by 70 broad, and in height 86 feet* from the water's edge, but the debris of the former buildings scattered over its summit increase it to a hundred in its highest part. Large massive bastions of lime and pebbles faced with solid brickwork, abut around the cliff, between which the

* Rich, in his work, estimates the height at 200 feet; he is however in error, for I bestowed some care on its measurement.

wall once stood. On the south face between the citadel and the modern town, and half way down the cliff, two buttresses of the same formation as the bastions, point out the situation of the gate-way. The bricks which faced them have been carried away for other buildings. A deep ditch about 30 yards in breadth, but now filled up with rubbish, conveyed the waters of the Tigris around the base of the citadel, thus completely insulating and rendering it impregnable, before cannon came into use. South of this on another isolated hill, stands the modern town, formerly girt in by a wall which has fallen to decay. It contains at present about 300 miserable houses and 1000 inhabitants, but the space formerly occupied by the ancient town is of great extent. Some ruins, called the Kanisah, or "Church," are still shown. A few years ago, when Suffok, the Shammar Sheikh, invested the town, a trench was dug by the inhabitants for defence. From it many curious urns of pottery and sepulchral vases were exhumed, one of which, in the possession of a Moollah Rajib, spoken of by Dr. Ross in his journal, I with difficulty procured from the owner. It is surrounded with figures of men and birds, of a curious, but rude execution, and is probably Babylonian.* The modern town has two mosques but no minarets. The streets are kept free from filth, and altogether bear an aspect of cleanliness and order seldom seen in eastern towns.

I am told on an emergency 400 matchlocks and guns can be collected for the defence of the place, and am inclined to believe this is rather under, than above, the true amount. It is however, certain, that the Tekriths have maintained their position against the Arabs, and even compelled the powerful Sheikh of the Shammar to relinquish his intended assault on the place by the menacing attitude they assumed.

Mr. Rich, in speaking of this place in the flourishing times of Daood Pasha, states that it was then farmed for 22,000 conl. Piastres annually, and that it boasted at that time of 600 houses. I presume this must be a mistake, for at present, though its dwellings are but half that number, and its population proportionably small, from the effects of the plague and other causes, the proprietor or farmer, pays yearly to the

* It is now in the possession of Major Rawlinson, C. B., the Political Agent in Turkish Arabia, and the learned and indefatigable author of a work which is now in the press on the cuneiform inscriptions of the East. To his other and varied accomplishments he adds, that of a keen and persevering antiquarian.

Government of Bagdad a sum three times as large as that mentioned by Mr. Rich. For 68,000 conl. Piastres, or a sum equal to about £600, it is farmed this year. The Hakim or Governor is Mustafa Agha, an Agent or Vakeel of the proprietor, who resides in Bagdad. I paid him a visit at his house, if such a wretched dwelling can be called one. He received me very politely, and taking my seat among the elders of the place, various topics were discussed. The Governor paid us the utmost attention, and to show his breeding and knowledge of the world before the motly assembly seated around, asked if I preferred coffee after the European mode, with milk and sugar or "Al'aral." Not to put him to any trouble, I mentioned the latter, but he would not be gainsaid, and after many instructions and lessons on the art of making it, his servants produced a tolerable beverage. Great complaints are made by the Tekriti against the Government, and at the present unsettled state of this part of the country. Fear of the Shammar on the one side, and the Abeid on the other, have prevented the townspeople from extending their cultivation to its usual limits, and the consequence is, the rich land laying between Tekrit and the Hamrin, is now a perfect waste. The inhabitants are all Mahomedans with the exception of one solitary Jew, who is on the staff of the Governor, and whose life is not to be envied. To the question of what have you in Tekrit? "One barren date tree and an infidel Jew," was the reply.

During the night obtained a meridian altitude of a Scorpii from which I deduced the latitude $34^{\circ} 35' 45''$ N. ; and from the citadel* I obtained the following bearings. True bearing of the tomb at Dur S. $27^{\circ} 8'$

* I have searched in vain for any ancient notice of Tekrit. Naturally strong and rendered in a measure impregnable by artificial works whose remains are still plainly distinguishable, it is not a little curious that it has as yet, I believe, remained unidentified with some of the strongholds of antiquity. Both Rich and Fraser, though frequently mentioning it in connection with the geographical description of upper Mesopotamia, fail to attach any historical record to this locality. In an old atlas I observe BIRTHA is marked as situated on this spot and having no works in my possession that allude to it, I am compelled unwillingly to remain in ignorance. BIRTHA is however generally regarded as identical with the modern Bir, or Birehjik, a small town occupying an ancient site on the upper Euphrates; and the near resemblance of the ancient to the modern name would seem to justify the conclusion.

I am inclined to regard it as having been at one time a Christian town. The Arabs have a tradition to that effect, and the term "Khanisah" only used to denote a "church,"

E. Magnetic bearing of the same S. $21^{\circ} 30'$ E. making the variation $2^{\circ} 38'$ W. Tel Benat near Dur, 150° , Khán Jozani 148° , Armin, on the opposite side of the river, called Kamsah, 110° opening in the Hamrin, where the Tigris breaks through, called "El Tet'bha," $348\frac{1}{2}^{\circ}$. A ruin of an ancient nunnery termed Darel Benat* or the "Girl's Residence," stands about one and half miles to the S. W. of the citadel.

Having obtained observations† for the chronometer and despatched a messenger to Mosul with letters to the Vice-Consul, and with instructions to communicate with Suffok, to whom I addressed a complimentary epistle, we left Tekrit at 9-40, A. M. A new Pilot, or rather an old one (for I believe he is upwards of 70 years of age) was shipped for the river above this; in fact he is the same individual who conducted the *Euphrates* under Lynch seven years since. He declared after having been on board an hour and witnessed the performance of the vessel against the current, that she could not pass the rapids which the *Euphrates* found difficulty in ascending; indeed, what he says I fear will prove true, for our progress to-day has been considerably slower than yesterday, and in many places amounted to almost a stand-still. At 4-15, P. M. having a long reach full of difficulties ahead and no hope of passing them before night comes on, brought to an anchor in the only secure spot to be met with in the neighbourhood.

From Dur, the principal channels appear to be confined to the western part of the valley of the Tigris, but below that place the main body of the stream attaches itself to the western cliffs.

The latitude was observed this evening by a meridian altitude of Dubhe $31^{\circ} 41' 52''$, thus making our whole day's progress of $6\frac{1}{2}$ hours' steaming equal to $6' 7''$ of nothing only.‡

would warrant the supposition. Three ancient edifices in the modern town and a ruin on the opposite bank of the Tigris, are thus designated.

Since writing the above note, I observe that Mr. Ainsworth, in his *Asia Minor* includes Tekrit (Tageit) in his list of Chaldean Bishoprics, Vol. II. p. 276, from a Catalogue published by Amru in the twelfth century.

The existence of Babylonian relics amongst its ruins, however, would refer its origin to a date anterior to christianity, but under what application it was known by, or from whence it derived its present name, I am at a loss to conjecture.

* Probably a nunnery when Tekrit was a Christian Bishopric.

† These observations place Tekrit $42' 16''$ west of Baghdad.

‡ A singular cave in the cliff forming the right margin of the river, is just below our

April 11.—At 6h. 14m. A. M. weighed, but in easting the stream caught her bow and there not being room from the confined space the river flows in, to bring her head up stream with the helm, dropped an anchor in the hopes of checking her, but without effect, from the hard nature of the bed of the river. Drifted down a considerable distance before we could get her head round, and did not reach the place we started from, until 6-45. The anchor too, on heaving it up, was found minus the stock. Sent the boats with a party of hands to track up while the vessel ascended the rapid, which she did with tolerable ease. Steamed up to a bluff point of the cliffs on the west side of the river called Abd'l Kerim* from an old Immam now in ruins standing on its summit. Hauled alongside the bank to wait for the boats, which came through an inlet or Khalidj, observing a party of Shammar horsemen making towards the boats sent an armed detachment to prevent them molesting the trackers, on which they retreated. The boats having joined at 9-20, steamed on. The river rose 17 inches between sunset and daylight, causing a greater rapidity in the current. It is hereabouts divided into many channels and well wooded islands. 12h. 20m.—Reached Gubah on the left bank, near a high mound† in the plain, and the first tamarisk grove met with, north of Baghdad. Our wood is deposited here. Completed wooding by two P. M. and stood on. The channel is very tortuous to Kaleh Abu Reyvash.

At four P. M. the Kaleh bore west. It is a ruined enclosure on the cliffs, with a fine plain or Hawi extending to the eastward; from it a

present anchorage; the Pilot terms it "E Seliva," or the "Siren." The Kelleckchis or raftmen have a peculiar dread of the spot, and will never stop in this vicinity, believing the interior of the cliff to be the habitation of a pleasing but seducing race, who lure but to destroy.

* This is the burial place of a son of the Imam Musa, the seventh of the 12 Imams revered by the Shi'as. He was born in the year of the Hejra 128, and was poisoned at Baghdad by order, it is said, of Harun El Rashid. He is buried at the village of Katheremem, on the right bank of the Tigris, three miles above Baghdad, and the Persians have built a handsome mosque over his remains the cupolas of which are covered with beaten gold. Rich's Kurdistan and Nineveh, note to page 144, Vol. 2nd.

† This mound is of great antiquity, and as its name signifies in Arabic a "Chamber or Temple," I think it might be identified with some of the last positions. I possess neither the time nor learning for such researches. Were the mound excavated it would no doubt afford some interesting relics. Its situation is about N. by W. from Tekrit, and is in Latitude 34° 47' N. or 11 Geographical miles distant from the town.

large encampment of the Shammar now occupy this magnificent plain. They are of Mejrís' party and of considerable strength. Nejin is the name of the Sheikh, indeed the margin of the river from Tekrit to Khán Kharneinah is now entirely peopled by the Shammar, and all communication between Tekrit and Mosul is in consequence stopped. They have vast herds of camels and sheep, which are seen gazing with their beautiful horses on this rich plain dotted here and there with black tints, affording a pleasing picture of pastoral life, did not the character of the tribe contrast sadly with its primitive habits.

At six P. M. brought to for the night on the east bank. Our whole progress to-day, as deduced from the latitude obtained from an altitude of Dubhe, $34^{\circ} 49' 43''$ has been but $7' 51''$ to the northward. The river rose three inches during the night.

April 12.—Left at six A. M. and struggled hard against the rapid stream until 9h. when we were opposed by a fall. The ascent of this, not 100 feet in extent, occupied us until 11h. 20m. It was only overcome at last by a south wind springing up, enabling sail to be set, and by sending our boats to track up in shore. 12h. 30m, passed a ruined Khán named Kharneinah,* situate under the cliffs on the west side of the valley. These cliffs now diverge considerably more to the westward, while those forming the east boundary of the valley of the Tigris, tend more to the eastward, leaving abrupt and broken angles at Kharneinah on the west, and at a point called Leg Leg on the east. Immediately north of Leg Leg about three miles, the remains of Nahr Hafu, or upper branch of Nahrwán, is seen. It is said to have conveyed the waters of the Tigris under the cliffs, through a tunnel, to the main branch at Kantarat el Resásá ;† another small canal or feeder is situate about two miles south of the same point. From the diverging points described above, the country is more open and undulates in gentle slopes to the foot of the Hamrin range. From Khán Kharneinah the river is very tortuous and is divided by numerous beautiful islands, covered with every species of wild grass, as well as with the tamarisk

* A caravanserai now in ruins. It stands on the high road to Mosul, and was much frequented when the kafilas pursued the route by the Jozira. The encroachments and increasing power of the Arabs rendering travelling by this route unsafe, caused its abandonment.

† Ancient Carche.

and poplar; some of the latter have obtained to considerable size, affording a precarious livelihood to the inhabitants of Tekrit, who raft it to Baghdad for sale. After leaving Kharnacinalh our progress was a little more rapid, owing to the fine southerly wind which continued till sunset, when we made fast for the night at an island about three miles below "El Tettha," or the "opening," where the Tigris breaks through the hills. The latitude observed here was $34^{\circ} 56' 57''$ and the northern mouth of the Nahrwán bore N. E. one mile distant. The continuation of the Hamrin on the west side of the Tigris, termed Jebal Makhul, is now end on, and bears N. N. W. half W. The eastern ridge, or that termed Jebal Hamrin, extends from a little above this point to the eastward, and is an incongruous heap of barren mounds, composed of sandstone and pebbles without a blade of vegetation. Both the Hamrin and the Jebal Makhul are alike in formation, and may be reckoned about 500 feet high at this spot, though their altitude decreases as they advance to the S. E. The rich plain at their base is in pleasing contrast with their desolate summit. During the night the river fell six inches. Thermometer at 50° to 85° in the shade.

April 13th.—Left at 5h. 45m. and not being favored as yesterday with the south wind, advanced at a snail's pace to our wood, which we reached at 7 A. M. It is cut in a small tamarisk grove just above the mouth of the Nahr Haffu, and covered in with branches to prevent its being fired by the Arabs. Here we remained wooding and despatching answers to letters just received from Baghdad until 9h. 30m. Made a fresh start at this time, but as I had anticipated, after receiving our fuel, with little or no success, struggled hard against the stream, which here breaks through the hills with much force, until 11h. 20m. when we were brought to a stand-still without any hopes of accomplishing our object, and on considering that our success hitherto had been mainly attributable to fresh S. E. wind, and that obstacles of a much more formidable nature than those we had encountered awaited us, besides the risk we ran of grounding and eventual detention, should the water fall after the high state the river had risen to, I reluctantly determined on retracing our steps to Baghdad, and accordingly put the helm up.

The last day's journey has been through a rich country teeming with wild plants of nearly every description; undulating slopes of an emerald green enamelled with flowers of every hue are spread before the eye like

a rich carpet, at every turn of the stream, and nothing is wanting but the hand of man to turn such a profusion of nature's gifts to account. But all is a vast solitude. The silence is unbroken except by the rushing of the torrent past, the time-eroded cliffs, or by the screech of an owl, awakened from his lethargy by the flap, flap, flap of our paddle wheels. When Mr. Rich passed this spot some 20 years' ago, all was bustle and activity. Arab tribes were located on the banks of the river, and the beautiful islands, rich in their spring garments, formed the abode of the peaceful cultivator. The ruthless Shammar have since then, by the weakness of the Government, spread devastation wherever they pitched their tents, and, thinned by the plague which assailed the Pachalic in 1831, the former population have been obliged to flee to the more secure districts in the neighbourhood of Kerkuk.

The rapidity with which we are now descending after our hard struggle upwards, appears to gain fresh impetus at every mile. Rocks and islands, steep cliffs and shingle banks, quickly succeed each other. Cattle, tents, and men are reached in a single hour, and the silent desolation of yesterday is exchanged for the noise and activity of animated nature. The following places were passed at the respective times found opposite to them, viz. Khán Kharneinah 00h. 52m. Place anchored at on the evening of April 11th, 1h. 15m. Kaleh Reyyash 1h. 30m. Reached Tekrit at 3h. 20m. P. M. thus performing the descent in 3h. 50m. which had occupied us 30 hours steaming on the journey upwards. Between Abdel Kerim and Kaleh Reyyash, a small stream or torrent fall into the Tigris on the left bank. It is named Nahr Milha, and is said to be of considerable size during the winter months, when swollen with the torrents from the Hamrin range.

April 14th.—Reached Samarra* at 9h. 9m. A. M. Remained here during the day to make arrangements regarding the despatch of our overplus fuel to Baghdad by raft.

In the evening visited the Maluryah, from its summit I obtained the following true bearings as deduced from magnetic by a prismatic compass. Minaret or tomb of Imam Mahomed Dur at Dur 342° 45'; Khán Tholush 119° 30'; Khán Mazrakji 132°; El Ghaim, tower at the entrance of the south branch of the Nahrwán, 165° 30'; ruins of Ashik, on the

* By good observations for latitude and longitude, I place Samarra in 34° 11' 33" North, and 32' west of Baghdad.

right bank opposite, 299° 30". Tel Benat or the "girl's mound" near Dur, 345° 30'. Tel Alij or the "nose bag mound" 18° 30'. Khalifa or old palace, 341° 00'. Qádésiyeh old fortress extending from 147° to 157°; Istabolat town 167°; variation of the needle 2° 55' west.

April 15th.—Left Samarra at 6h. 21m. and steamed down the river against a heavy south wind, which in the reaches directly opposite to it raised the waters of the Tigris into a considerable swell. Passed Qádésiyeh at 7h. 25m.; Khán Mazrakji 8h. 10m.; Khán Tholiyeh 9h. 3m.; mouth of the Atheim 10h. 0m.; Sindiyeh, where we stopped for fuel, at 11h. 52m.; Jedidel village 3h. 7m. P. M. and anchored off the gardens of Trumbee in a heavy squall of thunder, lightning, hail, and rain at 6h. 20m. The next morning took up our old berth at Baghdad after passing through the bridge of boats.

From these observations it will be seen that the journey northward against the stream occupied 86½ hours steaming, while the descent was performed in the short space of 19 hours.

I much regret the termination of our trip, for I had flattered myself that it might not only prove useful in a geographical sense, but also both instructive and amusing. I had contemplated, could I have only reached the neighbourhood of Mosul, a visit to that town and the adjacent ruins of the Assyrian cities of Nineveh, Khorsabad and Nimrud,* as well as a minute examination of the interesting Al Hadhr,

* A large and very ancient mound, I believe first described by Mr. Rich in his Kurdistan and Niniveh. He identifies it with the Larissa of Xenophon. The learned Bochart in alluding to this spot, remarks the improbability of a town with such a name existing in this part of the world previous to the conquests of Alexander. He therefore conjectures that this city is the Resen mentioned by Moses in Genesis x. 12, and imagines the name Larissa to have been applied to it by Xenophon not only from the attachment of the Greeks to this peculiar name, but from its resemblance to the Hebrew Larezen "of Resen," which no doubt suggested its being corrupted to Larissa. He concludes by observing that it is easy to imagine how this word (Laresen) might be softened by a Greek termination and made Larissa.

Mr. Fraser, in his work on Mesopotamia and Assyria, states it is also known by the appellation of Al Athus or Aeshur, from which the whole country derived its name. Be this as it may, there can be now no doubt of its great antiquity, for the enterprising and intelligent Bukhtyari traveller, Mr. Layard, so far back as last November, succeeded in discovering with little labour some beautiful specimens of antique statuary, in very high relief, and large slabs covered with the Assyrian cuneiform writing. He is now actively employed in extensive excavations since he obtained the Firman from the Porte,

so graphically described by my friend Dr. Ross, and I feel the disappointment the more, as I have already been six years in this country without ever having had such an opportunity, my duties not permitting me to absent myself from the vessel for a length of time, such as would be required to perform the journey by land from Baghdad.

The failure of this attempt is not to be attributed to any severe obstacles met with in the navigation of the Upper Tigris, for to a vessel possessing the power of those now running on the Thames of an average speed of 10 knots per hour, such difficulties as the *Nitocris* experienced would be deemed of minor importance. The *Nitocris* indeed under the most favorable circumstances in still water, cannot exceed the speed of 8 knots per hour, having a wheel of 12 feet diameter only, and a short stroke of 30 inches, more cannot be expected of her. By some miscalculation of the designer of the vessel this diameter of 12 feet is further reduced to 11 feet 4 inches, from being obliged to reef the paddle floats; as when carried out to the full extent of the circumference of the wheels, experience has proved, that she is much less effective than in her present state. The engines are in fact either placed too low in the vessel, or when launched the hull must have drawn more water than was calculated upon.

It is true that the *Euphrates*, built under the superintendence of Col. Chesney; ascended to a much higher point when commanded by and I am informed has realized in his discoveries all that an ardent antiquarian can wish for; indeed Nimrud is represented as inexhaustible. It is probable that Mr. Layard's first cargo of "reliques" have ere this, reached Baghdad, thus far on its way to England, and it is hoped, if the Government do not undertake the further excavation of this interesting mound, that some public body will lend its endeavours to facilitate Mr. Layard in the objects he has in view, and thus secure to England a rich mine of antique specimens, unique of their kind, which will afford matter for enquiry and further research into the large field now opened to us in Mesopotamia, and without doubt tend to elucidate and finally brighten the few glimpses afforded us, into the hitherto dark pages of ancient history.

The untiring and ardent mind of Major Rawlinson, I think, first suggested the idea of excavating on this site, and the antiquarian community of Europe are not only indebted to him, but to Sir Stratford Canning, H. B. M. Ambassador at Constantinople, who in addition to opening the mound, undertook, with a munificence rarely met with, to advance from his private purse the necessary funds for commencing the operations on an extensive scale. His unceasing exertions too, with the ministers of Constantinople to secure by Firman, the right of exploration on Turkish soil, without which Mr. Layard's exertions would have proved fruitless, must claim for His Excellency the gratitude of the British public. It only remains now for the Government to continue what has thus been so liberally begun.

Captain Lynch ; but in all respects she was a superior vessel, though drawing a little more water than the *Nitocris*, and carried her paddle shaft at a considerable height above her deck, thus giving a diameter of wheel of nearly one-third more. To the above causes then must be imputed the inability of the *Nitocris* to perform the ascent of the Upper Tigris, as I have said before, that under the most favorable circumstances (without either fuel or provisions) her speed does not exceed 8 knots, it can hardly be deemed a matter of surprize that she should have failed to contend against a stream of $6\frac{1}{2}$ geographical miles per hour with occasional falls, when it is considered that she carried above one month's provisions and 18 tons of fuel, besides the guns, material and men, on the present expedition.

When I left Baghdad I hoped for, but did not anticipate success ; I am therefore not disappointed. We have at all events to congratulate ourselves having ascended to the Hamrin, whereas our former journey, having the same objects in view, terminated at Dur from an insufficiency of water.

The bearings throughout these notes are true, excepting where expressly mentioned by compass, and are reckoned from north to the right ; east being 90°, south 180, west 270, and north 360°.

Note on the Sculptures of Bôdh Gyah, by Capt. M. KITTOE, 6th N. I.

Often has it occurred to me that if those who could draw even tolerably, would make rough outlines and send them to our Society, very great benefit might be derived, not only would the fast mouldering and vanishing relics of bygone days be preserved to memory, but we should have the means of comparing graven records from all parts of India, and perhaps be thus able to set many disputed points of history at rest, particularly as regards the habits of the early races, their objects of worship, their costumes, implements of husbandry, and of warfare. The few opportunities I have enjoyed of examining a tithe of the curiosities in this presidency, convince me of the justice of a remark of James Prinsep's on the subject of the art of painting and sculpturing practised by the early Buddhists, (see Note, p. 687, Vol. VI. of the Journal,) "it explains the practice equally, and teaches as how we may

successfully analyse the events depicted in the drawings of Adjunta, perchance, or the sculptures of Bhilsa."—What would not our talented and ever-to-be-lamented friend have given to see the clumsy though interesting objects, the subject of this paper? In these we find the worship of the Dagop and the Chuttur, of the Sun and of Fire, of deities hitherto unknown to us, but which appear to have reference to bramanical creed, and point to Egyptian origin.

As the best way to induce and encourage an undertaking is to set a good example, I now lay before the Society a portfolio of rough sketches of some of the curious sculptures of unquestionable antiquity found scattered here and there at the former parental seat of Buddhism—Bôdh Gyah.

It will be seen that these bassreliefs are in medallion, they form the ornament of posts or pillars which, from the elliptical sockets remaining, show them to have supported a railing similar to that still existing around the Tope or Chaitya at Bhilsa, and represented in the very sculptures themselves, not only around the Topes, but forming enclosures for the sacred Trees and "Chuttur" (Umbrellas), &c. This pattern, which I shall call the "rail or bar pattern," I had years since remarked as a peculiarity; it is to be found in the present sculptures, in the caves of Western India, Mahabullipore and Amaravatti, in the caves of Kundgirri and the Tope of Bhilsa, in fact it may be considered as the certain and indisputable mark of early Buddhist works. We have a square pillar with similar sockets in our museum, on one face of which is the figure of a priestess holding a bird cage, and on the other probably the elephant and Maya Davee, illustrative of her dream related in the Pâli annals; it is in Agra red sandstone, and I believe was found at Mutttra and deposited in the museum by Gol. Stacy; I invite the attention of my Calcutta brother-members to this curiosity, which has no doubt originally formed part of a similar work to those described.

By the foregoing it will be seen that from these sculptures we learn the peculiar style of architecture prevalent in the country two thousand five hundred years ago, at least of religious buildings, and from the Bhilsa sculptures we find that of fortifications.

We next see that the leading objects of worship were the Chaitya and the Bô tree, of which so much mention is made in the early Buddhist works.

Again we find that the implements of warfare were bows and arrows, spears, double-edged swords, precisely the shape of those still common in the Curjats or petty states of Orissa, called "Khandas," and that stones were hurled from the walls of their strongholds.

From the Bôdh Gyah sculptures we find that all the scenes are laid amongst the rocks; that such were the most favorite localities we have ample proof from most of the known sites in Behar, and of Western India, Cuttack and Ceylon, and the very remote antiquity of the practice is again confirmed by Herodotus and by holy scripture itself, as relates to Western Asia and Egypt, from which it may possibly have been borrowed.

The sculptures of Cuttack and Gyah represent the same style of dress and of coiffure, the men wearing a short, the women a long Dhotee, the upper part of the body remaining bare in both, with few exceptions; the hair of the men wound up in a knot on the crown, and that of the women both on, and behind, the head. The ears of either sex having extended lobes from the apparent weight of the great rings and knobs in them similar to those worn by the Kánphutta sects of monks (votaries of Siva) in the present day, and I should observe that the costumes above described closely resemble those still worn by the Kunds and Boomiahs of the Orissa mountains, the Chotyá Nagpore districts, the head-dress in particular; the broad necklaces and anklets are an equally prominent feature.

In the description of preparations for the great convocation in Magda after the death of Sakya, mention is made of the nature of the ornaments, amongst which were representations of festoons of flowers, &c.; now this ornament is of repeated occurrence in the sculptures I am treating of; garlands are represented as suspended from the Chuttur and the Bô tree, and from poles both on and beside the Topes or Chaityás; angels are seen flying with them over the object of worship; and from the fragments at Gyah and Barabar, it would seem that this was always a favorite ornament; here then again we have the correctness of a description contained in one of the most ancient writings extant, confirmed.

Of all the subjects, that of the hand issuing from a rock or a cloud, and holding apparently a flame of fire, which is again surrounded by other flames, with a concourse of people in the act of worship, is the most curious and interesting; it will, I think, explain the allusion to

“ Agni,” in the pillar inscriptions which Prinsep could not account for, therefore considered the passage doubtful.

The next which occurs on the same stone is a young male figure in a chariot drawn by four horses and attended by two amazons with bows and arrows, which I take to be meant for “ Surya” or “ Mythra,” the Sun, whose emblem is oft repeated in the shape of the chakra or wheel. This again explains another doubt in the same reading, as well as the emblems on the early coins.

A third sculpture exhibits a temple with the Monogram (on an altar) so common in the coins, likewise surmounting the standards represented in the Bhilsa sculptures, Ψ which I think may be considered to represent both the Buddhist and Hindu Triad, as the trísúl and the mystic syllable “ aum” combined ; taking the figure as it stands, it forms the trísúl, if separately, we have the \mathcal{H} \mathcal{O} and \mathcal{Y} , of which I consider it to be a combination, but if the second letter is objected to and | u be required, the | verticle line below the circle at once supplies it ; if again the y \mathcal{J} is preferred, we have it in the upper half thus Ψ , and I think that I shall not be taxed with too great a stretch of imagination in offering this solution of the problem.

Assuming the foregoing to be correct, I must beg permission to digress a little and offer a few words on this curious emblem to show its connection with the present idol and worship of Juggannath, and the once famous Somnath ; first then let me invite the perusal of Patterson’s able paper on the Hindu religion, to be found in the 8th volume of the Asiatic Researches, under the head Juggannath ; he attempts to show, and I think successfully, the origin of the idols and worship of Juggannath ; he considers those wooden idols to be an ingenious personification of the trilateral and mystic word “ aum” itself, held in reverence not only by the three great sects of Hindus, but (as I have shown) by the Buddhist likewise. Mr. Patterson imagines that the device was to render the temple an object of worship for all sects, the surest method to draw a large revenue from pilgrims, he was led to this supposition from the similitude betwixt the written syllable \mathcal{E} and the shape of the logs or idols



which (it will be observed) still more closely resemble the symbol of these sculptures ; supposing then these inferences to be correct, we come to the conclusion that the object of

worship at Juggannath was in fact the Supreme Being, "Jug-nath," "Lord of the universe," in the sign trilateral syllable representing His three attributes "aum."

That Somnath, the great pagod of Western India, was dedicated also to the Supreme Lord of the creation under the same symbol Aum, I think there can be no doubt; both temples are alike situated on the border of the ocean, where mortals at a glance could see the three great elements themselves, viz., the Heavens, the Earth, and the Waters the mightiest works of the Creator.

The word Somnáth may be composed of two syllables, Som and Náth, the latter meaning Lord, the former, either a way of expressing Sri in the dialect of the gulf or of an abbreviation of the words Sri and Aum, or thus Sri—Aum—Náth. The mighty Aum, the Lord, which latter I consider to be the most probable; the first conjecture merely arising from the fact of "Som" being an affix to other names in that part of India, such as Som Meanee for instance, and others I cannot at this moment call to mind. I am nevertheless aware that Som was a name for the moon, also an emblem of Siva.

I believe Juggannath to be of comparatively modern date; the present temple is more recent than that to the Sun at Kanarac commonly called the black pagoda, and neither are above 600 years old. I think it therefore not improbable when Somnath was destroyed Juggannath was established on the opposite coast in a remote spot less likely (as it has proved) to be molested by the Moslem usurpers of India's thrones.

I have suggested that the objects represented in the Gyah sculptures point to Egyptian origin; perusal of Mr. Patterson's treatise above quoted will show that the idea that India borrowed her mythology from Egypt is not novel. Capt. Burr, in his *Journal of the Campaign in Egypt* in the same volume has thrown out hints on the subject; nor are these gentlemen the only persons who have brought forward strong arguments in favor of the supposition, I therefore invite particular attention to this point and to the drawings,* in which will be found the figure of a female with the head of a horse or an ass, another of a goat on a pedestal or altar,—the water jars, the three figures, two female and one male. The Lotus oft repeated, and again the couple caressing each other, beside whom water jars are placed. The centaurs or minataurs, the

* I hope to be able ere long to supply copies of these drawings to the Society.

winged oxen and horses, and the sphynxes, all are objects at once curious and instructive, for which reason I have taken the drawings I have now the pleasure to lay before you.

As I am always asked by those who have been at Bódh Gyah, where these curiosities are to be seen, I will explain for the guidance of future travellers—first then, to the right hand facing the great tower within the quadrangle, is a miserable modern built mut or temple, containing five Budha images shown to the visitors under the name of the Panch Pandus ; beside this is another with a kind of porch supported by eight or nine flat octagonal pillars ; on these many of the sculptures are to be seen, also the sentence $\text{H} \text{U} \text{U} \text{+} | \text{A} \text{U} \text{S} \text{+}$. The gift to Gyah of Ajaya the ? The meaning of the word $\text{+} |$ I cannot make out ; it may be Kúru, and if so, it will read “ of the invincible Kúru ; ” there are other fragments built into the ceiling of the little temple in the centre of the square, also in the great temple itself ; further sculptures of the same kind are to be seen in the colonade of the Mahunt’s mut or monastery, where there are five more octagons and one square pillar of the same sort, on which latter the most curious subjects are found. There are a number of other pillars there, of the same shape and dimensions, but of a different material (granite), date and style of sculpture, the most interesting specimens of which are here represented, tinted blue in contradistinction to the others, which are of a redish yellow hue.*

I have been unable to find any of the elliptical connecting bars, but several portions of the upper rail or capping are to be seen ; many stones have been carried away, others are built into the walls of the mut and many still lie buried beneath the rubbish behind the great temple, where the rest were found.

There are many idols and fragments of former buildings well worth drawing, and I hope I shall be some day enabled to add them to the large collection I already possess and to offer a few remarks on them, my present notice was intended to apply only to the more ancient Budha sculptures ; I shall now therefore take leave of my readers, on whose patience I must have already trespassed too long.

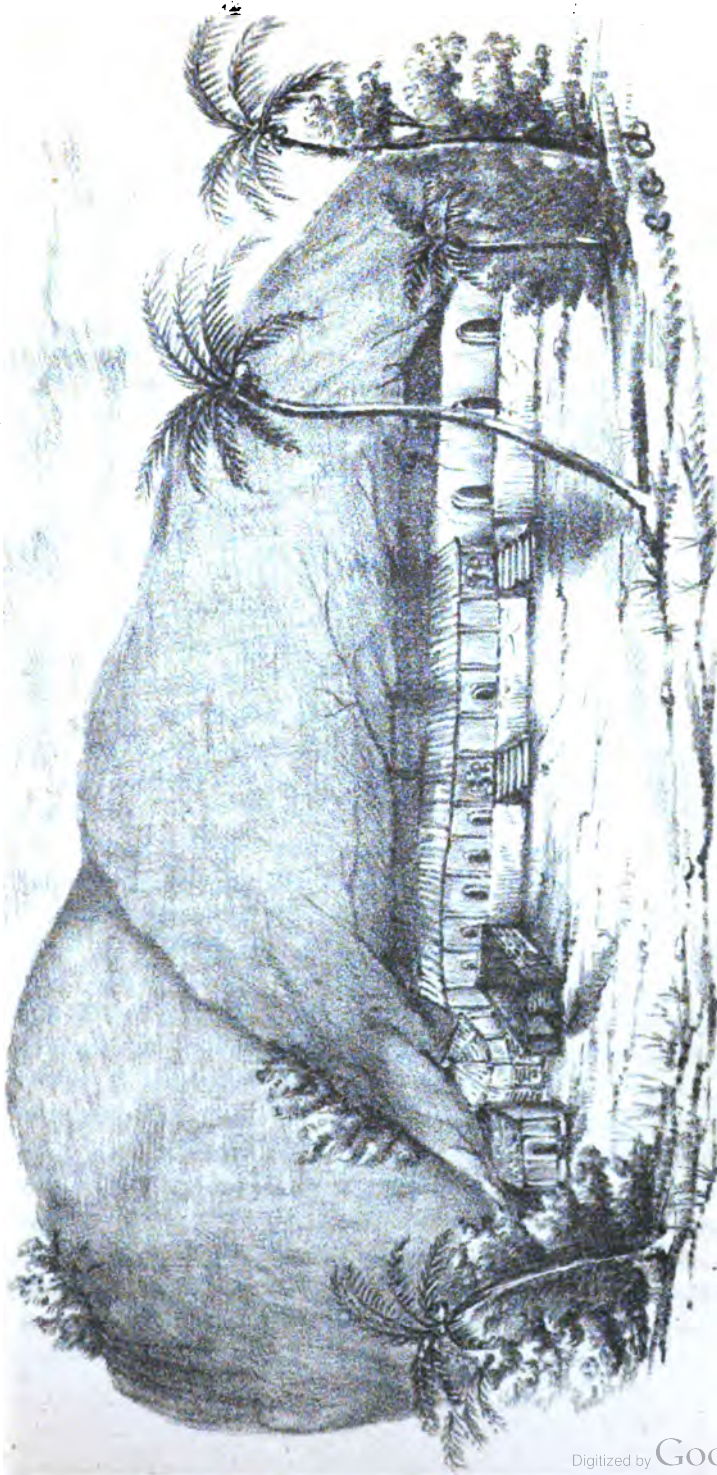
* This refers to the admirable drawings exhibited at the meeting, and on the occasion of Capt. Kittoe’s interesting lecture on the Buddhist antiquities of Gyah.
—Eos.

The rock temples of Dambool, Ceylon, by WILLIAM KNIGHTON, Esq. author of the "History of Ceylon," and late Secretary to the Ceylon Branch, Royal Asiatic Society.

The large mass of rock which goes by the name of Damboolla-galla, is situated about forty-five miles to the north of Kandy. It is of primitive formation, being chiefly composed of gneiss and mica-schist, and is in many places rapidly advancing to disintegration. There can be little doubt that it has either been elevated to its present position by successive upheavings of its mass, or that by the action of the sea when it was at the surface of it, or on a level with its bed, the surrounding earth had been washed away, leaving its naked mass prominently and permanently elevated.

At the village situated at its base, four lines of roads, or more properly traces, diverge in various directions. One running in a north-westerly direction through Anuradhapura to Aripo and Manaar, another in a north-easterly course to Trincomale, a third in a southerly direction to Kandy, and a fourth south-westerly through Kurneyalle to Ambapusse, where it meets the great road from Colombo to Kandy. To this circumstance, and to the existence of a tappal-station there, the village owes its origin, and as the traffic on these various lines of roads increases, there can be little doubt the village will increase likewise. A large and commodious rest-house is already in existence, and requires but a greater number of visitors to become much more comfortable than at present.

The accompanying rough and badly executed sketch, may give some idea of the appearance which the rock presents on its northern side as seen from the verandah of the rest-house. Somewhat of the shape of the hinder part of a gigantic human skull, it raises itself bare and naked, unvariegated over a very considerable extent, by a vestige of vegetation. To the south it spreads out into a less elevated and naked, but more extended mass, affording an easy access to that part hollowed out by religious zeal or fanatical enthusiasm into cave temples. Immediately above those temples the rock rises in a perpendicular mass, probably to a height of one hundred feet more, and affords by means of a disjunct ledge, a dangerous and fearful road to the highest summit. The excitement of climbing blinds one at first to the difficulties of



The Cave Temples of Dambodh.

this expedition, and it is not till he turns to descend that he becomes fully sensible of his danger. Arrived at the summit, a height of about five hundred and fifty feet above the surrounding plain, a wide and interesting view of the level country beneath repays the adventurer for his toil. In the east, rising in the distance to a considerable height, will be seen the rock Seeqiri (pronounced Heeqiri by the natives) to which Kassapo, the son of Datusens, fled to fortify himself against his brother, after he had murdered his father and usurped the kingdom, A. D. 477. The hill called Dahiakande, near the rock last mentioned, points out the position of the fort of Vigittapoorra, visited and described by Major Forbes and Mr. Turnour, and memorable for its siege by Gaimono the first, in the second century before Christ. To the south may be faintly distinguished the outlines of some of the Kandy hills, whilst to the north a wide and level plain extends itself, bounded by the rocks of Miwara Kalawia.

On the summit I saw the remains of an edifice which formerly existed there, consisting of stones and bricks, and on examining the vicinity for some other indications of human labour, I found a hole cut in the rock, one foot square and about a foot and a half deep, into which I imagine the beam or pillar on which the building rested had been inserted.

The entrance to the caves is as I have said, about one hundred feet below the level of the highest summit of the rock, and at the distance of about a mile from the village to which the rock gives its name. A rough tiled building, built principally of wood, affords a passage to the more immediate precincts of the caves, and on entering this the visitor finds himself standing on a ledge of rock covered with a slight coating of mould, out of which a few cocoanut trees and many shrubs glean a scanty supply of nutriment. To the right rises the perpendicular mass of the rock, which to a height of about thirty feet, has been excavated, partly by human labour and partly by nature, a wall being built up in front of the caves, which reaches to the overhanging mass of rock above. To the left the hill descends very steeply, covered with herbage of various kinds, amidst which hundreds of monkeys disport themselves, secure from the violence of man in a scene hallowed by the temples and images of the bloodless prophet of Maghada. The ledge of rock, covered with a slight mould on its eastern side, on which I am now

supposing the visitor to be standing, runs in front of all the caves, a distance of about five hundred feet, varying much in breadth, but gradually becoming narrower towards the western side, where are situated the two *aluth* or new caves. In front of all the temples a narrow verandah extends, which projects from their front wall, and above which may be seen the marks of the wedges used in excavating them.

I have said that the rock temples of Dambool are partly natural and partly artificial. So long ago as one hundred years before our era, they had served as a refuge to a Ceylonese monarch when escaping from the Malabars, who had invaded his kingdom, and in gratitude for his deliverance and for the shelter they had afforded him, Walagambahu piously increased the caves to a much larger dimension, placed in them images of Budha, appointed priests to take charge of them, and dedicated certain lands for their support. The invasion of the kingdom by the natives of the continental coast, the flight of the monarch, and his subsequent success, are thus related in the *Rajavali*.* "After his (the previous king's) death, Walagambahu Rajah succeeded to the throne. When he had reigned five months, seven Malabar chiefs with seven thousand men from Sollee, made a descent on Ceylon, and drove Walagambahu from the throne, and one of the Malabars taking the king's wife, went away with her. Another of them seized the patrya cup of Budha, and likewise went away. The other five Malabar chiefs remained, and succeeding one another in the government, reigned as kings for the space of thirty years." (The *Mahawanso*, with more probability, computes their reigns at fourteen years in all); "about the expiration of which time the king, Malagambahu, who had been living amongst the rocks in the wilderness, left his solitude, raised an army, and attacking the city of Anuradhapura, destroyed the Malabars, again ascended the throne, and caused the houses of stone or caves of the rock in which he had taken refuge in the wilderness to be made more commodious." In the *Mahawanso*, as translated by Mr. Upham, the caves of Dambool are particularly mentioned as having been constructed by Walagambahu, although in Mr. Turnour's version, which is generally so much fuller, strange to say, this notice is altogether omitted.

The next notice which Ceylonese history affords us of these caves, is in the account of the reign of Kirti Nissanga, A. D. 1187 to 1196.

* Part 3, p. 223, in Mr. Upham's translation.

The Rajavali,* after informing us that that prince went, with many followers, to Adam's peak, and worshipped there the print of Buddha's foot, adds that "in order to perpetuate his name in Ceylon, he caused the dagobah at Dambool to be built, and having gone there, caused to be made 72,000 figures of Buddha, and the said place he called by the names Rathinda and Boolhinda."

The word thousand, in the above extract, is probably an embellishment of the historian's own, seventy-two alone being mentioned in the inscription on the rock, which records that monarch's benefactions, and of which we shall now speak particularly.

The visitor has been supposed to stand on the ledge of rock immediately in front of the caves, after having passed the rough building which serves as an entrance. So situated, the first object which presents itself to him is this inscription on his right hand, deeply graven in the rock in the old Cinghalese character, differing but little from the character now used. The inscription itself occupies a space about six feet broad, and four in height. It commences by describing in the usual eastern style the monarch whose actions it records, Kriti Nissanga. He is stated in it to be "an invincible warrior," to be endowed with "might, majesty and wisdom," and to be "like the placid moon, radiant, with cheering and benignant qualities." These necessary preliminaries being ended, it proceeds to inform us that his subjects having been impoverished by inordinate taxes, he enriched them by relinquishing his revenue for five years, and by granting to them lands and cattle. It then asserts that besides all this, he rendered all those who cultivated jungle, and thus increased the quantity of cleared land, exempt from all taxation for a considerable period—a provision strikingly wise and excellent. The remainder of it, as being less tedious and redundant, I shall quote entire. "He (Nissanga) also made it a rule that when permanent grants of land may be made to those who had performed meritorious services, such behests should not be evanescent, like lines drawn upon water, by being inscribed on leaves, a material subject to be destroyed by rats and white ants, but that such patents should be engraved on plates of copper so as to endure long unto their respective posterities.

"Thrice did he make the circuit of the island, and having visited the

* Part 4, p. 255.

villages, the towns, and the cities, and having explored the places difficult of access, the fastnesses surrounded with water, the strongholds in the midst of forests, and those upon steep hills, he had as precise a view of the whole as if it was an *amlaca* (a kind of prism) on the palm of his hand, and such was the security he established, as well in the wilderness, as in the inhabited places, that even a woman might traverse the country with a precious jewel, and not be asked, what is it? When he had thus ensured safety in the island, he longed to engage in war, and twice dismayed the kings of Paandi,* and having accepted the royal maidens, and also the elephants and horses, with other tributes of homage which they sent him, he formed friendly alliances with such of the princes of Choda, of Gowda, and of many other countries as duly appreciated his good will, but by his personal valour struck terror into those who esteemed not his friendship; and he caused princesses to be brought to him from each of those countries, with other tributes of homage, and as then there remained no hostile kings throughout Dambadiva to wage war against him, he tarried at Rammisseram, where he made donations of balanced weights, consisting of valuables, and thus enriched the poor and satisfied the needy. He then caused obelisks of victory formed of stone to be set up as lasting monuments, and having built a devale consisting of five divisions, departed thence with his army, composed of four regular bodies, and returned to Ceylon. Then reflecting that albeit he had no enemies here, he might possibly encounter enemies hereafter, he caused alms-houses to be erected in many places in Dambadiva, as well as in this island, and caused alms to be distributed constantly. He also caused gardens and fields to be cultivated and dwellings for priests to be formed upon the hill Rankohakalooheene, wherein is situated the cave of Dambula Sena.

“ Having a perfect knowledge of the doctrines of Buddha, he promoted the cause of religion, and also the interests of science; he restored the ruined fanes, and the roads which were destroyed in consequence of the calamities which had befallen the land, during former reigns, and rebuilt the wihares in the city of Anuradhapura, in Kelania, Mewooyone and many other places; he expended vast riches, and within this wihare he caused to be made seventy-two statues of Buddha, in the recumbent, the sitting, and the standing posture, and having caused

* An ancient kingdom on the Coromandel coast. Its capital was Madura.

them to be gilt, celebrated a great puja at the cost of seven lakhs of money, and as is thus recorded upon this stone, gave to this cave the name of *Swarna Giriguhaaya*," (i. e. the cave of the golden mountain.)

Such are the contents of the lengthened inscription which prominently strikes the eye of the observer on first advancing to the caves of Dambool, and the picture which it gives us of the government of Ceylon in the twelfth century is far from contemptible. The caves themselves are five in number—the first three stretching from east to west, are the older, and the more laboured structures, the remaining two, forming an obtuse angle with the others, being much more recent and comparatively insignificant. The excavations are separated from each other partly by remaining portions of the rock, and partly by artificial walls, and they stretch into the heart of the mountain to various distances from fifteen to one hundred and thirty feet. The ground plan of them which I annex will perhaps give a better idea of their relative positions than a mere description.

In height they vary from ten to thirty feet, being generally more lofty at the entrance, and gradually decreasing in height as they advance into the rock. The cave usually called the first, as being the first the visitor reaches, is also the most easterly, and is but a few yards distant from the inscription just treated of. It is called the *Maha-Deva-Devale*, (the temple of the great god,) the title not referring to Buddha, of whom there is a gigantic colossal statue in the cave, but to Vishnu, a statue of that deity also placed in it being considered of superior sanctity. On entering the *Maha-Deva-Devale*, the visitor at first sees but little difference between it and the interior of the other wihares scattered in such profusion over our island. It is not till his attention is directed to the fact that the gigantic recumbent image before him is a portion of the rock around that he becomes sensible of the peculiar nature of the cavity in which he stands. The figure of Buddha is forty-seven feet long, his head rests in the usual manner on his right hand, the right arm being bent beside him, the hand again rests on a pillow, in which is apparent the impression supposed to be made by the weight of his head and arm—the whole being cut out of the solid rock around, together with the bed on which he lies. Being rather doubtful of this fact of which the priest had just informed me, and being anxious to be certain about the matter, in a moment of thoughtlessness, I knocked

pretty sharply the massive elbow beside me to test its truth, when the priest raised a cry of horror at my temerity, and seizing my arm, would have put me from the sacred edifice; I, of course at once apologized for my want of thought, as I was far from intending to wound his feelings, and I soon found that a few rupees, added to my explanation, made matters perfectly satisfactory. I had the pleasure of assuring myself by my profanation, however, that the image actually is of stone, and that there is no deception about the matter. Besides these two statues—the colossal one of Buddha, and the smaller one of Vishnu, there are four others of the Maghadie prophet, of about the natural size, and of the kind so common in all the wihares of the island.

Leaving the Maha-Deva-Devale, and proceeding to the westward, the visitor ascends a few steps, and finds himself in front of the Maha Wihare or Great Temple, by far the largest of the five. In front of the Maha Wihare, or as Major Forbes calls it, the Maha raja Wihare, the temple of the great king, and near the small wall that borders the steep side of the mountain, rises the Bo-tree, from beneath which a view of the exterior of the second, third, fourth and fifth caves may be obtained. The accompanying sketch, imperfect as it is, may afford some idea of their appearance. To the right the first temple stretches in a line with the second, but hid by intervening trees; and to the extreme left are seen the two smaller and more recently excavated caves, forming an angle with the others. The projecting inclosure to the left, of which two walls are seen, represents the tank, which it will be perceived is laid down in the ground plan. Immediately above both entrances to the Maha Wihare, marks of the wedges with which the rock was split are very apparent—evidences of the labour employed in the construction of the caves.

On the massive doors and small windows of the Maha Wihare being opened, the visitor sees before him a large spacious apartment, the floor of which, that is, the rock beneath him, is quite level, whilst the roof gradually descends from the entrance to the further side, being twenty-one feet high near the front wall and only four at the opposite quarter. Immediately in front of him (supposing him standing at the door) he sees a line of statues representing Buddha, either in the standing or sitting posture—some plain, others ornamented with an arch like canopy surrounding his figure. On his right hand the same line conti-

nues uninterrupted, making a right angle with the former one, but on the left, where a similar line also extends, his view is intercepted by a well proportioned dagobah, the top of which touches the roof above. The sketch beneath may give some idea of its proportions.

The Maha Wihare is upwards of one hundred and seventy feet long by seventy-five feet broad, and contains within its spacious dimensions forty-six images of the prophet god, none of them being smaller, and the majority much larger than life. Besides these, which stretch in the manner described round the cave forming three sides of a parallelogram, there are also statues of Walagambohu and Kirti Nissanga, the two great benefactors to the caves—the former the excavator of the first and second caves (the Maha-Deva-Devale and the Maha Wihare), the latter the embellisher of the “great temple,” and the excavator of the third. Kirti Nissanga appears also to have been the restorer of the first two caves to their original condition after they had been pillaged and defaced by the Malabars. In one corner of the Maha Wihare there is a depression in the floor of the cave, about two feet deep, into which water is continually dropping from the rock above. This water is considered sacred, and is used only for sacred purposes. A few young cocoanut trees in jars are placed around it, which present a yellowish, sickly appearance from the want of light.

One can hardly walk through the spacious cavity of the Maha Wihare without feeling involuntary awe at his situation. The great size of the cave itself, the strange echoing of his footsteps, number of gloomy and shadowy statues with which he is surrounded, the gentle dropping of the water in the distant corner, the noiseless tread of the yellow-robed priest who attends him, with the death-like stillness that pervades all around, are calculated to impress upon him a kind of religious or superstitious awe of which he may in vain endeavour to divest himself.

The entire of the roof of the Maha Wihare is covered with cloth, on which are represented countless images of Buddha with a few attempts at historical painting. The latter I consider much poorer than Major Forbes' description* led me to expect. I could not perceive any superiority in them to the various Ceylonese paintings I have seen in other parts of the island. In painting, the ancient Ceylonese seem to have been very imperfect, and although we occasionally find a correct

* Vol. I. page 371.

outline or a well proportioned figure, we seldom see a group represented without some absurdities that violate all our notions of congruity. I had formerly considered the Ceylonese attempts at painting as about equal to their musical performances, and I saw nothing at Dambool to make me alter my opinion. We see there kings praying at the Ruanwelle dagobah in Anuradhapura, (which was originally 270 feet high, and stood on a square mass of building 2000 feet in circumference,) whose bodies are represented as being larger than the dagobah itself, and whose towering crests overtop the building before which they bow. Again, in an attempt to delineate the landing of Wijeya, we have a ship sailing on an ocean filled with fish as large and larger than the vessel itself, and into whose enormous mouths, had the animals but held them open, the luckless adventurer with all his crew might have passed unwittingly until he should find out the difference between a fish's stomach, and the throne which he doubtless dreamt of in Ceylon. Nor is the attempt to delineate the combat between Dutu-Gaimono and Ellala, the Malabar invader, which occurred in the second century before Christ, much more successful as a work of art—the dart which the usurper hurls at his aspiring adversary being in proportion to the monarch's body what the maintop-mast of a vessel of 500 tons would be to one of us. But if these paintings are ridiculous in an artistic point of view, they are, on the other hand, extremely valuable as confirmations of the ancient history of Ceylon. If such an invader as Wijeya never landed on its shores, whence came the record of his expedition contained in the Mahawanso, the Poojavalli, the Neekasanga, the Raja Ratnacari, and the Rajavali, or if these be all fictitious whence came the paintings on the rock of Dambool, with the tradition connecting the name of Wijeya with it. And so of all the rest. Yet though the proofs of the truth of that history are scattered all around us in the island, more especially in the region round Dambool and Anuradhapura, there are those in the island itself who laugh at these tales, "as old wives' fables," and there are pretended savans in England who would reject them also, because they never heard of them before, and therefore will not take the trouble to investigate them.

On leaving the Maha Wihare the visitor finds little in the three remaining caves to excite his wonder or admiration. They are so inferior in size, and in the execution of the works of art which they

contain, as to excite little but contempt for them after having seen the great one. They may be taken as emblematic of the power of the various monarchs who formed them, and of the state of Ceylon at the period of their excavation—the second formed about 100 B. C. infinitely superior to the third, which was excavated in the twelfth century after our era; the third surpassing the fourth, which was constructed in 1750, and the fourth surpassing the fifth, which is still more recent. I shall therefore content myself with mentioning their contents, leaving the rest to your imagination.

The third is styled the *passpilame* or western wihare, and contains in addition to fifty images of Buddha of all sizes, a statue of Kirti Sree Rajah, who reigned about the middle of the last century—the last Ceylonese sovereign by whose exertions the caves of Dambool were embellished or enlarged. Although there is a greater number of figures in this cave than in any other, yet from its small size in comparison with the second, they do not produce any remarkable effect. The *passpilame* wihare is seventy-eight feet long, and varies in breadth from thirty to sixty feet. The fourth and fifth caves are called the *altith* or new wihares, in reference to their age, being, as I have before remarked, much more recent than any of the others. The fourth was constructed by the monarch last named, Kirti Sree; the fifth by a Kandian noble in the latter part of the last century. The first of these is forty-two feet long by thirty broad, and projects about fifteen feet in front of those formerly mentioned; it contains ten images of Buddha. The last is also about forty feet long by twenty broad, and contains a gigantic image of Buddha in the reclining posture, nearly twelve yards long. Besides this there are in the same cave eleven other statues of smaller dimensions.

Such are the five cave-temples of Dambool, lasting monuments of mistaken zeal and wasted labour—evidences of the religious devotion of those who excavated them, and evidences also of the implicit reliance once placed by the natives of Ceylon in the faith of the prophet of Maghada; but that faith is now on the wane—nay, its light is nearly extinguished, and but a solitary pilgrim or a prying antiquarian is now found to resort to those temples where thousands formerly worshipped and where kings once prostrated themselves.

It may not be out of place if I add to these notes that about twelve

miles from Dambool, on the road to Anuradhapura, or rather to the eastern side of the road, I accidentally met the ruins of an ancient native road, which tradition asserts once united Pollonnaruwa with a dagobah in the vicinity. A bridge of massive granite over a rivulet, now dry, first attracted my attention. It was composed of upright blocks of granite about eight feet long, supporting other horizontal blocks about four feet broad, seven feet long and a foot thick. On each side of this bridge the road might be traced for a considerable distance by its elevation above the plain around. The new road to Anuradhapura cuts through it, and on each side it presents of course merely the appearance of an ordinary mound of earth.

Some further Notice of the Species of Wild Sheep, by ED. BLYTH, Curator of the Asiatic Society, &c. &c.

“No great while ago,” writes Mr. Hodgson, (*J. A. S.* XV, 342,) “only two or three species of wild Sheep were recognised by men of science. But Mr. Blyth has, all at once, produced a splendid cornucopia of species, *founding many of them, however, upon an inspection of the horns solely.* I question the possibility of so establishing species or genera in this group; and, as a proof of the necessity of examining carefully the *entire structure* of the animals, I need merely refer to Mr. Blyth’s *signal error*, already adverted to, in reference to the organization of *Capra* or the domestic Goat, and to *an oversight equally important* to be mentioned presently.”

The “signal error” adverted to has not, however, been yet set right by Mr. Hodgson. It is true that I did follow my predecessors in stating that the Goats are devoid of the suborbital and interdigital pores which occur in the Sheep; and I have since stated (in XV, 154,) that the absence of the interdigital sinus affords an easy method of distinguishing a leg of goat mutton from one of *mouton proprement dit*. But Mr. Hodgson states (XV, 337), that “Goats *have* interdigital, though not lachrymary, pores; and consequently Mr. Blyth’s suggested genus *Ammotragus* is based on misconception, though accidentally true to nature, at least in my view of her, and without reference to systems.

But, however falsely used heretofore," &c. &c. Now I had several times even pointed out, to different friends, who have accompanied me to the Calcutta bazar, how to distinguish legs of Sheep mutton from legs of Goat mutton, by the invariable token here alluded to; and I therefore felt some surprise at Mr. Hodgson's assertion: but as he recommends me to "look at nature, instead of books," and as some tame Goats were immediately at hand, I of course had them caught and examined them; when I found that they do possess interdigital pores on the fore-feet only—not on the hind-feet,—a piece of information which I infer to be as new to Mr. Hodgson as the existence of pores on the fore-feet proved to myself. But I say nothing about an "important oversight," on his part, in having (when once about it) overlooked the circumstance of the non-existence of interdigital pores on the hind-feet of the common Goat: but will merely remark on the probability that *Ammotragus* was not so "misdiscriminated by Mr. Blyth," after all, but that it will be found to differ from the Goats in having, like other Sheep, interdigital orifices on all four legs.

We next come to my "oversight equally important," in the fact of my not having mentioned that *O. burrhel* was deficient in the sub-orbital sinuses, any more than Mr. Hodgson mentioned the same deficiency in *O. nahoor*, in his elaborate and latest description of the latter species, published in X. 231! To be sure, Mr. Hodgson alludes to my being "a professed naturalist:" but at the time I drew up the 'Monograph of the species of wild Sheep,' I was surely, in every respect, quite as much an amateur in the matter as himself, either then or now, and was very considerably his junior in such investigations. The different new species described in that paper are, indeed, the first novelties in the class of mammalia which I ever published!* Nevertheless, I cannot think of admitting the implied distinction between an amateur naturalist and a "professed" one. Whoever undertakes to describe new species of organized beings, by so doing *professes* himself a naturalist;

* And, therefore, I maintain that the somewhat harsh (not to say captious) tone of Mr. Hodgson's remarks on this labour of mine is altogether uncalled for, under the circumstances. Can Mr. H. cite a paper of his own which shows, on the face of it, anything approaching to the same amount of research amongst the labours of his predecessors? Or one that could have cost himself more labour in other respects? Or that has added more to the previous knowledge of the subject?

and credit will of course be given him for having duly studied the writings of his predecessors, or he is unqualified for the task, and should be content to borrow the assistance of those who do profess to have done so.

But I am pleased to see that Mr. Hodgson now admits my *Ovis burrhel*, as a good species: because, not very long ago (in XI, 283), he stated, positively, that "Mr. Blyth's *Ovis burrhel* is no other than my *náhóor*. Mr. Blyth's" (*i. e.* the Zoological Society's) "specimen of which was dyed brown by a preservative lotion that was applied by the killer and curer of it, Lieutenant Smith, 15th Native Infantry!" (Vide also note.) Captain Smith has lately favored me with sundry items of information respecting Himalayan mammalia; comprising a notice of *O. burrhel*, nobis, as distinct from *O. náhóor*, which I shall presently have occasion to cite.

In the course of a note which I appended to Mr. Hodgson's above quoted remark on my *O. burrhel*, I took occasion to observe (XI, 284, and there is another reminder in XV, 153), that "With respect to *O. ammonoides*, Hodgson, it will be remembered that I had dedicated this animal to Mr. Hodgson himself, terming it *Hodgsonii*, some time before the publication of the name *ammonoides*," *i. e.* in the 'Proceedings of the Zoological Society' for July 1840, whereas Mr. Hodgson's paper descriptive of *O. ammonoides*, and published in the Society's Journal for 1841, p. 230, bears his own date of March for that year. I cannot, therefore, understand upon what principle Mr. Hodgson adheres to the latter appellation; and the more especially as he is known to be particularly tenacious of his own nomenclature.*

* On the same occasion, I pointed out that Captain Hutton's *Ovis cycloceros* had been priorly named by me *O. Vignei*: and Captain Hutton, accordingly, adopts the latter name in preference to that of his own coining, in XV, 152. Nor is the above the only instance of the kind I have reason to complain of, on the part of Mr. Hodgson, who must show a little more respect for the claims of others if he expects his own to be upheld. For example, some time ago Mr. Hodgson will remember sending me a bird by the name *Chelidorhynx chrysoschistos*, which I informed him that I already had in print, by the name *Rhipidura hypoxantha*, XII, 935: and in correcting the proof, I inserted an acknowledgment of the receipt of Mr. Hodgson's specimen (in the following page), adding that I then adopted his genus *Chelidorhynx*; which, however, has since proved to be true *Rhipidura*, as opposed to *Leucocerca*, Swainson (vide XV, 290). Yet Mr. Hodgson had no compunction in publishing his *Chelidorhynx chrysoschistos* as a new species in the 'Proceedings of the Zoological Society' for 1845, p. 32; and at p. 26 he

And I must further take the liberty of recalling Mr. Hodgson's remarks (in X, 915), concerning a critique on his own labours. "It is well known," writes Mr. Hodgson, "that when Mr. Ogilby wrote, several successive catalogues of mine, embodying the improving results of new information, and greater skill in the appreciation of it, existed; and had Mr. Ogilby consulted the whole of them, according to their dates, he might have spared a great part of his cursorious remarks." Thus, with regard to tame Sheep with naturally short tails, Mr. Hodgson will find, in XV, 153, my printed statement that—"The fighting rams of India seem to me to be of a race descended from *Ovis Vignei*, of which they preserve the crescent horns and *short tail*:" and in the following page,—“Whether any *long-tailed* Sheep, with horns describing more than a spiral circle, could have descended from the crescent-horned and short-tailed *O. musimon* (which is closely allied to *O. Vignei*), is extremely doubtful.” Mr. Hodgson might, therefore, to be consistent with himself, have qualified a little his remarks on this subject (in XV, 343).

We would now return to the paragraph which I commenced by quoting, and examine whether really I founded "many species" of wild Sheep "upon an inspection of the horns solely:" but I will first remark that Mr. Hodgson has himself founded various species of mammalia upon what I consider much less satisfactory data than those afforded by the horns of different wild Sheep, which, in general, (as must be admitted by all who are acquainted with them,) supply exceedingly good specific distinctions.

Martes (?) *tufæus*, H. (XI, 281). "Have several fine skins from Lassa and Seling, but as they want the teeth and talons and tail, I can but conjecture from information and the specimens as they are, that the animal is a Marten. Thus judging, I should say that the *Toufee* has much of the size and proportions of the last or *flavigula*, but its pelage is much richer and softer. * * * Probable length from snout to vent 20 to 22 inches, mean height 7," &c. Now there is a Tibetan Marten which I have lately had occasion to describe, which I feel very confident to be this *M. tufæus*: but its size does not exceed that of the two European Martens (to which it is very nearly allied), gives, as another new species, *Dimorpha?* *rubrocyanus*, H., which I likewise distinctly informed him was my *Muscicapula hyperythra* (vide p. 127, ante)!!!

being considerably smaller than *flavigula*; and I infer, therefore, that the dimensions above given are those of *exceedingly stretched* skins.

“*Mustela* (?) *calotus*, II.” (*Calcutta Journal of Natural History*, II. 221, and pl. IX; a figure which I, for one, would certainly never have ventured upon publishing). I can give no opinion of my own respecting this animal; but in Mr. J. E. Gray’s ‘List of Specimens of the Mammalia in the British Museum,’ (p. 139,) I see “*Mustela calotus*, Hodgson,” placed as a synonyme of *Sciurus europæus* !!!*

In XI, 286, two Tibetan animals are enumerated as—“39. *Equus*, wild; *E. kiang*, Moorcroft; † *E. hemione*” (quære *hemionus* ?), “Auct? Found generally throughout Tibet: I have no specimen.”—“40. *Asinus equioides*, mihi. Species want verification, spoken of by Moorcroft and others: called wild Ass by the Tibetans, and said to be common on the plains of Tibet. Possess no specimen.” Mr. Hodgson, nevertheless, does not hesitate to give a name to the latter animal, which I am satisfied refers to *E. hemionus*, or the *Kiang* (vide XV, 146); while the other is, I suspect, the same wild type of *Equus caballus* as was described, and the foal figured, by Pallas. ‡

* Mr. Gray’s note of interrogation refers obviously to the work in which *M. calotus* is published, not to the identification of the animal.

† Vide Moorcroft’s Travels, I, 312, and 442, and other notices in the same work. E. B.

‡ While this article was proceeding through the press, the 28th No. of the *Calcutta Journal of Natural History* came to hand, containing a paper by Mr. Hodgson, entitled “Description of the Wild Ass and Wolf of Tibet,” in which he now states—“There is, I believe, no species of wild Horse in Tibet, and only one species of wild Ass, viz., the Kiang:” and though fully aware that Moorcroft had named this animal *Equus kiang*, and that he had himself termed it *Asinus equioides*, it is now a third time wantonly named *Asinus polyodon*! The last name, too, being founded on the mistaken supposition that the little præmolar in front of the series of upper grinders in the Kiang is peculiar to that animal; whereas (it is needless to remind the generality of Zoologists) this tooth is normally present in the Horse and Ass (!!), if not in every other species of the genus; but is subject to be occasionally lost, when its socket becomes gradually filled up, and disappears totally. Referring to five skulls of Horses in the Society’s Museum, I find this tooth or its socket present in three of them, but lost and the socket completely atrophied upon one side of one of these three; and in an Ass’s skull I find it on both sides, as in Mr. Hodgson’s figure of the series of upper molars of the Kiang: so much, then, for the name (or rather synonyme) *polyodon*! With regard to Pallas’s assertion (as quoted by Pennant and Shaw), that the *hemionus* has only 38 teeth in all, or two fewer than in the Horse and Ass, it is difficult to imagine which are here meant as being deficient, in addition to the two little upper præmolars; and I confess to entertaining doubts on the subject. The colour of the Kiang, I can safely assert to be ab-

Mr. Hodgson's subgenus *Pseudo-cervus* (X, 914, and XI, 284), refers, in my opinion, decidedly, to a young truly elaphine Stag (*Cervus Wallichii*, Duvaucel), of the third year; the horns of which had not attained the size and figure which they would have exhibited in the mature animal. It is most probably identical with the great truly elaphine Stag of Kashmir. So much for this alleged *subgenus*!*

Indeed, Mr. Hodgson should be the very last person to complain of "innumerable vague and shadowy species" being "the plague of Zoological science," (vide XV, 335,) inasmuch as he has burdened science with a frightful list of cumbersome and useless synonymes (vide for instance, those reduced in my papers on birds), based upon no distinctive characters whatever. Witness his catalogue of Nepálese Mynahs, (V. 771 :)† and even when convinced of error, instead of hastening to

solutely similar to that of several specimens which I have seen alive of *Equus hemionus*: the Society's skin of the former is in summer garb; and I have repeatedly witnessed, in England, the seasonal changes of the *hemionus*, which are just as Mr. Hodgson has described those of the Kiang. In fact, my opinion remains unchanged that the Kiang will prove, upon actual comparison, to be identical with *Equus hemionus*.

Mr. Hodgson's *Lupus laniger* is another familiar acquaintance, of which he might have seen three fine mounted skins, in different states of pelage, when he visited the Society's Museum: but I cannot accede to his opinion that it has any claim to be regarded as a peculiar species, after what I have seen of the variation of Wolves of different countries, and even of the same country; but I must reserve the discussion of this subject for a more convenient opportunity.

Some remarks on the transverse shoulder-stripe incidental to the Asinine subgroup of *Equus*, will be found in a note to vol. XI, p. 286: since writing which, I have observed a domestic Ass with a second transverse stripe, and another with four (!) and not *equidistant* cross-stripes, varying too in length, and the last crossing the loins. Buchanan Hamilton, I think, somewhere states that the Asses of Madras are sometimes without any cross-stripe: and finally, I may remark that those of Lower Bengal are very commonly more or less barred with black on the limbs, at all ages. That the supposed *Equus asinus* (ferus) of Prof. Gmelin was an individual variety of *hemionus*, with a small cross-stripe on the shoulders, I scarcely feel any doubt whatever.

* I have indeed been assured that Mr. Hodgson's *Cervus affinis*, or great elaphine Stag of the Nepal sál forest (X, 721), was founded on a skull and horns purchased from a ship in the port of Calcutta by the Nepal Vakeel, Luckman Pardia, who presented it to the then prime minister of Nepal, Bim Sen, by whom it was presented to Mr. Hodgson. It certainly would appear that Mr. H. has never since been able to procure another specimen.

† "We have seven species," writes Mr. Hodgson, "all abundant in Nepal.—1. *reliquiosa*.—2. *cristelloides*, (nob.)—3. *Tristoides*, (nob.)—4. *sylvestris*, (nob.)—5. *Affinis*, (nob.)—6. *Communis*, (nob.)—7. *Terriclov*, (nob.)—And Mr. Hodgson has since

relieve our catalogues of the incumbrance of fictitious species, Zoologists have great reason to complain that he suffers the misleading synonymes of his own imposing to remain permanently uncorrected. Thus, when I privately informed Mr. Hodgson that his *Astur indicus*

termed another—" *Gregicolus*, (nob.)"—In all seven new names (to pass over the extraordinary construction of some of them)!

"Of these," it is added, "2 and 3 are nearly allied to *crystalata* and *tristis*; 4 and 5 to *pagodarum* and *malabarica*. The 6th inclines much to *Sturnus*; and the 7th, a very osculant species, has a very considerable resemblance in the form of its wings, tail and legs, to *Cinlosoma*," (indeed it has no sort of relationship with the *Myiaba*).

Not one of these names has since been rectified, except by myself; though referring to some of the commonest birds of the whole Bengal Presidency. Thus, *Religiosa* is the common Hill Mynah, so often caged, and now standing as *Gracula affinis*, A. Hay, (XV, 32.) *Cristalloides* is another species first distinguished by Lord Arthur Hay, (vide XV, 33,) from *Acridotheres cristatellus*, (L.), of China; and it now stands as *Acr. griseus*, (Horsfield): though Dr. Horsfield was not justified in changing the name of his Javanese bird to *griseus*, since he believed in its identity with the Chinese *cristatellus*. *Tristoides* is the common House Mynah, *Acr. tristis*, (L.), so abundant throughout the country. *Gregicolus* is *Acr. ginginianus*, (L.), or the common Bank Mynah. *Communis* is *Sturnus contra*, Auct., now termed *Sturnopastor* (*contra*) by Mr. Hodgson. *Sylvestris* is *Sturnia pagodarum*, (Gm.), v. *melanocephala*, (Bahl). *Affinis* is *St. malabarica*. And *Terricolor* is the 'Brown Indian Thrush' of Edwards, first identified as such by myself, and also first distinguished by myself, (not by Mr. Hodgson, whose name I have nevertheless adopted,) from the nearly allied *Malacocercus striatus*, Swainson, of Ceylon.

Now, what benefit to science, it may well be asked, accrues from this random application of a host of new names; without so much as a clue to the particular species they refer to? Or what skill is required in the manufacture of such names? It is true that they are not binding in the least, unless some kind of intelligible description, or distinctly recognisable figure, is attached to them; but even in the latter case it is scarcely fair that those who first really discriminate species from their affines should be deprived of the right of naming them, because they had previously been described perhaps at random, without any trouble having been taken to determine whether they really were new—or perchance even familiarly known, as were most of Mr. Hodgson's Mynahs just referred to.

There is an old story that the most unskilful marksman may hit his object occasionally by flinging a handful of missiles at it together: and so by affixing new names to a multitude of species thus at random, and describing them at a venture, the merest tyro may chance to have his vanity gratified, sometimes, by seeing his name quoted as the describer of an actual novelty, regardless of the number of synonymes to which also he finds his name attached, and of the confusion which he thus oftentimes introduces.

It would be a beneficial rule if the merits of a describer of new species were to be estimated by the number of those which he succeeds in establishing, minus or deducted by that of the synonymes which he has applied to previously known species, or at least of such as remain uncorrected by him after a given period: and the permanent establish-

had been previously named *Falco trivirgatus* by Temminck, that gentleman replied that he had been long aware of it ; but he has certainly never given publicity to the information (as I hastened to do, in XI, 5). As Mr. Hodgson has not scrupled to refer to my unpublished opinion (of which more presently), respecting *Antilope gutturosa* (XV, 335), there can surely be no occasion for my refraining to publish what I have just stated of *Astur trivirgatus*.*

But enough of this *tu quoque* style of argument : though a little *rebutting* is fairly allowable in a contest wherein rams' horns are concerned ! My paper on the wild Sheep was originally published in the 'Proceedings of the Zoological Society' for July 28, 1840 ; was republished in Taylor's 'Annals and Magazine of Natural History,' Vol. VII, pp. 195, 248, with a few additional notes, and a plate representing the horns of some of the species ; and was again republished, with further additional notes, in the Society's 'Journal,' X, 858, to which last republication I shall refer, for the convenience of most readers in India. Let us see whether "many" of the species were founded "upon an inspection of the horns solely."

1. *Ovis Polii*, nobis. Founded on a magnificent frontlet and horns brought by Lieutenant Wood from the Pamir steppe ; combined with the notice quoted from Marco Polo, which refers undeniably to the same animal. Of the distinctness of this superb species, there can be no doubt whatever ; and the frontlet is figured in Taylor's plate, figs. 1 and 2.

2, 3, and 4. *O. ammon*, Pallas ; *O. montana*, Desmarest ; and *O.*

ment of a doubtful species named by another, or the reduction of such to the rank of a synonyme, should be regarded as a labour of equal or even higher merit than the promulgation of a species previously undescribed. Such a rule would furnish a criterion by which to appreciate the labours of a naturalist in this line, by enabling us to strike a balance between the amount of good he may have effected by adding to the stores of knowledge, and that of evil which he has introduced in the shape of confusion. It would check much recklessness in the imposition of new names which now unhappily prevails in several quarters.

* It is true that the name *Astur indicus* was published anonymously, in the 'Bengal Sporting Magazine,' and therefore the only legitimate sponsor that can be quoted for it is the editor of that periodical for the time ; but it has nevertheless been repeatedly quoted as Mr. Hodgson's species, and has been acknowledged as such by him, and therefore it surely behoved Mr. Hodgson to set matters right without delay when he learned that it had been described by Temminck.

nivicola, Eschscholtz. The first of these I had never seen, and could refer to merely : the second I was well acquainted with : and the third I only knew from M. Eschscholtz's work, but referred also to a notice of it in the narrative of Kotzebue's voyage. The Society's Museum now boasts a very fine specimen of *O. ammon*,* which I am enabled to assert, positively, is distinct from *O. montana* of North America : and I incline to refer to it, though with considerable hesitation, the horn in the Museum of the Royal College of Surgeons, London, (vide Taylor's plate, figs. 3 and 4,) for which I suggested the provisional name *sculptorum* ; and without any hesitation Mr. Hodgson's large species, first provisionally named by me *Hodgsonii* upon Mr. Hodgson's description of the horns in the 'Asiatic Researches,' and subsequently by him *ammonoides*.† Pallas's figure of *O. ammon*, copied into various works, though sufficiently rude, indicates certain characters which are at once recognised in the Society's specimen ; such as the lengthened white hair on the fore-neck and breast, the corresponding hair in *O. montana* being blackish ; and there is no reddish-black tinge on the face of *O. ammon* : the horns are badly represented ; but, with a specimen for comparison, it is readily seen that the errors are due to want of skill in the draughtsman. These horns are considerably less massive than in *O. montana*, and their section is very different, and especially the view of them as seen from above : but they are more prolonged, in an inverse ratio to the decreased bulk towards the base ; though considerably less prolonged and thicker at base than in *O.*

* Presented by G. T. Lushington, Esq., who has announced to me the despatch of four more perfect skins : we have also an imperfect skull of a young male. To Mr. Lushington the Society is likewise indebted for a skin of the Kiang received, and for another and more perfect specimen now on its route ; with numerous other valuable contributions.

† Mr. H. even confounded *O. ammon* with *O. nahoor*, in *As. Res.* XVIII, pt. II, 135 ; and the mistake was first pointed out in my paper : but as he described the horns of quite a young ram (vide his plate) as "accurately triangular" (i. e. *equilaterally*?) I did not feel justified in identifying the species with *O. ammon* : stating that even the "Rocky Mountain species would, at the same age, have much compressed horns, far from attaining to an equilateral triangle ;" to which I added that—"Should a true species be here indicated, as is not improbable, distinct from *O. ammon*, I propose that it be dedicated to that assiduous investigator of Nepalese Zoology, and be accordingly termed *O. Hodgsonii* !" My opinion now, that it is, positively and decidedly, identical with *O. ammon*, will of course be received *quantum valet*, in opposition to that of Mr. Hodgson ; who, however, has not advanced a single reason for supposing otherwise.

Polii. The most marked contrast from those of *O. montana* consists in the fact that the great bulge in the upper portion of the posterior surface of the horn in *O. montana* (which I refer to from memory only, though with the utmost confidence), is comparatively little more than indicated in *O. amson*; and the rugæ are particularly large in the latter species. Comparing the Society's stuffed specimen with Mr. Hodgson's figures and description of his (so called) *O. ammonoides*, the specific identity is beyond all question; and it follows that, as in *O. montana*, some individual variation occurs in different specimens. Thus, the horns of the Society's specimen are rather more bulky than those figured and described by Mr. Hodgson, (though, by his own showing,* he has represented them too small in his plate III). In the Society's animal, the horns had about completed their fifth year of growth; and measure round the curve (following the upper angle from the base—where the two are nearly in contact), thirty-three inches and a half, of which the years of growth are successively seven inches, eight and a half, nine, five and a half, and the basal (perhaps incomplete) four and a half; the circumference at base is eighteen inches, width of anterior plane at base four inches, and depth at base posteriorly six inches and a half; greatest width apart of the horns, measured externally, twenty-three inches; the tips eighteen inches apart.† Length of ears four inches and a half; and of tail underneath (where nude of hair) fully three and a half, exclusive of its upper vesture. The total length of this specimen, when fresh, would have been fully six feet; but as none of its bones are preserved, except the horn-cores, I will not (with the example of *Martes tufæus* before me) pretend to give the minutiae of its admeasurements.

5. *O. californiana*, Douglas. Description cited from 'Zoological Journal;' and the horns fully described by myself, and figured in Taylor's plate, fig. 5. An unquestionable species.

* "Head, to base of horn, one foot. Length of horn, by curve, three feet one inch." These proportions are not preserved in the plate, especially in the lateral view of the head. How is it, too, that the caudal disk is not represented in the figure of the female?

† In the skull of a young ram, with horns in their third year of growth, these curve round outwards to the tip, where they commence to gyre forward and even somewhat inward, as in the other, the tips ultimately turning outward in the old animal. In this specimen, each horn measures $20\frac{1}{2}$ inches round the curve, and their tips are that distance apart: the first year's growth measuring $11\frac{1}{2}$ inches, and the second year's only five inches.

6. *O. nahoor*, Hodgson. Described from specimens, amongst which was a hornless female; and first clearly established as distinct from *O. ammon*!*

7. *O. burrhel*, nobis. Described from a fine male; and the horn of a still older one. It would seem, however, that I was wrong in assigning to it a loftier altitude of haunt than that of *O. nahoor*. Capt. Smith informs me that *O. burrhel* and *O. nahoor* keep always in separate flocks, and are never seen on the same feeding-ground; the Burrhel seldom ascending above 16,000 feet elevation, while the Nahoor goes much higher. Both bleat like domestic sheep. Near the Boorendu Pass, the Burrhel is much more plentiful than the Nahoor; but the latter is far more extensively diffused over the Himalaya generally. At the close of summer, when the snow is nearly melted away, a very nutritious grass grows abundantly under a thin coating of snow, and both species become exceedingly fat by feeding upon it, i. e. in the months of August, September, and October. At this time they can only be compared to the prize animals exhibited at the Smithfield shows, and they run with considerable difficulty, though still being far from easy of approach. In winter, when snowed in, they actually browse the hair off each other's bellies, many together having retired under the shelter of some overhanging rock, from which they come out wretchedly poor. They produce one or two young, (commonly two,) in June and July. In Taylor's plate, the representations of the horns of these two species were unluckily transposed; No. 6 referring to *O. burrhel*, and No. 7 to *O. nahoor*.

8. *O. cylindricornis*, nobis. This is the least satisfactorily established of all the species in my monograph: it resting on a communication from Col. Hamilton Smith, relative to a species which must have been very different from either of those known to me, though described from memory only by Col. H. Smith (one of the most experienced of Zoologists in the history of the *Ruminantia*.)

* I may therefore legitimately claim credit for being the first to *discriminate*, in print, not only the three Himalayan, but all the Asiatic species of wild *Ovis* known up to the present time: unless *O. nivicola* of Kamschatka be considered an exception, though M. Eebscholtz does not explain in what respects this differs from *O. ammon* and *O. montana*; from the latter of which it would seem only to deviate in its inferior size, and in wanting the pale caudal disk?

9. *O. Gmelini*, nobis. Described from very fine specimens of the male, female, and young; and identified with a species long ago rudely figured by the younger Gmelin, and the horn by Pallas; and Gmelin's description of the habits quoted, with further original information. Head figured in Taylor's plate, No. 8.

10. *O. Vignei*, nobis. Described from a coloured figure taken from life, and from two pairs of horns, the distinctness of which from those of all the other species is most obvious: vide Taylor's plate, fig. 9. A skin of this animal was described by Pennant as the "Bearded Sheep," but was confounded by him with *O. tragelaphus* (vide X, 877); and there is a brief notice and very passible figure of the species, taken from an animal killed in the vicinity of Persepolis, in Lieutenant Alexander's 'Travels from India to England,' &c. (1827.) It again appears as the "Wild Sheep of the Hindu Koosh," described by Capt. Hay, *J. A. S.* IX, 440; and as *Ovis cycloceros*, Hutton, 'Calcutta Journal of Natural History,' II, 514, and pl. XII, being again noticed by the latter gentleman in *J. A. S.* XV, 152. It may be observed that Capt. Hay remarks this species to differ from *O. tragelaphus* "in having a lachrymary sinus;" and Capt. Hutton also describes "a moderate-sized lachrymal sinus, which appears to secrete, or at all events contains, a thick gummy substance, of good consistency, and of a dull greyish colour. The Afghan and Belooché hunters," he adds, "more especially the latter, make use of this gum, by spreading it over the pans of their matchlocks, to prevent the damp from injuring the priming." We may, therefore, rest satisfied of its existence in this species, which is nevertheless most closely allied to the next.*

* In a catalogue of Mr. Hodgson's collection presented to the British Museum, prepared by Mr. J. E. Gray, who has obligingly presented me with a copy of it, just received, I find *O. Vignei*, Blyth, set down as a synonyme of *O. ammonoides*, Hodgson, and *O. Hodgsonii*, nobis, also cited, either of which names has the advantage of priority over that of *ammonoides*, supposing the latter to refer to a species distinct from *O. ammon*: but Mr. Gray might as well identify *O. musimon* or *O. tragelaphus* with *O. ammonoides*, and reduce all the wild species of *Ovis* to one, as bring together two such widely different species as he has here done. He might just as well unite *Cervus capreolus* with *C. elaphus* or *C. tarandus*!

So, in his synonymes of *Presbytis entellus*, he not only erroneously refers *Pr. schistaceus*, Hodgson, to this Bengal animal, but the much more different *Pr. hypoleucos*, nobis, peculiar to Malabar and Travancore, and which Mr. Martin introduced as a variety of

11. *O. musimon*, L. Described by me from life, and a further notice given in *J. A. S.* X, 878. "The Argalis and Moufflons (not to mention the *Tragelaphi*),"* writes Mr. Hodgson, "seem to form two striking groups among the wild Sheep: our Nahoor is a complete Moufflon; hence it occurs to me to ask, if the Corsican animal is, like the Himalayan, devoid of suborbital sinuses?" To this I can reply, that the Prince of Canino states that it is so devoid: † but however this may be, if Mr. Hodgson wishes to subdivide the group of wild Sheep, he is altogether wrong in approximating the Nahoor and Burrhel to the

Pr. Johnii! This, too, is done without so much as a note of interrogation; while to the considerably more nearly allied *Pr. anchises*, Elliot, he does affix a mark of doubt—it being, however, with *Pr. prismus* of the Coromandel coast and Ceylon, distinct also.

With equal positiveness, in his 'Catalogue of the Species of Mammalia in the British Museum,' Mr. Gray identified *Bos gaurus* and *B. frontalis* (not to cite other instances of like precipitancy)! But he has now Mr. Hodgson's specimens of skulls of these two *Boves*, and, as a matter of course, enumerates them as separate species. So, with adequate data to form an opinion upon, will he by and bye admit *Ovis Vignei* and the different *Monkeys* alluded to; for to imagine otherwise will then even appear preposterous!

It will be necessary for me to go critically over this catalogue of Mr. Hodgson's species, upon which I have more than a few remarks and corrections of nomenclature and of synonymes to offer; but I shall confine myself here to one further remark, relative to the particularly cool manner in which *Anthus striolatus*, Blyth, is placed as a synonyme of *A. rufescens*: the fact being, that my description of *A. striolatus* is not even yet published, and the name could only have transpired through Mr. Jerdon's bare mention of it, in the 'Madras Journal' No. XXXI, p. 136; unless, indeed, Mr. Jerdon has himself forwarded specimens of this rare Indian Pipit to Europe, in which case I do seriously object to provisional and unpublished names of my coining being thus introduced to the world as empty synonymes.

Mr. Gray has, in fact, placed not a few synonymes to my credit (or discredit) in this catalogue, of which I shall hasten to disavow the paternity!

* What does Mr. H. mean by the *Tragelaphi*? *Tragelaphus*, Ham. Smith, stands for a genus of Antelopes, of which the *Guib* and *Boschbok* and *Ruppell's Decuda* are the types. If he wants a subgeneric name for the African Wild Sheep, he is perfectly aware that I have termed it *Ammotragus*. How would he approve of his *Pseudois* being thus contemptuously passed over?

† Vide Jardine's 'Naturalists' Library,' Art. Moufflon. I have some impression, nevertheless, of having observed small ones; which is rather confirmed by Mr. Ogilby's remark, in his 'Mammalogy of the Himalaya,' (vide Royle's *Betaay*, &c.) that "*O. nahoor* is intermediate in character between *O. musimon* and *O. tragelaphus*, which latter species it resembles in the form of the horns" (?), "and in the absence of the crumens, or tear-pits, which distinguish the rest of the genus." Now a specimen of *O. musimon* was set up in the museum of the Zoological Society, at the time that its then Secretary, Mr. Ogilby, indicted the remark here quoted.

Moufflon of Corsica. These two Himalayan species, instead of being "complete Moufflons," are (so far at least as their horns are concerned) most particularly unlike *O. musimon*, and form a little group *per se*, unless *O. cylindricornis* should prove to range with them: and the Moufflon is quite excluded from his definition of "round-horned" Sheep, for which group I presume the appellation *Pseudois* is proposed. Their being "furnished with a well developed tail," (really there is no such marked difference in this respect,) will not exclude the Californian Argali, the tail of which is described as "eighteen inches long!" Yet the horns of this animal are most typically those of an Argali (vide Taylor's plate)! Mr. Hodgson suggests "the generic appellation *Pseudois*, lest," he adds, "as has too often happened to me, some closet systematizer, who never was at the pains to examine nature for himself, should step in to 'name and classify,' (the work of a moment, *as ordinarily done*,) my discoveries."* But if any discovery is claimed in the present instance, it remains to show in what it consists: for Mr. Ogilby long ago remarked the absence of suborbital sinuses in *O. nahoor*; and the group formed by *O. nahoor* and *O. burrhel* was distinctly indicated in my monograph (vide *J. A. S.*, X, 867), being estimated there, as I still think, at its true value. Mr.

* By the way, how is it that these complaints, so many times repeated, and bordering somewhat on the querulous, should be altogether peculiar among present cultivators of Zoology to Mr. Hodgson? Does Mr. H. complain of my having chanced to anticipate him in the publication of *Rhipidura hypoxantha* and *Muscicapula hyperythra*? Or in first discriminating in print the *Ovis nahoor* from *O. ammon*?—Or, supposing that I knew of an animal of which I was well aware that Mr. H. possessed the female only, and that he was waiting to procure a male in order to satisfy himself whether or not it differed from a certain other species; supposing in such a case that I were to intercept the male which otherwise would have been transmitted to him, and immediately rush into print with a description of both sexes and a "mihi" attached, and in that description were even to refer to Mr. Hodgson's unpublished opinion respecting the species, which opinion he had been cautious not to commit to print!—Mr. Hodgson might perhaps be justified in saying that I had been guilty of much discourtesy towards him, and have forfeited my claim for courtesy in return? Even such, *mutatis mutandis*, is the history of *Antelope* (*Procapra*) *picticaudata*, Hodgson! Dr. Campbell kindly forwarded the female of this animal some time ago to the Society's Museum, and hoped soon to be able to procure and send a male; but Mr. Hodgson happened to be at Darjeeling when Dr. Campbell succeeded in procuring two males and a female, and has assuredly taken due (or undue) advantage of the accident of his local position! Who here "steps in to name and classify" &c. &c.?

Hodgson will find it necessary to become familiarly acquainted with many more Species of wild Sheep, than those found upon the Himalaya, if he thinks of subdividing the series otherwise than most crudely and unsatisfactorily; and when he has properly studied the whole genus, even as now known, he will find its subdivision considerably more difficult than may seem to him at present, and he will then be able to declaim with a better grace on the short-comings of others, who may have opportunities and local advantages which he has not, as he likewise enjoys some which they would assuredly not fail to turn to due account.

Should it prove that *O. musimon* is really devoid of the facial cavities, the value of this character would fall to a mere specific distinction; for however the wild Sheep may be arranged into minor groups, the *O. Vignei* (which has the sinuses) could scarcely be placed in a different subdivision from *O. musimon*. And to the same group must be referred *O. Gmelini* and *O. ophion*, though together perhaps forming a subsection of it! Both in *O. Gmelini* and *O. Vignei*, we find indications of affinity with the African *O. tragelaphus*.

12. *O. ophion*, nobis. Founded on the coloured figure and description, by M. M. Brandt and Ratzeburgh, of a specimen in the Berlin Museum.

13. *O. aries*, L. The domestic Sheep. Several wild types, as I still strongly suspect: but none of those above enumerated; unless, to a partial extent, *O. Vignei*, though even this very doubtful.

14? *O. (?) Ixalus probaton*, Ogilby. Described from a hornless specimen, which is at least closely allied to *Ovis*.

15. *O. tragelaphus*, Pallas. A well known species. Described from specimens, observed both alive and in museums.

The reader may now judge of the data upon which I founded my various new species of wild *Ovis*; and equally of Mr. Hodgson's disparaging assertion of my "founding many of them upon an inspection of the horns solely." Such assertions, if not promptly repelled, as I trust this has been, are calculated to damage the reputation of a working zoologist, who should endeavour to do the utmost that is *fairly practicable* with the means at his disposal; but who should know better than to transgress the bounds of moderation in these matters, as by publishing such a name as *Asinus equioides* to the world, upon

the data on which that name is sought to be established, and then ludicrously complain of "innumerable vague and shadowy species" being "the plague of zoological science."

Finally, respecting *Antilope picticaudata*, Hodgson: having only the skin of a female to judge from, I consider myself perfectly justified in having provisionally regarded it as *Antilope gutturosa* of Pallas, although I did not choose to go the length of publishing that opinion, as Mr. Hodgson has done for me. In the first place, both animals are from Chinese Tartary; secondly, both differ from every other known Antelope, excepting the Prong-horn of North America, in having a white caudal disk, as in the Argali Sheep, various true elaphine Stags, &c.; thirdly, the rest of the colouring of the Society's specimen corresponds with the described summer dress of *A. gutturosa*; fourthly, their short tails are similiar; fifthly, the females of both are hornless; sixthly, as regards the size of *A. picticaudata*, how was I to know that the female in the Society's museum was full grown, it having no skull to guide me; seventhly, *A. gutturosa* is described to have slight tufts of hair on the knees, scarcely sufficiently long to deserve the name of brushes; and though I could scarcely make these out distinctly in the Society's specimen, I thought they might perhaps be more developed in another; and eighthly, the suborbital sinus in *A. gutturosa* is described to be small, and I could merely distinguish a small bare place in lieu of the sinus on both sides of the face of the Society's specimen; moreover, we know that this sinus becomes more developed at the rutting season, and at other times it may be so slight as to become obliterated in a dry skin. As for the swollen larynx, it is as much peculiar to the male sex, as are the horns and præputial gland; and even the larynx would, I doubt not, as in *A. cervicapra*, be much more developed at the rutting season than at other times, and probably the præputial gland also. I should therefore have considered myself altogether disqualified from assuming the tone which I now feel myself entitled to hold, if I had added to the "innumerable vague and shadowy species" which Mr. Hodgson so consistently denounces, by describing *A. picticaudata* as a species distinct from *A. gutturosa*, of which, indeed, I am still very far from being satisfied, as I think it yet requires to be examined in the recent state, and the males during the height of the rutting period.

To conclude, if Mr. Hodgson had preserved the amenities of fair and amicable discussion, in his various depreciatory remarks, I should have forborne, as hitherto, from calling special attention to certain of his own very marked inconsistencies, to use the mildest expression; and should have even passed quietly over his appropriation of the Tibetan Antelope (if it *really* prove new): but in disregarding the rules of courtesy towards me and others, he has invited a plain-spoken rejoinder, which I have reluctantly felt myself compelled to issue *sine mord.*

P. S. It is due to Mr. Hodgson that I should here notice, and I have unfeigned pleasure in doing so, that I have just received from him a communication (dated March 24th,) in which he has, in the most handsome manner, spontaneously tendered his regret, if, in the heat of composition, he may have penned aught that I might consider as discourteous; and I rejoice that it is in my power to append this trait of good feeling on his part, which I am sure that he will have the generosity to exhibit further, should he haply think my reply at all acrimonious, or written under excited feelings.*

*Instructions how to take Correct Facsimiles of Inscriptions, by Captain
KITTOE, 6th N. I.*

To take correct facsimiles without reversing the writing which the common method of damping and pressing the paper on them, or of blackening the stone produces, the following method is recommended.

Heat in a ladle, and mix, equal parts of spirits of turpentine, linseed oil and bees wax, with sufficient red lead or ochre, ground as fine as possible, and let it cool. Then rub this into fine Serampore or bazar

* We regret that Mr. Blyth has deemed it necessary to couch his defence in terms of asperity. As his opinions were impugned in a recent paper by Mr. Hodgson, he has an undoubted right of rejoinder, for the tone of which he is of course responsible. But we protest against the repetition of such jousting in the Journal, the high character and dignified position of which are in no small measure attributable to the absence of every semblance of personality from its pages; a circumstance most honorable to the cultivators of science in this country, and not easily paralleled in the history of any European Journal. Our contributors will, we feel assured, concur with us that this high character must on no consideration be compromised.—EDITORS.

paper with a rag, so as to color it uniformly, more or less, according to the nature of the stone on which the inscriptions are cut ; if the surface is very smooth, the thinner the color the better, and vice versâ. It is best to keep a few sheets ready prepared of different shades of color on hand. These should be rolled on a light roller with a sheet of blotting or unsized paper between each, to absorb all superfluous greasy matter. Paper prepared with ochre mixed in water answers, but is apt to obliterate.

To take off impressions, first of all damp your plain paper slightly, and with little wafers of bees wax fasten it tightly over the inscription ; next cut a slip of prepared (colored) paper the width of two or three lines, according to the size of the letters, and when very large, of one line only ; apply the colored face to the white paper, and with a muller made of hard wood, rub the paper longitudinally and vertically until all the letters appear as clear they will, moving the colored paper onwards as the impression comes off : the color becomes transferred by this means into all the raised surface of the inscribed stone, leaving the cavities or letters white. This will be more or less perfect according to the nature of the stone, the smoothest giving the best impressions.

It is better in large inscriptions to cut your white paper also in strips and to number the lines as you take them off to enable you to adjust them afterwards.

When the impression has been thus taken, it should be most carefully compared, letter for letter, with the original, and indistinct letters should be supplied in pencil ; it will be found that rough surfaces require this invariably, indeed some inscriptions cannot be fairly imprinted with the color ; however, it is best to make the most of it and make the letters distinct with a pencil as suggested.

For correcting, the light at sunrise and sunset, also strong moon light, or by torch at night is best ; letters that are invisible at other times become distinct then ; the surface should be looked at obliquely, and indeed from every point till the eye catches the form of the letters ; of course this will be easier to one accustomed to the different alphabets and who may be able to read and comprehend them.

In searching for inscriptions parties should practically, never "leave a stone unturned," for they often occur in the most unlikely localities, usually above doors or within their jaumbs, or in some dark corner

within, and above all things, never believe it when the inhabitants say there are none, but search yourself for them.

I would lay much stress upon one point calculated to aid parties in their search for antiquities, it is this. Never neglect visiting every clump of, or single Peepul or Banyan trees, and particularly if on a high mound or by water, for a practice exists all over India of collecting fragments of stone of all kinds, sculptured or inscribed under such trees.

Whenever a high mound is seen in a flat part of country, depend upon it, it is the site of an ancient city. Those who have travelled in the Punjaub, and in the Cis-Sutledge territory, will not have failed to remark this. Witness all the places the names of which end in "put" and "hana," Paneeput, Son-put, Cong-put, Sam-hana, Pud-hana, &c. &c. but there are very many mounds in the other and distinct names such as Kupoor, Mumdote, Kunnoje, Kurra, Manicpoor.

It would be very useful if in the different revenue surveys attention were paid to those mounds or sites of old towns, and that they should be entered in the maps, the names carefully recorded in the dialect and written character of the country.

Hints on the Easiest Method of taking and preparing Drawings for Lithograph, by the same.

Several years ago I proposed contributing (monthly) specimens of sculpture, but various impediments have been opposed to the fulfilment of the promise; as I think that the subject is still worthy of consideration, I would suggest your inviting contributions, to facilitate which, both as to execution and economy, I would offer the following hints.

In the first place, the more simple the drawing the more correct the idea conveyed of the object to be represented and the less the trouble of execution, both for the draftsman and the copyist, whose charges must be regulated by the extent of work; a plain outline drawing is sufficient, and should be reduced to the size required for the Journal.

There is a method by which much accuracy is attained and trouble and expense spared.

The drawing should be first carefully reduced to the size required upon stiff paper, and the outlines boldly done with Indian ink; this

should be again traced on that description of China paper commonly used in Calcutta for lithographic purposes, with a medium pencil, or better still in lake with a pen, and be then carefully rolled and packed to prevent its being in the slightest degree crumpled or soiled; equal care must be observed whilst drawing, that neither greasy particles nor perspiration touch the paper; such drawings can be easily lithographed even by indifferent native draftsmen, for all that remains to be done, is, to apply the yellow transfer mixture over the pencil drawing, and when ready for use the whole has merely to be drawn over (traced) with the pen or brush and lithographic ink. Many of the plates of my Illustrations of Indian Architecture were prepared in this manner. The outlines should be exactly of the depths required for the shading. This plan is applicable to representations of any objects in outline and for facsimiles of inscriptions in particular, and will be found much safer than the actual drawings, with the chemical ink on the transfer paper, which are always liable to injury and never certain of success. Drawing the outline in pale red ink or lake is better than pencil, as the latter being dark, is apt to be overlooked in the tracing.

For drawing sculptures, &c. &c. a frame divided off into three inch squares, with thick white cotton twine well stiffened; the centre perpendicular and horizontal thread being red for easier guidance, is strongly recommended; the paper must be divided also into squares. The frame is placed at a convenient distance from the object, when all that is requisite is to keep the same position whilst drawing, and this is easily done by marking a dot on the object, cutting the crossing of the red threads; great accuracy and facility is attained by this method.

It should be borne in mind that clear, bold outlines are far more valuable than indistinct sketches, however beautifully colored, which are indeed of little use.



Notice of TREMENEERITE, a new carbonaceous mineral, by HENRY PIDDINGTON, Curator Museum of Economic Geology.

This substance was sent to the Museum from Tenasserim by Capt. Tremeneere, B. E. as Black Wad, but it contains no trace of Manganese.

It is, when fresh, in masses of a scaly structure and of a deep black colour, with a highly metallic lustre, much resembling coarsely foliated graphite; after a few months it partly falls to powder, or rather into scaly flakes, evidently from the decomposition of pyrites, of which it contains about three per cent. It powders easily, but the powder is always scaly, soiling, greasy, and glittering, like graphite. If the pulverised part be washed and ground, the tougher metallic looking scales remain as a black micaceous residuum, and it is only after long rubbing and washing that they also are pulverised, showing great toughness in the compacter and larger scales of the mineral. It soils much but is too soft to mark with, nor can any very determined streak be made; what is so is of a deep black. When heated a little sulphur sublimes; the mass burns but very slowly indeed, reddening only at first and for a long time like some varieties of graphite, and requiring a good supply of air to the crucible and constant stirring to effect its combustion.

With patient attention the whole is burnt, with the exception of a small residuum of a very light, and bright fawn-coloured powder, which is a mixture of oxide of iron and silic.

Its composition is found to be in 100 parts,

Carbon,	85.70
Water and Sulphur,	4.00
Peroxide Iron,	2.50
Earth, chiefly Silica,	7.50
	99.70
Water and loss,	30
	100.00

This mineral then differs from the anthracites in its high lustre, scaly structure, and ready pulverisation, by which it approaches the graphites; as well as by its iron and very slow combustion; but then from these it differs by its streak, and high combustibility with nitre; for, like coal and the anthracites, when projected upon melted nitre it deflagrates, heating the crucible instantly to redness, while the graphites not only boil but heat the crucible also, and seem but partly and very slowly to part with their carbon till a much higher heat is given.

This distinction I have not yet found noticed in any chemical or mineralogical work, but it seems to me to be no bad test by which to

separate the graphites from the anthracites; namely, that with nitre, at a heat a little above its melting point only, the former melt and are consumed, while the latter deflagrate and almost explode. My trials were made with graphite from Borrowdale, from Cochin and from the Himalaya, all of which, as above stated, diffused themselves over the nitre and were consumed gradually, while Newcastle Coal, American Anthracite and our present mineral deflagrate smartly.

It is usually taken, on the authority of Berzelius, founded on Karsten's researches, that the iron in graphite is a mere fortuitous mixture; but Beudant acutely says* alluding to this, that "when the iron is wanting we have no graphite, and when this substance is found in our furnaces, the proportions are sensibly the same," i. e. about 8 per cent. which he seems to think may be the true proportion. I do not advert to Kirwan's experiments, which were merely relating to coal and not to coal and graphite in comparison with each other.

In Professor Vanuxem's experiments (Phil. Mag. for September 1845) the quantity of manganese and iron in anthracites is stated to be from 0.2 to 7.10 per cent. and the water from 4.90 to 6.70. In the graphites he found from 1.40 to 3.60 per cent. of oxide of iron and manganese in the pure, and 20.00 per cent. in the impure kinds; and of water from 0.60 to 1.23 in the pure and 5.33 per cent. in the impure kinds.

It may then be a mooted point to which of these two classes of the anthracine† our mineral belongs, but as I have found nothing of the kind described before I have given it a distinguishing name, to be adopted or rejected, as better authorities shall determine.

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*On a new kind of Coal, being VOLCANIC COAL, from Arracan, by  
the same*

This coal was sent us from Kyook Phyoo by Major Williams, as one of the products of the eruption of the Mud Volcano at that station, described in his letter in the Proceedings for November, 1846.

It is in two lumps, which look externally like rolled boulders of Coal, and feel greasy on the outside like graphite.

\* Beudant *Minerologie*, p. 404.

† I use here Mr. Dana's term for this order.

It is highly sectile on the outside, being easily cut or pared without breaking, like soft plumbago. Internally it is a little more brittle, but still very sectile. Its smell when cut is very peculiar, being highly sooty, like the smell of a foul chimney in which a fire has not being made for a long time. When breathed upon the smell is very earthy and "bitter."

The internal structure is in one direction highly foliated, or scaly, and somewhat curved, with a semi-metallic lustre; at right angles to this it is granular and glimmering; the fracture partakes of both. In its general appearance it reminds us much of coal altered by dikes cutting through it. The streak is highly metallic, and the mineral very soft. It writes well and of a brown colour.

Its specific Gravity is 1.28.

In an impure part of the specimen there are minute white veins, which are Carbonate of Lime. It burns and swells up like Newcastle Coal, but its smell when burning is more that of Cannel Coal. This is doubtless from the absence of sulphur of which there are no traces. It coaks perfectly; swelling however to a mass four times the original size, while the best Newcastle only increases to about double its size.

Its composition is in 100 parts,

|                                           |        |
|-------------------------------------------|--------|
| Water, . . . . .                          | 1.00   |
| Carbon, . . . . .                         | 63.60  |
| Gaseous matter, . . . . .                 | 18.90  |
| Earthy residuum Iron and Silix, . . . . . | 16.50  |
|                                           | <hr/>  |
|                                           | 100.00 |

|                                                                                    |       |
|------------------------------------------------------------------------------------|-------|
| It gives of Coke per cent. by an independent experiment on a solid lump, . . . . . | 75.75 |
| Newcastle Coal from the Percy High main seam gives per cent. of Coke, . . . . .    | 78.8  |
| The mean of Cokes from English Coal by Dr. Ure (Dicty. Chemistry) is, . . . . .    | 65.0  |

We have here the fact that there must exist a seam or deposit of very fine Coal not far from the site of the Mud Volcanoes, and though at present all we know of the Arracan Coal is unpromising on account of the thinness of the seams, yet as nothing but surface examinations have yet taken place, and these not by professional miners, we may hope for



better results when due research shall have been made. The alteration of the coal by the steam of the Mud Volcano cannot be great, since it preserves so large proportion of its bituminous matter. And coal like this if attainable, and in quantity, would be very valuable.

The per centage of ash in English coal is I see\* only 7 or 8, at the highest, and more often far less. The mean of 13 specimens is 2.8 only, but one would suppose some error here.

Since this paper was written I have received from Major Williams a further supply of specimens collected at the Volcano, of which he says that there is no doubt about the coal's being the produce of the Volcano, and that the hardest specimens sent are those from a former eruption. Some of these are exactly our Volcanic coal, others approach more to Jet, and some which are intersected with Carbonate of Lime make very pretty specimens when polished.

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*Hints to Students of Arabic ; extracted from a letter by Col. LOCKETT.*

I have to apologise to you for not writing sooner, but I have been so much engaged with the public examinations in the College that I have really not had time.

If C. has made no progress in Arabic, he should commence with Bayley's Tables, which he will master in a week. He may then read attentively the Murt Amil and Shurhao Murt Amil, two works on Arabic Syntax, which will give him enough of grammar. I have translated both these works into English, and it will be of use to him, as there are many easy Arabic stories in it with translations. He can get a copy from the College Library on application. He must then begin to read some easy Arabic work to give him words and a knowledge of construction. The Arabian Nights Entertainment, and the Ikhwan-oos-suffa, are the easiest books and best adapted for that purpose. He may read about 200 pages in each. Then he may commence on Mahommedan Law in Arabic.

There are three text books of the Mahommedan Law, all containing texts or simple rules on the same heads, but expressed in different words, supposed by the writers to be more explicit or comprehensive. The most ancient and authentic is that of *Kudooree*. The *Wakayah*

\* Prinsep's Table, Jour. : Vol. VII. p. 197.

and *Kunz-ood-dukaek* are the others ; but they are but copies of the former with the change of style or phraseology I have mentioned. Then comes the *Shurhus* or Commentaries on these. The *Hedayah* is a Shurhu of the Kudooree, with an amplified text, but the whole of Kudoorees text verbatim et literatim is found in the *Hedayah*. This the Kazees and Mooftees and Moulavees in Calcutta were not till lately acquainted with. Captain Galloway, who has translated, but not prepared for publication the Kudooree, found part and explained it to them.

The *Hedayah* is an invaluable work, but then it is full of disquisition and subtilty of argument which would not be much to the taste of a beginner, and this has given rise to fifty different *Hasheeah* or annotations on the *Hedayah*. There is a commentary on the *Kudooree*, the *Suraj-ool Wuhauj* *مراج الوهاج*, but that is also a voluminous work. The Shurh Wukayah, a common work, is a good one. There are indeed several Shurhus on that text, all easy and good, by Abool Mukarum Birgundee, &c. and the Jaemeeah-ooz-Rumooz. Of the Kunz-ood Dukaek, the Aeenee is a good and easy shurh and a good book for a beginner, as well as the three last mentioned. Then there are the Futawahs, or collections of supposed cases and the opinions of the lawyers on them. These puzzle a beginner because he seldom finds a decided preference expressed for any opinion ; but this wears off by a little acquaintance with the books and the celebrity of the lawyers who have expressed the conflicting opinions, and the increasing strength of the reader's own judgment ; and if after all he find the opinions heavily balanced, he knows he may then adopt whichever his own mature judgment may think most suitable to the equity of the case. This is supposing him to be a Judge and that he had to decide a case in real life. The style however, of those Futawahs is quite simple, as well indeed as of all the Law Books, like that of books of science in all languages. Technical phrases are to be learnt of course. In short, the dryness of the subject is the only difficulty a student of Mahommedan law has to fear, but the *HAJEE* will encounter the Desert. Let there be a motive and the task will be overcome. C. should read Harrington's chapter on Mahommedan Law in the 1st volume of the Analysis, and provide himself with Hamilton's *Hedayah*.

PROCEEDINGS  
OF THE  
ASIATIC SOCIETY OF BENGAL,  
MARCH, 1847.

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The usual monthly meeting of the Asiatic Society was held on Wednesday evening, the 10th March. The Lord Bishop in the chair.

The minutes of the preceding meeting having been read,

Major Marshall stated that in the financial report lately submitted, no notice was taken of the debt of £150 incurred by the Society to the Hon'ble the Court of Directors in 1840, for the passage to this country of Mr. Blyth, the Curator of the Zoological Museum.

Dr. O'Shaughnessy, as one of the Secretaries, observed that he was not aware of the existence of this debt, but due enquiry should be made, and the result reported at the next meeting.

The proceedings of the February meeting were then unanimously confirmed.

The accounts of receipts and expenditure for the preceding month, with cash vouchers were laid on the table, for perusal of members during the ensuing month.

The following gentlemen were then balloted for and duly elected members of the Society.

H. Thornhill, Esq. C. S., proposed by Mr. Bushby, seconded by Lieut.-Col. Forbes.

J. Newmarch, Esq., proposed by Mr. S. G. T. Heatly, seconded by Dr. O'Shaughnessy.

Lieut. Douglas, Artillery, proposed by Capt. Broome, seconded by Dr. O'Shaughnessy.

Baboo Debendernath Tagore, proposed by Dr. O'Shaughnessy, seconded by Mr. Laidlay.

E. Linstedt, Esq., proposed by Mr. Blyth, seconded by Mr. Laidlay.

Baboo Dwarkanauth Bose, M.R.C.S.E., proposed by Dr. D. Stewart seconded by Mr. Blyth.

Rev. A. Sandberg, Benares, proposed by the Rev. J. Long, seconded by Mr. J. Ward.

Rev. William Keane, M. A., Emmanuel College, Cambridge, proposed by the Lord Bishop, seconded by Dr. O'Shaughnessy.

J. Kerr, Esq., Hindu College, proposed by Dr. O'Shaughnessy, seconded by Lieut.-Col. Forbes.

The following gentlemen were proposed as candidates for election :—

The Rev. S. Slater, proposed by Rev. J. Long, seconded by Rev. J. H. Pratt.

Count Lackersteen, proposed by Mr. Blyth, seconded by Mr. Laidlay.

D. Money, Esq. C. S., proposed by Dr. O'Shaughnessy, seconded by Mr. Welby Jackson.

Lieut. Staples, Bengal Artillery, proposed by Mr. Laidlay, seconded by Dr. O'Shaughnessy.

The subjoined letter from Mr. Carre Tucker should have appeared among the proceedings last month. The box of shells and bones to which it refers was exhibited at the January meeting.

*To the Secretary of the Asiatic Society, Calcutta.*

SIR,—I did myself the pleasure of sending you a few days ago, a box of bones, found at a place called Umhut, on the Koāna Nuddee, which flows from Oudh, and joins the Gogra at Gopalpore. A bridge is building near the spot; and the convicts in digging for Kunkur, came upon what would appear to be a pit filled with shells, deers' horns, and all sorts of bones. It appears to be about 12 or 15 feet deep. The size is not yet known; but many thousand maunds of shells have already been dug out for lime. The termination of the bed of shells, where we have come upon it, is perpendicular, like the side of a pit. The site is some jungle close to the high bank of the Nuddee.

No one in the neighbourhood can make even a tolerable guess how this immense mass of shells and bones could have come where we find them. There is no village any where near. Some of the people think that some great man in former days must have intended to build a bridge where mine is now building, and have collected the shells for lime. Others, that a mahajun may have collected them for exportation; but neither of these hypotheses will account for the large quantity of horns and bones found amongst the shells. Perhaps the most general belief is, that an Asur lived there, and that he was in the habit of chucking into this pit the bones of the men and animals he devoured, as also the shells of the fish he was forced to eat when he could get nothing better to devour!!!

I have little doubt the collection is artificial—but I am quite at a loss to imagine how, and by whom, it could have been made.

As a matter of curiosity, I have thought it right to send you some of the shells, bones and horns, with the above brief account. The discovery has been a fortunate one for me, in supplying me with an enormous quantity of the finest lime for my numerous bridges.

I have the honour to be, Sir,  
Your obedient Servant,

H. CARRE TUCKER.

*Magistrate and Collector.*

Goruckpore, 26th January, 1847.

Letters were read—

From the Secretary to the Superintendent of Marine, forwarding Meteorological Registers kept at Kyook Phyoo.

From the Society of Antiquarians of London, presenting the 31st vol. of the *Archæologia*.

From Captain Kittoe, respecting his late investigations of the Buddhist remains in the Gyah district, and announcing despatch of several sculptures and inscriptions.

*To the Secretaries of the Asiatic Society.*

DEAR GENTLEMEN,—I had intended being present at this meeting but am prevented, and as I had reserved my different papers as well as collection of Behar Inscriptions for the same occasion, they must also stand over for the next meeting.

The papers I have prepared are as follows:—

1. Notice of the Ruins and Temple of Oomga near Sherghatti, and inscriptions &c.
2. Notice of the Viharas and Chaityas of Behar.
3. Notice of the Buddhist sculptures at Bôdh Gyah.
4. Notice of the hills, caves and inscriptions, &c. of Barabar near Gyah.

With illustrations on a scale suited to the Journal, and ready for lithographing according to the plan suggested in a late letter to you on that subject.

I have the pleasure to state that I have despatched several cart loads of sculptures, &c. for our Museum, as well as a few Geological specimens.

I beg to invite the attention of the Geological branch or department to the subject of the mineral productions of the country south of Hazaribaugh, which I have lately passed through. The valley 10 miles south of the Dorunda road, the streams of which run westward exhibits the sandstone of the coal formation to a great extent; it was in this valley that coal was found six or seven years back. Above the rock and on the hills which separate it from the valley of the Deo Mad or Damooda, is a vast deposit of iron ore which supplies the province of Behar—

Gneiss ? make its appearance on the higher land and the sandstone again appears on either side of the Damooda valley ; no doubt coal would be found in abundance in all these tracts.

Sandstone of a less decided kind is found in the valley of the Barrakur, close to the great trunk road, where I quarried a large quantity for the public works, still I am of opinion that it belongs to the coal formation.

I have picked up rolled fragments of coal in the Mohana, which crosses the trunk road beyond Dunwa. I intended to have traced this coal, but public duties have ever prevented me. I believe coal would be found in the upper valleys of all the large rivers flowing from the Vindhia hills.

Having seen the Burdwan fields and those further west, which follow both the Barrakur and Damooda, as well as those just mentioned, I should lay great stress on the subject of the Orissa coal fields. I therefore now beg to assert that I feel confident that an extensive field exists in the valley of the Mshanuddee close to Cuttack, (below the surface,) and that the field I first brought to notice in 1837, called the Talcher mines, is fully as extensive as at first supposed by me. I can now safely say that the coal could be worked close to the river side (Brahman's) as low down nearly as Kurugpursad, below which the river is navigable the greater part of the year.

I would suggest that the valley of the Byturnee be also examined, though I consider the Brahmán's coals to be the most valuable on account of the immense supply of iron ore of excellent quality found in the same locality. Now that we are about to have rail roads with the consequent demand for iron, the subject of iron and coal fields becomes of first importance.

I must beg indulgence for this rambling letter ; the will must be taken for the deed. I am anxious to convey as much intelligence even of the slightest importance as chance throws in my way, with a view to stimulate others to do the same ; perchance I may convey some useful hint among the many.

M. KITTOE.

The marked thanks of the Society were directed to be conveyed to Captain Kittoe for this communication.

From Babu Debendernath Tagore, recommending that pundits from Benares should be employed in the publication of the Vedas.

*Minute on the intended publication of the Vedas by the Asiatic Society.*

- \*1 Chaturtha Arunya Gana.
- 2 Chandaggya Bráhmmana.
- 3 Agni Bráhmmana.
- 4 Atharva Veda Bráhmmana.
- 5 Atharva Veda Sanghita.
- 6 Anoostatra.
- 7 Atharva Prattangirá Kulpa.
- 8 Atharva Raháya.
- 9 Atharva Sanghita.
- 10 Arunya.
- 11 Arunyakopunishad.
- 12 Arshya Bráhmmana.

Though there are, as will be seen on perusing the list of Vedaic manuscripts specified in the margin\* sufficient materials, in the library of the Society, wherewith to commence the intended publications, yet I am of opinion that, for the reasons mentioned below, without the assistance of Vedaic Pundits who have studied the Vedas regularly as scho-

- 13 Rig Veda.
- 14 Rig Veda Prothamástaka.
- 15 Rig Veda Bráhmmana Punchika.
- 16 Rig Veda Bráhmmanástaka Punchika.
- 17 Rig Veda Soonta Sorton.
- 18 Kapistal Sunghita.
- 19 Gopatakha Bráhmmana Purvárdha.
- 20 Gopatakha Bráhmmana Prapatakha.
- 21 Ditiya Anoostatra.
- 22 Ditiya Arunya Gana.
- 23 Prathama Veda Gana.
- 24 Maddhaudina Sutpatha Bráhmmana Syasáhtaka Prapunchika.
- 25 Maitrayani Sákhá.
- 26 Moitra Baruna Sákhá.
- 27 Yajur Veda Maddhundina Sákhá.
- 28 Yajur Veda Satpatha Bráhmmana.
- 29 Vasa Bráhmmana.
- 30 Sarbingsa Bráhmmana.
- 31 Saptadasa Prapatakha.
- 32 Sám Vedhána Bráhmmana.
- 33 Sám Veda Uhagana.
- 34 Sám Veda Chhandasa.
- 35 Sám Veda Trayabingsati Prapatakha.
- 36 Sám Veda Panchabingsati Prapatakha.
- 37 Gopatakha Bráhmmana of the Atharva Veda.

that Vedaic Pundits should be procured from Benares, if obtainable there, and employed at fixed salaries, in order to assist in the intended publication.

DEBENDERNATH TAGORE,

*Member of the Oriental Section.*

From Dr. E. Roer on the same subject.

I take the opportunity also to report my proceedings with regard to the Vedas. I would have sent in my report concerning them long before, had it not been my wish to furnish the Society with a correct statement of the collections of the Vedas in Calcutta, which I could not as yet render complete, not having examined the MSS. of the Sanscrit College, to which I could not obtain access, the Library of the College being closed until Monday next. The Vedaic collections of our Library are very defective, and from the accompanying letter of Debendernath Tagore, you will perceive, that he believes we cannot procure parts of the Vedas in Calcutta, an opinion, which is also held by Radhakant Deb. There is however, a *complete and sufficiently correct* MS. of the Sanhita of the Rig or first Vedas (the first two parts are now with me) in the Library of Bishop's College, which has been placed at my disposal, and I would propose to print this Sanhita, if we can obtain the commentary, together with the commentary; if not, without it. With this view I will without delay employ a pundit, who under my superintendence, is to make a transcript of the MS. in question. With regard to the difficulties attending such an edition, as alluded to in Debendernath's letter, I believe, they are

lars, this very important and valuable undertaking of the Society cannot be executed to our entire satisfaction. Reason

1st, That frequent errors in copies are the invariable concomitants of manuscript preparation of works. Reason

2nd, That though a multitude of copies of the Vedas be procured for purposes of collation, yet the dialect in which they were written having in a great measure become obsolete and difficult to be understood even with the assistance of commentaries which are often no less obscure than the text, the collation cannot be properly made, as its effectual and satisfactory execution depends entirely upon a profound, critical, and scholastic acquaintance with that dialect itself.

I am therefore decidedly of opinion,

overrated. We should be able to do this here with almost the same success as in Europe, and I will take it upon me to bring this edition through the press, if the Society will avail themselves of my services. The language is antiquated only in a few grammatical forms, and there are some words out of use at present; but the language at the same time is simple; (it reminds one of Homer) and very far from the elaborative mode of grammatical structure, used at a more recent period. The suggestion, however, of employing a pundit, who has studied the Vedas at Benares, is a good one, as this will much facilitate the work.

E. ROER.

Both these letters were referred through the Committee of Papers to the Oriental Section.

From Colonel Sleeman, forwarding a Grammar and Vocabulary of the Goond language.

From Lieutenant Briggs, Seonee, describing an extraordinary rent effected in a hill in that district in the month of May last, apparently by volcanic agency.

*To the Secretary of the Asiatic Society, Calcutta.*

SIR,—In hopes that the following account of an earthquake, or eruption, which occurred in the month of May last, near to the ancient fortress of Mundelah, on the banks of the Nerbuddah, may be worthy of perusal, I have the pleasure of sending you a description (although a very imperfect one) of what appeared to me worthy of remark, after visiting the scene of the phenomenon.

About the end of May last, my friend Captain Skene, the Deputy Commissioner of the district, received a petition from the Thuseeldar of Mundelah, stating that during the night of the 27th May, the inhabitants of the villages situated at the foot of the mountain called "Dhumah Phai" had been thrown into a state of great alarm, by a tremendous noise and rumbling in the hill above them; which lasted the greater part of the night, and that in the morning they found that the hill "had opened" and "that trees of immense stature had been engulfed." We were by this account much inclined to believe that all this had been merely the effect of a landslip, but circumstances putting it in our power to visit the hill—we did so—and found our previously formed idea quite erroneous.

The Dhumah Phai, (which literally translated *should* mean the smoky mountain) is about 500 feet above the level of the plain—rather steep in ascent and covered with a thin stratum of earth, with numerous boulders of rocks projecting beyond the inclined plane of the hillside. Although we made every enquiry with the object of discovering whether any previous volcanic eruption had been the cause of the hill receiving the name of "Dhumah" we could not find that such had been the case, no tradition of the sort being known among the natives; and



some therefore inclined to believe, that as the Goonds are in the habit of giving every eminence a name, this has by chance received the term above mentioned.

On examining the hill we found that the eruption extends from the bottom to about three parts up. The effect of the shock has been to tear out, and push to either side, enormous masses of rock; (many of which have been split by the convulsion) and turn over trees of large size—conveying to the eye, the exact appearance as if a long mine had been so laid, that when exploded it had completely cleared a road-way of about 30 feet in breadth, and five or six in depth, leaving merely the bare surface of the rock composing the hill itself, exposed in many places; or, as if a gigantic plough had been passed down the mountain oversetting, tearing up, and pushing to either side, every obstacle that opposed it.—Rocks of from 20 to 30 feet in circumference, are seen split in half and removed to either side the line of eruption, not by any means exhibiting a tendency towards the foot of the hill, but appearing as if torn from their original position, and forced to the right and left—showing that the direction of the shock was from the interior, and not the upper part of the hill, as would have been the effect of a landslide. Indeed the position in which trees of large size are found, many of them with their roots uppermost, and branches entirely buried in the debris, clearly show that their displacement was occasioned by a more than natural cause. As many most respectable natives testify to the truth of the terrific noises that were heard during the night of the 27th May, we can have no reason to doubt this fact.

However with the most careful search I could find nothing of a volcanic nature apparently of a more recent date, than such specimens as are found all over this part of Central India. And now Sir, without intruding any idea of my own, as to the nature of the convulsion, let me beg your serious (?) consideration of the following conclusion at which the learned Thuseeldar has arrived: viz. "That the earth having become much heated, by the foregoing hot weather, had got fever; but having here opened, the bad matter had been discharged," and there was every likelihood of her doing well again!!

Your's very truly,

D. BRIGGS, *Lieut.*

*Supt. Jubblepore and Kamptee Road.*

*Seonee, 25th February, 1847.*

Papers were presented—

By Mr. Blyth on the species of Wild Sheep.

By Dr. W. B. O'Shaughnessy on explosive cotton and the results of the Artillery trials at Dum-Dum.

By Captain Madden, Bengal Artillery—Visit to the Pindree Glacier.

Reports were submitted by the Curators in the Geological and Zoological Departments.

*Report of the Curator, Museum of Economic Geology, December to February.*

I have received, through the Secretary to the Superintendent of Marine, the following very curious account of a phenomenon seen at sea. It were to be wished that we had many more such observers as the intelligent young officer who has given us this interesting note, for there is no doubt that these appearances are either indications of some extensive action going on, volcanic or electric, or of remarkable abundance of luminous animalculæ, and of which, if any of the water has been preserved, we may obtain some indices by chemical examination. I have written to Mr. Pearson and to Captain Biden, Master Attendant of Madras, requesting both to use their best endeavours to obtain for us specimens of the water, for I should suppose it impossible that some has not been preserved, since the ship must have carried a Surgeon who certainly should have done this.

No. 2310.

To H. PIDDINGTON, Esq.

SIR,—I have the honour by direction of the Offg. Superintendent of Marine, to forward for your information, the accompanying copy of a letter from Mr. George F. Pearson, Cadet of Infantry, Madras Presidency, dated the 27th ultimo, and of my reply thereto dated yesterday.

I have the honour to be, Sir,

Your most obedient Servant,

JAS. SUTHERLAND,

Secretary.

Fort William,

Marine Supdt.'s Office, 11th June, 1846.

*Ship Hashemy, May 21st, 1846.*

MY DEAR SIR,—In Lat. 37° 42' South, Long. 28° 48' East, being on board the barque *Hashemy* bound from London to Madras, we fell in with the following phenomenon in the sea, which perhaps may prove of some interest to you.

On the 17th of April in the above Lat. and Long. about 9 hrs. 45 min. (civil time) P. M. the surface of the sea became covered with what appeared to be a thick foam of a sparkling white appearance. This continued, being at intervals more or less bright and sparkling till near midnight. It seemed to exist in large patches over the sea, and when the appearance was at its height the passage of the vessel through the water could be compared to nothing else than if it were being borne through beds of driven snow.

During the phenomenon the Barometer was depressed  $\frac{2}{10}$  of an inch, and a thick black cloud hung over the vessel, which circumstances will I think indicate the presence of a large body of electricity in the atmosphere. I should likewise mention that the wind, which for two days had been very light, indeed at times almost calm, three quarters of an hour before the first appearance, shifted from N. N. E. into N. W from which quarter it blew a steady breeze till morning, when it died away into a light air.

On the afternoon of the same day several persons had perceived and actually talked about a dry kind of sulphureous smell in the atmosphere, wondering from whence it could proceed; was it not possible then that as the appearance was very much that of a gaseous vapour rising through the water, it might have been the effect of some submarine Volcano, the foaming appearance being caused by the fumes of sulphur rising through the water?

I had a bucket full of the water drawn up, some of which I put in a tumbler and tasted. It had a very bright sparkling appearance as of the purest spring water, but I could not discern any difference in its taste from common sea water.

In looking over Horsburgh's work I perceive that vessels have occasionally fallen in with a similar appearance, though if I could judge from his account, on a smaller scale. Surely it must have been something of this sort which vessels have mistaken for shoal water even when they could obtain no soundings. Hence the Telemachus Shoal and many others whose existence appears very doubtful.

Knowing the interest the Marine Board take in circumstances of this kind, I trust the extraordinary and interesting nature of this phenomenon may be sufficient apology for the liberty one, who is about to enter another profession of a very different nature, now takes in addressing you.

I remain, &c.,

(Signed)

GEO. F. PEARSON,

*Cadet of Infantry,*

*Madras Presidency.*

*Palaveram, May-27th. 1846.*

Major D. Williams of Kyook Phyoo has sent to us a small box of the minerals and earths ejected by the recent eruption of the Mud Volcano near the station. Upon examination I find them to consist exactly of the same kind as before. (*Proceedings of October 1843*), namely, grey indurated mud and shale, with black shaley masses, carbonate of lime fibrous and semi-crystallised, and Iron Pyrites.

Our active contributor Dr. Spilsbury, sends us from Bundlecund

12 Specimens Trap Rocks of various kinds.

1 Of the Copper ore from Sahghur reported on before.

20 Specimens of fossils of various kinds.

5 Specimens of the fine coal from Lameter Ghat.

We have received from our able contributor Lieut. Sherwill, of the Shahabad Revenue Survey, his splendid map of that district, which fully equals the former one, and he has added to it also some notes which, together with his magnificent collection of specimens (noticed in report of November 1845, when the present map and notes were promised), are like the former on Zillah Behar, unequalled by any contribution yet sent to the Society, as the fruit of the labours of a public officer in a most active department, yet finding time to combine with them, and to add so highly to their value, such researches. In reference to these maps I have to submit for the orders of the Secretary and the Society the following letters.

No. 61.

*To H. PIDDINGTON, Esq.*

SIR,—As I am desirous of having the Geological maps of Zillah Behar, and the southern portion of Zillah Shahabad lithographed in the Government Press, and as the original of these records are in your possession, I shall feel obliged by your making them over to me, at your earliest convenience, for the purpose specified above.

2nd. One lithographic impression of each map will be duly made over to you when received from the press.

I have the honour to be, Sir,

Your most obedient Servant,

H. L. THUILLIER,

*Offg. Deputy Surveyor General.*

*Supt. of Revenue Survey's Office,*

*Calcutta, the 6th March, 1847.*

*Capt. H. L. THUILLIER, Offg. Deputy Surveyor General.*

SIR,—In reply to your letter of this date, 6th, I beg to say that the maps in question are presented to the Asiatic Society for the Museum of Economic Geology.

2. Major Wroughton took a copy of the Geological map of Zillah Behar, which is no doubt in your office.

3. That of Zillah Shahabad will be submitted to the Society at its meeting on the 10th, when I will not fail to take the orders of the Secretary and the Society concerning it. There can be no objection, but on the contrary great advantage in having these valuable labours of Captain Sherwill's made as public as possible, but the originals I apprehend must eventually remain with us.

I have the honour to be, Sir,

Your obedient Servant,

(Signed)

H. PIDDINGTON,

*Cur. Mus. Eco. Geology.*

*Museum, 8th March, 1847.*

No. 63.

From *Lieut. H. L. THULLIER, Offg. Deputy Surveyor General,*  
 To *H. PIDDINGTON, Esq. Curator Museum Economic Geology.*

SIR,—I have the honour to acknowledge the receipt of your letter, dated 8th inst. and with reference to the 2nd Paragraph, beg to state, that a Copy of the Geological Map of Zillah Behar is in my office, but, as it is necessary whenever any map is to be lithographed, to take the exact impression from the *original* if possible, I trust the Society will not object to my being supplied with both the maps, executed by Captain Sherwill, for the purpose above specified.

2. On the Maps being lithographed, the Originals shall be returned, together with one Colored Impression of each of the Districts.

I have the honour to be, Sir,

Your most obedient Servant,

H. L. THULLIER,

*Supt. Revenue Survey's Office,*  
*Calcutta, 9th March, 1847.*

*Offg. Deputy Surveyor General.*

I have put into the form of a paper for the Journal the examination of a new Carbonaceous Mineral, which I have named *Tremenheerite*. It is a variety of the Anthracinæ, but neither Anthracite nor Plumbago, and is thus well entitled to a separate name.

(Signed)

H. PIDDINGTON,

*Cur. Mus. Eco. Geology.*

#### *Report of the Curator, Museum of Zoology.*

My Report for this evening's meeting is more brief than usual; and so much time has been expended during the past month in setting up the skin of the Giraffe, that I have but a small collection of other mounted specimens to exhibit. The donations for the museum are as follow:—

1. G. H. Bushby, Esq., Secretary to Government. A living specimen of a Marmot (*Arctomys bobac*, Pallas, v. *tibetanus*, Hodgson), from Sikim. This little animal is not more than a third grown, is quite tame, and seems likely to bear the difference of climate, as it does not appear to be incommoded by the heat.

2. G. T. Lushington, Esq., of Almorah. Two skins of the Tibetan Fox (*Vulpes nipalensis*, as erroneously designated by Mr. Gray).

3. D. C. Money, Esq. A specimen of a Nilotic Crocodile (*Crocodylus vulgaris*), taken near Thebes, and quite distinct from *Cr. palustris*, Lesson, of the Ganges, &c., which is regarded as a mere variety of the same by MM. Dumeril and Bibron. The length of this specimen is 10 feet; and we have stuffed examples of *Cr. palustris* and *Cr. biporcatus*, of the same length, from the neighbourhood of Calcutta.

Also a mummied Ibis, the skeleton of which will perhaps bear setting up.

4. R. Templeton, Esq., M. D., of Colombo. A further collection of Cinghalese

birds, comprising a new *Tephrodornis*, and a *Phyllornis* which I cannot satisfactorily determine. *Ph. Jerdoni* is common on the island, and I lately observed this species in considerable abundance in the Midnapore jungles; as also *Pynonotus flavivictus*, which is another common inhabitant of Ceylon; but neither of them inhabits the valley of the Ganges.\* In this collection, I may notice also *Parus cinereus*, Vieillot (v. *atriceps*, Horsf.), identical with specimens from Java, the Himalaya, and from central and southern India; and *Bucco rubricapillus*, Gmelin, distinct from the common *B. indicus*, and more nearly allied to the Malabar species referred to *B. barbiculus*, Cuv., in XV, 13, but which I now think distinct, and have termed *B. malabaricus*.

5. R. W. G. Frith, Esq. A huge specimen of the variety of the common domestic fowl, known as *Gallus giganteus*; a specific name which, I think, is inadmissible.

Also the skull of a Dolphin taken on the voyage out to India, which is all that I have been able to learn of its history. It agrees with the figure of *Delphinus delphis*, Linn., in the 'Ossemens Fossiles,' except that there is no trace of lateral constriction towards the base of the upper maxilla, and the teeth exceed fifty on each side above (amounting to fifty-three on the right side), and may be put down as fifty on either side below; this exceeds the extreme number hitherto observed in *D. delphis* (verus), and in no other species of true *Delphinus* described by M. Fred. Cuvier, are the teeth nearly so numerous.†

6. C. S. Bonnevie, Esq., of Rungpore. A large collection of Darjeeling birds, from which I have been permitted to select any required for the museum, and the rest are to be forwarded to that of the Christiania University. Among those selected for our own collection may be mentioned *Emberiza pusilla*, *Tchitrea affinis*, *Muscicapula McGregoriae*, (Burton,—the female of which is *Leiothrix signata*, M'Clelland and Horsfield, and *Niltava auricularis*, Hodgson), *M. sapphira*, fœm., *Ianthia flavolivacea* (p. 133, ante), *Pnoëpyga squamata*, *Tesia cyaniventer* (var. *auriceps*, Hodg., p. 137, ante), *T. castaneo-coronata*, *Culicipeta* (seu *Abrornis*) *poliogenys*, n. s., *Drymoica brevicaudata*, n. s., *Stachyris ruficeps*, n. s., *Ixulus occipitalis*, *Minia cinerea*, n. s., *Proparus chrysolis* (it should be *chrysopterus*,) m. and f., *Myzornis pyrrhoura*, *Erpornis zantholeuca*, and *Certhia discolor*,—for the most part, particularly five specimens ‡ Also a collection of Darjeeling *Lepidoptera*, from which a few good specimens have been selected.

\* *Oriolus melanocephalus*, so very common in Bengal, seems to be equally so in Ceylon, though in most parts of the peninsula of India, I believe it is of rare occurrence. Many other species are equally common in Ceylon and Lower Bengal: and *Malaccocercus terricolor* of Bengal, Assam, Nepal, and Orissa, is barely separable from *M. striatus*, Sw., of Ceylon. Indeed, coupling it with the fact of the deep colouring of *Acridotheres tristis* in Ceylon (XV. 314), and that of the representative of *Corvus splendens* being there black, though differing in no other respect, I question whether we are justified in considering *M. terricolor* to be really different from *M. striatus*.

† In XV, 368, for "*Delphinorhynchus rostratus*, F. Cuv." read "*D. frontatus*, F. Cuv."

‡ The novelties in this collection have been described and are incorporated in the continuation of my paper on 'New and Little Known Species of Birds.'

7. Mr. E. Lindstedt. Several specimens of snakes

8. Mr. T. C. Madge. A specimen of the common hammer-headed Shark of the mouth of the river, *Sphyrna Blochii*, (Val.), v. *Zygæna laticeps*, Cantor.

9. Lieut. Blagrave, 26th N. I. A few bird skins from the Upper Provinces.

10. W. C. Hurry, Esq. A number of living beetles, which, at this season, are extremely destructive to various flowers, &c., in the gardens around Calcutta. The species is widely distributed over the country, and is nearly allied to the well known Turnip-fly of England (*Halitica nemorum*); but I have no immediate means of determining it more exactly.

Among the few stuffed specimens, will be observed a Monkey from the Cape de Verd Islands (*Cercopithecus sabæus*): some undescribed Squirrels, and with them the *S. tristriatus*, Waterhouse, which I found in the vicinity of Midnapore, and have since received from Ceylon; the voice of this little animal being extremely unlike that of *Sc. palmarum*, which I found inhabiting the same places. Also a new Jungle-fowl, from Ceylon, *Gallus lineatus*, nobis: and a fine Cobra, 9 feet long, the *Hamadryas hannah*, Cantor, *As. Res.* XIX, 87, (1836;) being also the *H. ophiophagus*, Cantor, *P. Z. S.* 1838, p. 72, and *Naiia vittata* of Mr. Elliot, *Madr. Journ.* No. XXVI, 39, as identified by that naturalist with Dr. Cantor's reptile in the following No. of the same Journal, p. 390.

March 9th, 1847.

E. BLYTH.

*Books received during the month of Feb. for the meeting of the 10th March, 1847.*

PRESENTED.

Meteorological Register for January, 1847.—FROM THE SURVEYOR GENERAL'S OFFICE.

Ditto ditto, kept at Kyook Phyoo during the month of January, 1847.—FROM THE SECRETARY TO THE SUPERINTENDANT OF MARINE.

The Horn Book of Storms, for the Indian and China seas, third Edition.—BY H. PIDDINGTON, Esq.

Journal of the Royal Asiatic Society, No. XVII.—BY THE SOCIETY.

Archæologia; Vol 31.—BY THE SOCIETY OF ANTIQUARIES OF LONDON.

Historia Abbadidarum; Præmissis Scriptorum Arabum de ea Dynastia Locis nunc. Primum Editis. Auctore R. P. A. Dozy. Vol. Prius.—BY THE CURATORS OF THE ACADEMY OF LEIDEN.

The Oriental Christian Spectator, Vol. VIII. No. 2nd.—BY THE EDITOR.

The Calcutta Christian Observer, for March, 1847.—BY THE EDITORS.

R. Griffin & Co.'s Catalogue of Books and Stationary.—BY R. GRIFFIN & Co.

Statement of Facts relative to the transactions between the writer and the late British Political Mission to the Court of Shoa, in Abyssinia, by C. T. Beke, Esq.—BY THE AUTHOR.

A grammar of the Tahitian dialect of the Polynesian Language.—BY THE REV. J. LONG.

Biblical and Theological Vocabulary in English and Bengali.—BY THE SAME.

Dr. Carey's grammar of the Burman Language.—BY THE SAME.

Bhagavat Gita, textum recensuit at notationes criticas et interpretationem Latinam adject G. Schlegel; Editio altera auctior et emendatior cura Christiani Lasseni.—BY THE EDITOR.

Kal'ha, Kena, Prasna, Mundaka, Mandukya, Aitareya, and Vajsaneya Opanishads.—BY BABU RAJENDRALAL MITTRA.

EXCHANGED.

The London, Edinburgh, and Dublin Philosophical Magazine, Nos. 196—7.

Transactions of the Geological Society of London, Vol. VII.—part 3rd

PURCHASED.

Journal des Savans, Octobre 1846.

The Annals and Magazine of Natural History, for December, 1846.

The Lord Bishop having retired and Mr. Bushby taken the chair.

*Mr. Hume* rose and said there was a passage in the report lately published to which he wished to call attention. "Regarding Dr. Cantor's very beautiful drawings, the Secretaries have failed to obtain some essential information, and which they cannot hope for before Mr. Torren's expected visit to Calcutta in the ensuing month. The Committee of Papers confidently hope that in connexion with the Journal nearly the whole of Dr. Cantor's drawings will be published by the Society within a moderate period." He wished to ask if the information alluded to had been obtained. Further, on turning to the accounts he found that 2561 Rs. had already been spent on the Cantor drawings. He supposed that the accounts published with the Report were passed and beyond discussion, but he desired to be informed how many of these drawings were actually completed, and whether vouchers were forthcoming for the sums paid. He wanted a direct answer, a plain yes or no, to these questions.

*Dr. O'Shaughnessy*, (Senior Secretary present) replied that had Mr. Hume given any notice of his intention to ask these questions precise answers would have been in readiness. He regretted Mr. Hume had not started the discussion at the meeting regularly fixed for the consideration of the Report. He objected to Mr. Hume's categorical mode of questioning, as one uncalled for and unnecessary among a Society of gentlemen, whose only desire could be to aid each other in every enquiry calculated for the Society's benefit. *Dr. O'Shaughnessy* proceeded to observe



that the accounts were now printed for the first time since 1842. They were printed for general information, and although they had doubtless been submitted to regular meetings every year by his distinguished predecessor, still the Society at large had had no opportunity of examining them, and he considered every item fairly open to investigation. As to the number of Dr. Cantor's drawings completed, he believed it to be 13 or 14. Mr. Muller, the accountant, could say whether vouchers were in existence or not. He however begged permission to disclaim all responsibility for himself or his colleague Mr. Laidlay for any of the expenditure on account of the "Burnes or Cantor drawings," all of which had been entered upon previous to his election, and all further outlay upon which had been stopped on his suggestion, on his taking charge of the office. Mr. Piddington was at the time the executive officer of the Society in the arrangements made, and that gentleman could of course give any explanation required. He had only to add with reference to the intention of the Committee to publish the Cantor drawings in connexion with the Journal, that it was intended that any such cost should be included in the sum of 350 Rs. monthly set apart for that periodical.

*Mr. Muller* stated that on his being appointed accountant in July, in succession to Mr. Bolst, he found the papers of the Society in such confusion that he had the utmost difficulty in bringing them into any order. The vouchers he received were all without number or classification. He could not speak positively as to the existence of vouchers for the payments now under discussion, but at the next meeting he would be prepared with every information on this subject.

*Mr. Blyth*, Curator in the Zoological Department, begged permission to disavow all responsibility regarding the publication of the Burnes' drawings, which he looked upon as equally discreditable as works of art and in a scientific point of view. He had never been consulted as to their publication, although from his office in the Society his advice might have been naturally looked for.

*Mr. Piddington*, on being called upon, said that the history of the Burnes' drawings was, briefly, that being sent to the Society from Government, their publication was determined upon by the Society at a regular meeting, and a Committee named, of which he had been Secretary, to superintend the work, he being at that time only a member and not

an officer of the Society. The estimates and report of that Committee were duly sanctioned and approved of by the Society, and reports of progress were from time to time made and confirmed; all of which would be found in the proceedings of those years. The coloured plates were also exhibited with these reports, and unequivocally pronounced to be most creditable to the artists, as *exact copies* of the drawings, which together with the determination that the whole of the drawings were to be published, and not a selection from them, was the principle adopted by the Committee and confirmed by the Society. Whatever then had been done was the act of the Society and of no one individual. With respect to Dr. Cantor's Chusan drawings, the superintendance of part of these also had fallen under his management when Sub-Secretary. He was unable to say by what authority this undertaking had been commenced, but he received orders from the late Secretary, Mr. Torrens, to obtain estimates, and no bargain was concluded without his full knowledge and approbation; it being simply his (Mr. Piddington's) duty to carry on the Society's work as ordered by the Secretary. Dr. Cantor, himself a first rate artist, had pronounced his highest approbation of the style in which his work had been so far reproduced as exceeding any thing he supposed could have been done in Calcutta, as had also the late Dr. Griffiths. With respect to the charges, it was impossible for him to do more than to state generally that the colouring of plates of drawings of Natural History, was always most expensive, and that all other accessaries also were required to be of the first rate talent and quality procurable, and to this was to be attributed the high charges for these works, if they really were high, which he did not think they were. As to the gross amount charged in the account, of that he could not speak, having, as he desired expressly to state, no control whatsoever over the expenditure or payment, farther than to audit bills, but the whole of the estimates and every paper connected with these publications had been specially and most carefully made over by him to the late Secretary in March last, and these, together with the accountant's vouchers for payments ought to be forthcoming.

The original drawings and sets of the lithographed copies were now produced by the Librarian and handed round for examination of the members.

*Mr. Hume* then observed that examination of the drawings and

lithographs confirmed him in the belief that the funds of the Society had been most improvidently wasted. The sets of Cantor's collection had cost Rs. 2561, being 183 Rs. each set—now he had much experience in the expense of lithographs, and would pledge himself to produce plates infinitely superior to those now before the Society at the cost of from 5 to 10 Rupees per 100. Whether vouchers were forthcoming or not was now of no consequence. The money had been irrecoverably lost, but to guard against future extravagance of this kind he proposed, that, "no future outlay take place for drawings of any kind without regular estimates being in the first place submitted to and approved by a general meeting."

*Dr. O'Shaughnessy* having seconded the resolution it was unanimously carried.

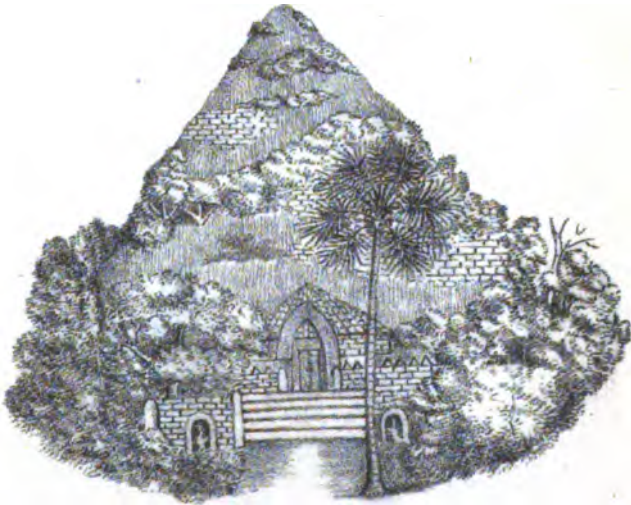
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We must not allow the present occasion to pass without adverting to the highly interesting lecture on the Buddhistical remains of Gyah and its neighbourhood, delivered in the Society's hall, on the 31st ult. by Capt. Kittoe. As the substance of the lecture is contained in the various papers handed to the Secretaries by that gentleman for publication in the Journal, it is unnecessary to give any more extended notice of it here; but we may mention that there was a goodly attendance of both members and strangers, who appeared much gratified with the instruction and entertainment of the evening. We trust that Capt. Kittoe's good example will be followed by others whose researches admit of communication in the same agreeable form.

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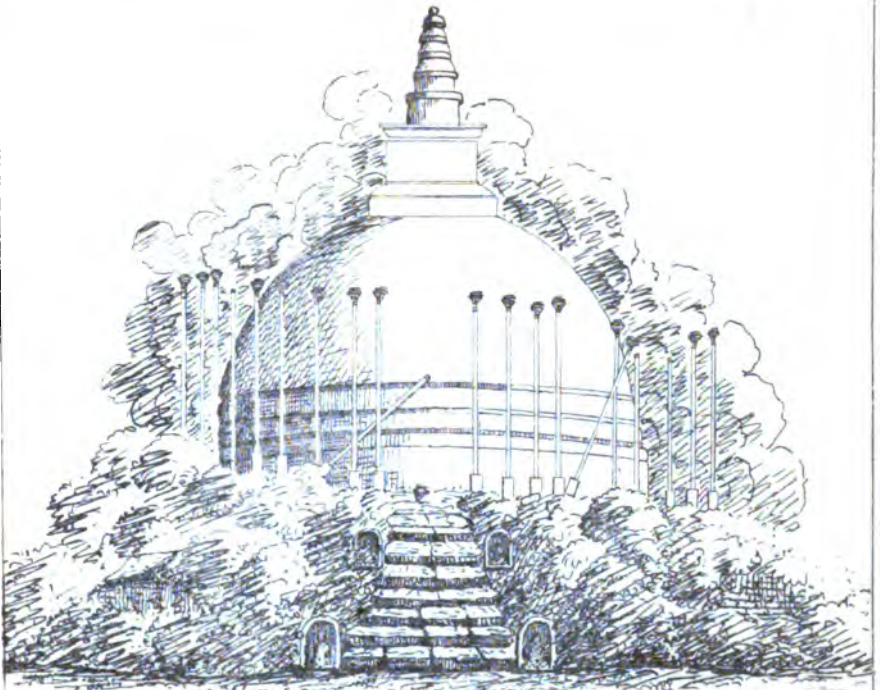


*The Jaitawanarāmaya Dagobah.*

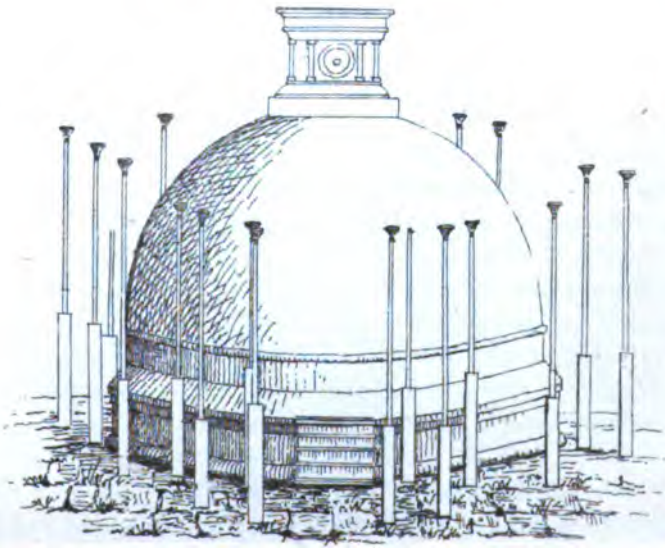


*The Ruanwelle Dagobah.*





*Thuparamaya Dagobah.*



*Lankaramaya Dagobah*





JOURNAL  
OF THE  
ASIATIC SOCIETY.

MAY, 1847.

*An Account of the Temple of Triveni near Hugli, by D. MONEY, Esq.  
Bengal Civil Service.*

As in architecture the superstructure depends upon the foundation, so in examination of ruins that time has made and spared, and in the attempt to elicit something of their earlier origin and history, how dependent are our conclusions upon the data that present themselves, and how difficult where these are slight and imperfect to form a satisfactory opinion!

The Temple of Triveni is shrouded in mystery, which legendary tale in the absence of historical fact cannot solve. Of its early date we know nothing. It is perhaps the most interesting ruin in Bengal, whether with reference to its present appearance or its past associations. About five miles from Hugli it stands on the most elevated spot in the neighbourhood, commanding a view of the river, which winds at a little distance beneath it. The temple originally must have occupied a large space and consisted of 3 or 4 Courts. On ascending two or three broken steps to the first Court you perceive on your right a part of the original temple, consisting of two rooms, of which there remain only the massy walls that enclose them and the doors by which you enter. You are struck at once with the solidity of the masonry, which but for Mahomedan aggression and Mahomedan sacrilege would have

defied till now the ravages of time. There is something Egyptian in the appearance of the doors, the sides inclining a little inwards towards the top, but this has been caused I think by a displacement of the stone-work. Each side is formed of one stone about 9 feet high, with a serpentine anaglyph running down the centre. From the first room a window looks out towards the river, on the outside of which there is a little ornamental engraving very light and chaste. A Mahomedan tomb desecrates one of the rooms, the inscription on which presents a passage in the history of the temple. Separated from the Court at a little distance is another Ruin of the original Temple of a different character. Here as in the other the hand of the invader and destroyer has been at work, and the demolition and displacement of the original masonry, the subsequent patchwork, and the superadded dome, are evidences of the ruthless and fanatical spirit, which marked in every clime and through every era, ere the power of the Crescent waned, its desolating course. The original Peelpye pillars in this temple are standing, and some of the stones in the outer walls have the appearance of an earlier date. On one of them is an inscription in Devanagree, which could not be decyphered. Mr. Marshman thinks this temple was built about 300 years ago by a Rajá of Orissá, Mukund Deb. It is with great diffidence I would venture to dissent from so good an authority, but there are facts which go far to show, as well as the appearance of the ruins, that its erection must have been at a much anterior date. I have alluded to an inscription upon a Mahomedan tomb. In this tomb was buried Zafir Khan, called by the Hindus Darap Khan, and the inscription which I annex with the translation, gives the date Hijeerah 713, or A. D. 1297.

بامر الخان الاجل الكريم المجد الجزيل العطاء الجميل النا نصير الاسلام  
 اظهر الانام شهاب الحق والدين معين الملوك والسلاطين مرابي  
 ارباب اليقين خان محمد ظفرخان اظفروه الله على اعدائه وعطف  
 اوليائه في غره المحرم المضاف الى سنه ثلث عشر سبعمايه \*

“By the order of the titled, beneficent, most worthy, bestowing good rewards, the protector of the Mahomedan faith, the most famous among men,

a bright star of justice and religion, the defender of Kings and Princes, the protector of the faithful, Khan Mahamud Zafir Khan. God grant him victory against his enemies and bless his Race on the 1st Mohurum seven hundred and thirteen Hijerah."

The following is a translation of the Khurseenamah preserved by the Khadems attached to the tomb, two of whom are appointed as Mutawulees by the Court of the Sudder Nizamut Adawlut and hold Rent-free lands in Nuddea and Hugli. "Shah Zafir Khan Gauzee, accompanied by his nephew (sister's side) Shah Soofee, leaving his connections at Mundgaun, Pergunnah Konwar Portup, Chaklah Muksoosabad, came to Bengal for the purpose of converting infidels to the Mahomedan faith. Having made a proselyte of Raja Man Nriputi, he was killed in a battle fought with Raja Bhoodev at Hugli. His head was left on the field and his body was buried at Triveni. Ugwhan Khan, son of the aforesaid Shah Zafir Khan Ghazee, having marched against the Raja of Hugli in Sircar Satgram, conquered him, converted the infidels to Mahomedanism, and married his daughter. After some time Ugwhan Khan also died at Triveni. The descendants of the Khanzadeh are still in existence. The title of Khan was conferred by Feroze Shah." At Pundooa there is a mosque or monument of Shah Soofee, who was nephew of Feroze Shah of Delhi, and the Aymadars claim the Rent-free Kúsbah as descendants. They hold a document from which it appears that their title has existed for 500 years. This corresponds with the date of the inscription on Zafir Khan's tomb and is good evidence that Zafir Khan and Shah Soofee were contemporaries. History is silent as to the professed object of the visit of these two connections of the royal family of Delhi to this part of Bengal, and the chasm is not supplied by the following legend. A Mahomedan subject of a Hindu Raja on a certain festival in honor of his son used cow's flesh. The Raja slew the son. The father resorted to the Court of Delhi and told his tale to Feroze Shah, who immediately sent an army to Bengal against the Raja, commanded by Zafir Khan and his nephew Shah Soofee. The Raja's name was Bhoodev Nriputi, with whom a battle was fought at a place called Mahanud near Satgram, about 8 miles west of Triveni, where Zafir Khan's army was victorious. There is another curious legend connected with Zafir Khan. He was in spite of his hostility to the Hindoos and the destruction of their Raj

looked-upon as a Boozoorg, or a man of divine inspiration, and is said to have worshipped Gunga. She smiled on the apostate devotee, and on one occasion so wrapt was he in devotion, that she rose from her liquid bed like

“ Another Venus breathing fresh and fair  
A goddess sparkling in her wavy dress,”

and overpowered him by fascination of her charms. Such was the effect of her influence over his spirit that he forgot the Koran for the Shás-  
ters, and in the ecstasy of the beatific vision the full tide of his aspi-  
rations rolled in Sanscrit shlokas instead of Persian verse. This is a  
remarkable but melancholy instance of the weakness of faith against  
the potency of love. The champion of a fanatical creed, with sword  
in hand, is caught like the God of war in the net work of beauty. The  
Sanskrit shlokas he composed are remembered and repeated to this  
day. They are called the shlokas of Durap Khan, and there is scarce-  
ly a clever pundit in India who does not know them. The follow-  
ing is selected as a specimen.

सुरधुनि मुनिकन्ये तारयेः पुण्यवन्तं स तरति निजपुण्यै क्षत्र  
जित्ते महत्त्वं । यदि च गतिविहीनं तारयेः पापिनं मां तदपि तव  
महत्त्वं तन्महत्त्वं महत्त्वं ॥

“ Oh ! Suradhuni Gunga, the daughter of Janhoo Muni, what will be thy  
greatness if thou wilt bestow salvation on the virtuous, who are saved by  
their own merits !—If thou bestowest salvation on me, who am a helpless  
wretch, I would then proclaim thy glory to the highest extremity.”

This religious metamorphoses in Zafir Khan must have had an effect  
on his son Ugwhan Khan, for he married the Raja of Hugli's daughter.  
She was buried within the precincts of the temple, where her tomb is  
still standing. It has crumbled to the ground, and there is no in-  
scription to point it out. But a curious custom marks the spot. Hin-  
doo votive offerings are presented there on Mahomedan festivals.

The date of the Arabic inscription on Zafir Khan's tomb, the  
Khurseenamah of the Khadems, and the statement of the Aymadars of  
Shah Soofee's tomb at Pundooa, correspond nearly with the following

account given by Ferishteh of Feroze Togluk of Dehli (vide Brigg's translation of Ferishteh, page 334, vol. IV.).

“On the death of Shamsooddeen, the nobles of the state elevated his eldest son to the throne three days afterwards. He had not long entered on his rule before his country was again invaded in the year A. H. 760, or A. D. 1358, by Feroze Togluk of Dehli.” The next passage is a curious coincidence. “When the Dehli army arrived at *Pandwah*, Sikunder Poorby, following his father's example, took refuge in the fortress of Yekdullah, &c.” This Feroze Shah must have been one of the Afghan Sultans of Hindoostan of 3d Turk Dynasty, who ascended the throne of Dehli about 1351 A. D. Zafir Khan may have been brother-in-law to Feroze Shah. He was uncle by the mother's side of Shah Soofee, and Shah Soofee was nephew of Feroze Shah. Could he also have been the father of Ababek Shah, who mounted the throne of Dehli in 1389? *His* father's name was Zafir Khan. The next question is who was Raja Man Nriputi converted to the Musalman faith by Zafir Khan? Was he one of the Rajas of Orissa, the limits of which territory extended till two centuries after as far north as Triveni. Mr. Marshman in his history of Bengal states as follows:—

“The powerful kings of Orissa had previously extended their conquest in Bengal; and hence the Oriyahs boast that their kingdom once extended to Triveni on the Bhageerutee. In the year 1550 Telenga Mookund Deb ascended the throne of Orissa. He was the last independent king of that country; he founded a ghat and temple at the sacred spot of Triveni which formed the northern boundary of his dominions.” Compare Asiatic Researches, page 164, Vol. XV. “During the sway of the princes of the Gungabun's line, for a period of nearly four centuries, the boundaries of the Raja of Orissa may be stated as follows; with sufficient accuracy for a good description. North, a line drawn from Triveni Ghat above Hugli, through Bisherpore to the frontier of Putkun, east, the river Hugli and the sea south, the Godaveri or Gunga Godaveri, and west, a line carried from Singbhoom to Sonepur.”

If Raja Man Nriputi was not one of the Rajas of Orissa, it is probable that both he and Raja Bhoo Dev may have been zemindars connected with the royal family of Orissa, as they appear to have been chiefs of some consequence, or else tributary to that power. Their

names are not among the Hindoo kings of either the Sen or Pal dynasty.

Within the first part of the temple on some of the stones are the following inscriptions in the Nagree character.

|                                                                         |                                                  |
|-------------------------------------------------------------------------|--------------------------------------------------|
| सीता निवासः श्रीरामाक्षिषेक<br>Sri Sitá Nidhúsah, Sri Rámábhisheka.     | } The residence of Sitá. The coronation of Ráma. |
| पक्षिषेक }<br>Bhisheka. }                                               |                                                  |
| श्रीरामेण रावणं बध्नाः<br>Sri Rámena Rávana Badha. }                    | } Rávána killed by Ráma.                         |
| सीता विवाहः }<br>Sitá Bivaha. }                                         |                                                  |
| कंसवधः }<br>Kangsa Badha. }                                             | } The distruction of Kangsa.                     |
| चानूरवधः }<br>Chánura Badha. }                                          |                                                  |
| श्रीकृष्णावधुरयोर्युद्धः<br>Sri Krishna Vána Surayor Yuddha. }          | } The war between Krishná and Ván Rájá.          |
| वृद्धयन्मदुःशसनयाद्यदुःक<br>Vridhudyumna dyah Shasánaydya dya dwamna. } |                                                  |

There are also near the northern and eastern entrances images of some of the Hindoo gods, such as Narasingha, Varáha, Ráma, Krishna, Lucshmi, &c. &c., most of them much defaced. The stones with the inscriptions were probably placed below some of these deities or others that have been destroyed, and as these deities are peculiar to the worship of Vishnu, it is most likely that the temple was consecrated to that deity. The stones containing the inscriptions are evidently out of their places. There is no regularity in their location, and one or two of them have the wrong side uppermost. From these appearances as well as others already mentioned, it is clear that the building is not now in its original state, and that formerly it must have been one Hindoo temple. The literal signification of Triveni is "three streams," in allusion to the river Gungá, Jumna, and Saruswati held sacred by the Hindoos. The spots where these rivers meet and where they separate are considered holy, and on this account the Shastras enjoin that expiatory ablutions should be particularly performed at these places.

According to Hindoo tradition there are two Trivenis, one at Prayag

or Allahabad, called *Joocta Veni*, on account of the junction of these streams, and the other *Moocta Veni* near Hugli, on account of their separation.

At the latter place the Jumna separates and takes its course eastward near *Gustia's Khal* or Bagur Khal, about a mile from Triveni, round the villages Jaguli, Beeroie, &c. and uniting afterwards with the rivers Chota Durga and Bura Durga in the Sunderbuns, ultimately joins the bay of Bengal. The Saruswati takes its course on the western bank to the Ganges round the villages Triveni, Supta-grama or Satgaun, Hossenbazar, &c. &c. and branching out from the creek at Sankhral near Budge Budge, joins the river Hugli and flows into the bay of Bengal.

Alluvian accretions have nearly choked up the bed and diverted the course of the Jumna, and it is now almost dry and not navigable by boats. But it is a fact, which has been I believe clearly ascertained, that in former times the main branch of this river flowed under the walls of Satgaun by Amtah and Tumlook into the Ocean, and that ships of large size came up to Satgaun, which was then famous for its commerce. The Saruswati is only navigable in the rains. The various wild mythological Hindoo traditions of the sources of these sacred streams must have given additional sanctity to Triveni.

The following shloke from the Muha Bharata, points out the locality of this sacred spot :—

प्रद्युम्न नगराक्षये सरस्वत्यास्तथोत्तरे । तद्दक्षिण प्रयागस्तु गङ्गातो  
यमुनागता ॥ स्नात्वा तत्राक्षयं पुण्यं प्रयागइव लभ्यते ॥

“On the south of Pradyumna Nagara, north of the river Saruswati, is the Dukshin Prayāga, or south Prayāga, where the river Jumna separates from the Gunga. This place is equal (*in point of holiness*) to north Prayāga (Allahabad), and imperishable virtue may be attained by means of bathing here.”

The celebrated Raghununduna, the compiler of Smriti Shastras or Hindoo Laws, whose doctrines or religious rites are strictly observed by almost all the natives of Bengal, refers to the spot in the Prāyas-chittya Tutwa, or book treating on the expiation of sins.

दक्षिण प्रयाग उन्मुक्त वेणी सप्तयामाख्य दक्षिणदेशे ।

“The south Prayāg called the *Moocta-Veni*, is situated in the southern part (*of Bengal*) near Supta-grāma.”

Satgaun or Supta-grama, must also have contributed to the sanctity of Triveni. It was not only famous for its commerce in the palmy days of Rome, but it was here the seven wise men of the east, the Supta Rishis or Munis, renowned for their piety as well as their wisdom, resided, and in the plantain groves, or on the banks of the sacred stream, worshipped the river goddess. The Hindoos believe that they came with Gunga from Hardwar to establish her worship at this place. Their names were Marichi, Angira, Atre, Pulastya, Pulata, Crutu, and Vashishtá. Supta-grama was so called from the seven sages having resided there. Their worship of Gunga is referred to in the following extract from the Maha Bhágbut Pooran.

तत्र सप्तर्षयो वीक्ष्य गङ्गां देवसुदुर्लभां । अश्वत्थं वीक्ष्य सानन्दां  
शंखशब्देन नारदा इत्यादि ।

“Oh! Nárada, the seven Rishis after seeing Gungá, who was nearly to be seen even by the *Devts* worshipped her, and she was pleased on hearing the sound of the shell, &c.”

Mention is made of Supta-grama or Satgaun in Rennell's memoirs, as well as Hamilton's Hindoostan, and Mr. Marshman in his history of Bengal, page 2, gives the following account :—

“The chief city of the west of Bengal was Satgaun, not very far north of Hugli. It was known to the Romans. It is also mentioned in the Poorans as Supta-grama, or the seven villages. It was the great mart of Bengal to which nearly all the sea-borne trade was brought.” A tradition is still current amongst the inhabitants of Triveni that many temples stood once on the banks of the three sacred streams, and they attribute to the seven Rishis the honor of their erection. It is most probable that the banks of these sacred streams in those early times were studded with temples. Every neighbouring spot has its legend still and retains its sanctity, and if such buildings are the signs of a successful faith, whatever that faith may be, can we wonder, where no clearer light had yet shone, that such signs were numerous, and that Idolatry, springing with the mythological river at its mountain source, should swell with the stream, and pour its full tide along unchecked, deluging the country on either side as it passed to its Ocean boundaries.

Such temples, if they remained unscattered in the time of Zafir Khan Ghazee, could scarcely escape the fury of the terrific Kalapahar.



He lived about the reign of the Orissa Raja Telenga Mookund Deb, A. D. 1550. He was by birth a bráhmaṇ, but by conversion a Muhamadan, and such was the terror he inspired, that it is commonly reported and believed, that the arms and legs of the idols for many a kros round dropped off at the sound of his kettle drum.

The present ghaut is of modern date, but the former possibly may have been coeval with the temple. Stones of large size are imbedded in the river, between the ghaut and the temple, which probably are the ruins of the ancient ghaut. Trivení is still held in high estimation by the inhabitants of Orissa. The fame of its sanctity is far spread. Once a year there is a grand mela, and thousands flock to the ghaut for the purpose of bathing in the river. The sight is well worth the seeing. It is a fine picture for a clever artist. There is something highly picturesque in the attitudes, the grouping and the dresses. There is too a lesson to be learned from the deep fervor, however mistaken, and the burning zeal, however blinded, of the anxious worshippers. A lesson which Christians may learn and not be ashamed, and yet a painful impression is forced upon a thinking mind, that while light and knowledge are spreading rapidly, and so many nations enjoying the blessings they confer, here in ancient India, near the very seat of a Christian Government, superstition so dark and strong should hold its sway, and delude, alas how fatally its thousands and thousands of votaries.

This is but a skeleton account of Trivení, which others may be able to fill up. These are but broken links of a chain it is difficult to connect. Others in possession of better data, and with a better knowledge of Indian history, may be able perhaps to form a connection.

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*Notes on the Caves of Burabur, by Capt. KITTOE, 6th N. I.*

I now proceed to redeem my pledge of publishing the result of my enquiries concerning the caves of Burabur in Bahar.

Differing from all other works of the kind known to us, these caves or chambers are, with one exception, entirely devoid of sculpture or ornament of any kind. They are in all seven in number; four in one

hill, three in another, but the name "Satgurba," commonly understood to mean "seven chambers," is applied to two only, which subject I shall treat of further on.

I shall first of all state that the hills called Burabur, are isolated rocks of sienitic granite rising abruptly from the plain about 15 miles north of the city of Gyab, by the left bank of the Phulgo or Mahanud-da; the cluster is remarkable for its picturesque appearance, and for the noble masses of rock piled, as it were, one above another, with hardly any soil, consequently little vegetation, and rising to various heights, from 100 to 3 or 400 feet.

Although Burabur is that by which the cluster is commonly known, each hill has a name of its own. The highest being called "Burabur," also "Sidheswur," from a temple to Mahadeva that once crowned the highest, and of which I shall speak presently.

The next in height is the "Kowa Dol," which is detached from the rest by near a mile to the south-west.

A third is called "Nag-arjuni," and is the eastern-most of the great cluster.

A fourth, and the smallest, called Durhawut, is at the northern extremity; others have names also, but as the above alone contain objects of notice I shall rest content with giving them only.

The Kowa Dol being first met with, on coming from the Dak bungalow of Belah on the Patna road, from which it is distant full six miles, I shall take it first. It is an almost entirely bare rock, having nearly a perpendicular scarp on its northern face, and sloping at an angle of  $45^\circ$ , more or less, on the opposite or southern side: east and west, it is disjointed and inaccessible; huge stratified masses are piled one over the other, decreasing in length at each end, the whole is surmounted by single blocks like pillars; the centre one of which towers above the rest and is conical. It is said that formerly there was a huge block balanced on the top of this cone, which from its being moved by birds alighting on it obtained the name of "Kowa Dol" or crow-moved, or the crow-swing; about a century or less back, this rocking-stone fell down, where it may still be seen.

This hill seems to have been surrounded by a large town; there is an artificial mound continuous round the north and east faces, filled with broken pottery, bricks and blocks of hewn stone; there are two names

given, "Sarain" and "Summunpoor; on the portion called by the latter name there is an extensive Muhammadan cemetery; there are none but paltry monuments with fragments of some ancient Buddhist temple built into them.

In the hollow or recess on the east side are the remains of a once splendid Buddhist temple, of which many pillars are still standing, also a gigantic idol of Budha, seated, with no other inscription than the usual pious sentence of the Budhists. The dimensions of this figure, which is beautifully executed, are as follow:—

|                                     |     | <i>Ft. in.</i>      |
|-------------------------------------|-----|---------------------|
| From seat to crown of the head..... |     | 8 0                 |
| Across the shoulders .....          |     | 4 0                 |
| From knee to knee .....             |     | 6 0                 |
| Round the wrist.....                |     | 5 6                 |
| Do. the neck .....                  |     | 3 8                 |
| Do. head .....                      |     | 5 8                 |
| Across the forehead .....           |     | 1 4                 |
| Length of thigh .....               |     | 3 6                 |
| Do. of shin .....                   |     | 3 6                 |
| Do. of upper arm .....              |     | 2 6                 |
| Do. lower Do. ....                  |     | 2 0                 |
| Round the arm .....                 |     | 2 8                 |
| Do. the wrist .....                 |     | 1 6                 |
| Depth of head....                   | 2-6 | Length of hand 1-4  |
| Do. of face .....                   | 1-6 | breadth of Do. 8-0  |
|                                     |     | Do. of foot.... 1-6 |
|                                     |     | breadth of Do. 8½   |

These measurements will convey some idea of the proportions of this fine piece of sculpture.

The Sinhasun or throne, is very handsome; there are the usual supporters, the Sinhas or lions rampant, trampling on elephants couchant, and ridden by amazons armed with shields and swords. The stone is the grey chlorite or pot stone; of such almost all the idols in this district as well as of Orissa are made; from the style of the carving, and the alphabet of the inscription I can assign no very remote date to these works; not more than 8 or 900 years, if so much.

Leaving this Buddhist relic we find some 60 or 80 figures of bráhmical idols rudely cut in the huge detached masses of rock at the foot of the hill. Of these Durga slaying "Mahésh-Asúr," is the principal,

and most often repeated ; the next is the Lingam, and again the Gouri Sunkur, or Mahadeva, caressing Parbutti, who is seated on his knee, with the bull, "Nandi" at his feet, and the "Sinha" or lion at her's. There is one block hewn into the shape of a small temple, with niches and images on the four sides. It has formed part of a small Dehgope to the memory of some departed devotee of heretical sect, the great Budha temple is likewise a funeral monument, as I shall, I hope, establish hereafter in a treatise on the subject of the Dehgopes or Chaityas for which I have collected much matter.

The sculptures on the detached blocks are in a very rude style, but this may be attributable in some measure to the extreme coarseness, and hardness of the material, as well as inequality in the grain. The weather was so windy and cold that I could not make proper drawings of these sculptures, but the accompanying rough sketch will convey some idea of their position, particularly of those to the arrangement of which I would call attention, as follows :—

First niche, from proper right, male figure erect with a spear ; 2nd, female figure "Pudmavati" or "Maya Davee;" 3rd, Budha seated ; 4th, Mahadeva and Parbutti, commonly called "Gouri Sunkur;" Parbutti seated on Mahadeva's knee with the bull Nandi at his feet, and the Sinha or lion at her's ; 5th, male figure erect with four arms ; No. 6, male figure riding on the shoulders of another ; 7th, the Lingum and Yoni ; 8th, male half figure "Aruna?" 9th, Mahadeva and Parbutti repeated ; 10th, male figure erect holding a lotus in each hand, probably "Surya;" 11th, Gunesha ; 12th, female figure with four arms, attended by Nandi and Sinha, perhaps meant for "Durga," 13th, male figure standing on a prostrate figure. After these, nine niches have, what appears to me to be, Durga slaying Mahésh Asúr, with her trident ; she has one foot on the buffaloe's neck and holds it by the hind leg. This subject is repeated on many detached rocks. The Linga is of as frequent occurrence. There is one very large four-faced Linga called the Choumurti Mahadeva, such as may be seen in the caves of Ellora ; it is of common occurrence in this district. This subject of the Linga I shall reserve also for a future paper, and here take leave of the Kowa Dol.

We now proceed eastward for half a mile or more, then skirting the southern base of the main cluster for a mile, an embankment is met with connecting one spur of the hill with the other, which together

forms a kind of amphitheatre or recess; the ground is strewn with bricks and potsherds, denoting the existence in former times of a large town. The first object the visiter is led to is a strong spring of clear water murmuring through the fissures of the rock at the base of the northern ridge and disappearing under ground beyond a basin or small reservoir of modern construction. This water is called the "Patal Gunga," the Ganges flowing beneath the earth. I need not state the absurd stories connected with this natural curiosity; a fair is held here yearly in the month of August.

We are next led up the steep and slippery face of a bare mass of sienite for more than an hundred feet, when the remains of a rudely constructed wall (connecting the masses of rock) appear; passing these for a short distance, and sliding down a block, worn smooth by the process, we find ourselves beside the first cave (See plate VIII. fig. 4) called "Viswa Mitra." The first apartment is square or rather pyramidal like Egyptian works.

The dimensions being 7' 9" at top and 8' 9" at the base; the height 6' 8½" outside, 6' 7¼" at the inner end, in the centre of which is a doorway likewise narrow at top and wide at the base, (a feature common to all the caves,) this leads into an unfinished chamber of an irregular oval form: on the east side of the first room, is the inscription marked as fig. 13 pl. IX. There are four sockets about 6 inches in length by 2 inches wide, two on each side on the floor of the outer chamber, apparently to receive some kind of frame work. There is a precisely similar arrangement at the Aswastema terrace over the great inscription of Dhowlee in Cuttack.

Leaving this cave we pass under the mass of rock in which it is seated, in an easterly direction between huge detached masses, here and there connected with rude walls or piles of stone; some fallen pillars and hewn blocks are the only remains of what was once a gate-way, beneath which are the traces of a flight of rude steps, and a causeway leading down into the amphitheatre first described; a few yards further west bring you into the elevated valley or basin: on the south side are the two ridges of rock out of which the three great caves are excavated. The length of this table-land may be three furlongs or more, and greatest breadth one and half. The whole space except where there are the remains of tanks, is strewn with bricks and potsherds, and

there are traces of numerous foundations apparent in every direction ; to the north is the peak called Sidheswar and Burabur, immediately under which, and of a second not so high, are the remains of a fine gateway and a massive wall connecting the two, and the immense blocks which appear to have served as bastions : this passage leads down into another and extensive level, surrounded with hills, which likewise appear formerly to have been connected by walls and embankments, to have had large reservoirs and been covered with habitations ; indeed, this is not confined to the two spots now described, but has been continued further eastward, connecting the Nag-arjuni hillocks until the river Phulgo or Mahanudda was reached ; one low hill has been evidently used as a grand bastion, it is called absurdly Sher Shah's Bungalow ; a causeway leads to it ; it may have been appropriated by the early Muhammadans, but it is undoubtedly part of these most ancient Indian works, the name even of which is lost to us, unless the place be that mentioned in the inscription of the Nag-arjuni cave, to the description of the locality of which it answers.

I must now return to the great caves. The first of these is the "Kurun Chowpar," and faces the north ; it is entered through a narrow Egyptian doorway, as already described, the room is placed east and west, and has a segmental roof, as have all except the Viswa Mitra ; the ends are at right angles and plain, on the western there is an altar or throne as shown in the plate ;\* the whole surface except the floor is wonderfully polished ; the echo is very beautiful in all these caves. The dimensions of the room are 33'-6"×14', and 10'-9" to the crown of the arch, the side wall or faces being 6'-2" to the springing line. The labour of cutting and excavating such a chamber in the hardest of rocks must have been great indeed, but that of polishing such a surface almost incredible ; we are struck with amazement and rivetted to the spot : from the quantity of chips of hæmatite strewed about, I am inclined to think this mineral was used in polishing. My servants having delayed on the road and arriving late, I was obliged to pass the night in this chamber with a bundle of rice straw for my bedding and covering, and although the wind was very high and cold, the temperature within was not so unbearable as to prevent my enjoying a good night's rest ; the bears having been graciously pleased to forego their visits, as I kept a candle

\* This throne appears to be the "Sri Asanam" mentioned in the Pāli Annals.—M. K.

burning which I had accidentally brought with me. But to return to my subject, on the left corner of the door is the inscription number 5, plate IX. which is nearly obliterated, through the effects of the weather and probably by the hand of some fanatic, at a very remote period, it is much to be regretted, for there is just enough left to excite our curiosity, and show that the record was valuable : I have restored as much as I well could ; it appears to have entirely escaped notice hitherto, indeed, although a square space has been cut and polished, it is but barely perceptible, and not at all in the strong light of noon-day ; it is best seen by clear moonlight standing beneath. I availed myself of the opportunity before I lay down to rest, to trace all the visible letters with red ochre ; sunrise and sunset are also favorable periods, which I remarked upon in my notes on the inscriptions of Cuttack. Dr. Bland, H. M. S. *Wolf*, made the same discovery whilst tracing the inscription at Singapore. I shall revert to this subject when treating of the whole of these Pāli inscriptions together.

There are eight other short sentences, of some of which James Prinsep gave translations in the sixth volume of the journal, but as he had only very imperfect impressions with Persian labels, the work of a pedantic Kaith employed by Mr. Hathorn, he was led into error and difficulty thereby. I shall therefore embody the whole in a separate plate,\* for easy reference : these I must again refer to under the head inscriptions.

On the right hand, facing the cave and separated from the main mass, is another, the eastern end of which has been scarped and a terrace cut ; in this face are three niches with carvings rudely executed ; the right hand one contains the linga, the two others, apparently figures of Siva and Parbutti, but they are undoubtedly of far later date than the caves, and the same as that of the sculptures at Kowā Dol and on the Sidheswur mount.

We now proceed to the largest caves, two in number, entered on the southern face of the ridge of rock, parallel with that of the cave above described, and which ridges are about 950 feet long, and 70 across, with a narrow passage between. There is a space of about 100 feet wide between the main hill and rocks and these ridges ; this is filled for some depth with bricks, earth and hewn stones, the ruins of temples, so as to block up the entrance of the westernmost cave,

\* See plate IX.

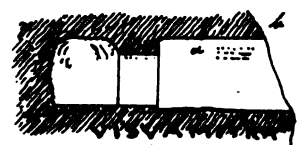
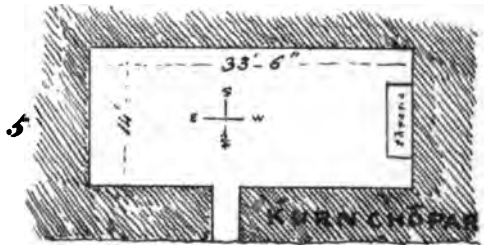
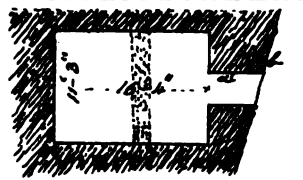
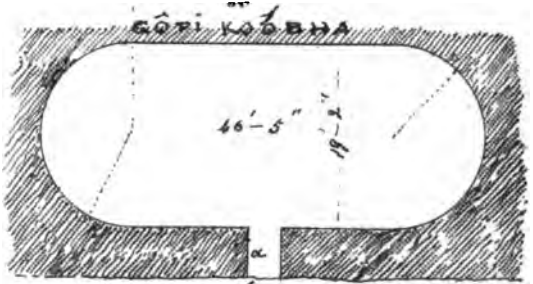
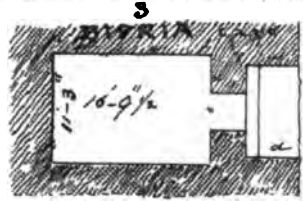
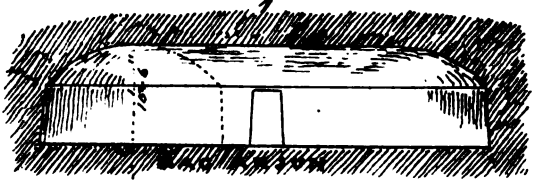
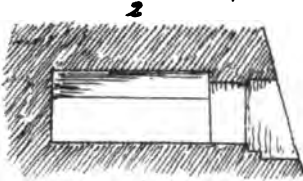
leaving just room to crawl in, in a sitting posture ; these may be the remains of the temple alluded to in the two inscriptions translated by Prinsep, and which, as he justly conjectures, are of a far more modern date than the caves or the Páli inscriptions which record their construction, and first appropriation. I am in hopes of having a passage cut in front of the rock and doorways, by which means the water which now floods the caves will be let off and prevented again reaching them, and admit a free passage for visitors, and perhaps bring to light some hidden curiosities.

Figure 6, pl. VIII. will best explain the shape of this curious work of patience and labour ; the entrance has an outer recess or porch about three feet deep, the doorway of Egyptian shape, is six feet high ; the room is highly finished and polished though perfectly plain ; there is a niche in the centre of the east end, and on the west the singular convex end or side of the circular inner chamber with a projecting hood or dome like a mushroom, with its tapering doorway, faces the visitor, who, if inclined to the study of Buddhist antiquities, will at once exclaim this is a Dehgope or cave Chaitya. On the left or east side of the entrance (outer) recess is the purposely mutilated inscription marked fig. 5, pl. IX. of which sufficient is left to show that in the 12th year of the reign of the beloved Rajah, this "Nigope" cave was excavated ; unfortunately the first syllable is doubtful, but the second is not so, and suffices I think to settle the point of the cave being a Chaitya or shrine ; indeed I am inclined to believe that three of the four on this hill were such, for the common name of "Sutgurba," which the Kaith moonshee, taking the word "sat" as a numeral, wrote "huft khaneh," or seven chambers, the meaning generally however, though improperly given at the present time, should in my estimation be rendered the caves of righteousness. In the Páli annals, the spot it called "Suttapanni Gurba," i. e. allowing my inference before explained as correct. The other caves at Nag-arjuni were perhaps not so, but intended as habitations for the ascetics, as already shown.

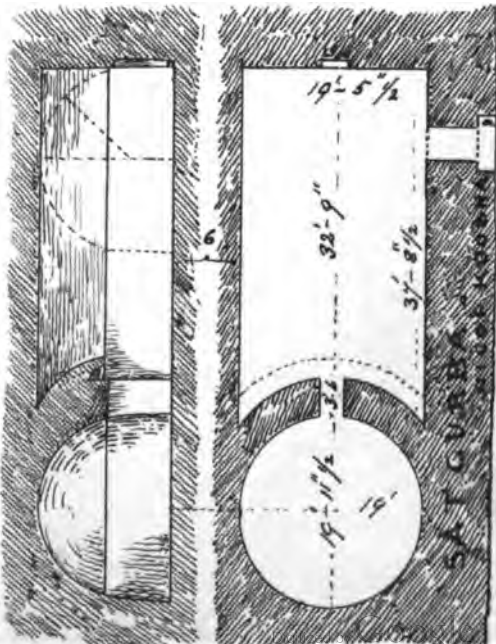
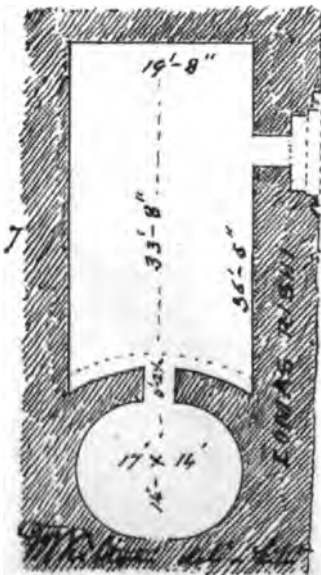
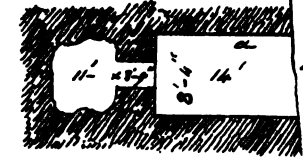
The extreme lengths of these chambers from end to end, as well as their width and height to crown of vault will be seen in the plate.

At the end and further east of the above mentioned, is a second double chambered cave of the same shape, but has remained unfinished, the sides only being polished and the vault left in the rough, as well as the





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Chaitya at the end. This is called by Buchanan, "Lomas Rishi;" he gives a wood cut of this singular archway and frieze carved out of the solid rock over and about the usual shaped door, but as I shall have to draw attention to the peculiar style of architecture it displays, I have annexed a drawing of my own ;\* there is no Pali inscription here, nor are there any traces of there ever having been any. The inscription No. 15 Pl. XXXVI. of the VI. Vol. of the Journal, occupies the spandril under the arch, also those marked 18 and 19, in the same plate, which are immediately under the other and above the head of the doorway. This external sculpture still retains the beautiful polish originally given to it.

Having described these caves I must conduct my readers to the summit of the "Kurun Chowpar" or "Sidh Eswar" Maha Deva, to this there is an almost impracticable and dangerous path on the southern face by which I ascended, having done so, I found the crest of the hill strewn with potsherds and bricks, and a narrow passage with Lingas and figures of "Ganesha," rudely carved out of the masses of rock, the same as at the Kowa Dol ; steps are here and there cut in the rock, and innumerable fragments of hewn stone lie scattered, over which the traveller climbs till he reaches a level spot, 50 feet or more below the highest point ; on these are fragments of idols and one entire figure of Varaha ; there are two rows of sheds used by the confectioners, when the fairs are held. Upon ascending the peak we arrive at a modern building called Sidheswar, in which there are several large idols of considerable antiquity, on one of them is an inscription, see fig. 13 plate IX. In a dark chamber is a huge linga with garlands made of solah hanging over it ; some portions of the base of the temple remain ; these, together with the fragments strewn about, and the great extent of the terrace, show not only that one magnificent temple at least must have crowned this height, but from their being fragments of various styles, that there have been successive temples ; and I am further inclined to think, that there may have originally been a tope like those of Bhilsa, Sarnath and Manikyala, though from discoveries made, there would be no reason for the worship of Siva (as Sidheswar) not being observed in connection with that of Budha, in the same vicinity, for not only is this anomaly apparent at the western caves, at Cuttack,

\* This drawing is omitted as it will appear in connection with the subject of Buddhist architecture hereafter.

Maha Bulli Poorum, Girrinár, &c. but in this district also, where it must have been up to the latest date : Even now, I consider it more than probable that the mút or monastery of Bódh Gyah was originally a joint Budha and Saiva establishment ; it is now the latter only ; but this is a digression, the subject is one affording an ample text for a separate paper.

That this temple of Sidheswar is of remote date we can infer from the early character of the sentence No. 6, Plate XXXV. Vol. VI. of the Journal, and of mine, of which a translation is given at page 679 of the same volume, "the irresistible and auspicious Joganund salutes Sidheswar;" here then we see, how necessary it is in carrying out such studies, that the traveller should accurately copy even the most trivial sentence or word ; the more I see the more I learn the value of this, therefore I would impress it on my fellow-labourers, and at the same time never to trust to native copyists.

On leaving Sidheswar peak, I descended on the north side, the face of which, though as steep if not more so than on the south, has a much more gentle and practicable path laid out diagonally towards the east, and in some places steps have been cut in the rock ; this passage leads on to the lower land already described as the site of a city. After proceeding for half a mile towards the river, between detached rocks, and leaving that which I have described as a tower or bastion to the left, and the Nag-arjuni peak to the right, and climbing over some masses of rock in front, the traveller meets with a large terrace of brick-work and stone, grown over with bushes with some ruined tombs ; beside this is a large brick well ; turning to the left or north at a few yards distance a small cave is seen, fig. 1, plate VIII. This is the one which from the Páli inscription Prinsep has termed the Milkmaid's Cave. The salutation to Sidheswar, written, or rather rudely cut in the doorway of this cave, No. 1 of my plate, also No. 2 of the same. This room and its porch are as beautifully polished as the rest, the dimensions will be seen by the plate VIII. fig. 1.

Upon climbing the terrace named, (which has been that of a large temple,) and looking down where there is a gap in the rock, another doorway is seen, over which is a square polished surface containing the Páli inscription, fig. 3, plate IX. Upon entering this, the long inscription, fig. 9, plate X. is found cut on the right hand side of the entrance.\*

\* Notz. For easier reference the spots where the inscriptions occur are marked a and b, on the plans.







There is but one chamber, this has been divided by a thin brick wall by some Mahomedan fakir, perhaps several centuries back, the doorway or aperture to which is so small as to have prevented my entering it, but I felt the end with a 10 foot rod. From the fragments found scattered, I conclude that there must have been a very handsome temple here of very early date.

Retracing our steps and turning to the south, we descend through a passage between a row of huge blocks of sienite, which had formed part of the southern barrier to the great enclosure, we then come on to the plain, then turning to the left (or east) and continuing to a tope of Tar-trees under the Nag-arjuni's frightful crags, we reach a flight of steps, about the centre of the hill; after an ascent of about 60 feet a narrow terrace is found continued along the side of the rock, in the centre of which an Egyptian doorway leads you into a splendid oval-shaped and vaulted room, polished in the usual manner; over the doorway is a square polished surface containing the inscription No. 1, pl. IX, is 3 of Prinsep's plate, and on the left hand side of the passage or thickness of the rock, is that given in his plate XXXIV. and translated at page 673; on the opposite side are some more recent scrawls.

This cave is inhabited and has been so for many years, by Mahomedan saints; there is a small mosque before the door, more than a century old; the cave is called Nag-arjuni, whether from the Buddhist saint of that name having lived there, or from mere fancy it is not possible to decide, though as the name Sidheswar has been preserved, and if my version of "Satgurba," be correct, I see no reason to doubt the inscription, moreover I am inclined to think that it is the very peraputetic chamber named in the Páli annals in which Annund Múni performed his austerities.

Having described the caves I must conclude with Dhuravat.

I have already said that it is the north-westernmost end of the cluster of hills. I visited this place by moonlight, therefore had not so good an opportunity of examining the locality, however, I saw sufficient to enable me to decide that there is the site of a Buddhist temple. On the lowest hillock, at the head of which is a fine tank called Chundoke, many idols and miniature Chaityas, such as are found all over the district, are placed in and about a modern temple to "Nirsinha" on the east bank of the tank: there is one very remarkable figure of a

man with twelve arms, each hand holding a lotus ; it is a Buddhist sculpture. I was told of several other figures in the vicinity, but had no leisure to examine them, those I saw were comparatively modern, mostly well executed. To the northward of the tank is a high mound of bricks and rubbish, perhaps the ruins of a monastery or of some of the buildings of the ancient town, of which nothing else remains.

I will now offer a few words on the inscriptions, of which there are in all 29 ; including that on the idol at Sidheswar, six are in the old Pāli, three in the Gupta, and three in an unknown character, to which I shall invite particular attention, and the remainder are in various types of Nagree, from the earliest to latest date.

Plate IX. Nos. 1 and 2, are those numbered 3 and 2, in Prinsep's plate. No. 3 had hitherto been overlooked, being in the same cave as the long inscription No. 9, plate X. It will be perceived that there is a slight difference in some of the words of the three, perhaps errors in cutting, otherwise they are verbatim. The same, excepting the initial name (of the cave), I have neither books to refer to nor pundits to consult by which I might explain these variations, therefore I must content myself with inviting the attention of those who are more fortunate, and who are better scholars.

In fig. 1 the word  $\text{𑀧𑀺𑀢}$  "Gopi" is clear enough, but instead of the last word of the inscription being  $\text{𑀧𑀺𑀢}$  Aliyam, it seems to be  $\text{𑀧𑀺𑀢}$  Sooliyam, though I am inclined to think it is merely a mistake of the engraver.  $\text{𑀧𑀺𑀢}$  "Nisiti" is written  $\text{𑀧𑀺𑀢}$  "Nisita" both in Nos. 1. and 3., No. 2. on the contrary has neither change ; indeed with the exception of five letters, purposely hammered out, it is quite perfect, (a stronger proof of the soundness of Prinsep's conjectures could not be needed, the copy he had being very imperfect ; ) however, knowing what they should be, it was no difficult matter to trace them, but it must be observed that all the inscriptions in the lath or Pāli character have had the letters ground and polished after cutting, to which circumstance their better preservation must be attributed ; moreover all have been cut on a polished surface. I speak of those I have myself seen ; those in our museum afford proofs.

In No. 2. the word  $\text{𑀧𑀺𑀢}$  is deserving of notice, the second letter

being more like 𑀧 h. but the mark is placed lower down, and may be equivalent to the short ikar of the Sanscrit, though it has been supposed not to exist in the Pāli; this would at once make it वप्रोच instead of वप्रोच. वप्रोच appears to have no meaning.

No. 3 over the doorway of the cave which appears to have escaped notice, has the word 𑀧 𑀢 𑀭 वडयी the meaning of which I know not; in other respects the inscription is a repetition of those before named.

We now come to the three remaining Pāli writings that have hitherto been overlooked. The first (figure 4) is the most perfect, though the five last letters which I feel warranted in restoring have been hammered out as before described. Upon referring to Prinsep's papers on the pillar inscriptions P. 471, Vol. VII. I find that the sentence "Duda vasa bhisitēna" 𑀧 𑀢 𑀭 𑀢 𑀭 𑀢 𑀭 𑀢 𑀭 𑀢 𑀭 𑀢 𑀭 𑀢 𑀭 is common to them. I am enabled therefore to read that "by the beloved Rajah in the 12th year of his reign, this cave was caused to be excavated, &c." the remainder I cannot render for reasons above given. Thus much would seem to point to the same person as author both of the pillars and of these caves, and if the similarity of design and execution be considered a criterion, we may infer that it was Dusarat himself whose name is repeated with the title "beloved of the gods" in the three first named inscriptions. This reasoning it will be seen throws doubt on the assumption that Asoka was the author, a doubt Prinsep himself always entertained. Indeed, if the conjectures I have made on reading the passage before quoted of the Pāli annals, are correct, there are none, that he was not.

If, we may judge by the unfinished state of caves, (Nos. 4 and 7, plate VIII.) we shall naturally conclude that they are of later date than those bearing Dusarat's name; one difficulty would thereby be removed were it not that this prince (if Prinsep be right), was the third in descent from Asoka; but it suggests a further conjecture, i. e. whether this Dusarat may not have been the very deified personage of the purans, king of Ajudhia and father of the hero Ram, whose history I believe to be a mythological tale of a real event. The conquest of Lunka or Ceylon by him may be in reality that made by a prince, whose title was Devanam Parya, or Devanam Parya Dasa, for either title conveys the same meaning. I throw out these as hints for the consideration of those who have read more and have better opportunities for study than myself.

I may here further digress and allude to the rude Budha sculptures I found at Bôdh Gyah and which I am about to lay\* before the society. In these, buildings are represented with arched entrances precisely of the design of that of the great cave, which again (like those in Cuttack) are miniatures of similar designs in the caves of Carli and others in the west of India. Now it is common for Archæologists to found their arguments as to the age of ancient buildings, upon comparing them with the paintings which illumine ancient manuscripts of known date, it being evident that such forms must have been in existence at, or prior to, the representation being made, the same rule must apply to sculptures such as those of Bôdh Gyah, therefore if they belonged to Asoka's great temple, the works they represented existed before it, or at the same time at least; but as these sculptures represent buildings on rocks, we may incline to the first opinion. That the sculptures belonged to the same period as the first pillars there can be scarcely a doubt, for they are of precisely the same stone, and one the quarries of which have not been discovered; this is of itself a remarkable circumstance; besides, they bear inscriptions in the identical character, and record gifts in the same style as those on the posts of Bhilsa.

I now return to my inscriptions. Fig. 5 differs somewhat in the reading, there being an adjective between the opening sentence, and the word  $\text{𑀮𑀺}$  or cave. This word after the most careful examination appears to be  $\text{𑀮𑀺}$  "Nigôp," the "gôp" is clear enough, which is curious, for it is at the entrance of the very cave which I have described as having a Dagôp or Chaitya, the remaining obliterated letters amounting in number to that required for such, together with parts of them still visible, admit of our supposing the sentence to have been the same as the others, i. e. "for the one of Buddhist ascetics."

No. 6 is too imperfect to be made out without the aid of a clever pundit, and needs such a Pâli scholar as Rutna Pala who assisted Prinsep. I must content myself with inviting the attention of others possessing greater advantages. The mark  $\text{𑀮𑀺}$  will not escape notice, it is found on coins, and in the inscriptions of the Saindharee caves and that of Kund-

\* See notes on Sculptures at Bôdh Gyah, p. 334 of the present Volume.

girri in Cuttack. This inscription is immediately over the left corner of the entrance, but so weatherworn and mutilated that a casual observer would not perceive it. A sentence seems to have existed over the door, but is now become illegible.

No. 7 is that published as 15 by Prinsep (see pl. XXXV. Vol VI.) and from the awkward manner in which the separate sheets of impressions were taken by the Moonshee, gave so much trouble, and rendered the reading doubtful; by the impression I now submit,\* it will be seen that, instead of its occupying three distinct spaces, the whole is comprised in one, and, as conjectured by Prinsep, it fills the spandril or space between the arched head and the top of the square doorway. I believe Kamulakanta to have been right when he pronounced that the first two lines had no connection with the four last. This struck me at first sight. I have since read the remarks, the letters are smaller, and I think have been added at a somewhat subsequent date; there can be no doubt that both have been an afterwork, perhaps centuries later than the caves.

No. 8 has also been rendered by Prinsep in the same volume, but it may be as well to compare the present accurate impression with the former; it is engraved within the jaumb of the doorway to the Nagarjuni (oval) cave, the edges are rough owing to the want of skill in cutting.

No. 9, plate X. appears hitherto to have (together with No. 3, (before described), escaped notice. I trust that some scholar will come forward to translate it, should I not be able with the assistance of a clever pundit to do so, but I shall first beg to invite Saroda-purshad to undertake the task. I feel sure it could not be entrusted to better hands. The character is the same as that of the two foregoing numbers, the dates, therefore, may not much differ. This is likewise cut within the jaumb of the small cave, fig. 3, plate VIII.

No. 10 is inscribed on either side of the head of a female figure or idol on the Sidheswar temple: It is a very rude performance.

Nos. 11, 12, 13, and 14, or figs. 7, 8, 9, plate IX. are the curious characters to which I would invite the attention of our French and German fellow-labourers. I have remarked the same characters on the Allahabad pillar, and in the caves of Cuttack. Prinsep refers to the

\* This refers to the inscriptions exhibited at Capt. Kittoe's lecture.—Eps.

same as occurring at Barahut, in Ghurwal (see plate IX.) page 342, Vol. V. of the Journal. No. 11 however differs considerably, and is written vertically like Chinese ; it is placed horizontally in Prinsep's plate. It has always occurred to me that these are Trans-Himalayan characters written by pilgrims at a very early period. No. 12 was not sent to Prinsep ; it is rudely cut and scattered. No. 14 is a single letter or word on one of the pillars of the Satgurba arch.

I shall not trouble my readers with repeating the whole of the smaller sentences, which had no doubt from time to time been cut by the ascetics who occupied the caves when the Budhists were expelled ; there are two only deserving of notice. These I have given as 15 and 16 in plate IX. The first shows that at a remote period the presiding deity of the spot was "Sidheswar" Mahadeva, which it is still.

The second or fig. 16, are deserving of notice ; they are of a very early types, and admit of another reading besides that given by Prinsep ; see No. 16 in P. 679, Vol. VI. viz. it may be an abbreviation of "Bodistá Likhítá" or the writing of Budhists, for the double letter more resembles the compound ञ than ञ् and may have been written by the fanatic who injured the Páli inscriptions, but if this reading be not admitted, I should prefer another, namely, "the root of Budhism," which (supposing this locality to have been the site of Sakya's preaching and of the great convocations of Magda, of which I think there is little doubt) would be most appropriate.

I offer the foregoing more with a view of throwing out hints for those whose deep and extensive reading must enable them to speak with greater confidence. I could wish I were able to boast of more myself ; in the absence of such desideratum I endeavor to collect and make known every trifle that may tend to the elucidation of doubtful points in the early history of this vast empire, my more gifted readers must take the will for the deed and excuse any blunders.

*Process of working the Damascus Blade of Goojrat ; by Capt. JAMES ABBOTT, Boundary Commissioner, Lahore.*

In the Appendix to my narrative of a journey to Khiva, &c. I published a paper upon the fabric of the Damascus blade, written by my friend Colonel Anosoff, of the Engineers, master of the celebrated Fabric of Arms at Zlataoost in Siberia, accompanied by such remarks as my own experience suggested. But having been the guest of that gentleman I did not conceive myself at liberty to publish without his express permission, which I had no means of obtaining, the process by which cast steel is rendered sufficiently elastic for sword blades. And not having witnessed the forging of a blade, I was ignorant of the further precautions necessary to bring out the grain of the Damask.

I have now just returned from Jullalpoor in Goojrat, (the Goojrat of the Punjaub) and am prepared to describe the whole process adopted there, in the fabric of sword blades, celebrated throughout India.

The blade of Goojrat is of two kinds, the simple and the mixed damask.

The simple damask is precisely similar to the damask of Isfahaun in Persia. Its Damascene is a granulation covering the entire surface of the blade, and often disposed in lateral processes ; as if the blade had been woven throughout of infinitely fine wires. At other times, this granulation is streaky like a skein of floss silk that has been rumbled into innumerable wrinkles too minute to be followed by the eye.

At other times it has the grain observed in timber, when intersected obliquely.

All these different kinds, are the same substance, submitted to the same process. At least, the general treatment and intention are the same, and the differences arise from accident, not design.

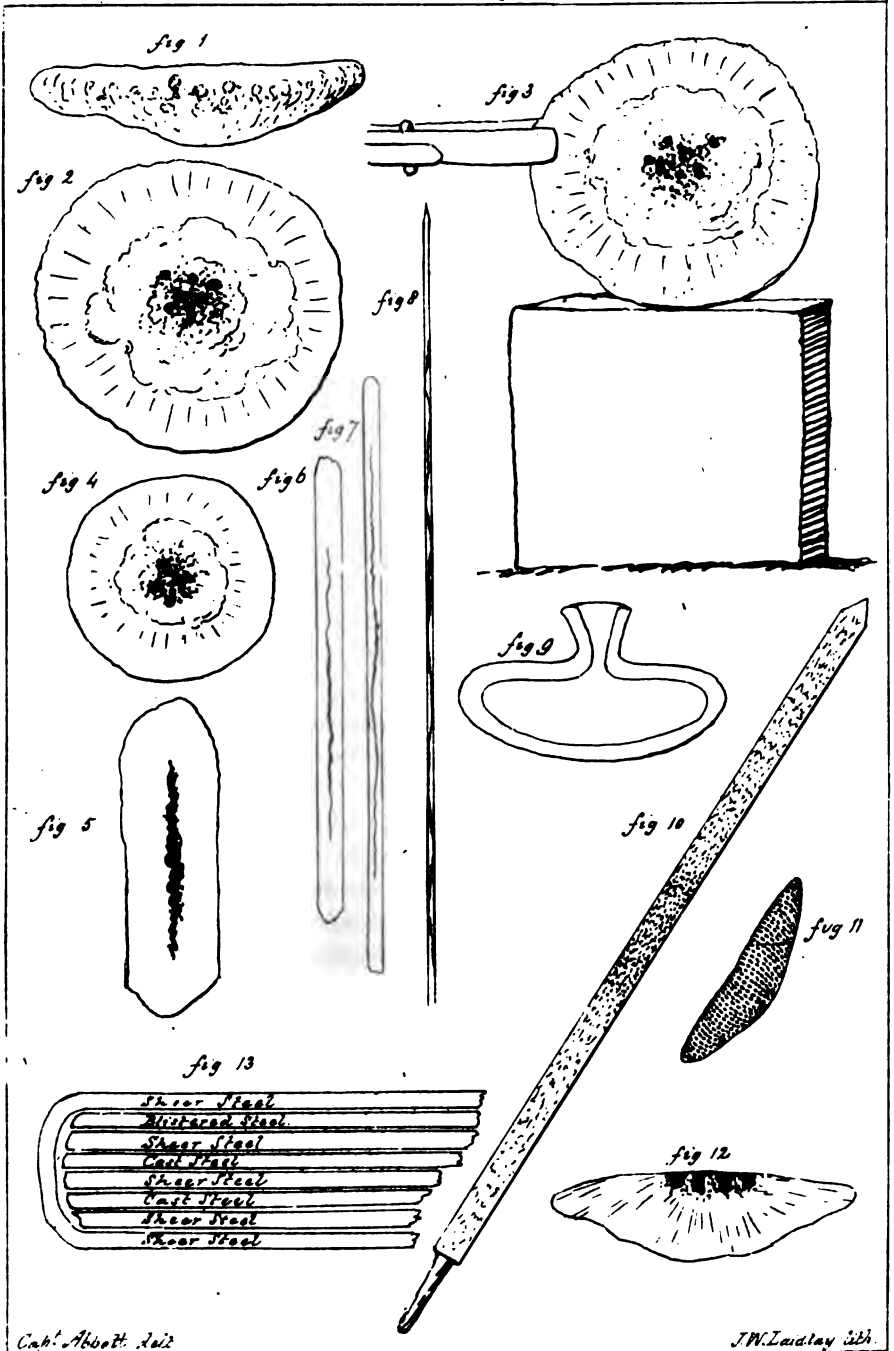
The substance is a small cake of cast steel weighing about 2 lbs. and exhibiting manifest symptoms of the fluid condition in which it acquired its plano-convex shape. That is, the lower or convex surface, bears the impression of the coarse gravelly mould into which it was poured. And the upper or flat surface, has those concentric wrinkles and radiations, which all metals take in crystallizing after fusion. This cast steel (*fowlahd*) is purchased at Umritsur in the small cakes above noted. The natives know not its origin, but only that it

comes from the south, and can be purchased at Delhi, in large as well as in small cakes. In India, if the same question is asked, the natives reply, that it comes from the north. It is, probably, therefore, brought up the Indus and Sutlej from the Persian Gulf.

The accompanying figures 1 and 2 (Pl. XI.) represent the plan and profile of a mass lying upon the table before me. Now, upon considering the internal structure of this, we are aware that it is a bundle of concentric needles crystallized around a porous centre, the vesicles of which are coarse and apparent, formed by the splash of the metal as it fell fluid into the mould. These I have rudely represented in dots in figure 12. It is also manifest that the most solid portions of the mass are the lower or convex surface. And, accordingly, in beating it out into a bar, great care is taken to preserve each surface distinct from the other, in order that the edges of the lenticular mass may become the sides or flat surfaces of the blade; that the convex surface may become the edge; and the flat, porous surface, the back. Under any other disposition, the damask figures would be confused and unseemly—and, as cast steel cannot be welded, by any art known in Asia, the porosity of the centre of crystallization in the mass, would either offer a jagged, flawed edge, or one of the sides must be disfigured and weakened by it. And thus the arrangement pursued in the fabric of the simple damask blade is suggested by sound sense. The elegance and symmetry arising from the arrangement is the accidental but necessary consequence.

The mass of cast steel being brought to red heat and held, as represented in figure 3, edgewise upon the anvil, is beaten into a square prism or bar—an operation of about two hours duration. When the requisite length is attained, the bar is flattened under the hammer, those sides in the bar, which had been the edges, being placed, the one above the other below, so as to become the flat surfaces of the blade. The blade being shaped with the hammer and file and roughly burnished, is brought to a dull red heat in a long charcoal fire,—a long vessel of common oil is placed within reach, and the blade is plunged by successive drawing cuts edge-foremost, into the oil; so that the edge becomes the most highly tempered part, and the back remains the softest. The excessive temper is abated in the usual manner by laying the blade over a slow charcoal fire. It is then burnished, and ground,





Capt. Abbott del.

J.W. Lauday lith.



and being carefully cleansed from grease in wood ashes, white vitriol (kussees) dissolved in water is rubbed over all the surface excepting the edge. This, eating deepest between the interstices of the crystals, exhibits their arrangement which constitutes the damask of the blade.

In following the mass of cast steel through all the changes of figure produced by the action of the hammer (figures 4, 5, 6, 7, 8,) we perceive that, as it cannot be welded, the pores in the centre of crystallization must remain, although immensely elongated under the extension of the mass. These accordingly exhibit themselves in an irregular and ugly seam in the back of the blade, impairing both its elegance and its solidity. And hence it is manifest, that in order to the production of a blade without flaw, either the porous heart of the mass should be ground out previous to the action of the hammer, or the blade should be forged of excessive breadth, and the unsound back be ground away. But the necessity of either precaution would not exist were necks made to the moulds (fig. 9) in which the steel is originally cast; so that there might be a surplus of metal (as in casting bullets and gums)—to give solidity by pressure to the incumbent mass.

We further observe, that as the flat surfaces of the blade (figure 10) are formed of the edges of the lenticular mass (figure 11) they present a section across the crystallization; rectangular in the centre, but of various obliquity toward either end. It follows, that the less the original mass is altered by hammering, the more nearly lateral will be the disposition of the dots representing the ends of crystals—and hence the various figures presented by the same metal under slightly different treatment. It is also apparent, that these figures will materially alter, according to difference in the shape of the original mass—and it may be reasonably doubted, whether the shape in which the cast steel is brought to India, be the most conducive to symmetry of damask or to soundness of fibre.

As the damask of a blade is the map of its crystallization, so it is probable that the figures alter according to the purity of the iron of which the steel is formed, the quantity of carbon contained in it, or to both these circumstances combined. Nay, the degree of heat of the fused metal at the time of casting, and the temperature of the mould in which it was formed may both contribute to differences in the crystallization.

Col. Anosoff, himself the reviver, if not the inventor of the elastic damask, lays down the following laws, as the test of quality of the damask, viz.

1st. The Damascene formed principally of right lines, almost parallel, denotes the lowest quality of damask.

2d. When the right lines become shorter and are partly replaced by curves, they denote a better quality than the first.

3d. When the lines are interrupted, show points; and when the dimensions of the curves increase, this is a still better symptom.

4th. When the interrupted lines become still shorter, or rather when they change to points as they increase in number, so as to form in the breadth of the steel, here and there, as it were, nets, interlinked by threads, which undulate in diverse directions from one net to the other; in this case the damask approaches perfection.

Finally. When the nets open further to form figures resembling grapes: or when they occupy the entire breadth of the steel and partake it in nearly equal articulations, in that case, the damask may be recognised as of the highest possible quality. See Appendix, 2d Vol. p. LXXVI. Abbott's Journey to Khiva, &c.

Now, whilst I concur with Col. Anosoff in believing that a connoisseur may read the quality of damask steel in its Damascene, I rather doubt the above being the key to the language,—because the globularity of the marks must depend very much upon the angle of section of the crystals, an angle dependent upon the figure in which the steel was first cast.

Several very costly damask blades were exhibited to Burnes at Cabul, and it was explained to him, that they were valued according to the continuity of the flossy streaks from hilt to point. I myself observed when in Khorussaun, that a decided preference was given to the streaked variety, viz. to that which appears like an amalgamated mass of infinitely fine wires. It will be seen from the process of forging the simple damask that any continuity of fibre must be a mere accident, and denote nothing as respects the quality of the metal.

I have before me a beautiful specimen of Siberian damask, given me by Anosoff, and presenting upon its surface the prismatic play of colors which he values so highly. In appearance it differs from the Jullalabad blades chiefly in the greater uniformity of its interlaced streaks;

attributable probably to a better figure in the mass of steel from which it was forged. It is perfectly elastic. The simple damask of Jullalabad being tempered in oil, has little elasticity, and the makers will not warrant it to undergo any proof. It is liable both to bend without recovery and to snap short on concussion. The same is observable of the damask of Khorussaun, constructed by a similar process. The cast steel when tempered in water becomes too brittle for sword blades, and the elasticity given by oil is not greater than that which brass possesses.

A very elegant elastic blade which I purchased in Siberia, and thought cheap at 20 guineas, exhibits a damask of oval concentric rings, so regular and beautiful that I would not believe it to be real damask, until a portion of the blade had been burnished and the acid applied in my presence, when the re-appearance of the Damascene, placed the matter beyond doubt. I have seen a similar though less beautiful Damascene upon daggers forged at Isfahaun. It is difficult to imagine this to be the mere exhibition of crystallization.

The simple damask of Jullalabad is wrought into three figures. The very narrow, rather thick, much curved Khorussauni sabre—whose section is an abrupt wedge, unwieldy in the grasp and as unfit for offence as for defence.

The broader, much curved, plain or fluted blade of Damascus, with a double-edged point, which its curvature nullifies. And a long straight single or double-edged blade, broad, thin and fluted, wider near the point than at the hilt: always set in a basket hilt, with a pommel projecting three inches to protect the sword-arm and much used by gladiators who exhibit at the Mohurram. All are forged in the same manner from the same material, yet each has its own separate Damascene, owing to the greater diffusion of the grain of crystallization in one kind than in the other. In the very narrow blade it is more streaky—in the broad blade it more resembles the most delicate of the streaks upon watered ribbands. The darkening of the blade toward the edge, observable in Khorussauni sabres, is not visible in these—I attribute this darkness to an increase of carbon. But at Jullalpoor the sword-cutters think it proceeds from increase of temper, and that the stain upon the damask is dark according to the degree of its temper.

Such is the secret of the pretty but useless damask of Goojrat ; at least of the simple variety. The compound damask is far less elegant, but constitutes a good blade, little inferior perhaps to the produce of Salinjer, though certainly less elastic. The following is the process employed in the fabric of the Sukkaila or compound damask.

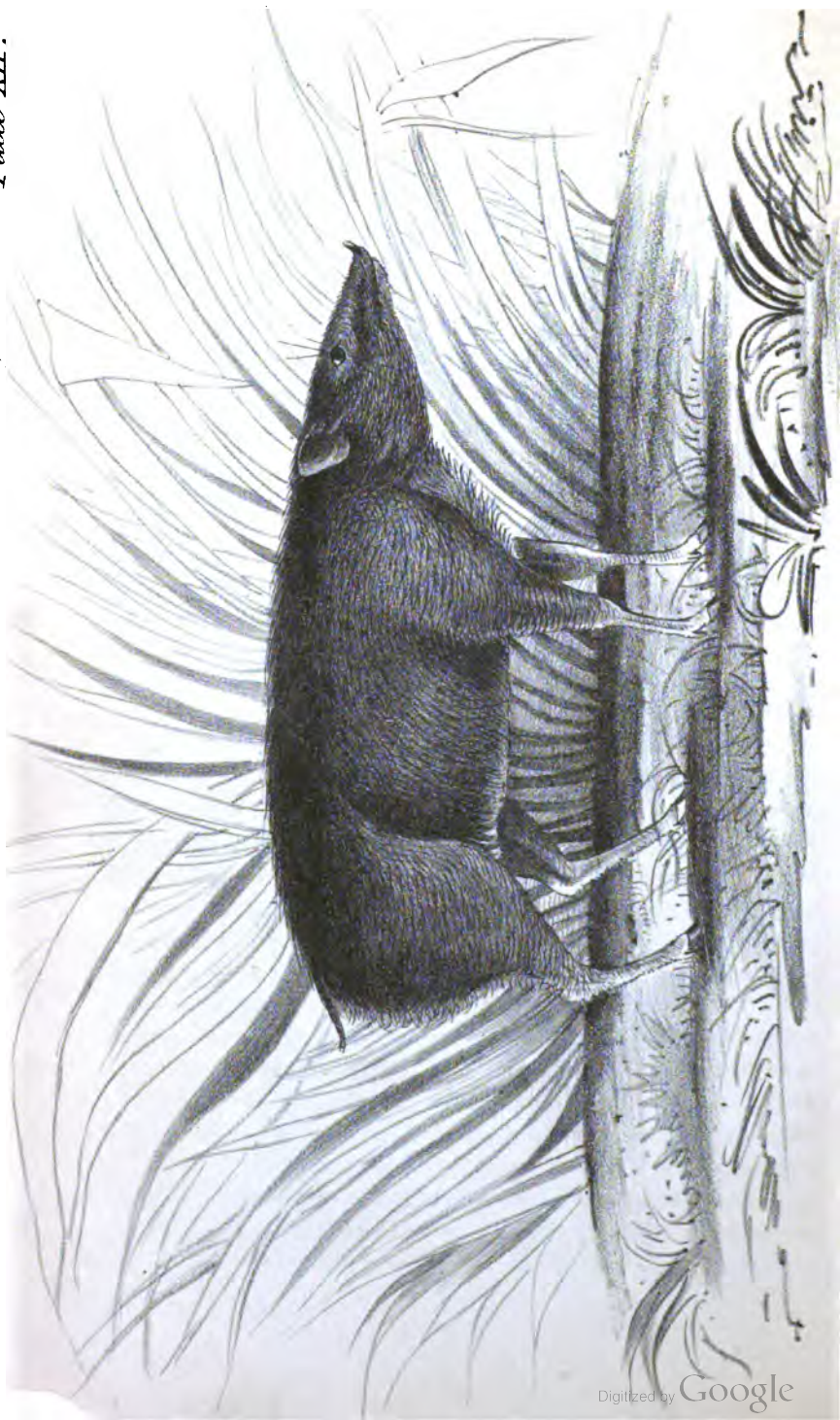
A ribband of keeri or sheer steel being bent into the figure of a siphon (fig. 13) is filled with six or more ribbands of cast steel, blistered steel and sheer steel as per accompanying diagram. I distinguish between cast steel and blistered steel, because the first has been in actual fusion, whereas the second appears to me that which goes in England by the name of "cast or blistered steel," and comes from Europe in small square bars. This mass being well hammered at welding heat, is doubled,—welded, redoubled and rewelded. A small bar of sheer steel of similar length is then welded upon the side which is to be the back, and a similar bar of cast and blistered steel well mixed together is welded for the edge. It is then beaten out, flattened and shaped into a blade, and tempered in water. The Damascene of this blade is coarse and resembles the transverse lights upon a watered ribband. It has a moderate elasticity, if well tempered : but of course its quality must depend chiefly upon the fineness of the steel employed in its fabric,—and there is little choice of material in India.

There is no doubt that a blade may thus be constructed, the edge of which may be keen as that of cast steel, whilst sufficient elasticity is preserved to render it proof against distortion or fracture under very severe shocks. And if, instead of thick ribbands of the several metals, fine wires were employed, an elegant Damascene might be the produce. This I am inclined to think is the original Damascus blade, as distinguished from the blade of Isfahaun : for, as its celebrity was greatest, when defensive armour was in common use, it is absurd to suppose it could have resembled one of the faithless brittle blades of cast steel, which now bear the name.

The price of the Jullalpoor or Goojrat blade in a scabbard, without hilt, varies from 8 to 12 Rs. (16 to 24 shillings.)

The instruments employed in the manufactory are rude and imperfect. Yet as the solidity of a sword blade depends much upon the quantity of labour expended in hammering, the very imperfection of the implements may tend to the excellence of the work. A bar of steel





*Porcula Sabrania*. Pigmy Hog of Saul forest..



under a very heavy hammer is soon beaten out ; but every blow unsettles on either side, as much of the crystals of the steel as it has compressed beneath it :—and I believe, that four times as much labour should be bestowed in hammering the slightly heated bar, as at present it receives at Jullalpoor.

But the imperfection of the furnace tends wholly to that of the blade. For as it is impossible to give the same degree of heat to all parts of the weapon at the same time ; one portion becomes harder and more brittle than the other : and the blade is more liable to fracture than if the whole were equally brittle. The equal distribution of heat throughout the blade is perhaps attainable only by immersion in molten metals ; a method practised, I believe, by Savigni, the celebrated cutler.

Should you deem this worthy of publication in the Society's Journal, I believe it will be the only existing record of the process of making the simple damask sword blade.

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*On a new form of the Hog kind or Suidæ, by B. H. HODGSON, Esq.*

Pachydermata.

Suidæ, Genus Porcula, mihi.

Generic character—Teeth  $\frac{2}{3}$ .  $\frac{1}{1}$ : $\frac{1}{1}$ .  $\frac{2}{3}$ : $\frac{2}{3}$ =40.

Canines small, straight, severely cutting, but not ordinarily exerted from the lips. Fourth toe on all the feet, small and unequal. Tail very short but distinct.

Type Porcula Salvania,\* mihi.

Pigmy Hog of the saul forest.

Sáno Banel and Chota Súvar  
of the Natives.

Habitat, Saul forest.

Sp. Ch. Pigmy Hog of a black brown colour, slightly and irregularly shaded with sordid amber. Iris Hazel ; nude skin, dirty flesh colour. Hoofs, glossy brown—length from snout to vent 18 to 20 inches. Height 8 to 10 inches. Weight 7 to 10, rarely 12 lbs.

Precision and comprehensiveness certainly belong to technical descriptions ; and the above few words, though they may prove distasteful

\* झाकबन्धा, of or belonging to the Saul forest.

to the general, will be largely suggestive to the instructed reader, and at the same time convey to the latter more information than he would obtain from five times the space occupied with popular description merely. A description of the popular kind I will supply presently; but in the meanwhile I must proceed distinctly to state the grounds upon which I suppose the Pigmy Hog to represent a new form among the animals of its kind. My books are few for reference, and my materials scanty for examination; but, having made the best use in my power of both, I shall not hesitate to tender to the Society the results of my investigation of a new and most rare species in that shape which appears to me most calculated to stimulate further research, reserving for a future report any additional information I may myself obtain in correction or confirmation of my present views; for I am entirely of the opinion of the late able institutor of our journal, viz. that it is designed as a prompt record of current facts and suggestions, to be stated as made, and to be corrected with recurring opportunity.

Mr. Gray, in his recent and excellent catalogue of the immense stores of the British museum states that there are five genera of the Porcine family, or *Sus*, *Dicotyles*, *Babirussa*, *Choiropotamus* and *Phacochærus*. Of these I regret that I have no means of satisfactory reference for *Choiropotamus*. But it and *Phacochærus* are exotic forms not easily mistaken, and I apprehend cannot comprehend our present subject; nor can *Babirussa*, though an insular Indian type; for its characteristics are well known. There remain only *Sus* and *Dicotyles*, or the Hogs proper and the Pecary hogs; and, that our animal belongs to neither of these, but is an interesting intermediate link between them, will I think be at once apparent from my generic definition, or from that and what I shall now add thereto relative to the organization and habits of the Pigmy Hog. My materials for description consist of a male of the species, young but sufficiently grown to indicate its fixed characters, and fresh but deprived of its entrails. I have had its skull extracted and have compared carefully its general form and its cranium with those of the tame and of the wild hog and of their young, and I have studied all these under the guidance of Cuvier and his commentators as well as of the general zoology of Shaw.\* As the result of these

\* *Régne animal*, Vol. III. pp. 330, 334 and 401, 414; *General Zoology* II. 458, 470, and *Régne animal*, V. pp. 287, 290.

observations and references it appears to me that the Pigmy Hog of the Saul forest is almost equally allied to the true Hogs and to the Peccaries, agreeing with the former in the absence of any peculiar external organs, such as the gular flaps of *Larvatus* and the pelvic sac of *Torquatus* and *Labiatus*; also in the number and form of its incisor teeth, and in having a perfect tail and four overt toes to each foot, but differing from the true Hogs and agreeing with the Peccaries in the number of its molar teeth, in the style of the laniaries, and in the diminished elongation of the jaws; and showing yet further inclination towards the same form (*Dicotyles*) by the extreme smallness of the tail as well as by the tendency of the fourth toe to disappearance. The presence of a tail and of a fourth toe, with the limited number of molars and the straightness of the unexserted laniaries, are the positive characters of our proposed type; which, how like soever to the ordinary Hog, differs therefrom materially in structure and not less in manners and habitat; for, whereas the Hog abounds all over India, the Pigmy Hog is exclusively confined to the deep recesses of primeval forest, and hence (I believe) has entirely escaped all notice by Europeans up to the present hour; and, whereas, again, the grown males of the common Hog invariably dwell apart, those of the Pigmy Hog abide constantly with the herd, and are its habitual and resolute defenders against harm. I obtained my single specimen recently in the Tarai of Sikim; but I know that the species dwells also in the Tarai of Nepal: nor have I any doubt it inhabits as far north-west and south-east, as the saul forest extends, though such are its rarity and secludedness, that knowing of its existence and anxious to procure it as I have been for 15 years past, I have only just succeeded. Even the aborigines whose home is the forest, seldom see and still seldomer obtain it, much as they covet it for its delicious flesh, and eagerly as they search for it on that account; and an old Mech who brought me mine, informs me that in 50 years' abode in the Sál-bári or Saul forest, though a hunter every season, he never got but 3 or 4 of these much desiderated animals to eat, partly owing to their scarcity and partly to the speed with which the females and young disperse, and to the extraordinary vigour and activity with which the males defend themselves whilst their families are retreating.

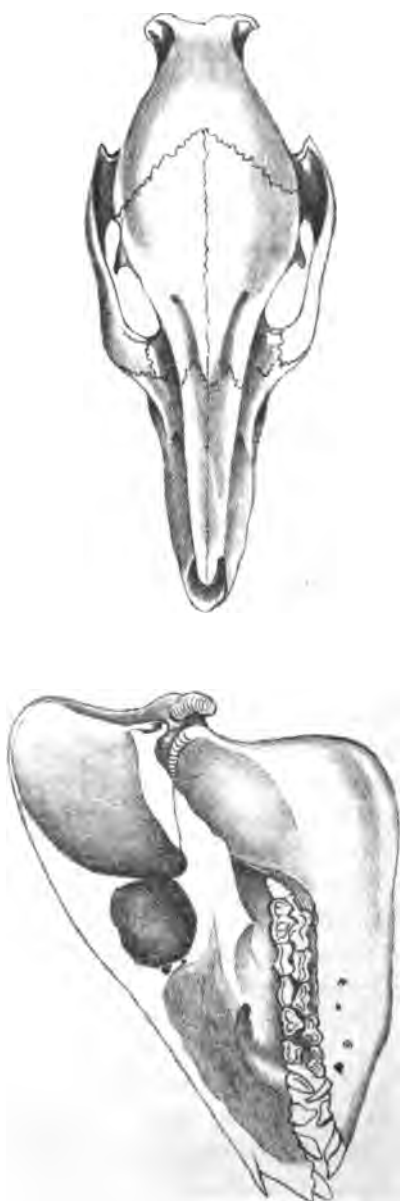
That so tiny an animal should effectually resist men must seem

almost incredible, and yet I am credibly assured that even when the annual clearance of the undergrowth of the forest by fire occasionally reveals the Pigmy Hogs, and the herd is thus assailed at advantage, the males with the help of rough and unopen ground really *do* resist with wonderful energy and frequent success, charging and cutting the naked legs of their human or other attackers, with a speed that baffles the eyesight and a spirit which their straight sharp laniaries renders really perplexing if not dangerous. The herds are not large, consisting of 5 or 6, to 15 or 20, and the grown males, as I have said, constantly remain with and defend the females and young, *perhaps* pairing off for a short period in the season of love, of which there are said to be two in the year, and the litter to consist usually of but 3 or 4 young ones. Their food is chiefly roots and bulbs, but they also eat eggs, young birds, insects, and reptiles, having a good deal of the omnivorous propensity proper to the whole family (*Suidæ*).

The Pigmy Hog is about the size of a large Hare, and extremely resembles both in form and size a young pig of the ordinary wild kind of about a month old, except in its dark and unstriped pelage. The likeness of the limbs and members to those of the common Hog is so close that every purpose of general description of the Pigmy Hog is served by pointing to that resemblance, desiring only that heed should be taken by the observer of the shorter jaws, and eye consequently placed midway between the snout and ear; of the much shorter tail, nude, straight, and not extending so far as the bristles of the rump; and, lastly, of the smallness of the inner hind toe. The ears also are quite nude, and the abdominal surface of the neck as well as the insides of the limbs and the belly, are nearly so: but the upper and lateral external parts are covered thickly with bristles, even longer and more abundant than those of the wild or tame Hog, save upon the ridge of the neck where the common Hog has always more or less of, and generally a conspicuous, mane, but the Pigmy Hog, little or none. The hairs of the Pigmy Hog are from two inches to two and a quarter long, harsh, simple, or with the tips ordinarily bifid; and those of the face and outsides of the limbs shorter only than elsewhere.

The dimensions have already been stated summarily and will be set down in detail below. The colour of the animal is a black brown, or brown black, shaded vaguely with dirty amber, or rusty red—a result of





*Porcuia Sabrania.*

many of the bristles being partially or entirely of the latter hue, but so that the general surface exhibits no regular lines, nor the individual hairs any regular rings. The skull of the Pigmy as compared with that of the common Hog exhibits a very considerable contraction of the great length of the facial portion or jaws in *Sus* proper, leaving no room for the extra molars of the common Hog, which has seven in each jaw, above and below, whereas our tiny friend has only six; by zygomæ less curved and bulging; by smooth maxillars and intermaxillars, so unlike the rugged outline of these bones caused in the common hog by the retroversion of the canines; and, lastly, by orbits more nearly complete, having larger processes from the zygomæ as well as from the frontals.

And now, first pledging myself to transmit to the Society without delay all the further information I may obtain relative to the habits or the structure of this interesting species, which if obtained alive and induced to breed in captivity, would be to the ordinary pork of the larder what the delicious Gairni beef is to the flesh of the common Ox, I conclude with the detail of dimensions, and with pointing attention to the accompanying accurate drawings of my accomplished draftsman.

|                                       |   |      |                 |
|---------------------------------------|---|------|-----------------|
| Snout to vent, .....                  | 1 | 7    | 0               |
| Head to occiput, .....                | 0 | 6    | 0               |
| Tail, .....                           | 0 | 0    | $\frac{7}{8}$   |
| Fore leg, elbow to tip of hoof, ..... | 0 | 5    | $\frac{1}{2}$   |
| Hind leg, heel to ditto, .....        | 0 | 4    | $\frac{1}{2}$   |
| Length of ear, from front, .....      | 0 | 1    | $\frac{7}{8}$   |
| Width of ear, .....                   | 0 | 1    | $\frac{5}{8}$   |
| Mean height, .....                    | 0 | 9    | 0               |
| Snout to eye, .....                   | 0 | 3    | 0               |
| Eye to ear, .....                     | 0 | 2    | $\frac{3}{4}$   |
| Girth behind shoulder, .....          | 1 | 1    | $\frac{1}{2}$   |
| Length of fore hoof, .....            | 0 | 0    | $\frac{11}{16}$ |
| Width of ditto, .....                 | 0 | 0    | $\frac{1}{2}$   |
| Weight, .....                         | 7 | lbs. |                 |

#### SKULL.

|                                               |   |   |               |
|-----------------------------------------------|---|---|---------------|
| Length, .....                                 | 0 | 5 | $\frac{1}{2}$ |
| Width, .....                                  | 0 | 2 | $\frac{1}{2}$ |
| Weight, .....                                 | 0 | 3 | $\frac{3}{4}$ |
| Symp. intermax. to fore angle of orbit, ..... | 0 | 2 | $\frac{7}{8}$ |

Teeth  $\frac{2}{1} \frac{1}{1} \frac{2}{2} = 40$ ; the two first molars only, on each side, false and compressed, and not the three first as in *Sus*, which has  $\frac{3}{1}$ , or one more, above and below. Tushes moderately elongated and not much curved—according to information and to the specimen, which latter, on this point only, is hardly adequate to fix the type.

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Notices and Descriptions of various New or Little Known Species of Birds. By ED. BLYTH, Curator of the Asiatic Society's Museum.

(Continued from page 157.)

Motacillidæ. This is a strongly marked family of birds, especially characterized by the lengthened and pointed tertiaries (as in the Plovers and Sandpipers), by the regular double moult,* and by the ambulatory gait of the species. I consider them to be nearly allied by affinity, neither to the *Enicuri* nor to the Larks; although the Water Wagtails resemble, to a certain extent, the former in their colours, as is commonly the case with animals frequenting the same haunts; and the Pipits resemble, in like manner, the Larks, not only in colouring but in the elongation of the hind-claw.

Motacilla, L. (as now restricted). Of this there are three Indian species.

M. maderaspatana, Brisson (nec Lin.): *M. maderaspatensis*, Gm.; *M. maderas* et *M. variegata*, Stephens (nec *variegata*, Vieillot); *M. picata*, Franklin: *Pied Wagtail* of Latham. Inhabits Upper India, and the peninsula; but I have never known it to occur below the Rajmahl hills in Lower Bengal, though Calcutta is given as the locality of a specimen in *Rev. Zool. &c.*, 1839, p. 40. The skin referred to may have been brought from Calcutta; but it may be doubted whether the fresh bird was obtained there. I have once seen it from Darjeeling; but never from the countries eastward of the Bay of Bengal.

* Mr. Yarrell remarks—"Having frequently examined specimens of our Wagtails in the spring of the year when they were assuming either their change of colour or the additional brilliancy of tint, peculiar to the breeding season, without finding any new feathers in progress, I am induced to consider the vernal change in these birds as so many instances of alteration effected in the colour of the old feathers, and not a change of the feathers themselves." 'British Birds,' 1, 383. My own observation, both in England and in India, and in caged birds as well as in wild ones, is directly the reverse. I have shot many during the vernal moult (*Motacilla*, *Budytes*, and *Anthus*), and have even found it difficult to get one that was not changing its feathers.

M. luzoniensis, Scopoli: *M. alba*, var. γ , Lath., (both founded on *la Bergeronette à collier de l'île de Luçon* of Sonnerat): *M. dukhunnensis*, Sykes; *M. leucopsis*, Gould; *M. alboides*, Hodgson; *M. alba* of Jerdon's list. Very common throughout India (with some partial exceptions*) and the Malay countries, visiting the plains in the cold weather; the appearance of this familiar little bird, and the harsh chattering of *Lanius phænicurus*, being generally the earliest signs of the approach of that season. The common Indian Wagtail is nearly allied to *M. alba* and *M. Yarrellii* of Europe; but has a larger patch of white on the forehead, the throat is white at all seasons, and there is much more white on the wings. Back of the male black in nuptial plumage.

M. boarula, L. This European species is also common throughout India and Malasia; specimens from Java, &c. absolutely resembling those from England. It even inhabits Australia.

Nemoricola, nobis. With the general form of *Budytes*, this combines the short hind-claw of *Motacilla*, and a peculiar disposition of colours, alike different from other Wagtails and from the Pipits. Haunts sylvan, and general habits much the same as those of the Tree Pipit, except that I am not aware of its ever mounting singing into the air, or that it even sings at all. In this respect (the total absence of song) *Budytes* differs both from *Motacilla* and *Anthus*; and the humble Lark-like efforts to soar a little way into the air, singing all the while, seem peculiar among this group to the Pipits.

N. indica; *Motacilla indica*, Gmelin (founded on *la Bergeronette grise des Indes* of Sonnerat): *M. variegata*, Vieillot (nec Stephens). India generally, Arracan, and Malacca; but nowhere a common species, so far as I can learn. In the vicinity of Calcutta, I have obtained it at all seasons.

Budytes, Cuvier. The Yellow Wagtails with long hind-claw.

B. citreola, (L.): *B. calcaratus*, Hodgson.† Tolerably common, more so perhaps above Rajmahl, in Bengal, where it occurs in flocks.

* Mr. Jerdon never observed it in the Carnatic.

† Mr. Gray adopts this latter name, in his Catalogue of Mr. Hodgson's specimens presented to the British Museum: but the Indian species (examples of which were presented to this Society by Mr. H.) seems to accord wholly with the descriptions of *B. citreola*; from which I cannot help doubting its distinctness. It appears that Mr. Gray has also more recently described the same bird as *B. citreoloides*, Hodgson.

From the province of Mymunseng Mr. Frith has presented the Society with a beautiful specimen, having the back deep black !

B. viridis, (Gm.), founded on Brown's figure, pl. 33 : *B. melanocephala*, Savi, and also of Sykes ; probably *B. beema*, Sykes ; and *B. neglecta, melanocephala, et flava*, of Jerdon's list ;* *Blue-headed Wag-tail* of Latham ; and his *Wagtail Lark* is the female of either this or the next species. In a very interesting paper on the birds of Corfu, &c. (*Ann. Mag. N. H.* 1843, p. 416), it is stated that the Yellow Wagtail of that part differs from the English one, in having the head in the breeding season of a jet-black, at other times of a lead-colour. This black-headed species is common in Afghanistan ; and it would seem also to be that found generally in peninsular India, and in the west ; but never in Lower Bengal, that I am aware of. Having no specimens, I cannot point out any difference that its hyemal garb may exhibit from that of the next species.

B. flava (? Lin.) : *Motacilla bistrigata*, Raffles ; perhaps *B. beema*, Sykes ; *B. cinereocapilla* (?), of southern Europe ; *B. neglecta* (?), Gould. Several species of *Budytes* are puzzling in the extreme, from their general similarity combined with the variation to which each is subject. Mr. Gould first distinguished the common British species from that equally common on the European continent, both of which had been confounded under *B. flava*, (Lin.) ; as he likewise did the British and continental Pied Wagtails, that had been confounded under *Mot. alba* ; and the respective Rock Pipits which had been alike classed as *Anthus aquaticus*.† It is very curious and remarkable that, in each of these instances, the common British species is extremely rare (even if they have all been yet *noticed*.) in the neighbouring continental countries, and *vice versa*. Fortunately, the Society now possesses fine specimens of each of the six, which enables me the better to form an opinion respecting their Indian equally near affines.‡ In the common British *Budytes*, now *B. Rati*, Pr. Bonap., particularly in summer

* Mr. Jerdon now considers these to be the same, vide *Madr. Journ.* No. xxxi, 132.

† The American species figured under this name in the *Fauna Americana-borealis*, is distinct again, being the *A. ludovicianus*, Bonap.

‡ Since writing the above, I have come to the conclusion that two Norwegian specimens sent as *A. obscurus*, are neither that species nor *A. aquaticus* ; but merely dark specimens of *A. pratensis* in summer dress, shot late in the season.

dress, the male has the whole head bright yellowish, very yellow in some towards the forehead, and there is constantly a bright yellow supercilium. In *B. flava*, (Lin.), v. *neglecta*, Gould, the common species of northern Europe, the head is of a dull ash-colour, with—it is said invariably*—a white supercilium; though this is so little developed in one of two Norwegian specimens before me, that I cannot but question its alleged permanency. In the Indian *B. bistrigata*, again, (which Mr. Strickland identifies with *cinereocapilla* of southern Europe,) the fully mature male in breeding plumage has the head and nape fine dark ashy, with no trace of supercilium; the ear-coverts darker; and throat (or rather chin) white, spreading laterally to contrast with the dark ear-coverts: a specimen so coloured is mentioned in Mr. Jerdon's notice of his *B. melanocephala*, and supposed by him to be probably the female of that bird; but younger specimens exhibit a white supercilium in every degree of development, and many of these certainly cannot be distinguished from the European *flava*; which, after all, I suspect will prove to be the very same. Indeed, the note would seem to be quite similar, being, in both, weaker and less articulate than in *B. Raii*; and it is more common to see these birds about watery places than is the case with the British species.† But whatever its true name, the subject of the present notice is one of the commonest of Bengal birds, frequenting the open country in straggling flocks during the cold season, and disappearing as they assume the nuptial dress. On the Calcutta maidan, where a large herd of cattle are generally grazing, regardless of the hottest sun (which is a remarkable trait of *Bos indicus*), each one will commonly have its attendant *Budytes* keeping to the shadow of the beast's foot, watching for the insects which it rouses from the grass at every step.

Anthus, Bechstein: comprising *Corydalla*, Vigors, and *Agrodoma*, Swainson. If any subdivisions could be admitted in this natural (and very difficult) group, the Tree Pipits would appear to have the best claim to be separated from the rest: the form to which the names *Corydalla* and *Agrodoma* have been applied, serving to connect the

* "The grey-headed birds without a white supercilium are never found in the north of Europe." Strickland, *Ann. Mag. N. H.*, 1844, note to p. 115.

† The plumage of the females of *B. bistrigata* is very much yellower, and more approaching that of the males, than in *B. Raii*.

Tree Pipits with those allied to *A. pratensis*, *obscurus*, &c. ; though where to trace the line of separation, at all satisfactorily, seems quite impossible, albeit Mr. Swainson has classed his *Anthus* and *Agrodoma* in distinct and widely separated natural families. The Tree Pipits (to which, if it be thought necessary to separate them, the name *Dendronanthus* may be applied), are distinguished by shorter tarsi, a less elongated and more curved hind-claw, and a comparatively short and less slender bill than in many others : they resort to open woodlands, and perch often ; and their gait and general manners are different from those of other Pipits (as may be well observed by keeping them in confinement). Their actions are more deliberate, and they have not the habitual rapid run of other Pipits and Wagtails ; neither, in captivity, are they at all peckish and quarrelsome disposed towards their companions, as is eminently the case with the *Motacilla* and *Budytes* genera, and with the Rock and Meadow Pipit of England and the species allied to them. I might point out other differences of the kind, the *ensemble* of which imparts a very distinct subgeneric character to the Tree Pipits ; but such distinctions are not to be recognised in the dry skins with which the systematist is compelled principally to deal : and I shall proceed to range all the Indian species in *Anthus* proper, commencing with the arboreal Pipits, of which I think two species are before me.*

1. *A. trivialis*, (L.) : *A. arboreus*, Bechstein. This species, the most migratory of the European Pipits, (or a near affine to it,) abounds in Lower Bengal during the cold season, and, it would seem, in suitable localities throughout the country : frequenting groves and gardens, with a disposition to be social, if not gregarious ; and where an extent of thin tree-jungle harbours them in considerable numbers, I have noticed that, towards evening, they commonly fly to and fro over their haunts in scattered parties ; now perhaps two or three, then several, and then perchance a solitary bird, each frequently uttering a slight chirp, and often several descending to alight for a while near together on the same tree : this restlessness they will continue to evince till it is getting dark ; and it would scarcely be guessed what bird it was, till one had been brought down. I never heard the species sing in this part of the world : and its (hyemal) dress is different from that with which we are more

* The Tree Pipits certainly approximate the American genus *Sciturus*.

familiar in Europe; the upper-parts being uniform greenish-olive, with strongly marked dusky streaks on the crown, and slight dark centres to the dorsal feathers; and the breast-spots are very broad and black. A specimen from Nepal exhibits the summer plumage, having the upper-parts much paler and fulvescent, with the dark centres to the feathers considerably more developed; and the breast-spots are less intense and Thrush-like.*

A specimen shot out of a flock by the river-side, by the memorable battle-field of Palási (Plassey), is perhaps distinct: the bill is larger; the general size above the average of *A. trivialis*; and there is much more of the dusky colour on the dorsal feathers (it being broader on each individual feather); but the plumage is considerably worn and abraded. The following description was taken of it when fresh. Length six inches and a half, by eleven inches; wing three and a half; tail two and three-quarters; bill to gape eleven-sixteenths of an inch; tarse three-quarters; hind-claw five-sixteenths.† Irides dark; bill dusky above, sullied carneous below; feet light brownish-carneous. The *ensemble* of the upper-parts of this specimen differs much from either that of the nuptial or non-breeding dress of ordinary *arboreus*; but I suspect it is merely the former, that had not been cast at the usual moulting period, but retained till the month of February, becoming proportionately abraded.

2. *A. Richardi*, Vieillot. This species must be very common in Lower Bengal, from the number occasionally brought and sold for 'Ortolans' in the Calcutta bazar, especially after the season for *Calandrella brachydactyla* has passed, and even so late as May: but in the few excursions which I have made, I have never chanced to fall in with them at all plentifully. Those I have observed and shot have been chiefly in cultivated land, and they not unfrequently perch on the sum-

* Since the above was written, Capt. Boys has favoured the Society with a specimen from N. W. India, which I at once recognized as the European Tree Pipit; of which latter a specimen has been received more recently from England. The common Indian bird has the upper-parts very nearly as plain as those of *Seiurus auricapillus*, and of the same hue; the under-parts being equally Thrush-like, but tinged with fulvous. I have kept the European bird in confinement for years, and regularly noticed its vernal and autumnal changes of plumage.—It seems that Mr. Gray has described the ordinary Indian Tree Pipit, in his 'Zoological Miscellany,' as *A. maculatus* et *A. brevirostris*, Hodgson.

† Among the admeasurements of several individuals of the common species, I find one precisely agreeing with the above, and others nearly approximating.

mit of a small tree ; emitting, before they fly, a chirp not unlike a Sparrow's.

These birds vary in size ; the male being generally about seven inches and a half, or seven and five-eighths (sometimes nearly eight inches), long, by twelve to twelve and a half in alar expanse ; closed wing three inches and five-eighths to three and seven-eighths ; and tail three inches to three and a quarter : tarse generally an inch and a quarter, or at most an eighth less ; and long hind-claw commonly about five-eighths, sometimes prolonged to above three-quarters of an inch. Bill dusky above, yellow at base of lower mandible, and duller yellow anteriorly sometimes to near the tip ; legs yellowish-brown, very yellow on the soles ; inside of mouth bright yellow in adults. Younger individuals have the interior of the mouth faintly lutescent caraneous ; and the base of the lower mandible much the same.

Such are the common dimensions of this species : but I once obtained a male, so different in appearance from others shot on the same occasion, that I was inclined to regard it as distinct, until examination of an extensive series convinced me of the contrary : the specimen differs most remarkably in its conspicuously shorter tarsi and toes ; the streakiness of its crown is more decided and strongly marked than usual ; and there is less white on its outer tail-feathers, and that more sharply defined. Length seven inches and three quarters by eleven and three-quarters ; wing three and five-eighths ; tail two and seven-eighths ; tarse only an inch ; middle toe without claw not three-quarters ; and hind-toe (minus claw) but half an inch, instead of nine-sixteenths to five-eighths of an inch. The brevity of tarse corresponds with Yarrell's figure of the leg of this species, in 'British Birds,' I, 388 ; but the toes of the latter are more of the ordinary development.

Richard's Pipit occurs in collections from the Himalaya and from Arracan ; but Mr. Jerdon enumerates it as a rarity in the south of India. The *Anth. australis*, Vieillot, if not identical, must be nearly allied, to judge from the description of it on the *Dict. Class.* ; and this is referred to "Australasia," a name of doubtful signification, since some authors confound it with Australia, while others intend by it the great Oriental Archipelago and neighbouring mainland ; for which Austral-Asia is by no means a bad appellation.*

* The Society has since received what is doubtless the true *Anth. australis*, from

3. *A. similis*: *Agrodoma similis*, Jerdon, *Madr. Journ.* No. XXVI, 35. This fine species equals the largest specimens of *A. Richardi* in size, but has the shorter tarse of the individual last described, and also a shorter and much more curved hind-claw. It is further readily distinguished by the strong ferruginous tinge of the pale portion of its plumage, as especially the under-parts and margins of all the wing-feathers; and the upper-parts are less streaky than in *A. Richardi*, with a prevailing dusky hue and slight admixture of ashy on the lighter edgings of the dorsal feathers. Tail having its outermost feather dark, obliquely tipped for its terminal third with ruddy-whitish, which extends up the whole narrow outer web; and the penultimate feather is tipped, for about a quarter of an inch only, with the same. Length of wing three inches and seven-eighths; of tail three and one-eighth; tarse an inch; and hind-claw (straight from base to tip) but three-eighths. From southern India; and Lord Arthur Hay lately obtained a specimen in Jummoo, in the N. W. Himalaya.

4. *A. montana*, Jerdon, *MS.*: *A. rufescens* apud Jerdon, *Catal.* This also is a strongly marked species, deeply tinged with fulvous, with strongly contrasting broad blackish central streaks to the feathers of the upper-parts. Bill short, and tolerably strong; the tarse short, and hind-claw moderately curved. The tail has its outer feather dull isabella-white for the terminal two-thirds, obliquely separated as usual from the dark base; the penultimate has the terminal third of the same hue; and both, with the antepenultimate, have their extreme tips pure white. Wing three inches and one-eighth; tail two and three-quarters; bill to gape eleven-sixteenths; tarse seven-eighths; and hind-claw (straight from base to tip) half an inch. Inhabits the grassy hills of the Neilgherries, where tolerably common. Mr. Jerdon has occasionally observed it to perch.

5. *A. striolatus*, nobis, *n. s.* Allied in appearance to the last, but distinguished by its longer bill and tarse, straighter hind-claw, and the much purer white of the outer tail-feathers, though these are a little creamy on their exterior webs only. The general cast of colour is also less brightly fulvous, and the dark central streaks are less deep and contrasting; presenting a general difference which is obvious to the eye,

Sydney; and excepting that its toes and claws are still shorter, it agrees most closely with the single specimen above described, shot on the upper Hoogly.

though scarcely expressible in words : a more available distinction consists in the flanks being streakless, whereas in the preceding species they are conspicuously streaked throughout ; and the wing-edgings are also much more albescent. Length of wing three inches and three-eighths ; of tail two and five-eighths ; bill to gape three-quarters ; tarse an inch ; hind-claw half an inch. I obtained a single specimen of this bird from a collection made at Darjeeling ; and Mr. Jerdon has since procured several in the neighbourhood of Nellore, on the Coromandel coast.*

6. *A. malayensis*, Eyton : *A. agilis* apud Jerdon, *Catal.* ; *A. pallescens* apud Sundevall. † Nearly allied to the last, but distinguished by its smaller size, by the less contrasted streakings of the back, and especially of the head, and by the fewer spots on the breast. In one specimen before me, from Assam, the pectoral spots are so few, that the bird might be mistaken for *A. rufulus*. Length of wing commonly three inches and one-eighth, sometimes less ; of tail two and a quarter ; bill to gape eleven sixteenths of an inch ; tarse an inch ; long hind-claw commonly half an inch. To facilitate comparison, I have given the admeasurement of bill to gape from dry specimens, in which it is less than in the fresh bird. The young have dark upper-parts, each dorsal feather being narrowly margined round with whitish ; coverts and tertiaries the same ; and the breast has many more spots than in the adult. In this dress, the species presents more the appearance of a young Lark, than I have seen in any other Pipit. It is one of the commonest birds of Lower Bengal during the cold season, in all open places ; and a few remain throughout the year : habits, much as in *A. pratensis* ; and song very insignificant, a mere repetition of one note, as often mounting some forty or fifty feet into the air, it descends sailing to the ground in the usual manner of the birds of this genus. It also appears to be very generally diffused throughout India, as well as in the countries eastward of the

* In Mr. Gray's catalogue of Mr. Hodgson's specimens presented to the British Museum, *A. striolatus*, Bl., is set down as a synonyme of *A. rufescens* ; but it does not appear upon what authority, and the species assuredly does not accord with the descriptions of *A. rufescens*. *A. pelopus*, H., as described in Mr. Gray's appendix to that catalogue, would seem to differ only in its shorter tarse.

† Add *Cichlops ubiquitousus*, Hodgson, Gray, *Zool. Misc.* ; and a wearisome list of other synonymes from the same source are corrected in Mr. Gray's catalogue cited in the preceding note, which I cannot but think it much to be regretted were ever published.

Bay of Bengal, down to the Straits of Malacca; and (as Mr. Eyton remarks) it is probably the Sumatran *Alauda pratensis* apud Raffles.

7. *A. agilis*, Sykes. Until recently, Mr. Jerdon and myself have referred the preceding species to this one; but Mr. Strickland (to whom Mr. Jerdon sent specimens of the former) pronounces them to be distinct, and I am unacquainted with the true *agilis* of the Deccan.

8. *A. rufulus*, Vieillot. Nearly allied to *A. malayensis*, but distinguished by its larger size, much shorter hind-claw, and by the absence, frequently, of any spots on the breast, which, when they occur, are few in number, small and inconspicuous: the dark centres of the dorsal feathers are also obscure, or even obsolete; but a narrow dark central streak to each feather is more or less developed on the crown. Length six inches and three-quarters, by ten and three-quarters; closed wing three inches and a half; tail two and a half: hind-claw seldom exceeding three-eighths of an inch. From the bare stony plains of the central table-land of the peninsula of India; and I recently obtained a few on similar ground near Midnapore.

9. *A. pratensis*, (L.) Mr. Gould has seen specimens of this common British species from Western India, according to Mr. Yarrell, 'British Birds,' I. 392.*

10. *A. aquaticus* (?), Bechstein: if distinct, *A. roseatus*, Hodgson.† Mr. Hodgson sent this bird under two or three names; but on careful comparison of many, and looking particularly to the growing feathers of moulting birds, I am satisfied of the series being throughout specifically identical. They also accord with my recollection of the European *A. aquaticus* (nec *obscurus* of Britain), respecting which Mr. Gould (as cited by Mr. Yarrell), remarks:—"We have some reason to believe that there are two species of Rock Pipits nearly allied to each other, as we have never been able to find in any of the examples killed in the British Islands that uniform vinous tint we have observed to pervade the breast of continental examples; neither have we been able to meet with any specimens in continental collections, that strictly accord with the dull and indistinct markings of those of the British Islands:" to which I

* Mr. Gray refers the *A. hortulanus*, Hodgson, n. s., to this species; but the specimens which Mr. H. presented to this Society by the name cited, were decidedly of the Indian type of *A. arboreus*, to which the appellation *hortulanus* is better applicable.

† This Mr. Gray refers to *A. cervinus*; *Motacilla cervina*, Pallas: *A. rufogularis*, Brehm.

may add, (from my own notes,) that the absence of *pure white* on the exterior tail-feathers is a further distinction of the British species, though there is always a pale external and terminal portion. I believe, too, that there is this distinction in their habits, that while the continental species is met with far inland, the British *A. obscurus* keeps almost wholly to the immediate vicinity of the sea; the only instance I have known to the contrary (and I believe none has hitherto been recorded), being that of one taken in a bird-catcher's net near London, which I kept for some two or three years in a cage. Now the Nepal bird conforms to all these indications of *A. aquaticus*, unless it be that the streaking of its upper-parts is too strongly brought out; and it appears that, at one season (probably that of breeding), the lower-parts, to judge from several moulting specimens in different stages of advancement, but none complete, become throughout of a faint vinous-roseate hue, with the pectoral spots much contracted; while, at another season, the rosy tinge wholly disappears, the lower-parts becoming weak fulvescent, with the dark spots much larger and broader. The bend of the wing, and margins of the secondaries, are yellowish green, not unfrequently rather bright, but sometimes this colour is scarcely observable; and the axillaries, and anterior margin of the wing beneath, incline to sulphur-yellow: outermost tail-feather dullish white externally, but tipped, as is also the next, with purer white. Length of wing generally three inches and a half, or an eighth less or more; of tail, commonly two and three-quarters; tarse seven-eighths; and hind-claw generally three-eighths. Inhabits the Himalaya? (Nepal.) A single specimen differs from the rest in having the upper-parts plainer, especially the head, which is scarcely striated; and the pectoral and flank spots are smaller and more contracted than usual: probably the nestling dress, a little abraded.*

Among what are termed the "Warblers," comparatively few have hitherto found a place in Indian Ornithology, to what the general analogy of other countries would lead us to suppose exist. The genus *Curruca*, so largely developed in Europe, has only three ascertained representatives.

* Add, as an eleventh Indian species, upon the authority of Mr. Gray's catalogue before referred to, *A. rufescens*, Tem., v. *campestris*, Bechst., v. *Cichlops thermophilus*, Hodgson, Gray's *Zool. Misc.*, p. 83.

1. *C. orphea* apud Jerdon ; nec *orphea* vera, as I have been assured : probably *Black-headed Warbler* of Latham. This Indian species combines the characters of the European *C. atricapilla* and *C. sylviella*, but has a much larger and longer bill than either, which tends a little to be incurved. Length of wing three inches and a quarter, of tail two and three-quarters ; bill to gape three-quarters of an inch ; and tarse seven-eighths. Colour brownish-ashy above, whitish beneath, pure white on the throat and middle of belly ; cap, including lores and upper ear-coverts, black in the male, dusky or blackish-grey in the female ; the nape and rump comparatively pure ashy : tail blackish ; its outermost feather externally white for the basal two-thirds, obliquely separated ; the next four successively less broadly tipped with white : bill dusky, with whitish base to lower mandible ; and feet plumbeous. From southern India. If a new species, *C. Jerdoni*, nobis.

2. *C. affinis*, nobis, XIV, note to p. 564 : *C. cinerea* apud Jerdon, Catal., vide *loc. cit.* Hitherto only observed in southern India.

3. *C. sylviella*, (Gm.) : *C. garrula*, Brisson, and of Sykes and Jerdon. Since writing the note referred to in the preceding notice, I have not only received *C. sylviella* from Mr. Jerdon, entirely agreeing with British specimens, but have myself shot a pair, about a hundred miles above Calcutta. I observed many of them frequenting the baubul *Mimosæ*, in little parties ; and, as in England, keeping chiefly to the trees, and not to low bush-covert, as is the habit of *C. sylvia* (*v. cinerea*).

M. Temminck mentions having received a female of *C. atricapilla*, the melodious British Blackcap, from Java ; in which case it would probably be also an Indian bird : and I am very greatly mistaken if I did not, upon one occasion, observe *C. hortensis*, another charming British songster, in this neighbourhood, both seeing the bird, as far as I could make it out among the foliage, and recognising its familiar notes ; though having my gun loaded with heavy shot, and being upon the look out for more redoubtable game, I did not secure the specimen.

Calamoherpe, Boie. Three species of this genus are noticed in XIV, 594-5, and one of them again in XV, 288. In *Madr. Journ.* No XXXI, 130, Mr. Jerdon, following Mr. Strickland, identifies *C. montana* with the British *C. salicaria*. This is a mistake, unless Mr. Jerdon has confounded two species under *montana*, which is improbable. More

recently, he has favoured me with his *montana* of southern India, which is identical with the Bengal species. I have pointed out the distinctions, *loc. cit.*; and may add that the songs of the two species are altogether different, that of *C. montana* being a low soft warble.* *C. montana* is probably the *Sylvia arundinacea*, var. A, of Latham.

Phyllopneste, vide XIV, 593. Mr. Jerdon has sent me two very closely allied races which he thinks have been confounded under *Ph. rama*. The one he regards as true *rama*, which is of a more rufescent brown colour; the other has a more greyish shade. I can hardly, however, bring myself to admit their distinctness. The latter variety occurs abundantly in Lower Bengal, upon the sandy soil above the tide-way of the Hoogly, haunting baubul topes and scattered trees near villages, as well as hedges and low bush-jungle; and I have recently observed it in the jungles north and west of Midnapore. The following are my notes, taken from several recent specimens. Length five inches, by seven and a half in alar expanse; wing two inches and three-eighths, to two and a half; tail two inches to two and one-eighth, its outermost feather an eighth of an inch shorter: bill to gape five-eighths of an inch; tarse three-quarters. Irides dark: bill dusky above, pale carneous below: inside of mouth yellow: legs light brown, tinged with plumbeous on the joints. Length of first primary, five-eighths of an inch and upwards. Colour above greyish-brown, below pale, passing to white at the vent and on the lower tail-coverts; lores, continued as a streak passing the eye, pale.

Culicipeta, nobis, XII, 968. I obtained a very beautiful species of this genus a few miles above Calcutta.

C. cantator, (Tickell,) *J. A. S.* II, 576.† Length four inches and a quarter, by six and three-eighths in alar expanse; wing two inches and a quarter; and tail an inch and three-quarters: bill to gape nearly

* Mr. Jerdon has also sent a British specimen of *C. salicaria*, which certainly approximates to *montana* more than two others in the Society's collection do; these three being unquestionably of the same species: all, however, are of a more rufescent and less greenish shade than *C. montana*; the bill of *C. salicaria* is narrower; and, as above remarked, the notes of the two species are exceedingly unlike, which, I think, of itself decides the question. Mr. Jerdon suggests that *C. agricola* may perhaps be the *C. palustris* of Europe.

† *C. schisticeps* of Mr. Gray's catalogue of Mr. Hodgson's specimens presented to the British Museum, pp. 67, 153.

five-eighths; and tarse five-eighths of an inch. Bill light dusky above, amber-coloured below; legs light yellowish-carneous, with a leaden tinge: bill narrower than in *C. Burkii*; and the rictal setæ are less developed; the claws, especially that of the hind-toe, being shorter. Colour, a lively yellowish-green above, bright yellow on the throat, cheek, supercilium, lower tail-coverts, and edge of the wing above the insertion of the quills: the great alars are also margined externally with greenish-yellow, and the tail more especially towards its base: greater wing-coverts tipped with pale yellow, forming a bar on the wing: the entire abdomen and flanks greyish-white: on each side of the crown a broad black longitudinal band, divided by a yellowish-green mesial one: upper tertiaries very slightly margined at the tips with yellowish-white; and the tail-feathers having a narrow yellowish-white internal border. Shot near Calcutta.

C. poliogenys, nobis, n. s. This is nearly allied to *Abrornis schisticeps*, Hodgson, (XIV, 592,) from which it differs in having the cheeks and ear-coverts, with the feathers commencing from the base of the lower mandible, of the same ash-grey colour as the head, and the throat greyish white, instead of these parts being bright yellow, as in *C. schisticeps*. There is also a conspicuous whitish-yellow wing-band, of which the latter species presents no trace whatever. From Darjeeling.

It is exceedingly difficult to arrange the great series of the birds of this group at all satisfactorily; and I fear that we shall have eventually to adopt many divisions among them. Of the various species allied in colouring and markings to *Culicipeta Burkii*, that bird stands alone in several particulars, as the more decided fly-catching form of bill, and accompanying development of the rictal setæ; also the longer and more slender, though equally curved, claws. Although the species upon which the division was originally founded, I regard it as an aberrant member of its genus, though Mr. Hodgson would separate from it the others by the name *Abrornis*, XIV, 592. Retaining, however, the near *Culicipeta* for the series, I think we must refer to it—2, *C. schisticeps*,* (Hodg., loc. cit.) 3, *C. poliogenys*,—4, *C. cantator*,

* This is *Phyllopneuste xanthoschistos*, Hodgson, of Gray's catalogue; and *Culicipeta schisticeps* of the same is *C. cantator*, (Tickell). *Abrornis chloronotus*, Hodg., Gray, so far as I could judge from a sadly injured specimen, did not appear to me to differ from *Reguloides modestus*, (Gould,) except in being rather brighter than usual.

—5, *C. pulchra*, (Hodg., *ibid.*),—6, *C. castaniceps*, (Hodg., *ibid.*)—7, *C. trochiloides* (*Acanthiza trochiloides*, Sundevall, v. *Ph. reguloides*, nobis, XI, 191, and XII, 963),—and 8, *C. occipitalis*, (Jerdon, XIV, 593), formerly referred by me to *Phyllopneuste*.*

As another aberrant member of the same group, but which can scarcely range in the same minimum division with *C. Burkii*, though barely separable from *C. trochiloides* in a subgeneric sense, we have the *Regulus modestus*, Gould, a form which, if *Abrornis* be detached from *Culicipeta*, would equally require to be separated, and might range as the type of a distinct subdivision—*Reguloides*, nobis.

Then, of *Phyllopneuste* may be recognised two marked subdivisions; that with the green plumage, typified by *Ph. hippolais* of Europe and *Ph. indica*: and that with brown plumage, exemplified by *Ph. rama*: the former being allied to the green species of *Phylloscopus*; the latter to those with brown plumage, as *Ph. fuscatus* and its immediate allies.

Also, of *Phylloscopus*, should perhaps be distinguished the bright green species with long wings, such as *Ph. sibilatrix* and *Ph. nitidus*; and the numerous species of the type of *Ph. trochilus* and *Ph. rufus* of Europe, of which I have already described—*Ph. javanicus*, (Horsf. v. *magistrostris*, nobis,) *Ph. viridanus*, *Ph. lugubris*, *Ph. tristis*, *Ph. brunneus*, and *Ph. fuscatus*; probably also the *Ph. affinis*, (Tickell), to which Mr. Jerdon refers his *Sylvia indica*.

The last appears to be a bird which I long regarded as the young (in the yellow dress) of *Ph. lugubris*; and which Mr. Jerdon thinks is his *Ph. indicus*, but wishes to see a recent specimen before he quite decides that it is so. That it is distinct from *Ph. lugubris*, I am now satisfied; and must not omit to state that Prof. Behn, of Kiel University, first pointed out to me the specific distinctions of the two, when we had fresh specimens of each before us, in the course of a fortnight's trip which I had the pleasure of taking with him and M. Kielroup, both of the scientific corps attached to the Danish frigate *Galatea*, in quest of specimens of all kinds on the banks of the Hoogly and their vicinity. The following are the distinctions which I noted down at that time. The bill is more feeble, and much more compressed, in *Ph. affinis*; while in *Ph. lugubris* it is very little compressed, approaching to the *Culicipeta* (i. e. *Abrornis*) form, and the rictal setæ are

* To the synonymes already given of *C. Burkii*, add *Acanthiza arrogans*, Sundevall.

considerably more developed. The colour of the legs is also very different, being in *lugubris* pale greenish-dusky, while in *affinis* there is a strong tinge of brown. I have obtained numerous specimens of this bird, all of which were of the same dusky-green colour above, with dull yellow supercilium and lower-parts, brightening on the middle of the belly; and I have reason to believe that this colouring is permanent—unlike the yellow dress of the British *Ph. trochilus* and *Ph. rufus*, which is not their nestling garb, but is put forth very soon after leaving the nest. *Ph. affinis* measures four inches and three-eighths to four and three-quarters long, by six and a half to seven inches in expanse; wing two inches and one-eighth, to two and three-eighths; and tail an inch and three-quarters to one and seven-eighths: bill to gape half an inch, or a trifle more; tarse three-quarters of an inch, or nearly so. Irides dark. Bill dusky above, amber-coloured below; interior of the mouth bright yellow; and legs pale brownish-dusky, tinged with yellow; the soles more or less yellowish.

Another and larger species was obtained on the same occasion, with very similar colouring.

Ph. griseolus, nobis, n. s. Length five inches and a quarter, by seven and a quarter; wing two and five-eighths; tail two and a quarter; bill to gape nine-sixteenths; tarse three quarters of an inch. Irides very dark brown; bill dusky above, below pale amber; interior of the mouth whitish, with scarcely a tinge of yellow; tarse externally, and the toes above, light brown, internally and beneath yellow. This bird is distinguished from *Ph. affinis* by its much larger size, and by the decided ashy tinge of its upper-parts; also by the colour of the legs in the recent specimen, and whitish interior of the mouth. The yellow of the under-parts is more confined to the central region, and a somewhat ruddy whitish prevails, instead of yellow, on the ear-coverts. Some specimens of *Ph. fuscatus* are so similar, except in wanting the yellow, that I should have been tempted to regard them as different phases of plumage of the same species, analogous to those exhibited by *Ph. trochilus* and *Ph. rufus*, were it not for the different proportions of the first primaries, besides that the wing is longer in *Ph. griseolus* than in any specimen of *fuscatus* yet examined. In the latter, the first primary is fully half the length of the second; while in the former it does not exceed one-third of the length of the second: measuring from the

tip of the short first primary to that of the wing, *Ph. fuscatus* gives but an inch (in four specimens under examination), while *Ph. griseolus* gives an inch and a half.

It would seem that *Ph. fuscatus* undergoes a certain seasonal change of colouring: the whole plumage being less olivaceous, and more of a fuscous-ashy above, with a faint ruddy tinge on the supercilium, ear-coverts, and slightly on the under-parts, and the bill and feet being darker, in a specimen shot late in April, than is observable in others killed during the cold weather.* Perhaps, however, the former may be merely a very bright old bird, and it is to this specimen in particular that *Ph. griseolus* shows a marked approximation: but the difference in the length of their first primaries betokens their distinctness; and the latter has also the wing fully a quarter of an inch longer than in the other.

Regulus cristatus, Ray. This species visits Simla, and a fine specimen procured near that station has been obligingly presented to the Society by Capt. Thomas. It is quite undistinguishable from the British bird; and the genus has not heretofore been recorded as Himalayan.

Ægithalus flammiceps, Burton, P. Z. S. 1835, p. 153. In XIII, 379, I suggested that this might probably turn out to be a *Stachyris*, Hodgson: but I have lately obtained a specimen, and consider it to be rightly classified. The *Dicæum sanguinifrons* of Lord Arthur Hay, XV, 44, refers evidently to this bird: but the affinities of the genus do not seem to be with *Dicæum*, and indeed are at present very obscure. I certainly do not think that *Ægithalus* approximates *Parus*, near which it has been currently arranged; nor do I know of any Old World form that much resembles it.

Parus, Lin. A synopsis of the Indian species of this group was attempted in XIII, 942; and a new species from the eastern ghats of the peninsula described in XIV, 553. I have now to add three others, two of which have been overlooked hitherto from their similarity to allied species.

P. aplonotus, nobis: *P. xanthogenys* apud nos, XI, 59, and probably

* Another, recently obtained (March 17), resembles that above described; and the difference from *Ph. fuscatus* is so marked, that I cannot help here also suspecting a distinctness of species.

of Jerdon. This differs from true *P. xanthogenys* of the Himalaya in various details of its markings: as in having the back plain dull yellowish olive-green, without the broad black lateral margins to each feather, conspicuous in the Himalayan species; in having the yellow colouring reduced in quantity, and also less vivid, the posterior crest-feathers being but slightly tipped with yellow; the broad and well marked yellow supercilium is diminished to an elongated spot posterior only to the eye, there being no yellow above the eye; and the loral feathers, instead of being wholly yellow, are black with slight yellowish tips: the black band posterior to the eye is much broader; and the black throat and front of the neck very much broader, comprehending the feathers about the gape, which are yellow in the other species: the white tips to the tail-feathers are also much more developed: and, lastly, without descending to more minute particulars, the tertiaries are laterally edged throughout with white, whereas in *P. xanthogenys* there is only a trace of this towards their base. The general resemblance, however, between these two species is very great: but *P. xanthogenys* is at once distinguished by the variegation of its back; and when the two are seen together, by the much greater quantity of yellow on the sides of the head and neck: while in *P. aplonotus* the black throat is conspicuously much broader, and there is a greater proportion of white on the wings and tail. *P. aplonotus* inhabits the mountains of central India; and there is little doubt of its being Mr. Jerdon's more southern bird referred to *P. xanthogenys*.

P. Griffithii, nobis. This species is founded on a drawing of a bird obtained by the late Dr. Griffith, between Assam and Ava. With a near affinity in colouring to *P. xanthogenys* and *P. aplonotus*, it is at once distinguished by being crestless, and by the details of its markings. Length of wing about two inches and three-quarters, and of tail two inches and a quarter. Colour black, with the lores and sides of neck, the rump, under-parts, an occipital spot, and triangular terminal drops on the dorsal feathers, yellow; throat and fore-neck black: tail considerably forked, and tipped with white; also the greater wing-coverts and the tertiaries, with the base and edge of the primaries.

P. rubidiventris, nobis: *P. melanolophos* apud Hodgson. Here, again, two nearly allied species have been confounded together, from their general resemblance: the true *P. melanolophos* inhabiting the

N. W. Himalaya, as about Simla; and the present species, Nepal and Sikim. Size about the same, but the bill of *P. melanolophos* is conspicuously more slender: the latter has also the back, and the belly, pure dark grey; the black of the throat and breast carried further down; a ferruginous patch confined to each side of the breast, below the black; and the greater and lesser wing-coverts are tipped with rufescent-white, forming two bars on the wing.—*P. rubidiventris*, on the other hand, has the upper-parts of a paler and rufescent grey, with a strong tinge of ferruginous upon the rump; no trace of bars on the wing; the black of the throat less developed, this being bordered with the same grey as the back; and the whole of the abdominal region is tinged with dilute ferruginous.

P. atriceps, Horsfield, will bear the prior name *cinereus* of Vieillot, founded on one of Levaillant's figures. It is the *P. major*, var. B, of Latham.* In my description of *Sylviparus modestus*, Burton, XIII, 942, I omitted to notice the spot of silky-yellow feathers above the eye, upon which Mr. Hodgson founds his name *seriophrys* (or *sericophrys* would have been better); neither has Mr. Burton noticed it. This is very conspicuous, however, in the recent specimen (as I have been informed); but was completely hidden in the dry skin from which I drew up the notice adverted to.

Paradoxornis group, XIV, 578. To this should probably be referred the Australian genus *Struthidea*. Of *Heteromorpha ruficeps*, Capt. Tickell writes me word—"I have killed several of these birds, and watched them in their wild state, at Geeng, near Darjeeling; and I cannot agree in opinion with those who would class its group among the *Crateropodines*. This bird is a great devourer of grain (maize, rice, and buckwheat, which last is common about Nepal). It perches on the tops of high trees, as well as bushes, when off its feed; and in fact shows nothing in its manners of the thicket-loving, skulking, habits of the *Crateropodines*."

Of the vast series of birds comprised in, or allied to, the last named, many subgroups will require to be distinguished. Just upon the confines of the series, we have the *Leiotrichanæ*, comprising *Cutia*, *Pteruthius*, *Leiothrix* and its subgenera, *Ixulus*, *Yuhina*, and even *Mycornis*. Then another minor series, comprising *Sibia*, *Leioptila*, *Ixops*, *Actino-*

* The Society has lately received a specimen of this bird from Ceylon.

dura, *Garrulax* (perhaps further separable, especially the form of *G. striatus* and *G. imbricatus*), *Crateropus* of Africa, *Psophodes* and *Sphenostoma* of Australia, and finally *Turnagra* of Lesson (v. *Keropia*, G. R. Gray), to which the *Garrulus striatus* of Vigors has been referred. Another little section consists of *Pomatorhinus* and *Xiphorhamphus*, nobis, to the former of which true *Timalia* is nearly allied. Another of *Memura*, *Pteroptochus*, and *Scytalopus*. Another long subseries, of *Cinclosoma*, *Circolorhamphus*, *Megalurus*, *Gampsorhynchus*, *Arundinax*, *Sphenura*, *Sphenæacus*, *Schænicola*, *Laticilla*, *Amytis*, *Stipiturus*, *Malurus*, *Atrichea*, *Hylacola*, *Praticola* (v. *Calananthus*), *Pellornium*, *Malacocercus*, *Drymoica*, *Cisticola*, *Prinia*, and *Orthotomus*; and scarcely separable would be *Timalia*, *Mixornis*, *Chrysomma*, *Macronous*, *Turdinus*, *Malacopteron*, *Alcippe*, *Setaria*, *Erpornis* (?), and *Stachyris*. How all these are to be finally disposed of, each according to its proper affinities, is a problem to our best ornithologists just now; and those who have most studied the series, will not, I believe, be the most eager to offer an opinion. It is easy enough to cut the Gordian knot, by carrying out the principle of ranging all the large species in *Merulidæ*, and all the small in *Sylviadæ*, and thus manufacturing duplex series, presenting "beautiful analogies" and "representations" one of the other; but the time has a little gone by for such frivolities, and ornithologists must pursue the course adopted by students of other branches of Natural History,—must study structure, internal as well as external, and learn to regard habit as altogether subordinate, inasmuch as species may be framed on any particular subtype of organization, however subordinate, and be modified upon that subtype in adaptation to any special mode of life,—and this too, without reference to each other, beyond the fortuitous one of their presenting similar modifications, which are thus *analogous* merely, or by no means indicative of *affinity*, i. e. of that intrinsic relationship upon which all legitimate classification must be founded. But I pass to add a few new species, and remarks on old species, to some of the genera that have been enumerated; having upon former occasions treated of the several Indian genera among them: and this having done, shall bid adieu to the Insessorial tribes for a while, till fresh novelties among them begin again to accumulate.

Leiotrichanæ. (Treated of in XIII, 934 et seq., and XIV, 552).

The *Siva nipalensis*, Hodgson, should, I now think, be referred to *Alcippe*, nobis, being closely allied to *A. sepiaria*, (Horsfield); and I doubt whether *A. Phayrei*, nobis, XIV, 601, is other than an individual variety of *S. nipalensis*, in which the blackish nuchal streaks are wanting. *S. nipalensis*, with the nuchal streaks, is not uncommon in Arracan. I also now think it better to class my *Siva occipitalis*, XIV, 553, with *Ixulus flavicollis*, Hodgson; modifying the diagnosis of *Ixulus* so as to comprise both species, for they are undoubtedly very closely allied, notwithstanding the considerable difference in form of bill. Of the genus *Pteruthius*, Mr. Hodgson has sent the following descriptions of what are considered by him to be two new species.

Pt. zanthochloris, H. (*Non vidi.*) "Above vernal-green, below bright yellow. Cap slaty-blue. Throat white: alars and caudals internally dark, the latter tipped with yellow, and albescent marginally on the sides. Iris dark brown. Legs fleshy-white. Bill plumbeous. Structure typical. Size small. Sexes alike? Length five inches; bill seven-sixteenths; tail under two inches; wing two and a quarter in some, nearly two and a half in other specimens; tarse thirteen-sixteenths; central toe and nail nine-sixteenths; hind seven-sixteenths."

Pt. melanotis, H. (*Non vidi.*) "Structure typical. Closely allied in size and otherwise to the preceding species. Length four inches and a half; extent six and a half. Bill half an inch. Tail an inch and six-tenths; tarse eight-tenths. Central toe and nail plus half an inch. Hind under half an inch. Above vernal-green, below bright yellow. Throat bright chesnut. Nape slaty. Ears half golden, half black. Wing-coverts black with white tips. Bill dark slaty. Legs fleshy. Tail nearly even, and paled to the sides." The habitat of both these (alleged) species would appear to be the region of the Terai, at the base of the S. E. Himalaya. I cannot, however, help suspecting that the latter is merely the adult male of the former.

Proparus chrysolis (*chrysopterus* ?), Hodgson, XIII, 938.* Fine specimens of this bird, from Darjeeling, are now before me, in much better order than that formerly sent by Mr. Hodgson. They have the upper-parts fine olive-green, which fades to ashy by exposure to the

* The name *chrysolis* must have arisen from a slip of the pen on the part of Mr. H., probably for *chrysopterus*, or perhaps *leucotis*, as the former is inapplicable to the species. It had better stand as *Pr. leucotis*.

light ; crown nigrescent, and throat dark silvery-ash ; the ear-coverts whitish silvery-ash. The male has the whole under-parts, below the throat and fore-neck, bright yellow, the first five primaries edged with the same ; the secondaries and basal two-thirds of all but the middle pair of rectrices are margined with orange-yellow ; the tertiaries internally with dull white, and most of the great alars have a small white spot at tip. In the females, the lower-parts are merely tinged with yellow, and that of the wings and tail is comparatively very faint.

Minla cinerea, nobis, n. s. Allied in form and size to *M. castaniceps*, XIII, 939. Colour olive-grey above, tinged with green ; beneath white, tinged on the flanks with ashy, and shewing some yellow along the middle of the abdomen : a broad yellowish-white supercilium, and over this a black one ; the coronal feathers margined with black, and the cheeks mingled black and white ; orbital feathers subdued white ; wings and tail without markings ; the tertiaries edged with grey, and the secondaries with very faint dull yellowish. Length four inches and a half, of wing two and a quarter, and tail an inch and three-quarters ; bill to gape nearly five-eighths ; and tarse three-quarters of an inch. Probably a female bird. From Darjeeling.

In XIV, 600, at the suggestion of Mr. Strickland, I regarded as identical the *Hypsipetes gracilis*, M'Clelland and Horsfield, with *Sibia capistrata*, (Vig.), v. *nigriceps*, Hodgson ; but referring since to Dr. M'Clelland's drawing of *Sibia gracilis*, and more particularly also to the latin diagnosis (*P. Z. S.* 1839, p. 159), I find that they are decidedly distinct. The following description is taken from the drawing of *S. gracilis*. Above dark non-rufous brown, paler below, and the throat white ; rump and upper tail-coverts ashy ; tail also greyish, with a broad black subterminal band, and broad greyish-white tips ; wings dusky-black, the great coverts partly, and the tertiaries wholly, greyish-white, the latter having a slight dusky subterminal border and white extreme edge. Iris whitish. Bill dusky-black ; and legs dull white. Wing three inches and a half : tail about four inches. Inhabits Assam.

Leioptila, nobis, n. g. This form serves to connect *Sibia*, Hodg., as exemplified by *S. capistrata*, with *Yuhina*, Hodg. ; but cannot be placed satisfactorily with either. It also much approaches *Ixops*, Hodg., in general structure, but the legs and toes are much smaller. The bill, too, is more slender, less so than in *Yuhina*, rather more so than in

Sibia; but it incurves less than in *Sibia*, and has the tip of its upper mandible slightly bent over, and emarginated feebly; the upper ridge being more obtusely angulated than in the others: nostrils somewhat large, the orifice reduced to a fissure by the overlapping membrane: rictal bristles fine and inconspicuous. Wings rather short, and rounded; having the first primary but half the length of the third, and the fourth and fifth longest: the tertiaries broad, and almost truncate. Tail somewhat long, having its three medial pairs of feathers equal, the rest graduating. Legs too much destroyed in the only specimen examined, to permit of description.

L. annectans, nobis. Length about seven inches and a quarter, of wing three and an eighth, and tail three and a half, its outermost feathers an inch less; bill to gape three-quarters of an inch, and tarse seven-eighths. Colour of the back, rump, and upper tail-coverts, bright rufo-ferruginous (much as in the male *Cutia nipalensis*); the great range of wing-coverts broadly tipped, and the tertiaries edged externally towards their base, with the same: scapularies, flanks, and lower tail-coverts, weaker ferruginous, and a trace of the same at the setting on of the neck: throat and breast pure white; the head, neck, and ear-coverts, black, mingled with brownish upon the crown, and streaked on the nape with white: wings and tail black, the caudal feathers white-tipped, and successively more deeply so to the outermost; the primaries and secondaries edged externally with ash-grey, and the tertiaries bordered with white round their broad tips. Bill black, with the base of the lower mandible yellow; and the legs pale. From Darjeeling.

Garrulax, Lesson. To the synopsis of this genus in XIV, 598 *et seq.*, I have only further to add, that Mr. Jerdon has favored me with a copy of Buffon's figure, in the *Planches Coloriées*, upon which was founded *G. perspicillatus*, (Gm.); and this confirms me in my opinion that the species is alike distinct from *G. Belangeri* and *G. leucolophos*, though nearly allied to both, and forming with them a particular subsection. Of *G. Belangeri*, the Society has been recently favoured by Mr. Barbe with many specimens from the Tenasserim Province of Yé,* all exactly agreeing in their distinctions from *G. leucolophos* of the Himalaya, Assam, Sylhet, and Arracan: and also with specimens of *G. pectoralis* from the same part, remarkable for the very slight develop-

* Also with others from the vicinity of Amherst, forwarded by E. O'Ryley, Esq.

ment of the black pectoral band, which in one is indeed wanting altogether, though on minute inspection a black dash may here and there be seen upon a few of the feathers that should constitute the band in question, and which band is particularly well developed in some Arracanese specimens. The *G. McClellandii*, nobis, judging from Dr. McClelland's figure of it, is probably a variety only of *G. moniliger*.

Pomatorhinus, Horsfield. A synopsis of this genus was attempted in XIII, 946; to which I should have added *P. Isidorei*, Lesson, from New Guinea, described in the *Dict. Class.* The form of the wing is, however, so different in the Australian species, that (as long ago suggested by Messrs. Jardine and Selby, in their 'Illustrations of Ornithology,' it is probable that they will have eventually to be separated. Two other additional species are described in XIV, 597; and I have now to add

P. olivaceus, nobis, *n. s.*: probably (rather than *P. schisticeps*) the *P. montanus* apud McClelland and Horsfield, *P. Z. S.* 1839, p. 166. Allied to *P. schisticeps*, *P. Horsfieldi*, and *P. montanus*. Size of the two last, with bill of intermediate length. Colour of the same uniform dull olive-green above as in *P. schisticeps*, with a faint rufescent tinge on the nape; head of the same olive-colour as the back: throat, breast, and middle of the belly, together with a long superciliary streak, pure white; beneath the latter, the lores and ear-coverts are black, and beyond the ear-coverts there is ferruginous spot on the side of the neck, continued as a slight border to the white breast: flanks and lower tail-coverts olivaceous. Bill yellow, the upper mandible dusky above at base; and feet leaden-brown. Length under nine inches; the wing and middle tail-feathers respectively three and seven-eighths; bill to gape an inch and a quarter; and tarse the same. From the Tenasserim Province of Yé, whence sent by Mr. Barbe. Dr. McClelland's figure of his *P. montanus*, from Assam, seems to agree with this; but may prove upon examination to be distinct, in which case it might stand as *P. assamensis*, McClelland, *MS.* From bill to forehead the drawing measures an inch, wing three inches and a half, and tail about three and three-quarters.

P. melanurus, nobis, *n. s.* Resembles *P. Horsfieldi*, but seems always to have a shorter bill, and the colours are more brought out: the hue of the upper-parts is more rufescent, the tail much blacker, and the

cap is suffused with blackish, mingled with rufescent, but contrasting with the rufescent hue of the rest of the upper-parts. The black of the tail affords the readiest distinction. Inhabits Ceylon.

P. rubiginosus, nobis, XIV, 597. All the specimens of this bird which I have hitherto seen, from Darjeeling, correspond with my description of the supposed male; having the cap black, and some erect lengthened plumes above the lores of the same deep rufous as the breast: but the Arracan specimens, three in number, which I have now seen, alike correspond with my description of the supposed female; having the crown of the same olivaceous hue as the rest of the upper-parts, this being of a greener tinge than in the Darjeeling birds; the feathers above the lores short and white, like the rest of the supercilium; and the rufous of the under-parts is much weaker and more fulvescent. Hence, I now suspect that they are two distinct species, and shall designate that of Arracan *P. Phayrei*.

Gampsothynchus rufulus, nobis (XIII, 371, XIV, 596). Mr. Hodgson has sent a description of this curious species, from which may be cited—"Irides straw: bill sordid brown; legs sordid fleshy-grey. Expanse of wings eleven inches and a quarter." I have also seen several more specimens, nearly all of which had a greater or less intermixture of whitish feathers (as described).

Mizornis chloris, Hodgson, XI, 794, XIII, 380 (*Motacilla rubica-pilla* (?), Tickell). This has since been described by Mr. Hodgson as *M. ruficeps*, H., P. Z. S. 1845, p. 23.*

Stachyris ruficeps, nobis, n. s. Allied in form and size to *St. pyr-rhops*, Hodgson, XIII, 379; but having the crown light ferruginous, and the chin and middle of the throat white, with slight black central streaks to the feathers: rest of the upper-parts plain olive, and of the lower whitish, with a fulvous tinge on the sides of the neck and breast. Length of wing two inches and an eighth, and of tail an inch. From Darjeeling.

In XIII, 370, I remarked the near affinity of *Timalia hyperythra*, Franklin, for the *Malacocerci*; an opinion fully borne out by subsequent observation of the habits of the species in its native jungles: but I find

* And in Mr. Gray's list of Mr. Hodgson's specimens presented to the British Museum, it is identified with *Timalia gularis*, Horsfield; though I question upon sufficient grounds, however closely allied.

that *T. hyperythra* of Jerdon's list, inhabiting southern India and Ceylon, differs from true *hyperythra*, which I obtained in the Midnapore jungles, in having the chin and throat white, and the ferruginous hue of the rest of the under-parts rather deeper. The length of recent specimens was five inches and a half, by six and a half in alar expanse; closed wing two inches, to two and an eighth: iris brown; bill pale, darker above; and legs carneous. This bird occurred in flocks, and its note considerably resembles that of *Malacocercus caudatus*, except in being proportionally weaker. Should it be considered separable, as a species, from its representative in southern India, the latter might stand as *M.* (?) *albogularis*, nobis. The difference is, indeed, somewhat like that between *Geocichla citrina* and *G. cyanotus*.

Of the more typical species of *Malacocercus* (*vide* XIII, 367 *et seq.*, and XIV, 597), several additional specimens of *M. striatus* from Ceylon are true to the characters which I pointed out as distinguishing this bird from the closely allied *M. terricolor** of Bengal, &c.; though the approximation of some of them is extremely close: and with these, Dr. Templeton has favoured the Society with examples of a new species, which may be termed

M. rufescens, nobis. This pertains to the same section of the genus as *M. striatus*, *terricolor*, *malabaricus*, and *griseus*; but has the tail longer and more graduated;—in this respect, and in its colouring, approximating to the other or long-tailed section. Length above ten inches, of wing four, and tail five inches, its outermost feather an inch and three-quarters less; bill to gape an inch, and tarse an inch and three-eighths. Colour deep brown above, with no intermixture of grey except upon the crown, and bordering the primaries; flanks, abdomen, and lower tail-coverts, much the same; but the throat and breast vinaceous-brown. Bill and feet bright yellow. Inhabits Ceylon.

* With regard to my identification of this bird with *Turdus canorus*, Lin. (XIII, 368), on the authority of Edwards's figure and description of his 'Brown Indian Thrush,' Mr. Strickland writes me word:—" *Turdus canorus*, L., is not founded on Edwards, pl. 184, (though Linnæus erroneously quotes that plate in his synonymes). *T. canorus*, L., is founded on *T. chinensis*, Osbeck; out of which Linnæus also inadvertently established his *Corvus* (vel *Lanius*) *faustus*. The latter specific name should stand, being used by Linnæus in his *Amœnitates Academicæ*, prior to using *canorus* in the *Syst. Nat.*

(N. B. Osbeck's name *chinensis* is out of the pale of the binomial nomenclature.) This bird has a white streak behind the eye, and is the *Ianthocinclu canora* of my Chinese list *Ann. Mag. N. H.* 1843, p. 221."

Some doubt still remains respecting the identification of *Garrulus albifrons*, Gray, with *M. Malcolmi*: but to the former must be referred the *Pale-eared Thrush* of Latham; and his *Gogaye Thrush* is evidently a species nearly allied to *M. Earlei* and *M. caudatus*. Both the latter occur plentifully in Lower Bengal, above the tideway of the river; frequenting hedges and small detached trees in the open cultivated country, and never "mango topes" or groves, like *M. terricolor*. It is remarkable that *M. Earlei* has the iris bright light yellow, while that of *M. caudatus* is dark hazel.*

The *Timalia hypoleuca*, Franklin, v. *T. Horsfieldi*, J. and S., is cited as *Chrysonna hypoleucos*, (Fr.) Hodgs., in *J. A. S.* XIV, 602, and Mr. Hodgson has designated the group *Chrysonna* in *P. Z. S.* 1845, p. 24. I agree with him that it is justly separable. This bird is the *Parus sinensis*, Lath., which specific name should stand, provided the species prove to inhabit China. It is also the *Gotah Finch*, and *Emberiza calfat*, var. A, of Latham.

Genus *Prinia*, Horsfield, and its immediate affines. This group was treated of in XIII, 375 *et seq.*, and some more recent discoveries in it by Mr. Jerdon are alluded to in XIV, 490. That gentleman has since obliged me with the loan of his specimens; and it appears that a further dismemberment of the series is required, than the separation of the little group *Cisticola*. Without coining a new name, the species may be distributed under *Prinia*, *Cisticola*, and *Drymoica*.

The typical *Priniae* have a rather longer, straighter, and more slender bill, which in all the Indian species appears to be constantly of a black colour; and the hues of the plumage are mostly pure greyish and brightish olive-green above, with clear fulvous-white or yellow below. Altogether, they approximate more to the *Orthotomi*, or Tailor-birds; so much so, that Mr. Swainson has suggested that *Pr. familiaris* of Java is "probably an aberrant species of *Orthotomus*;" and Col. Sykes remarks, of his *Pr. socialis*, that it constructs the same ingenious nest, and has the same habits, same note, and feeds in the same manner, as

* Recently, I have observed *M. caudatus* in abundance, in low bush cover in the vicinity of Midnapore; and *M. Earlei*, also, is common in some parts of the same district, in general frequenting higher bush-jungle.—This genus, *Malucocercus*, seems to be wholly Indian, and finds its nearest allies in the African *Crateropodes*. The Burmese and Malayan countries seem to have no immediate representatives of it; and, in the latter more especially, species of *Garrulax* seem to be almost wholly wanting.

Orthotomus longicauda.* In general, I think it will be observed that they frequent higher jungle, and scrubby open country less, than the *Drymoicæ*; which would bear out their affinity to the *Orthotomi*: and, lastly, it may be remarked, that the first species below noticed was classed as an *Orthotomus* by, I believe, the Baron de la Fresnaye.

1. *Pr. flaviventris*, (Delessert,) vide XIII, 376. This species is remarkable for the absence of subterminal variegation to its tail-feathers.

2. *Pr. olivaceus*, (Raffles,) *Lin. Tr.* XIII, 313. Apparently closely allied to the preceding, but having a subterminal blackish band to its tail-feathers.

3. *Pr. familiaris*, Horsfield, figured both in the 'Zoological Researches in Java,' and by Mr. Swainson. Also evidently allied to the two preceding.

4. *Pr. socialis*, Sykes: *Foodkey Warbler* of Latham. Southern India.

5. *Pr. Stewarti*, nobis; *Sylvia kalaphutki*, Buch. Ham., MS.: probably *Flaxen Warbler*, var. A, of Latham. I found this species upon three specimens procured by Dr. Stewart near Agra, which alike differ from three of *Pr. socialis* before me, in their smaller size, considerably smaller bill, whiter throat, and much less distinct subterminal broad caudal band as seen above, the rest of the tail-feathers being also considerably more rufescent: in other respects the two species present a close resemblance. Length of wing an inch and three-quarters; tail two and a quarter; bill to gape nine-sixteenths; tarse three-quarters of an inch: the corresponding measurements in *Pr. socialis* being two inches, two and a quarter, eleven-sixteenths, and seven-eighths or nearly so. In the latter species, the tips of the tail-feathers have the terminal quarter of an inch conspicuously black, with a slight greyish edge beyond; while in the present species the dark band is much less broad, and only appears above as if showing through the feathers.

* This observation concerning the nest leads me to suggest that the "unspotted verditer-blue eggs" found in some Tailor-birds' nests, as noticed by Mr. Hodgson, in *P. Z. S.* 1845, p. 29, were those of *Pr. Hodgsoni*, nobis; for the nearly allied *Drymoicæ* lay blue eggs, as remarked by Mr. Jerdon of *Dr. inornata*, and so do the *Malacocerci*, *Sphenuræ*, &c., to which they approximate. As for Mr. Hodgson's two species of *Orthotomus*, I consider his *O. patia* to be decidedly the young of the other, previously named *O. lingow* by Sykes. Mr. H. forwarded the young as a separate species to the Society's Museum.

6. *Pr. Hodgsoni*, nobis, XIII, 376 : *Pr. gracilis* apud Jerdon, et nos passim.

7. *Pr. gracilis*, Franklin.* A species which I consider to be this one, was observed abundantly in the low sâl jungles to the northward of Midnapore ; and some time previously, Mr. Jerdon forwarded a young bird with the MS. name *Pr. tarda*, which, without having now by me for comparison, I suspect will prove to be the same. Length four inches and a half, by five and three-quarters in alar expanse ; wing an inch and seven-eighths ; tail two inches ; bill to gape five-eighths ; tarse thirteen-sixteenths of an inch. Some specimens are rather smaller. Bill black ; irides deep amber ; bare orbits dull yellow ; feet dull orpiment-yellow. Colour slightly rufescent olive above, greyer on the head and neck ; the wing-feathers edged externally with rufous-brown : under-parts silky-white, tinged with yellowish-fulvous on the flanks, and faintly on the sides of the neck : tail brown, albescent-greyish underneath, with subterminal dark band and whitish tips, much more conspicuous on the under surface than above. The following is the description which I took of Mr. Jerdon's specimen from S. India :—

Colour light greyish olive-green above, slightly fulvescent white below, with a tinge of yellow on the sides of the neck : wings pale dusky, margined with light rufescent-brown ; and tail the same, with a very strongly marked subterminal blackish band and pale greyish tips, as seen beneath, but the former scarcely visible on its middle feathers above : bill pale, the ridge a little dusky towards its tip ; and legs very pale, probably flesh-coloured in the recent specimen. Length about five inches or less, of wing one and seven-eighths, and middle tail-feathers two inches, the outermost an inch and an eighth less ; tarse thirteen-sixteenths.—This species is very common in the Midnapore jungles, in straggling flocks of a dozen or more individuals ; and a number of them together sometimes utter a twittering kind of song : but from their small size, restlessness, and the nature of the cover they frequent, it requires some patience to obtain a number of specimens.

8. *Pr. rufescens*, nobis, *n. s.* Closely allied to the last, from which it is distinguished by the much more rufous colouring of its entire

* Nec *Pr. gracilis*, Ruppell, which should be a *Drymoica*, if the distinction here proposed be adopted.

upper-parts, and of the flanks: the tail above, and wings externally, are uniform rufous or light ferruginous. Inhabits Arracan.

To *Cisticola* we can only refer

C. cursitans, (Franklin.) India generally, including Lower Bengal, though chiefly above the tideway of the river. A second species is common in parts of the south of Europe, the *C. schænicola*, Bonap.; and a third occurs in Australia, recently described (and since figured) by Mr. Gould as *C. campestris*, *P. Z. S.* 1835, p. 20.* These little birds frequent sedges and long grass in the open country, also growing corn and other low crops; and the Indian species may be commonly observed to rise a little way into the air, as is the habit of so many birds that inhabit similar situations, repeating at quick intervals a single note—*jik, jik*. Like its European affine, it is also remarkable for the beautiful construction of its nest, *sewing* together a number of growing stems and leaves of grass, with a delicate pappus which forms also the lining, and laying four or five translucent white eggs, with reddish-brown spots, more numerous and forming a ring at the large end, very like those of *Orthotomus longicauda*. It abounds in suitable districts throughout the country.

Drymoica, Sw. The types of this division, as cited by Mr. Swainson, are—1, the European *Cisticola schænicola*,—and 2, *le Capocier* of Levaillant, or *Sylvia macroura*, Lath., of South Africa, considered identical with the species figured in Denon's Egypt. Other African species have been figured and described by Ruppell and by Dr. A. Smith: but no restricted *Prinia* appears to have been yet met with on the African continent. To the same immediate group as *Dr. macroura*, (Lath.) Sw., must also be referred several Indian species, some of which are very closely allied together, and difficult to describe apart. The bill is shorter, less slender, wider and deeper at base, with more developed stiff rictal bristles, than in the true *Priniæ*; and, if black, is only of this colour during the breeding season, as in *Sphenura* and *Megalurus*. The plumage is commonly plain deep brown, darker

* Add, also, several of Dr. A. Smith's *Drymoicæ* of South Africa, as *Leucillantiæ*, *terrestris*, *cherina*, *subruficapilla*, apparently also the large *natalensis*, and perhaps *chinitana*. His *Dr. tatrix*, or the *Pinepinc* of Levaillant, constitutes Mr. Swainson's further subdivision *Hemipteryx*. Gould also figures and describes a *C. magna* from Australia.

(or sometimes rufous) on the crown, where the feathers have usually somewhat paler margins; the lores, under-parts, and more or less developed eye-streak, pale; and the graduating tail-feathers have a subterminal dusky bar and pale tip, in general distinctly traceable, but less strongly marked and contrasting than in the *Prinia* and *Cisticolæ*. They inhabit low scrubby bush-cover in the open country, rather than high bush-jungle, to which the *Prinia* chiefly resort; or long grass, the favourite abode of the *Cisticolæ*: and the nest is of ordinary construction and open above, neither formed by sewing a few grass stems and leaves together, in the manner of the *Cisticolæ*, nor broad leaves, like the *Orthotomi* and (so far as known) the *Prinia*. At the head of the Indian species may be placed

1. *Dr. criniger*; *Suya criniger*, Hodgson, *As. Res.* XIX, 183. Nepal.

2. *Dr. longicaudata*? *Sylvia longicaudata* (?), Tickell, II, 576: *Prinia macroura*, Franklin (nec *Sylvia macroura*, Lath.), altered to *Pr. Franklinii*, nobis, in XIII, 376. (*Non vidi.*) Hab. Indian peninsula, probably to the northward chiefly.

3. *Dr. sylvatica*, Jerdon. A specimen of what appears to me as the young of this bird, has been forwarded on loan by Mr. Jerdon with the specific name *neglecta*.* The plumage has the unsubstantial texture characteristic of immaturity; and the general colour is not so-dark, the crown being of the same faintly rufescent brown as the rest of the upper-parts, † the rufescent edgings of the wing-coverts and primaries are more developed, and the tail is much shorter; its middle feathers measuring but two inches and a half, and the three or four outer tail-feathers having broader but ill-defined dull whitish tips, and no decided indication of the subterminal dusky band (which I also find to be the case in certain unshed tail-feathers of a specimen of *Dr. Jerdoni*, while those that had been moulted resemble the corresponding feathers of *Dr. sylvatica*). Entire under-parts of the same uniform clear fulvous-white. Length of wing two inches and a quarter; of bill to gape five-eighths, and tarse seven-

* It is described by Mr. Jerdon as *Prinia neglecta*, in the *Madr. Journ.* No. XXXI, 130; being altogether different from *Dr. Jerdoni*, of which that gentleman forwarded a second specimen by the same opportunity.

† In the young of *Dr. Buchanani*, the rufous crown is much less marked than in the adult.

eighths, having apparently been fleshy-white. This young bird (for such it certainly is, whatever its species), was procured from the jungle skirting the base of the eastern ghauts of the peninsula. *Dr. sylvatica* inhabits the Neilherries, but I believe is not confined to them.*

The Society has received a species from Java almost exactly similar to *Dr. sylvatica*, but smaller, having the wing but two inches and an eighth, instead of from two and three-eighths to two and a half: the bill, however, is fully as long, or longer than in most specimens of *Dr. sylvatica*, and the tips of the tail-feathers have a much broader and more conspicuous dusky band, as seen from beneath, with a narrower whitish terminal margin.

4. *Dr. brevicaudata*, nobis, n. s. Length five inches and a quarter, of wing two and an eighth, and tail but two inches, its outermost feathers half an inch shorter; bill to gape five-eighths, and tarse three-quarters of an inch. Colour plain uniform greenish olive-brown above, inclining to tawny towards the tail; paler and albescent below, passing to olive on the flanks: the anterior third of the under surface of the wing nearly pure white. Bill dusky, and legs pale. From Darjeeling.

5. *Dr. Jerdoni*, nobis: described as a new species of *Prinia* in XI, 883, but regarded as a variety of *Dr. inornata* in XIII, 376. Intermediate to *Dr. sylvatica* and *Dr. inornata* (vera) of Southern India; also nearly allied to the Javanese species, which it resembles in size, but differs in its subterminal dusky tail-band not being nearly so broad, and essentially resembling that of *Dr. sylvatica*. Except in being smaller, I can detect no available distinction of this species from *Dr. sylvatica*; i. e. distinctions which I might predicate as constant: but two specimens before me correspond exactly in dimensions; having the wing two inches and an eighth, middle tail-feathers two and a half, bill to gape five-eighths, and tarse three-quarters. Inhabits Southern India.

6. *Dr. inornata*, (Sykes.) This is smaller, again, but otherwise similar, except that the tail-feathers are more albescent under-

* I recently obtained a single specimen, about 40 miles to the N. W. of Midnapore. It was in an open bushy place, near tree-jungle; where also were many of the *Chrysoman hypoleucos*. Its note was a long-continued and rapid repetition of the sound *twit*. Length six inches and a half, by seven inches in spread of wing; closed wing two inches and a quarter; tail three and one-eighth. Legs caraneous-brown; irides deep amber, as usual throughout the group.

neath, and the subterminal dusky band tends to contract into a medial spot on each tail-feather. Length of wing under two inches, of middle tail-feathers two and a quarter, bill to gape barely five-eighths, and tarse three-quarters of an inch. A specimen sent by Mr. Jerdon with the name *sericea*, I take to be the young of this; distinguished by the looser texture of its feathers, and by its general much paler colouring: also from Southern India.

7. *Dr. fusca*, (Hodgson,) *P. Z. S.* 1835, p. 29: *Prinia inornata* of Bengal, Nepal, &c., apud nos, *passim*. Hab. also Arracan. Plumage altogether more fulvescent than in the preceding species, and less firm in texture; with the tail-feathers much browner, and not so strongly marked at the tips: all the wing-feathers broadly edged with rufous-brown, and tail tinged with the same. Inhabits likewise the Midnapore district.

8. *Dr. Buchanani*, nobis; altered from *rufifrons*, Franklin, XIII, 376: *Prinia brunniifrons*, Hodgson, *Ann. Mag. N. H.* 1845, p. 19; probably *Sylvia longicauda*, var. A, of Latham. Nepal, Upper Bengal, Southern India.

9. *Dr. lepida*, nobis, XIII, 376. During an excursion up the river, I obtained several specimens (and observed many more) of a strongly marked species, which appears to be this one, so far as I can identify it from comparison with the injured Scinde specimen. Length four inches and three-quarters to five and a quarter; the tail varying from two and one-eighth to two and five-eighths, with its outermost feathers from an inch to one and a quarter less; alar expanse five inches and a quarter to five and a half; closed wing an inch and three-quarters; bill to gape half an inch, or a trifle more; tarse five-eighths of an inch. Irides bright yellowish-brown: bill plumbeous, paler (and sometimes carneous) below; legs pale carneous, with a faint tinge of yellow. General colour light olive-grey above, each feather having a mesial dusky streak, broader on those of the crown and back: wings light dusky-brown, the feathers margined with olive-grey: and tail throughout distinctly banded above, with narrow transverse duskyish lines; below pale, with whitish tips, and a subterminal dusky band to each feather: the under-parts throughout are greyish-white, with lores and a slight supercilium of the same. This bird inhabits low scrub, intermixed with tufts of coarse sedgy grass, growing in sandy places by the

river-side ; and it frequently flies out to feed among the thin herbage growing along the margin of the sand-dunes.*

Malacopteron group. I know of no birds more difficult to arrange than the chiefly Malayan series nearly allied to true *Timalia*, to certain species of which Mr. Eyton first gave the name *Malacopteron*. Twelve or more species of this series are now before me.

First, following true *Timalia* and *Macronous*, we have *Turdinus*, nobis, XIII, 382, founded on *M. macrodactylus* of Strickland. Lord Arthur Hay has recently added, with a mark of doubt, a species which his lordship terms *Turdinus? superciliaris* (*Madr. Journ.* No. XXXI, p. 163) ; but suggests a divisional name, *Turdirostris*, and defines its characters, in case should it be deemed separable, which I now consider it to be. Indeed, I am not satisfied that its affinities are not rather with *Copsychus* and *Kittacincla* (p. 139, ante).

Next, might come *M. magnum* of Eyton, with which I would only place an allied and larger species of the series before me, which may be described as

Malacopteron majus, nobis. Length seven inches and a half, or more ; of wing three and a half ; and tail three inches : bill to gape an inch ; and tarse thirteen-sixteenths of an inch. Colour resembling that of *M. magnum*, except that the upper tail-coverts are brighter rufous, and that the rufous feathers of the forehead and vertex are not tipped with black. Found at Malacca. What appears to be a female of this bird has been since received from Penang. Colour the same, except that the head is plain brown, like the back, and the tail is more rufous underneath ; there is a dark line from the base of the lower mandible, bordering the white throat ; and the wing does not exceed three inches.

M. magnum, Eyton, *P. Z. S.* 1839, p. 103. Length approaching to six inches ; of wing two inches and seven-eighths ; and tail two and three-quarters ; bill to gape above three-quarters of an inch ; and tarse three-quarters. Colour olive-brown above, greyish towards the neck, more rufous over the rump, and the tail brownish-ferruginous ; forehead and vertex bright rufous, the feathers narrow-spatulate, of rigid texture, and tipped with black ; occiput black ; the small feathers around the

* Lord A. Hay informs me of an additional undescribed species, very common in the Upper Provinces, which he calls *Dr. terrestris* (*Non vidi*). This specific name has, however, been previously applied to a South African *Cisticola*.

eye white-centred : lower-parts white, slightly tinged with brown, more especially on the sides of the breast. Bill and feet pale, the former darker above. Also from Malacca.

These two species are distinguished by a much compressed bill, of moderate length, and strongly and abruptly hooked at tip ; and by the peculiar rigid feathers of the forehead and vertex ; *M. majus* being moreover stronger and more robustly made, as well as longer, than *M. magnum*, which latter bird has been rather unlucky in its appellation.

Trichastoma, nobis, XI, 795. This has been referred to *Malacopteron*, but may now be restored, and I think *Malacocincla*, nobis, XIV, 600, might be included in it. The bill is more elongated, less compressed, and less abruptly curved at tip, than in the preceding section ; widening considerably at base, and pretty regularly in the first species, while in the second it is narrower and more slender, and in the third (which must be regarded as aberrant) it is deep and much compressed. The species are *Tr. ferruginosum*, nobis, XIII, 383, —*Tr. rostratum*, nobis, XI, 795,—and *Tr. Abbotti*, nobis, XIV, 600. The two former are from Malacca, and the third was described from Arracan, whence the Society has received several specimens altogether similar ; but it has now also one from Malacca, which differs in being of a much more olivaceous and less rufous tinge above, with also less rufous below, and that of the upper tail-coverts is not so deep.*

Next follows *Alcippe*, nobis, XIII, 384 : of which the following species are before me.—1, *A. atriceps* (*Brachypteryx atriceps*, Jerdon) ; —2, *A. affinis*, nobis, XIII, 384 ;—3, *A. cinerea*, (Eyton), *ibid* ;—4, *A. poiocephala* (*Timalia poiocephala*, Jerdon) ;—5, *A. sepiaria* (Horsfield) ;—6, *A. nipalensis*, (*Siva nipalensis*, Hodgson), of which *A. Phayrei*, nobis, XIV, 601, seems to be merely an individual variety. Nos. 3, 4, 5, and 6, respectively from Malacca, S. India, Java, and Nepal and Arracan, are very nearly allied ; especially the two last, which present the same dark lines proceeding from over the eye down the nape.

Very close to the above, and scarcely separable from them, ranges my *Setaria albogularis*, XIII, 385 ; and if *Brachypteryx nigrocapitata*

* *Brachypteryx bicolor* of Lesson, vide XIII, 385, is not improbably either *Tr. ferruginosum* or *Tr. rostratum*.

of Eyton truly belong to the present series, another subdivision will be required for its reception.

I have at length brought my remarks on the *Inesores* to a close for the present; and it is not likely that I shall again have such an accumulation of them to deal with. In conclusion, I may once more refer to Mr. Hodgson's late paper, in the 'Proceedings of the Zoological Society,' for April 8th, 1845, to identify a few more synonymes than have been already indicated in the present article.—*Mizornis ruficeps* = *M. chloris*,* *J. A. S.* XI, 794, and note to XIII, 380; *Erpornis xanthochlora* = *E. xantholeuca*, Hodgson, XIII, 380; *Horeites schiatalatus*, *Horornis?* *fuligiventer*, and *H?* *fulviventris*,—*non vidi*; *Chelidorrhynch chrysochistos* = *Rhipidura hypoxanthus*, (nobis,) XII, 936. The reduction of synonymes is oftentimes a more acceptable service to Zoology, than the establishment (or especially the semi-establishment) of species previously undescribed; and the time and labour expended in the task of reducing synonymes, can only be appreciated by those who have personally engaged in it.

Postscript.—The *Strix indranea* of Sykes, *Proc. Zool. Soc.* 1832, p. 82, is a species which has not heretofore been identified; but I think there can be little doubt that it refers to the young of *Bulaca newarensis*, Hodgson, *As. Res.* XIX, 168, and *J. A. S.* VI, 372, v. *B. monticola*, Jerdon, *Madr. Journ.* No. XXX, 167; there being evidently a mistake in the dimensions assigned—"longitudo corporis 21 unc., caudæ 9,"—21 being put for 11. Thus Mr. Jerdon gives—"Length of male 20 in., of female 22 in. Of the latter the wing is 14, tail 9;" and in a fine specimen from Goomsoor, which looks in imperfectly mature plumage, the length of wing and tail are respectively as here given; but its total length would scarcely have exceeded 19 in. Mr. Hodgson states that the sexes of his *B. newarensis* "are alike both as to size and colours," and merely gives the dimensions as "20 to 21 inches, by 48 to 50 between the wings:" but rather the larger of two fine specimens before me, from the N. W. Himalaya, has the wing 17 inches long, and the tail 11 inches; and its total length, when recent, must have been fully 2 ft. All, however, are evidently of the same species, which must now accordingly rank as *Bulaca indranea*, (Sykes.) Mr. G. R. Gray has figured this bird with yellow irides, instead of their being dark brown:

* Probably *Motacilla rubicapilla*, Tickell, as I formerly suggested.

such a feature would detract from its undoubted near affinity for *Syrnium*, to which genus Mr. Gray even refers it.*

The other Indian species of *Bulaca*, which is currently (but by no means satisfactorily) referred to *Strix sinensis*, Lath., is beautifully connected in the same group with *B. indranee* by the intervention of the Malayan *B. seloputo*, (Horsf.), v. *pagodarum*, (Tem.)

With regard to *Syrnium nivicolium*, XIV, 185, XV, 9, I find that it has a fulvous phase and a non-fulvous phase of plumage, corresponding to what obtain in *S. aluco*; but the dark markings are always much deeper-coloured in the European species, and mottle the plumage more uniformly and more minutely; the black being much more predominant on the upper-parts, and without producing any streaky appearance. The ground-hue of the lower-parts is quite white in some specimens, deep fulvous in others, but in all is mottled similarly with dull black.

Genus *Bucco*, Lin. There are several allied species of small Barbets which require discrimination.

1. *B. indicus*, Lath. One of the commonest birds of India generally, but I have not yet seen it from Ceylon, where it is replaced by one of its affines; on the eastern side of the Bay of Bengal, I have seen it from Arracan, the Tenasserim provinces, and Malayan peninsula (where it seems rare); so that it may also be the *B. philippensis* of Raffles's list of Sumatran birds, which, he remarks, "does not appear to be different from the *B. indicus*."

2. *B. philippensis*, Lin. : *B. rubricollis* (?), Cuv. This has been generally confounded with the preceding species; but (from the description) it should differ in wanting the black on the crown and sides of the neck. Dr. Horsfield includes it in his catalogue of the birds of Java.

3. *B. rubricapillus*, Gmelin; founded on the "Red-crowned Barbet" of Brown's 'Illustrations.' On comparing four specimens of a small Barbet from Ceylon with Brown's most wretched figure, I have no doubt that they are of the species meant to be represented; in which case Brown must have got up his coloured drawing from a much injured skin. This Ceylon bird differs from *B. indicus* in having its throat, and above and below the eye, orange-yellow, instead of sulphur-yellow;

* In his Catalogue of Mr. Hodgson's specimens presented to the British Museum, I am glad to see that Mr. Gray also refers *B. newarensis*, Hodgson, to *Strix indranee* of Sykes.

in the much inferior development of the crimson gorget, which is little more than indicated; in the black of the moustaches and ear-coverts being replaced by dull verditer, that of the crown being also considerably less developed; and in the abdominal region and lower tail-coverts being uniform *streakless* pale green, more or less faintly tinged with verditer: the feathers of the upper-parts, also, are margined with dull verditer, instead of yellowish; and the nasal bristles are yellow at their extreme base.

4. *B. malabaricus*, nobis. In XV, 13, I referred a small Barbet, from Malabar, sent on loan by Mr. Jerdon, to *B. barbiculus*, Cuv., as it agreed with the description of that Molucca species in the *Dict. Class.*; but in Griffith's brief notice of *B. barbiculus* ('A n. Kingd.' VII, 469), "a yellow post-ocular spot" is mentioned, which, conjointly with the difference of habitat, induces me now to consider the Malabar species as distinct. From my description of the latter (*loc. cit.*), it would appear to differ only from *B. rubricapillus* of Ceylon, in having the throat and around the eyes crimson, instead of orange-yellow; the crimson of the throat comprehending the slight crimson gorget of *B. rubricapillus*, and being there bordered with yellow, alike in both species.

5. *B. barbiculus*, Cuv. Inhabits the Moluccas.

6. *B. cyanotis*, nobis. In XV, 13, I remarked that—"In Arracan, there is further the *B. australis*, Horsf. (*v. gularis*, Tem.); but the crimson of the cheeks, sincipita, and moustaches, seems invariably to be much less brilliant than in Malacca specimens." The close similitude of some of the preceding races has induced me to look more particularly to the differences of the two referred to in the above passage; and I have found a good distinguishing character in the Arracan bird having constantly the ear-coverts of the same verditer-blue as the throat, while the Malacca bird has invariably black ear-coverts slightly tipped with verditer: but the crimson spots are so much weaker in the present species that the two may always be distinguished at a glance.

7. *B. trimaculatus* (?), Gray, mentioned in Eyton's list of Malacca birds, *P. Z. S.* 1839, p. 105: *B. australis* of Raffles's list of Sumatran birds, and hence apud nos, XV, 14; but not of Dr. Horsfield's Javanese list. This is distinguished from *B. australis* by having no yellow about

it; and I cannot doubt that it is Mr. Gray's *B. trimaculatus*, because the name is a very good one, and the habitat is correct; besides that I doubt the existence in the Malayan peninsula of more than the following species—*B. chrysopogon*, *versicolor*, *armillaris*, *quadricolor*, *indicus*, and the present *trimaculatus* (?), heretofore confounded by me with *B. australis*. Colour deep green above, yellowish-green below: tail verditer beneath, and a tinge of the same above, and also at the bend and edge of the wing: throat bright light verditer; the sides of the forehead and posterior half of the crown, verditer blue-grey: anterior half of the crown, ear-coverts, feathers at base of lower mandible, and slight gorget (more or less defined), black: three large crimson spots on the sides of the face, one behind the eye and above the ear-coverts, a second below the lores and in front of the ear-coverts, and a third below the ear-coverts. Bill and legs black: the vibrissæ extremely long. What appear to be the females are duller in their colours, with generally some appearance of crimson below the black gorget. The young are wholly green, paler beneath, with the base of the lower mandible white in dry specimens.

8. *B. australis*, Horsfield (nec Raffles): *B. gularis*, Temminck. Inhabits Java.

9. *B. flavifrons*, Cuv. From Ceylon. (*Non vidi*.) This would seem to be considerably allied to the last. All these species appear to resemble each other in size.*

Picus major, *P. himalayanus*, and *P. darjellensis*† (vide XIV, 196). In these three nearly allied Woodpeckers, the bill is shortest and most robust in *P. major*, longer and more slender in *P. darjellensis*, and in *P. himalayanus* intermediate. The adult male of the first has a narrow occipital band of bright crimson; that of *P. darjellensis* has a scarlet occipital band more than twice as broad as in *P. major*; and that of *P.*

* An error seems to have crept into my description of *B. quadricolor*, Eyton, XV, 14, to judge from three specimens since received by the Society. Instead of—"beneath the eye, and middle of fore-neck, also crimson," read *deep blue*.

† In Mr. Gray's list of Mr. Hodgson's specimens presented to the British Museum, *P. darjellensis* bears the hybrid name *P. majoroides*, Hodgson, Gray, *Zool. Misc.* and *P. moluccensis* apud Hodgson (which is *P. pygmaeus*, nec *P. nanus*, of Vigers), is referred to *P. sizuki*, Tem.; but does not the latter refer to *P. moluccensis* verus? *Gecinus chloropus*, (Vicillot,) apud nos, is also referred by Mr. Gray to *P. xanthoderus*, Malh., 1845; but I retain my opinion that it is the *chloropus*.

himalayanus has the whole coronal and occipital feathers crimson-tipped. The well defined whitish frontal band of *P. major* is narrower in *P. darjellensis*, and ill-defined and mingled with reddish in *P. himalayanus*. *P. darjellensis* is further distinguished from the two others by having broad black central stripes to the feathers of the abdomen, flanks, and sides of the breast; and by the black moustachial stripe not being continued round the ear-coverts, but the fulvescent hue of the latter is continuous with a broad dull golden-fulvous band on the sides of the neck; the lower tail-coverts of *P. darjellensis* are also a weak scarlet, and not crimson. Both the Himalayan species have the white bars on the primaries much narrower than in *P. major*; and in *P. darjellensis*, the white wing-patch is much smaller than in the two others. Lastly, *P. himalayanus* has the black markings on the sides of the neck less developed and less strongly defined than in *P. major*, descending much less upon the breast, where a ferruginous stain is always perceptible; and the upper third of the ear-coverts are black, instead of their being wholly whitish, as in *P. major*.

P. canicapillus, nobis, XIV, 197, ranges southward to the Tenasserim provinces, but in the Malayan peninsula is replaced by *P. moluccensis* (*verus*), v. *Tripsurus auritus*, Eyton,—distinct from *P. Hardwickii*, Jerdon, of India.

Funx torquilla, Lin. A British specimen of this bird, lately received by the Society (in a collection sent by the "Cornish Institution"), is conspicuously different from all the numerous Indian specimens which I have seen, in the whiteness of its abdominal region; contrasting with the fulvescent hue of its under tail-coverts, and also breast: the abdominal markings are also much less developed; and the grey bordering the medial dorsal streak is more albescent.* In Indian Wrynecks, the whole colouring is somewhat more uniform; and the abdominal region is either quite concolorous with the lower tail-coverts, or very slightly paler (in hardly an observable degree); the markings of the underparts throughout being much more developed. The note of the Indian bird is quite similar to that of the British Wryneck; of which it can scarcely be considered more than a variety: but *Y. pectoralis*, Vigors, of South Africa, merely differs in having a large rufous mark on the throat and breast. I have observed these birds in tolerable abundance

* The descriptions of the European bird mention the whiteness of its abdominal region.

upon some of the partially cultivated alluvial islands up the river ; and recently shot one, near Midnapore, in the act of running up the perpendicular bole of a tree, in the manner of a Woodpecker. It is very seldom that the Wryneck is seen to climb ; and that it ever does so has, I think, been denied : but in England I once winged one of these birds, and placing it on the trunk of a tree, it immediately ascended with such celerity that I nearly lost it, pressing its soft tail against the bark, as the stiff tail of a Woodpecker or Tree-creeper is applied.*

Eudynamis orientalis, (Lin). Two males received from Ceylon seem to have fed on some fruit that has stained and affected the healthy condition of their beaks, which are of a blackish colour, with rugous exterior, instead of being smooth and of a pale greenish hue, as usual. This bird seems perfectly identical in India, China, and the Malay countries ; but the Australian Coël (*Eu. australis*, Sw.), which was confounded with it by Messrs. Vigors and Horsfield, is constantly larger ; the wing, in three males now before me, measuring $8\frac{1}{2}$ in. instead of $7\frac{1}{2}$ in. ; and the tail $8\frac{1}{2}$ in. instead of $7\frac{1}{2}$ in. : one of these specimens has two unmoulted secondaries in one wing, of its first plumage, which are barred rufous and black, but very unlike the corresponding feathers of a female or young male of the Asiatic species.

Rhinortha chlorophæa, (Raffles.) Upon a former occasion (XIV, 199), I asserted the specific identity of the previously supposed two species of *Rhinortha* ; but I find that the two phases of plumage observable in this bird seem to be characteristic of the adult male and female, rather than of the adult and young. Thus, the grey-headed bird with rufous tail—*Cuculus chlorophæus*, Raffles, v. *Phœnicophæus caniceps*, Vigors, and *Anadœnus rufus*, Swainson,—appears to be the male ; and the rufous-headed bird with barred black tail—*Rh. lucida*, Vigors, v. *An. rufescens*, Swainson, and *Phœnicophæus viridirostris*, Eyton—to be the adult female : the former being described, and the latter figured, as *Bubutus Isidorei* by M. Lesson, in the Zoology of M. Belanger's voyage. I have obtained a young specimen, with its wing and tail-feathers not fully grown : and this resembles the (presumed) adult female, except that its upper tail-coverts are dusky-rufous ; the

* Since the above was written, Lieut. Blagrave has sent two specimens of Wrynecks from the Upper Provinces ; and these approximate the European bird, more than any other Indian Wrynecks that I have yet seen.

outermost and penultimate tail-feathers have no white at their tips, and the ante-penultimate very little; there being also a strong tinge of rufous towards the subterminal black tail-band of the four middle tail-feathers, which, with other indications, tends to show that this specimen was a young male: its throat had been grey, with very flimsy feathers; but a line of firmer rufous feathers were being developed along the middle of the throat. Another young specimen was moulting, and had nearly acquired the mature livery of the presumed male; but several rufous feathers appear intermingled with the grey on its crown and neck; and a single penultimate tail-feather is retained, dark and without subterminal black band and white tip, which shows that the male plumage is obtained on the shedding of the first or nestling garb, and consequently that the intermediate (or presumed feminine) plumage is not assumed by the other sex.

Corvus splendens, Vieillot, black variety? Such appears to be a single specimen of a Crow, received from Ceylon.

Genus *Crypsirina*, Vieillot, treated of in XII, 932, and XV, 30. It seems that *Dendrocitta*, Gould, is the name that must stand for the group exemplified by *Corvus rufus*, Scop., Lath., v. *Coracias vagabunda*, Lath.; while *Crypsirina*, Vieillot (v. *Phrenothrix*, Horsf.), must be reserved for the *Corvus varians*, Lath., v. *Phrenothrix temia*, Horsfield, which is a very distinct type from the other.* Fine specimens of the latter beautiful bird have lately been presented to the Society, by the Rev. J. Barbe from Maulmain, and by E. O'Ryley, Esq. from Amherst; thus confirming Helfer's statement of its occurrence in the Tenasserim provinces, while on the Malayan peninsula it does not appear to have been yet observed. This species is very remarkable (among birds of the great passerine type of structure) for having but ten tail-feathers, like the Drongos†; and it is curious that, at first sight, the tail even resembles that of a Drongo, in its expansion and exterior curl upward at tip: but there is this essential difference, that the tail of *Cr. varians*, instead of being forked, is, in the opposite way, extremely graduated

* Mr. G. R. Gray has rightly separated them, in his Catalogue of the Genera of Birds.

† Except *Cr. varians* and the Drongos, the only truly passerine birds I know of that have fewer than twelve tail-feathers, are a few with rudimentary tails, as instanced by Mr. Hodgson's *Pnoépyga*, vide p. 137, ante.

(much more so than is represented in Horsfield's figure, in the 'Zoological Researches in Java'); and the expansion and curvature is accordingly exhibited by the two middle feathers, instead of the outermost as in the Drongos.

Sturnia dominicana, XIII, 363. The species described under this head stands now as *St. Blythii*, (Jerdon.) "*Pastor dominicanus*, auct.," writes Mr. Strickland, "is synonymous with *Turdus sturninus*, Pallas, also *T. dauricus*, Pallas, and *Pastor malayensis*, Eyton;" described in XV, 35. "*St. elegans* (Lesson)," XV, 364, adds Mr. Strickland, "is certainly *Oriolus sinensis*, Gmelin, founded on *Pl. Enl.* 617:." it would therefore now stand as *St. sinensis*: and I may add that *St. pagodarum*, (Gmelin, 1788,) has for a synonyme the *Turdus melanocephalus*, (Bahl, 1792,) as noticed in XV, 6.

Genus *Ploceus*, XIII, 945. The males of the three Indian species, after the breeding season, assume the colouring of their females by a change of plumage; and resume their bright colours by a partial change of plumage at the commencement of the hot season, or during March. The little Amaduvat (*Estrela amandava*) also moults twice in the year, and in like manner assumes the female livery after the breeding season. This is well known of the Whidahs (genus *Fidua*.)

Passer indicus, Jardine and Selby, XIII, 946. As compared with the common European Sparrow (many specimens of each), the Indian common Sparrow has, perhaps, on the average, rather a shorter wing; the rufous predominates more on its upper-parts, and is brighter; the lower-parts are much whiter; and the ear-coverts are of an uniform subdued white. The females and young, also, are altogether considerably paler, both above and below: but the markings of both sexes are identical in the two races. It may be noticed that a tendency to exhibit the same differences is distinctly observable in *P. montanus* of the respective regions, which, of course, is in favour of the opinion that they truly are climatal varieties of the same. In habits, notes, and colouring of the eggs, there is no difference whatever between the European and Indian common Sparrows.

Ligurinus xanthogramma, (G. R. Gray.) In the 'Zoology of the Voyage of H. M. S. Beagle,' Mr. G. R. Gray has figured and described two species of Greenfinch (*Ligurinus*, Brisson), by the names *Chloropiza melanodera* and *Chl. xanthogramma*; the former from East

Falkland Island and Patagonia ; the latter from East Falkland Island and Tierra del Fuego. In XIII, 956, I alluded to the latter as presenting " a close approach, on the part of the Greenfinches, to the Goldfinches (*Carduelis*), the Siskins (*Chrysomitris*), and also to the Linnets (*Linota*) ; the form of its beak scarcely differing from that of the Himalayan Siskin (*Chr. spinoides*) : " and in XIV, 554, I again alluded to this bird, remarking that the *L. sinicus* " agrees in size, and in the Goldfinch-like marking of its wings, with *L. xanthogramma* of the Andes." I was led into a mistake, however, in the identification of this Chilian species (as I was informed) with *L. xanthogramma* ; and have not yet been able to identify the bird in question, probably for want of the necessary works of reference. Its affinities are as I have stated, and it is very nearly allied to the Chinese Greenfinch (*L. sinicus*) ; but I have not now by me a specimen of the latter, with which to compare it.* Length $5\frac{1}{2}$ in. ; of wing 3 to $3\frac{1}{2}$ in. and tail $1\frac{1}{2}$ in. Colour hair-brown above, the interscapularies margined paler, and the crown and nape with greenish-brown ; rump brownish-yellow, passing to siskin-yellow towards the tail-coverts, which latter are pale greyish ; wings having the primaries and base of the secondaries marked with bright yellow, as in the Goldfinches, contrasting with the black winglet, and terminal half of the primaries which are tipped with whitish ; secondaries edged and the tertiaries tipped with whitish-grey, the rest of the outer web of the tertiaries brown ; under-parts paler brown, tinged with yellow, more especially on the throat, abdomen, and also on the forehead ; towards the vent white ; and the lower tail-coverts pure canary-yellow : tail dusky, with the basal half of all but its middle feathers bright yellow, and slightly edged with greyish-brown : bill pale, darker above ; and the legs pale.

In the same collection with the preceding were two examples of a species of *Serinus* (?), from Peru. Length about five inches, of wing two and five-eighths, and tail two inches. Upper-parts streaky, the feathers centred darker, with hair-brown margins ; rump dull siskin-yellow, and a faint tinge of the same on the crown and neck, and upon

* Can it be the female of *L. sinicus* ? The collection in which two specimens of it occurred did contain some Chinese specimens, together with many from Chili and Peru ; but those from each locality were kept separately, with care, and I was assured that the birds in question were from Chili.

the shoulder of the wing : lores, throat, and under-parts generally, bright canary-yellow, tinged with a light ruddy colour on the breast and flanks : margins of primaries obscure dull yellowish. Bill small and short. This bird can scarcely be the *Chrysomitris compestris* of Gould, which inhabits the same region ?

Nectarinia Horsfieldi, nobis, XII, 975. I have lately seen a second specimen of this species, from Mussoorie ; so that it is probably peculiar to the N. W. Himalaya.

Iora—? In *Ann. Mag. N. H.* 1844, p. 42, Mr. Strickland remarks that—"Dr. Horsfield has lately obtained a new *Iora* equal in size to the small *Oriolus xanthonotus* ;" which species of *Iora* I alluded to in XIV, 602. Such a bird the Society has now received from Arracan, where it was obtained by Capt. Phayre. The specimen before me was probably a female, measuring 6 in. in length, the wing $2\frac{3}{4}$ in., and tail $2\frac{1}{4}$ in. ; bill to gape 1 in. ; and tarse $\frac{3}{4}$ in. Colour plain green above, yellow below, brightest on the throat and breast ; no white markings on the wings, except a slight white edge to the primaries. If new, *I. innotata*, nobis. In XV, 44, I suggested that this genus might "perhaps come within the extreme confines of the *Meliphagidæ* ;" and subsequent observation of the habits of *Phyllornis* has led me (p. 118, ante), to approximate *Iora* to that genus, with which I think it should form a particular subfamily of *Meliphagidæ* (peculiar to Southern Asia and its islands) ; and *Oriolinæ*—to which Mr. Strickland regards *Iora* as subordinate—I regard as another subfamily of the same major group.

Pycnonotus nigropileus, nobis, n. s. In XV, 286, I had occasion to offer some remarks on the Bulbous immediately allied to *P. jocosus* ; and now we have an analogous little group formed by the present species, with *P. bengalensis* and *P. hæmorrhous*. The bird now described inhabits the Tenasserim provinces, and merely differs from *P. hæmorrhous* in having no black on the throat and breast, which are brown with greyish margins to the feathers, like the back ; and the whole nape and back are much paler than in *P. hæmorrhous*,—the cap alone being black.

Rubigula aberrans (?), nobis, XV, 287 : *R. gularis*, fœm. (?) A second specimen received from Ceylon entirely resembles that previously described.

Tchitrea affinis, XV, 292. Specimens of *Shah Bulbouls* from Darjeeling are clearly of this species, as shown by the form of the crest, and the much narrower and less lengthened middle tail-feathers than in *Tch. paradisi*; but the black edgings of the tail-feathers are scarcely more developed than in the latter, and it is remarkable that in Malacca specimens these edgings are more developed than in those from Arracan and the Tenasserim provinces.

Lanius lahtora, XV, 300. To the synonymes of this species should have been added *L. burra*, Gray, of Hardwicke's Illustrations, founded on a wretched native drawing, which was evidently intended to represent the ordinary grey Shrike of India.

Tephrodornis affinis, nobis, n. s. Merely differs from *T. pondicerianus* (XV, 305), in being greyer, and in wanting the conspicuous whitish supercilium. It is common in Ceylon.

Niltava McGregoriae, (Burton). The Society has at length received this beautiful little species from Darjeeling: and I have no hesitation in assigning to it, as synonymes, not only *N. fuligiventer*, Hodgson, but (as the female) *Leiothrix signata*, McClelland and Horsfield, vel *Niltava auricularis*, Hodgson, placed as a *Siphia* in p. 127, ante. The bird described by Mr. Hodgson as the female, in the 'India Review,' I, 650, is clearly of another species, being probably his *Dimorpha monitiger* (p. 127, ante). With the colouring and general structure of its congeners, this bird approaches *Muscicapula* in its small size, and form of bill; and it much resembles *Niltava grandis* in its colouring, but has merely the front (instead of the whole cap) ultramarine-blue, and scarcely a trace of this on the shoulder of the wing,—also the anterior half of the inner side of the wing white, instead of black,—and the abdomen dusky-ash passing into white towards the vent. Its range may now be traced from Simla to Darjeeling, and thence to Assam. The bill of this bird differs greatly from that of *N. sundara*, but that of *N. grandis* is intermediate.

Muscicapula sapphira, nobis, XII, 939; figured in Jerdon's 'Illustrations of Indian Ornithology.' In the female of this species, the wings, tail, and rump, are of the same beautiful deep blue as in the male; but the head, neck, and interscapularies, are plain brown; throat and fore-neck ferruginous, rather paler and much broader than in the male; and the belly and lower tail-coverts are of the same bluish-white as in the

other sex ; axillaries and fore-part of the inner surface of the wing, also pure white. From Darjeeling.

Siphia leucura, (Gm.), p. 125, ante. With respect to the rufous throat of this species, I find that it is assumed by every male at the commencement of the hot weather, or during the month of March ; being obtained by a partial moulting confined to the feathers of the throat. I think that I have seen the same remarked of the European *S. parva*.

Pratincola leucura, nobis, n. s. In my notice of this genus (p. 129, ante), I overlooked the present species, which is the representative of *Pr. rubicola* and of *Pr. indica* in Scinde. Dimensions of the latter species, and general aspect of the upper-parts as in the former, but the rufous of the breast is confined to a rather small patch, the sides of the breast and the whole abdominal region, with the lower tail-coverts (if not the upper also), being pure white ; and the exterior four (if not five) rectrices on either side are wholly white on their inner webs except at tip, the dark colour at tip increasing successively to the outermost feather, which alone has its whole outer web dark, the rest having merely the terminal half of their outer webs dark-coloured. Described from a slightly injured male (with imperfect tail, and its upper coverts wanting), in full summer dress, procured by the late Sir Alexander Burnes in upper Scinde.*

Ianthia flavolivacea, (Hodgson,) p. 133, ante. A finer specimen of this bird than the one previously described, *i. e.* in fresher plumage, has the upper-parts fulvescent-olive, with the fulvous tinge somewhat stronger towards the tail, and the under-parts dilute rusty, having a faint golden gloss. It has much the aspect of the female *Tarsiger chrysæus*, Hodg., but is readily distinguished by wanting the yellow at the base of the tail, and by having its under-parts much less yellow. From Darjeeling.

Tesia auriceps, Hodgson, p. 137, ante. This has lately been received by the Society, and it appears to me to be merely a bright old male of *T. cyaniventer*, Hodgson, having (*i. e.* the Society's specimen) all its colours more intense than usual, and the cap fine golden-green rather than "golden-yellow," and not contrasting very strongly with the green of the back.

Turdus unicolor, Tickell, Gould, and *T. dissimilis*, nobis, p. 144, ante. I regarded these birds as distinct, more from deference to the opinions of others than from my own conviction : and now I have procured two

* Add *Muscicapa lucionensis*, var. A, Latham, to the synonymes of *Pr. caprata*.

additional recent females which completely satisfy me of their identity. That described as *T. unicolor*, I now infer to be a very old female; and think it probable that old males, with rufous sides (as described under *T. dissimilis*) would also assume the more ashen hue of the upper-parts, and the spotless ashy of the throat and breast: but, in such case, the variation this Thrush would exhibit is most remarkable.

Sitta europæa, and *S. affinis*, XV, 288. Mr. Strickland informs me, that "the bird sent as *S. europæa* from Norway, is the *S. asiatica*, v. *uralensis*, auctorum, found in Siberia and the Ural, but never yet recorded from Norway, where, according to all my authorities, the true *S. europæa*, with the lower-parts fully as rufous as in Hodgson's *nipalensis*, is alone found." This latter species is distinguished from *S. europæa* by its much smaller size, &c., as mentioned in a note to XV, 289, and by a character which I did not then notice, (from an imperfection of the specimens at that time before me,) viz. that the two middle tail-feathers have, constantly, their basal half white, except on the longitudinal outer half of their exterior web.

Totanus solitarius, Vieillot, XIII, 389. This, according to Mr. Strickland, is identical with *Scolopax melanoleuca*, Gm., and *Sc. vociferæ*, Wilson.

P. S. No. 2. In the 'Calcutta Journal of Natural History,' No. 28, p. 560, it is remarked that the *Palæornis nigrirostris* of the Catalogue of Nepalese birds, is "asserted to be the young merely of *P. pondicerianus* vel *mystaceus*;" and its distinctness as a species is there argued. The latter, however, is not the case. I have long since ascertained the black-billed bird to be the female of *P. pondicerianus*; though occasionally, but rarely, females of this species will have a little red on the upper mandible, more or less. The same sexual diversity occurs in other species of *Palæornis*, as in *P. caniceps* and *P. erythrogenys* recently described from the Nicobar Islands, in *P. columboides* of the Neilgherries (the female of which is *P. melanorhynchus* of Sykes), and seemingly in *P. bitorquatus* of the Isle of France. The fine series of *P. pondicerianus* set up in the Society's Museum exhibits this fact most convincingly. The young female of *P. pondicerianus* was not long ago named *P. modestus* by Mr. Fraser (in *Proc. Zool. Soc.* 1845, p. 16).

The same correspondent asks—"Why was the publication of the 'Catalogue of Nepalese Birds' discontinued after about a title only had been given?" To this I think it will be sufficient to reply, that every one of the novelties contained in that catalogue has now been

published by me, excepting only such names as there were no specimens to answer to; of which a very few only occurred.

A collection of birds from Afghanistan and the Deyra Doon, just received on loan from Capt. Hutton, affords the following novelties, which I proceed to describe out of hand.

Malococercus Huttoni, nobis. Merely differs from *M. caudatus* in its larger size, and the general paler hue of its upper parts. Length of wing $3\frac{1}{2}$ in., and of middle tail-feathers above 5 in. From Candahar.

Carpodacus crassirostris, nobis. Length about $5\frac{1}{2}$ in., of wing $3\frac{3}{8}$ in., and tail $1\frac{7}{8}$ in. Bill highly *Pyrrhuline*, resembling that of *Hæmatorpiza* (XIII, 950). General colour earthy grey-brown above, faintly tinged with crimson on the tips of the feathers; the under-parts, cheeks, forehead, rump and upper tail-coverts, conspicuously crimson-tipped; and the alars and greater wing-coverts and rectrices except towards the tip, margined with deep crimson. Bill apparently yellow; and legs pale. From Afghanistan.

Emberiza? aurifrons, nobis. A true Bunting, but with bill of peculiar form, much resembling that of *Passer arcuatus*, (Tem.), of South Africa. Length $5\frac{1}{2}$ in., of wing 3 in., and tail $2\frac{1}{4}$ in.; its medial feathers $\frac{3}{8}$ in. shorter. Forehead and vertex bright golden-saffron, much as in *Catamblyrhynchus diadema*, (Laf.), figured by Mr. G. R. Gray; occiput, cheeks, throat and fore-neck, black, passing to dusky on the nape and sides of the neck; back dusky, with yellowish lateral margins to the feathers; the rump towards the tail deep canary-yellow, shoulder of the wing golden fulvous-yellow, and margins of the remiges and rectrices saffron-yellow; under tail-coverts pale canary-yellow, and rest of the lower parts albescent tinged with yellow, with a dusky central streak to each feather, and those of the breast dusky with yellow margins; axillaries pure white; a pale bar on the wing; and the bill and feet dark. From the north-west Himalaya.

Melanocorypha torquata, nobis. Afghanistan Lark, XIII, 962. Nearly allied to *M. calandra*, from which it differs in its smaller size, and general paler hue; the black of the sides of the breast meeting across. Length of wing $4\frac{1}{2}$ in., and of tail $2\frac{1}{4}$ in.; tarse under 1 in. The exterior web of the outermost tail-feather is not white, as in *M. calandra*.

Notes, chiefly Geological, from Gooty to Hydrabad, South India, comprising a brief notice of the old Diamond Pits at Dhone, by Capt. NEWBOLD.

From the granite rock of Gooty northerly, to about a mile or two beyond Piapully, granite is the prevalent rock.

The pebbles of a small stream running at the foot of the granite hill of Piapully, I found encrusted with carbonate of soda, and had the appearance of having been snowed upon. Reddish felspar is the prevailing mineral in the granite,—associated with chlorite, and actynolite, as at Gooty.

Beyond Piapully, which is $12\frac{1}{2}$ miles from Gooty, pebbles of sand-stone and pudding-stone, quartz and chert, some of them angular and little worn, indicate the proximity of an aqueous deposit, which is shortly afterwards seen *in situ*, as a bed of pudding-stone capping the summit of a rugged hill sloping southerly, and again sweeping up, saddle shape. On the opposite side into a steep crag of granite scattered blocks of basaltic green-stone are seen in this vicinity; and the subsoil is often a bed of kunker.

From the granite limits to Kurnool.—From this locality to within a few miles south of the Tumbuddra, a range of hills having an average apparent height of 250 feet, the level and peculiar contour of which distinctly informs us of their nature,—continues flanking the right, or east, of the Kurnool at irregular distances of 2 or 3 miles, but now and then throwing promontory-like bluffs to the westward. These hills are of sand-stone, dipping slightly towards the east; and the rocks in the plain at their base granite, gneiss and hornblende schist. The sand-stone caps the granite, which is seen at several points along the range, forming the base and about three fourths of the height of some hills, as in the vicinity of Dhone and Ramulacota, on which rests a thick bed of sand-stone. The lower layers next the granite are often of pudding-stone, or conglomerate. The imbedded rocks are almost entirely pebbles of white and rust-stained quartz, much rounded, from the size of a filbert to that of a man's head. A few pebbles of trap, hornblende, tough actinolitic green felspar, and flinty slate,—the very hardest portions of hypogene and granitic rocks,

are occasionally seen ; but I did not observe a fragment of the ordinary mass of granite or gneiss.

In shooting and other excursions among these hills across the N. and S. strike of the strata, I observed to the eastward the ordinary blue lime-stone of Cuddapah resting conformably on this sand-stone, and beds of a more recent sand-stone and conglomerate capping the lime-stone. This is the celebrated diamond conglomerate of Banaganpilly. That it is of more recent origin than the lime-stone and subjacent sand-stone, is proved by superposition, and by its imbedding fragments of chert derived from veins in the lime-stone.

These chert pebbles are recognized, not only by mineral identity, but by their imbedding the oolitic looking globules which are seen in myriads in the lime-stone cherts and jaspers.

I am not aware that the difference in the age of these two sand-stone beds has been before noticed, or that the existence of an older sand-stone formation underlying the Cuddapah lime-stone and the diamond conglomerate, has hitherto been pointed out either by Malcolmson, Voysey, or other writers on the geology of South India. I found sulphate of barytes in fine crystals in the lime-stone ; and beds of a fine steatite, (occasionally passing into French chalk,) which are quarried and the steatite exported to Madras, and other places. It is cut into pencils and extensively used by the natives for writing accounts, &c. in their black books of prepared cloth, and also for smoothing chunam.

Along the base of the hills half a mile N. E. of Dhone, the ground for half a mile is covered with old diamond excavations in a bed of sand-stone gravel, now covered with rubbish and bushes. North of this 10 or 12 miles are the diamond mines of Ramulacota before described.*

The diamond pits of Dhone have not been worked within the memory of the oldest man of the village ; but he says his forefathers dug there : with what success is uncertain. Their being neglected may be perhaps received as a negative proof of their unproductiveness, or of having been exhausted.

Slightly thermal and perennial springs, and dykes of basaltic green-stone posterior to the sand-stones and limestone formation, which they penetrate and alter, are of frequent occurrence throughout the diamond

* Journal Royal Asiatic Society, 1843, p. 231.

area ; as well as saline incrustations of carbonate and muriate of soda, both on the banks of the rivulets, and on the surface of the granite-based plains on the western flank of these hills.

The dykes of basaltic green-stone are occasionally seen traversing the granite and hypogene schists of the plain, like a black wall, and burying themselves in the sand-stone and lime-stone range to the eastward. An instance of this is observed about 4 miles S. of Dhone at the boundary pass. This dyke is in some places 150 feet high and 200 broad. Its course can be traced for miles.

The hill of Yeldoorty (22 miles S. from Kurnool) is of a poor ferruginous quartz rock veined with white quartz, the rocks in the plain, at its base, are granite and gneiss, with reddish felspar, penetrated by trap dykes.

At Woolundarconda (14½ miles S. of Kurnool), the granite rises in small, but picturesque tors and logging stones. Here the sand-stone range approaches the road. A little further N. massive hornblende schist is seen in weathered and apparently waterworn masses.

The range terminates in the bluff whale-backed, sand-stone hill of Juggernaut, about 3½ miles south of Kurnool, whence the blue lime-stone and its associated shales base the plain to the banks of the Tumbuddra and Hendri at Kurnool,—the hypogene schists occasionally showing themselves. Here regur is the prevailing surface. From Gooty to Taikoor reddish sandy alluvial soil is much blended with it.

From Kurnool to Paugtoor.—After crossing the Rajghat ferry over the Tumbuddra, the tongue of land (here 16 miles broad), which lies between it and the Kistnah, is traversed ; like most others trips of land similarly placed, its surface is slightly convex,—rising gently towards the centre from the beds of the rivers which flank it. It is for the most part covered with regur, occasionally mixed with alluvium, based on the blue lime-stone of Cuddapah,—a bed of kunker often intervening. This soil is often 15 feet thick.

The wells naturally deepen towards the centre. One is 61 feet deep. The lime-stone is rarely seen above the surface ; the dip appears to be quâquâ versal in some low mammiform elevations ; in other localities it is nearly horizontal, or dipping at an angle of 5° towards the east.

Angular fragments of granite, gneiss, and hornblende schist sparingly scattered among the pebbles of the lime-stone formation on the river bank, attest the proximity of these rocks.

Rectangular blocks of a greenish crystalline limestone with reddish argillaceous, and arenaceous veins;—imbedding iron pyrites in cubic crystals. It is at first sight difficult to pronounce whether this rock is hornblende schist, rendered calcareous by contact with the lime-stone, or lime-stone which has taken up hornblende. I have little doubt that these blocks are from the junction line of these two rocks. It effervesces but feebly with acids.

The Kistnah at Paugtoor.—The Moorish fort and pettah of Paugtoor stand on the right bank of the Kistnah in the Nizam's territories, the S. frontier of which has been just crossed about half a mile N. of Kurnool. The bank here is formed by two perpendicular cliffs of light bluish grey lime-stone, in nearly horizontal strata, divided by vertical fissures from summit to base, like those in the sand-stone ranges of Gundicota and Cuddapah.

The Kistnah here does not appear broader than the Tumbuddra at Kurnool, which, at the narrowest part between Raza and the fort, measures exactly 616 yards from bank to bank. The river was filled with the muddy freshes of the monsoon, and running, near Paugtoor at the rate of about 24 inches per second. A velocity calculated strong enough to transport pebbles the size of an inch in diameter; velocity, No. 6, of the scale laid down by the talented Secretary of the Royal Geographical Society,—Col. Jackson. It is, however, clear from an inspection of the size of some of the pebbles in the river's bed, (some of which are as large as a hen's egg,) that the velocity must often be increased to No. 7 of the scale; or to 36 inches per second. The temperature of the water is the same as that of the Tumbuddra (a foot below surface), viz., 79° Faht. exceeding by one degree the average temperature of rain-water in this part of the country. The temperature in the shade at the time of observation 86°; time, 2 P. M.

A tumblerful of the muddy water deposited, after standing 6 hours, $\frac{1}{16}$ th of its bulk. The sediment was a fine reddish silt, which effervesced with acid; but is less calcareous than that of the Tumbuddra. The reddish colour of the deposit brought down by the Kistnah, a river which completely traverses the great overlying trap region, is worthy

of notice by those geologists who consider the regur or black soil of India as a fluviatile deposit ; or as the washings of trap rocks.

The still unflooded parts of the river bed consisted of collections of light-coloured sand and silt, and accumulations of pebbles from the size of a No. 4 pellet to that of an egg, as before stated. These pebbles were chiefly of quartz, calcedony, cornelian, agate, and Mocha stones : fragments of onyx and sardonyx rare and small. Also common and semi-opal ; heliotrope, and jaspers of various shades of red, brown, green and yellow.

I picked up some rolled bits of radiated zeolite, limestone, pegmatic granite with reddish felspar, and find nodules of cream-coloured and greyish white kunker.

Nothing but the very toughest fragment of the overlying trap, whence these calcedonies and zeolites have been washed for a distance of not less than 100 miles to the N. W. have remained entire ; these debris we must look for nearer to their situs, or try to recognize it in the sands : thus following the maxim in geological dynamics ; viz., that in alluvial beds the most indurated portions of transported matter will always be found at the greatest distance from their situs.

I am informed that in the bed of the river nearer its embouchure, the cat's eye and diamond are found in the Polnad Circar, and I know that the last named gem is found in the bed of the Kistnah in the eastern parts of Kurnool near Siddeswar, and still further east beyond the wilds of Perwut and the diamond mines of Purtil, Moogaloor, Codavacutloo, and Oostapully, which are on the N. bank of the Kistnah ; the diamond I have no doubt, has been washed out of the diamond sandstone formation of these tracts east of Paugtoor and Kurnool ; but the cat's eye, like those in Ceylon, is probably from the gneiss or granitic rocks.

From the Kistnah to Judcherla, 60 miles northerly.—The limestone formation extends about three miles in the plain north of the Kistnah, when granitic rocks are met with associated with gneiss in the vicinity of Myapore. This granite rock spring up irregularly from the surface of the plain, leaving often level spaces between each hill, but those of gneiss usually form short, and more regularly continued ridges.

These elevations, however irregular in detail, have a general direction

of E. S. E., which has apparently determined that of the Kistnah across the peninsula after escaping from the overlying trap formation. One of the peaks rises from the rest like truncated cone.

As I was obliged to pass the granite and lime-stone junction line by night, I am unable to afford a description of the disturbance, or of the mineral alteration in the latter rock which might be anticipated.

A succession of these rocks continues to be crossed until Judcherla is approached, 60 miles north from the Kistnah, when they sink into smooth undulating plains with an occasional granite rock starting up. The rocks in the centre of this granitic zone, in the vicinity of Paungal, attain the highest elevation, (viz. about 1000 feet above the plain.) The highest which I had an opportunity of measuring trigonometrically, did not exceed 950 feet.

The granite is generally small-grained, with reddish felspar, often coloured (as near Paungal) with actinolite or chlorite in quartz and felspar veins. Here also a graphic granite occurs in the gneiss.

Granitoidal gneiss (for the transition from granite to gneiss is imperceptible, and the alteration by contact under great heat mutual) is seen in low and rather smoothly swelling hills, around the bases of the loftier granite peaks.

The basaltic green-stone dykes have usually an easterly direction:—and, as a general rule, large dykes are crystalline towards the centre, and compact at the edges like the lava dykes of Somma and Etna. I observed crystallized epidote on a dyke at Paungal. Another dyke is seen close to the west side of the town of Judcherla, about 40 paces broad, and may be traced westerly as far as the eye can reach.

From Judcherla to Hyderabad, 59½ miles northerly.—From Judcherla the country is open; the formation gneiss,—penetrated by granite and basaltic green-stone. At Nagumpilly the fort stands on a bed of quartz in the granite which is intersected by a basaltic dyke containing hypersthene. A second dyke is seen between Nagumpilly and Furrucknugger; and two others a little north of Furrucknugger. This latter is from 30 to 50 paces broad, and takes a zigzag direction towards the east. Abundant efflorescences of natron take place on the surface of the soil in the vicinity.

Beds of quartz become more frequent in the granite as Hyderabad is neared. At Nagumpilly, just mentioned, 47 miles south of Hyderabad,

the bed or vein runs east by south, and in many places is amethystine.

In a vein of quartz near Palmacul the purple colour of the amethyst is more decided; and, at this place, I detected, in combination with oxydulated iron ore, oxide of manganese, which I have little doubt imparts this beautiful tinge to the quartz.

At Shemsabad, about 19 miles south from Hydrabad, another vein of similar quartz occurs.

Hydrabad.—Hydrabad is situated in the lowest part of a shallow flat valley, bounded by irregular granite rocks which rarely rise more than 400 feet above its general level. According to the barometric measurements of the Trigonometric survey, Hydrabad is 1672 ft. above the level of the sea; Secunderabad 1837 ft.; and the granite rock of Moel Ally 2017 ft. The Mussy river flows easterly through this valley; and, by a transverse break through the north and south ridge of Bhonegeer, about 18 miles to the eastward, to the Kistnah which it joins at Wujerabad, about 47 miles west of Amrawutty.

The plains around Hydrabad are often crowded with tors, logging stones, and globular masses of granite, which Broignart, on the authority of De Luc, has pronounced to be boulders; but which are, without doubt *in situ*, as I have stated in a former paper on supposed boulder formations in South India.

The prevailing colour of the granite is reddish, owing to that of the felspar, which predominates almost to the exclusion of quartz.—The latter mineral is not wanting in the granite; but, from some unknown cause in nature's laboratory, has been segregated in large veins and beds, instead of being diffused in grains throughout the substance of the rock. These veins, or beds, are still more amethystine than those of Shemsabad, Palmacul, and Nagumpully. Mr. Malcolmson is of opinion that the crystallized specimens found near the European barracks are fit for the purposes of jewellery. Another amethystine vein occurs, according to Christie, near the British native cavalry lines. Mr. Malcolmson has found it at Bekonurpett, about 60 miles north of Hydrabad, and I have traced it 46 miles westerly to Sedashipett;—and 47 miles southerly to the vicinity of Nagumpully. It occurs often at Hydrabad in hexagonal pyramidal prisms filling cavities in quartz. Voysey mentions their occurrence at Pitlan and Ghazipettah.

Four or five dykes of basaltic green-stone, or possibly the ramifications of one enormous coulée, traverse the granite rocks of Hyderabad with a general easterly direction. One of them runs through the tombs of the kings at Golconda, and is probably identical with that seen six miles to the eastward between the British Residency and the great tank of Hussain Saugor. From the blasted and chiselled appearance of some of the blocks and mineral resemblance, this dyke has evidently contributed part of the material for the dark and highly polished slabs of which the royal tombs are constructed. It must not be confounded, as has been done by Malcolmson,* with the dark talcose rock of the pillars supporting the tombs of Hyder and Tippoo at Seringapatam. The rock on which stands the celebrated fortress of Golconda is of a granite resembling that of Gooty, with reddish felspar, quartz in small grains, dark dull green scales of mica, and a little hornblende. Actynolite, both crystallized and blended with compact felspar and quartz, occurs in veins pretty generally throughout the granitic rocks of Hyderabad.—A rough trigonometric observation from a paced base makes the rock of Golconda 450 ft. above the general level of the plain.

Soil.—The surface soil, in the vicinity of Hyderabad, is the reddish granite alluvium, partly washed down from the sides of the neighbouring hills, and partly the debris of the decaying rocks on the spot. It is originally reddish in colour, but often altered by cultivation and manuring into an ashy grey. It generally contains a small proportion of calcarious and saline matter,—derived, probably, from the infiltration of water which has held these minerals in solution.

The alluvium brought down by the Mussy (here from 100 to 180 yards broad), from the westward, is a reddish sand and silt; also beds of pebbles chiefly granite, nodules of ferruginous clay, (apparently from lateritic beds,) and kunker.

Voysey states that this river rises in a granitic country, (according to Hamilton, it rises about 43 miles W. from Hyderabad, at the Anantghur pagoda,) and attributes to this cause the circumstance of its not having black alluvium or regur on its banks. (Vide my remarks on the Kistnah in this paper). It may be here stated that the Tumbuddra

* Madras Journal, July, 1836, p. 199.

has its rise, and course, entirely in a granite country before it passes through the great black soil or *regur* plains of Bellary—whose granite and gneiss are also the principal rocks.

The surface soil from Hydrabad southerly to the Kistnah near Myapore, is generally a reddish alluvium, sometimes more or less sandy, or clayey, according to the prevalence of felspar or quartz in the adjacent rock. It varies from the zero of the bare rock to 12 feet in thickness. Sometimes a bed of kunker, (from 6 inches to 2 feet thick) intervenes between it and the rock; but more frequently the loose gravelly debris of the subjacent granite or gneiss, which is extremely prone to decay on exposure to the air, or to moisture, whether from springs or rivers.

Where subterranean springs exist this bed of Mhurrum, as it is called, is sometimes from 30 to 50 feet thick; but, more commonly, water is found at depths from 6 to 30 ft. Springs impregnated with calcareous or saline matter seem to effect the breaking up of the rock to a greater extent than those of pure water.

Mr. Malcolmson,* in speaking of this granitic debris, thus observes: "It has been stated by Dr Christie, that this debris is, at a considerable depth, again consolidated by pressure. In the *Edinburgh Journal of Science*, 1828-9, this is also mentioned as a fact, common to the rocks of other parts of India. With every respect for his authority, I cannot avoid the conviction, that the inference was founded on imperfect observation, and that it has since been employed in Europe, in support of an ill-founded theory. The 'Mhurrum' or gravel found in deepening a well at Bolarum (6 miles from Secunderabad) upwards of 50 feet deep, during the dry season of 1832, is not in the slightest degree consolidated." "Much of the debris of Secunderabad is, however, consolidated by lime, which is seen to agglutinate the fragments, or to pass in vein-like lines or nodules through the gravel. Occasionally there are only a few fragments of quartz or felspar scattered through the kunker, or they appear to be inserted into the surface." "The debris is also sometimes united into pulverulent masses, by the oxidation of the iron contained on the sienite; but this takes place at the surface, and seldom acquires any degree of hardness."

While perfectly coinciding with the general accuracy of my lamented

* *Madras Journal*, July 1836, p. 198.

friend's remarks, yet it cannot be denied that great and long continued pressure in general tends to consolidation. That it has not produced this effect on the gravel of some of the deeper wells at Hyderabad is, as Mr. Malcolmson observes, strictly the case, but consolidation has been counteracted in a great measure, by the continual state of moistness in which the debris is kept by the percolation of the spring water in its way upwards and the constant separation and shifting of the particles by water in motion. The temperature of a perennial spring of pure water in the garden of an Arab outside the city walls, I found to be 80° Faht. Temp. of air in shade— 89° .

The temperature of the Bhugga, whence many of the Mahomedan nobles and the Minister Chundoo Lal procure water, was $79^{\circ} 2'$ Faht. Temperature of air in shade 87° .

The mean temperature of Hyderabad is I believe about 80° .—Height above sea by boiling point of water 1702 feet.

On my way to Hyderabad, at Mahanundipet, about 42 miles north of the Kistnah, date, June 4th, 1839, at $10^{\circ} 15'$ A. M., I witnessed a phenomenon rather rare in this part of India, viz.—an annular solar rainbow. Its *radius*, taken to the inner circle from the sun's centre, was $22^{\circ} 30'$. It continued advancing with the sun towards the zenith, but disappeared gradually, before the meridian was attained, at an attitude of about 75° .

The sky was lightly veiled with thin grey clouds (*cirri*), amid which the sun shone with a watery light, and defined disc, encircled by four differently coloured, contiguous zones. The prismatic tint of the band nearest the sun was orange, then yellow, pale green, and violet in succession. The united breadth of the four zones amounted to $38'$.

The wind was blowing strong and steadily from the west. The thermometer in shade 80° . It had been on previous days usually from 83° to 86° in the shade. At this time the temperature of the open air was 86° . All the lunar halos in this country which I have measured have a radius from 22° to 23° ; and there is, in general, a slight depression in the thermometer at the time of their prevalence.

ON *TEREDO NAVALIS* and a natural defence against its ravages, by Mr. LEHMANN : from the *Transactions of the Scandinavian Naturalists of Copenhagen*, 1840 ; translated and communicated by Dr. T. CANTOR.

Teredo Navalis, an important agent in the economy of nature, is universally known by the damage it inflicts upon the wood work of posts and ships. While accomplishing the intention of nature in destroying decayed wood in the sea, it at the same time attacks ships, bulwarks and the piles of quays. Like all animals intended by nature to clear her stage, the *Teredo* is endowed with immense power of reproduction, and therefore by its numbers becomes more destructive than the largest animals which come in collision with the industry of man. Every museum exhibits specimens of wood perforated by this shell-fish, which lines its abode with lime, in composition similar to that of its shells. But my inquiries as to the length of time required by the animal to perforate the wood, have hitherto been fruitless. Some samples of the works of *Teredines* are here submitted, because I am enabled to attest the age of the artificers. Five years after the posts of bulwarks of Kyholm were erected they appeared in the state now exhibited. From these it will be seen that the *Teredines*, during the said period, have attained to their full size, of more than 12 inches in length, and half an inch in diameter. It may therefore be inferred, that they thrive, and combine quick growth with great multiplication.

The more important the works are, which are attacked by the *Teredo*, and the quicker the destruction is perpetrated, the greater the solicitude which has been exerted to defend the wood, and many applications have been tried, but none have stood proof in the sea. The only remedy hitherto successful, has been to cover the wood with plates of metal, of copper, brass or zinc. But they are too expensive to be used universally, nor are they easily protected.

I believe to have found a defence offered by nature herself, which I therefore recommend to the attention of naturalists. The pilot and light vessel, placed in the North-Sea, in the mouth of the Eider, requires not to be coppered, and, as she has to sail but few miles, is therefore provided with a sheathing of plain boards. The *Teredo* attacks the latter indeed, but cannot penetrate to the sides of the vessel,

as the interval between them and the sheathing is filled with a layer of cow-hairs. The boards of the sheathing are annually repaired or renewed. Last year it was reported that the sheathing required no renewal, "although" it was thickly covered with muscles. This circumstance reminded me that I earlier had found no *Teredines* in bulwarks on which muscles (*mytilus edulis*), were fixed, an observation, which I however had not then followed up. At present I have reason to believe, that the sheathing of the pilot-vessel was not attacked, because it was covered by muscles. As the latter may easily be bred, they offer a natural defence, of no expense, and may besides be turned to economical account.

The muscle attaches itself to piles by means of the *byssus*, or filaments, and multiplies so readily that its young, if suffered, soon cover the whole surface. In the frith of Apenrade piles have, from time immemorial, been sunk, on purpose for the sake of the muscles, which in the course of four years attain to a length of 3 to 4 inches. They are consumed either in fresh state, or are pickled and exported in large quantities. The smaller muscles are thrown back near the piles to which they soon again attach themselves. The short period in which they will cover a surface, I have had an opportunity of observing, when a new light-vessel was placed near Laessøe in Kattogat. In 6 months her bottom was covered with a thick mass of young muscles, which had tended to impede the speed of the vessel. Two feet square of the mass, submitted to my examination, consisted of several layers of muscles, 2 inches in length, so firmly connected by the *byssus*, that a needle could not pass between them. No single muscle could be detached without the whole mass following.

Teredo breeds during the dog-days, the muscle some months earlier. Where the latter has fixed itself, the eggs of the *Teredo* cannot reach the wood, nay, by intercepting the communication with the sea, the muscle will suffocate *Teredines*, which may happen earlier to have found their way into the wood.

At first I supposed the *byssus* might possibly contain something specifically repulsive to the *Teredo*, and I therefore had it submitted to the chemical analysis of Dr. Scharling, which however has not given the result expected. It is the mere mechanical covering of the muscles, which prevents the *Teredo* from reaching the wood.

[The valuable hint contained in Dr. Cantor's communication will doubtless be appreciated by all such as are interested in the protection of wood-work from the attacks of the *Teredo*. Nowhere would this natural opponent of its ravages be more serviceable than in the Hugli; but the *Mytilacea* are, strictly speaking, inhabitants of salt water, although some of the family are capable of being localised in rivers, as is the case with *Dreissina polymorphus*, discovered by Pallas in the Volga, and some species of *Modiola*. The valves of two species of *Mytilus* have occasionally brought to me from the Hugli; one, closely allied to *M. edulis*, but less ventricose, and easily distinguished from it by the cardinal teeth; the other apparently identical with the *M. crenatus* of Lamarck, figured in the *Conchologia Systematica* of Reeves; but as neither of these, nor *Dreissina*, of which I have several specimens, have been found alive, I think their presence altogether accidental; they may have found their way to this river either with ballast or adhering to the bottoms of vessels. *Modiola emarginata*, (Benson,) however, inhabits the water of Tolly's nullah, as I was informed a few weeks ago by its distinguished describer himself. —J. W. L.]

PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL,
APRIL, 1847.

Lieut.-Col. FORBES, in the Chair.

The Proceedings of last meeting were read and adopted.

The accounts and vouchers of the previous month were submitted as usual.

The following gentlemen were then duly elected members of the Society :—

The Rev. S. Slater.

Count Lackersteen.

D. Money, Esq. C. S.

Lieut. Staples, Bengal Artillery.

The Senior Secretary communicated the desire of Capt. Jas. Abbott, Boundary Commissioner, Punjab, to rejoin the Society from 1st January, 1847.

The following gentlemen were named as candidates for admission :—

Capt. J. C. Hanyngton, 24th N. I. Dep. Com. Chota Nagpore, proposed by Lieut.-Col. Ousely, seconded by Capt. Kittoe.

Rev. James Thomson, proposed by Dr. O'Shaughnessy, seconded by Col. Forbes.

Geo. Udny, Esq. C. S., proposed by Lieut.-Col. Forbes, seconded by Dr. O'Shaughnessy.

R. Thwaites, Esq. Professor Hoogly College, proposed by Mr. Jones, seconded by Mr. Kerr.

M. E. Gibelin, Procureur du Roi a Pondicherry, proposed by Mr. Piddington, seconded by Mr. Laidlay.

J. R. Logan, Esq. Singapore, proposed by Dr. O'Shaughnessy, seconded by Mr. Laidlay.

James Stewart Blakie Scott, Esq.

Falconer Chute Sandes, Esq.

Warren Hastings Leslie Frith, Esq.

Robt. Thomas, Esq. proposed by Mr. R. W. G. Frith, seconded by Mr. Laidlay.

(Mr. E. Ryan's name was withdrawn from the list of members at his own request.)

Read letters from Capt. Kittoe, forwarding specimens as follows.

To W. B. O'SHAUGHNESSY, Esq.

MY DEAR SIR,—I have the pleasure to send a few specimens as per list in the margin. They are trifling but may be useful till better are supplied.

4 Specimens sandstone. The black sand is that in which the gold is found
 1 of Iron ore. wherever washed for in the south-western districts.
 1 of yellow ochre.
 1 Garnets?
 2 Rock at Ranchee.
 1 Black sand of the Gold.
 1 Plumbago?

The minute specimen resembling plumbago was found together with the sand by Major Armstrong in Singhboom.

The yellow oxide (or ochre) appears to be of a superior kind, and would probably fetch a good price in the English market for yellow paint.

Your's faithfully,

M. KITTOE.

1st April, 1847.

From *Capt. Jas. Abbott*, giving a description of the process of manufacturing the Damask sword blades of *Goojerat*.

From *Sec. to Sup. of Marine* forwarding Meteorological Register for February, from *Kyook Phyoo*.

From *B. Hodgson, Esq.* forwarding a paper on the *Tibetan Badger, Taxidea Leucurus*, with plates.

Ditto on the *Hispid Hare* of *Bootan*, (with plates.)

From *Capt. James Abbott*, enclosing a drawing of Sculptures dug from the site of the Indo-greek city of *Bucephalia* on the *Hydaspes*.

The above papers were directed to be published in the *Journal*.

From *Syed Yar Ali*, requesting patronage for a work entitled "The *Ookburee*" a commentary on Arabic poetry. (Referred to the Oriental Section.)

From *Mr. Hodgson*, applying for copies of the *Tibetan Grammar and Dictionary* of the late *Csoma de Koros*, for the use of a Native traveller and scholar; offering payment for the same.

Resolved that the books be presented to Mr. Hodgson, with the Society's acknowledgments for the valuable contributions received from him this evening.

From *Capt. Kittoe*, forwarding volcanic specimens from mount Merope, on part of Col. Garstin, Bengal Engineers.

To W. B. O'SHAUGHNESSY, *Esq.*

MY DEAR SIR,—I beg to forward herewith on the part of Col. Garstin, Engineers, some specimens of substances ejected during the late eruption of Mount Merope in Java, also a piece of Lava from Vesuvius, in which a copper coin is embedded, having been thrown into it whilst in its heated state.

The three specimens from Merope are curious; they are said to be different from what this volcano has hitherto been known to discharge.

The eruption took place on the 2d September last, (1846) commencing at 5 A. M. when it belched forth flames and smoke accompanied with a loud noise—at 6 a shower of ashes commenced falling and continued till midnight; the following day the eruption ceased and the mountain again became at rest.

Col. Garstin begs the Society's acceptance of the specimens.

28th March, 1847.

M. KITTOE.

From *Capt. Kittoe*, forwarding notes on the Temples and Ruins of Domga.

Ditto on the Viharas of Behar.

Ditto on the sculptures of Bodh Gyah.

Ditto on the caves of Barabar, and presenting various Buddhist sculptures and inscriptions from Barabar—and on the part of Col. Onseley an inscription from Mynpat.

It was further proposed by *Capt. Kittoe*, duly seconded and resolved,

That it should be observed as a rule henceforth that all inscriptions should be rendered in the vernacular, and together with a transcript of them in their original language be printed and a few copies presented on the part of the Society, through the contributors or other channel, to the zemindars, rajas, and priesthood at and near the locality whence obtained.

The following letter from *Capt. Kittoe*, having been mislaid by that gentleman was recorded for publication.

To W. B. O'SHAUGHNESSY *Esq.*

Senr. Secy. Asiatic Society.

MY DEAR SIR,—Having now seen the supplementary number of the Journal of our Society, I beg to answer the call of members assembled at the May meeting, therein recorded, and offer my opinion on the suggestions of Mr. J. Muir, touching the subject of adopting Hindu and Jain Architecture in designing and building the new Colleges.

I am of opinion that the Hindu or the Budhist styles, could well be adopted; of the Jain, I can say nothing, not having met with any specimens, except what are given in Tod's work, and too indistinct to copy from; however I would offer a few remarks applicable to any order of architecture, Classic, Gothic, Saracenic, or Indian, &c.

It has ever appeared to me that those races who were sufficiently advanced in civilization to practise architecture and sculpture, had no doubt fixed rules for guidance in their designs; that each had marked peculiarities, and striking dissimilarities, which had only been deviated from in later times, through various causes. The chief of these would seem to have been the result of international intercourse from conquest. The conquerors wishing to establish their own, but with imperfect means of instructing the conquered, who on their side were disinclined to part with their favorite forms.

The blending of one style with another, however skilfully performed and pleasing the effect to the eye of the multitude, is not to be lauded; something ever remains wanting, and offends that of men of taste, of many even who feeling defect to exist, could not point out in what particular; hence I must differ from Mr. Muir, as to his proposal to collect and put together fragments such as those displayed in Tod's Rajastan; indeed, the extreme richness of detail would alone render the copying them impracticable in these times of rigid economy and utilitarianism; we must then look to the most simple forms, of which we have an abundance close to Benares itself, (where one College is about to be built) without borrowing from Rajpootana. I allude to sundry fragments in the city and the vast ruins at Jounpoor appropriated by the Mahomedans in early times.

For "Indo-Mahomedan" details my publication on that subject affords ample data; a judicious application of them alone is all that is necessary. I however must here lament my past inability to complete what I began; I intended to have classed each style or stage of this clever compound under a separate head to prevent the architect and builder making those displeasing jumbles of ornamental parts and of other features which are ever and anon perpetrated in the present day, in the works of native architects in particular, such as Saracenic arches springing from lean Corinthian shafts and capitals,

a jumble of rich frieze ornaments and cornices in the place of simple brackets, and the elegant "Chujja" (projecting eaves) and many other absurdities. In fact, Indian architecture in our day, is what ancient English, commonly called "Gothic," was at the period of its decline in the reigns of Elizabeth, and Henry the eighth, nor has any great improvement in this respect taken place in our own time. Much may be attributed to want of knowledge and taste in design; architects, thinking to make up for these defects, by loading the surface with minute ornamental detail; also to false economy in stinting the extent and solidity of the structure; indeed this is the first error, profuse ornament to cover the defect; the next, one which of itself defeats the great object, nay, acts in a reverse ratio. Minute ornament is highly expensive to execute, difficult to protect and to keep in repair, consequently not lasting; therefore to be avoided.

The proportions of Indian buildings differ so greatly from those in European countries, that there is no one style, which would not to some degree require modification, and I see no reasonable objection, provided it be judiciously done.

To give effect to the exterior elevation of a building, domes and cupolas are essential, but these belong rather to Mahomedan works. The pyramidal roofs of Hindu, Jain and Budhist edifices are heavy, unless made of a costly description, and it must be remembered that we have no pure examples of early domestic buildings to guide us, therefore I entertain the opinion that the Puthan or early Mahomedan would be the best suited, not only from its near approach to the Hindu, but from its simplicity and consequent cheapness of execution, besides its admitting of wider latitude of design.

Were sufficient funds available in any instance, a magnificent edifice in purely Hindu form, could be designed with slight modification of the size of the doors and windows.

Of the Badshahi or later Mogul works, we have so many fine examples, that were funds available there would be nothing to prevent the carrying out of designs which for grandeur would even exceed them, provided good ones be forthcoming. I need hardly add that for this, a thorough knowledge of the subject is essential, which can only be attained by a patient examination of the proportions of the buildings themselves and of their component parts.

In conclusion I would dwell on the fact of their having been regular rules, by which the architects and masons were guided; every part and moulding had its particular name and proportion one towards the other, and the fine combinations we observe were not the result of chance as too often advanced, but of careful design and excellent taste.

30th March, 1847.

M. K.

From the Rev. J. Long forwarding an account of the Temple of Triveni near Hooghly, by David Money, Esq. C. S.

The Secretaries submitted on the part of the Committee of Papers—

A report by Dr. Roer on the proposed publication of the Vedas, favorably supported by the Oriental Section. The Committee propose that the report be adopted—the publication of the Vedas forthwith commenced, on the responsibility of the Oriental Section—that Dr. Roer be appointed *Editor*, subject to the condition of his submitting proofs of the work, both text and commentary, to the Oriental Section, without whose “*imprimatur*” no portion should be finally sent to press,—further, that the Oriental Section be solicited to favour the Society from time to time with their opinion as to the progress of the work with the view to the subsequent remuneration of Dr. Roer’s labours as editor thereof.

It was agreed, that the Report and illustrative documents be printed and circulated to resident members, and the subject discussed at the next meeting.

The Committee submit two propositions by Capt. Kittoe.

Military Members, (Subalterns.)—There are many young officers in the service who would be proud to be considered members of our Society, but can by no means afford the expense. I propose that Subalterns should be admitted upon a reduced (half) monthly subscription, and that they should be excused the entrance donation, binding themselves however to pay the same upon promotion or upon their succeeding to staff employ, general or regimental, after which they will pay the full subscription or retire.

I am confident that by such an arrangement lights would be drawn from under their bushels, and that many would be induced to exertion, for which there is at present no encouragement.

MOHUNT OF BODH GYAH.

In return for the civility and attention shown to me in my labours at Bodh Gyah, and with a view to encourage him and his monks to give further aid I propose that through me the Society should present the Mohunt with a copy of the Mahabharat neatly bound.

M. KITTOE.

The first proposition the Committee are not prepared to recommend under the present circumstances in which the financial affairs of the Society are placed.—(Decided accordingly).

The second proposal they submit for the sanction of the Society.— (Agreed unanimously).

The Committee have received an application from Mr. Hendrie for the payment of Co.'s Rs. 100, for sundry lithographs stated to have been executed by order of Mr. Blyth. The sketches are good, the charge moderate, and the artist cannot afford to suffer loss by his labour; on these grounds the Committee recommend that the bill be paid, but they desire to record their opinion of the inexpediency of any officer of the Society incurring such expenses without due sanction.— (Agreed accordingly).

The Rev. Dr. Hæberlin, a member of the Committee of Papers, being very frequently absent from Calcutta, the Committee recommend that *Baboo Debendernath Tagore*, be appointed a member of the Committee in Mr. Hæberlin's place.

This proposition gave rise to some discussion, Major Marshall insisting that it amounted to the expulsion of Dr. Hæberlin, while the Vice-President and Secretaries declared the sole object of the proposition was as stated, to obtain an efficient colleague constantly at the Presidency and competent to advise the Society on questions connected with Sanscrit literature. The Rev. Mr. Long being referred to, as Dr. Hæberlin's most intimate friend present, said that he was likely to be very often absent. The question having been put to the vote was negatived, the majority of the members present not voting.*

Copies were submitted of 4 coloured plates executed for the Journal, by Mr. Bennet, in illustration of Mr. Hodgson's papers on the *Ovis Ammonoides*, and *Procopra Picticaudata*, at the cost of Rs. 226 for 4 sets, each of 550 copies: payment of the amount was sanctioned accordingly.

The Committee submitted without comment a further claim by Mrs. Ballin, for Co.'s Rs. 563, 4, for *printing* 14 sets of the "Burnes" drawings, work stated to have been executed many months since and which was it appears duly authorized by the regular officers of the Society. Bill directed to be paid. The Committee further submitted the cash vouchers and accounts of the total expenditure on the Burnes' and Cantor drawings.

* Dr. Hæberlin has since written from Dacca confirming Mr. Long's statement in every respect and requesting to have his name removed from the Committee.—*Secs.*

Read the annexed extracts from a letter from M. E. Gibelin, Procureur du Roi a Pondicherry, communicated by Mr. Piddington.

Pondichéry, 24 Février, 1847.

MONSIEUR,—Quoique je n'aie pas l'avantage d'être connu de vous, vous avez mis tant d'obligeance à me rendre un service qui vous était demandé pour moi, que je ne puis tarder davantage à vous en adresser tous mes remerciemens.

Pour que vous puissiez juger de l'application que je fais de mes recherches sur la législation hindoue, recherches que vous avez aidées si gracieusement de votre concours, j'ai l'honneur de vous adresser, par le paquebot à vapeur de Madras, un exemplaire d'un premier volume d'Études sur le droit hindou, volume dont l'impression vient à peine d'être terminée. Je vous prie de l'accepter comme un témoignage de ma gratitude.

Dans une introduction que j'ai cru devoir placer en tête, j'ai cherché à réunir les principales traditions historiques qui constataient la filiation des peuples chez lesquels se rencontraient aussi les concordances les plus nombreuses et les plus frappantes entre les lois qui les gouvernent et les lois des Hindous.

Dans les Études qui suivent, j'ai cherché à établir, par la comparaison des textes, ces mêmes concordances législatives. Mon but a été, par ces rapprochements, de faire mieux apprécier la loi primitive que nous avons à appliquer ici chaque jour, de mieux pénétrer son esprit, et de pouvoir la discuter alors, avec cette connaissance plus intime, comme nous discutons les lois de notre Europe, qui ne sont, ainsi que je crois avoir commencé à le démontrer, que les traditions de cette même loi.

Il y a donc dans mon travail, ou du moins c'est-ce que je me suis proposé, deux objets distincts, l'un d'études historiques, l'autre d'études pratiques ou d'application journalière. Suis-je parvenu, de près ou de loin, à m'approcher du but que je désirais atteindre? C'est-ce que je vous prierais de vouloir bien examiner, Je m'estimerais heureux si vous aviez la complaisance de vous en expliquer franchement avec moi. J'ai encore une route assez longue à parcourir : je puis rectifier des erreurs, modifier des méthodes defectueuses. Aidé de l'expérience, des lumières d'hommes plus versés que moi dans la connaissance des lois du pays, je puis améliorer mon œuvre en la terminant.

Il aurait été bien avantageux pour moi, si j'avais pu m'étayer de tout ce que vos grands Jurisconsultes, les William Jones, les Colebrooke, ont laissé consigné dans les intéressants recueils de vos Recherches Asiatiques. Peut-être me sera-t-il permis quelque jour, d'aller consulter, à Calcutta même, et leurs écrits et leurs dignes successeurs, dépositaires et continuateurs de leur

science. En attendant, . . . veuillez agréer l'expression des sentiments de haute considération, avec lesquels je suis,

Monsieur

Votre très humble

et très obéissant serviteur

(Signed) E. GIBELIN,

Procureur général, Chef de l'administration de la Justice à Pondichéry.

Mr. Piddington stated in reference to the highly interesting work of Mr. Gibelin noticed in the presentation, that while Sub-Secretary he had furnished that gentleman at his request and expense with copies of some rare Sanscrit works.

Zoological Department.

Mr. Piddington read the subjoined note, giving
An account of a Volcanic Island off the Coast of Coromandel, from the Annual Register, Vol. 1st, 1758.

I find the following highly curious paper in the *Annual Register*, and it has undoubtedly escaped the notice of all the writers on Indian and on general Geology, though clearly allied to the phœnomena of the same kind which have appeared in the western hemisphere as Sabrina off the Azores, and Graham's Island in the Mediterranean, in our own days. The time at which it occurred is also remarkable as being the epoch which from the great earthquake at Lisbon in 1755, to 1767, may be called an earthquake epoch all over the world.

As connected also with the Volcanic action on the opposite shores and islands of the Bay and within the Andaman sea, this last recorded eruption on the Indian shore is highly interesting. Capt. Halsted's account (in Vol. X. of the *Journal*) of the upheavment of Cheduba, would place that event in 1749 but we may not improbably suppose that his aged informant might have mistaken his age, as natives of the east usually do. There is no shoal now near enough to Pondicherry to allow us to suppose it the remains of this remarkable Island, and at three leagues distant from the coast there 40 or 50 fathoms are found, so that it may have easily subsided into deep water. The shoal seen by H. M. S. *Melville* (Goris Bank) was in a line joining Pondicherry and Chittagong, and a shoal noted on a chart in my possession which belonged to the late Mr. Greenlaw, as having been seen by an American ship, is close on the line joining Pondicherry and Cheduba. Both these may have been a partial upheavment in this line.

The following remarkable account is given by an officer on board a French East-Indiaman, in a letter to a friend at the Hague :—

Jan. 20th, 1757.

“Just before we sailed from Pondicherry, fires broke out on the surface of the sea three leagues from that place, with the utmost impetuosity, throwing up pumicestones, and other combustibles, and forming an island of a league long and of the same breadth, which increased to a considerable height, with a volcano, making a most hideous noise, like thunder, or great guns, and a cloud proceeding from it, breaking into small rain of sand instead of water. This prodigy was first seen by a ship’s crew belonging to Pondicherry, who thought at first it had been a water-spout ; but coming near it, saw a prodigious flashing of fire, which smelt of brimstone, and heard a most astonishing noise ; afterwards a vast quantity of fish was perceived dead on the sea, and appeared broiled. Sailing a little further, they met with such quantities of pumice stones, that it was hardly possible to make way through them ; at the same time they discerned land, but it appeared to them as a cloud of fire and smoke on the surface of the sea, and the cloud ascending into the air, distilled in showers of rain which brought abundance of sand on their ship’s deck ; and being nigh the flashes of fire, and hearing the noise, they were under great consternation ; but it pleased God to send them a little breeze of wind that brought them from it. Another ship sailed round it, and they were so becalmed, that the ashes proceeding from the vast fire fell on their deck, and they were in great danger of being burnt.”

Mr. Piddington next submitted his usual report on the *Museum of Economic Geology.*

Museum of Economic Geology.

We have received from D. Money, Esq. C. S. a brick from Egypt, of which he says :—

“The brick from Thebes was from one of the oldest ruins on the western side of the hill near Madinet Aboo. It had a cartouche which could not be decyphered, but which, as well as the ruin from which it was taken, was a proof of its great antiquity ; some bricks near the spot have been found with the cartouche of Thothmes 2d and Thothmes 3d on them. It was curious too from its size and weight,

and was unburnt and mixed with chipped straw and was most probably of the *same kind*, though it may not have been the same, which the Israelites were forced to make. I thought, under such circumstances, it might have a slight value in the rooms of the Asiatic Society."

I have added to the collection of soils a very rare one here, the brick red soil of Bermuda, obtained from the lower part of a box of plants sent to me from that Island.

To the division of building and ornamental materials I have also added specimens of the common grey and the yellow Chunar sandstones, and of two kinds of trap, grey and buff-coloured, sent to the Auckland Testimonial Committee from Bombay.

Geological and Mineralogical collections.

I have several contributions in both departments, but they have unfortunately only come in too late to be examined (which many of the specimens require) before reporting on them, and I have other work in hand in the laboratory.

We have received from Colonel Ouseley a specimen of Fibrous Carbonate of Lime obtained in the district of Nagpore, under the following circumstances detailed by him.—“Near where I was encamped, is a village named Rutha, with a hill of considerable height called ‘Raj-poora;’ a land slip took place the rains before last, and a small stream emerged from the bottom of the slip. In this, and in a great chasm, these stones are found; they are to be had in any quantity.”

As above stated the specimen is a very common mineral, but its matrix is curious as approaching more nearly to an impure chalk than any thing we usually meet with in India. I sent a small sample to Dr. Cantor, requesting he would examine it for infusoriæ, but he informs me it does not contain any.

I am enabled to fill up a blank in our Mineralogical collection by a specimen of Atacamite, which (and this is an instance of how frequently valuable specimens are lost in India even in the hands of those who know their value), I found amongst a number of refuse and common minerals from my own collections.

We have to acknowledge also from E. Lindstedt, Esq. a fossil fruit (siliceous) from the coast of Abyssinia, of which the following is the memorandum furnished by Capt. Hodges to him:—“The stone I gave

you was picked up by me on the sea beach of the Island of Massouah, on the coast of Abyssinia, in the month of May, 1846." The specimen was exhibited at the last meeting.

Zoological Department.

Mr. Blyth read his report on the progress of the Zoological department.

The following are the only donations which I have to bring under notice this evening.

1. From E. O'Ryley, Esq. of Amherst, portions of two skeletons, with the skulls of *Rhinoceros Sumatrensis*; one of these skulls belonging to the individual, the skin of whose head was lately forwarded by Mr. O'Ryley.

Also a collection of bird-skins, comprising *Crypsirina varians* (v. *Phrenothrix temia*, Horsf.) and other species of interest: and

A small living Turtle, of the species *Chelonia virgata*—the edible turtle of the Bay of Bengal.

2. From Capt. Beaumont, a very fine recent specimen, with a jet-black hood, of *Larus ichthyæetus*, Pallas.

3. From J. McLeod, Esq. A fish, taken near the equator, which is a *Monoacanthus*, apparently the *Balistes lævis* of Shaw.

Also two species of *Phyllosomata*, some *Acalepha*, and other specimens obtained on the same occasion.

4. From Capt. R. Rollo, 50th Madras N. I., a skin of *Anthropsides virgo*.

5. J. B. Villy, Esq. A pair of living Doves, of the species *Geopelia tranquilla*, Gould, from Australia.

6. J. B. Porter, Esq. A dead Pheasant, from Shanghai, the *Phasianus torquatus*, or common ring-necked Pheasant of China.

The fine collections of mounted specimens upon the table, prepared since the last meeting, do not call for any particular remark.

April 7th, 1847.

Books received for the Meeting of Wednesday, the 7th April, 1847.

PRESENTED.

Meteorological Register for February, 1847.—FROM THE SURVEYOR GENERAL'S OFFICE.

Ditto ditto, kept at Kyook Phyoo during February, 1847.—BY THE SUPERINTENDENT OF MARINE.

The Calcutta Christian Observer for April, 1847.—BY THE EDITORS.

La Rhétorique des Nations Musulmanes d'après le traité Persan, intitulé Hadayik ul Balagat, par M. Garcin de Tassy.—BY THE AUTHOR.

Le Moniteur des Indes Orientales et Occidentales, No. 9.—BY THE EDITORS.

Etudes sur le droit civil des Hindous; Recherches de législation comparée sur les Lois de l'Inde, les lois L'Athenes et de Rome, et les coutumes des Germains; par E. Gibelin.—BY THE AUTHOR.

EXCHANGED.

The London, Edinburgh, and Dublin Philosophical Magazine, No. 198.

Journal Asiatique, quatrieme serie, Vol. VIII. No. 38.

Calcutta Journal of Natural History, No. 28.

PURCHASED.

The Calcutta Review, No. XIII.

The Annals and Magazine of Natural History, Nos. 122—3.

Journal des Savans, Novembre, 1846.

DONATIONS TO THE MUSEUM.

Two Duffla Caps.

A quiver with two poisoned arrows; and a Knapsack.—BY H. DRIVER, Esq.

For all donations to the Library and Museum as well as contributions to the Journal, the thanks of the Society were directed to be offered by the Secretaries in the usual form.

REPORT ON THE "VEDAS."

ASIATIC SOCIETY.

PROPOSED PUBLICATION OF THE VEDAS.

In compliance with a Resolution passed at a general meeting of the Asiatic Society held on the 6th April, 1847, the Committee of Papers circulate for the information of the resident members, the annexed documents, chiefly communicated by the "*Oriental Section*" of the Society, relative to the proposed publication of the Vedas.

The expense of the undertaking is to be defrayed from the grant of 500 Rs. per mensem, allowed to the Society by the Hon'ble Court of Directors, for the promotion of Oriental literature.

The Committee of Papers propose that the views advanced in Dr. Roer's report, supported by the Oriental Section, be adopted by the Society on the responsibility of that section—that Pundits from Benares be engaged—that Dr. Roer be appointed Editor, under the supervision of the Oriental section, by whom all proof sheets should be examined and passed before finally sent to press—lastly, that the section be invited to report progress from time to time, and that after six months the question be entertained of the manner in which Dr. Roer's labours may be duly remunerated.

The above propositions will be discussed at the regular meeting of the first Wednesday in May.

W. B. O'SHAUGHNESSY,
Sen. Sec. Asiatic Society.

April 12th, 1847.

Asiatic Society of Bengal.

G. A. BUSHBY, Esq.

W. JACKSON, Esq.

BABOO DEBENDERNATH TAGORE.

BABOO HURREE MOHUN SEN.

GENTLEMEN,—I have the honor to inform you that you are solicited by the Asiatic Society of Bengal to afford them, through the

Committee of Papers, your valuable aid, as additional members of the section appointed for advice and reference to, on

"ORIENTAL LITERATURE AND PHILOLOGY."*

Of this section Dr. E. Roer is the Secretary, and he will from time to time circulate for your examination all papers and documents upon which the Asiatic Society may desire the benefit of your suggestions.

The members of the several sections being appointed by the Society as ex-officio inspectors of the Museums and Library in their several departments, your co-operation in this respect is most earnestly invited, and any aid or advice you may be pleased to afford for the improvement or increased efficiency of these branches of the Society's establishment, will be received with the utmost thankfulness and respect.

In deference to the expressed wishes of the Honourable the Court of Directors, reiterated in Mr. Secretary Bushby's letter, dated the 21st November, 1846, the Asiatic Society are desirous of taking immediate measures for the publication of the *Vedas*, with a commentary, the expense to be defrayed from the grant from Government of 500 Rs. per mensem for "Oriental Publications." Your Secretary, Dr. Roer, will be requested to obtain for the Society, at the earliest possible period, such suggestions as your section may be pleased to communicate on this important subject.

I have the honor to be,

Gentlemen,

Your most Obedt. Servt.

W. B. O'SHAUGHNESSY,

Asiatic Society, 16th Feb. 1847.

Sen. Sec. Asiatic Society.

Asiatic Society, the 30th March, 1847.

GENTLEMEN,—In compliance with the request expressed in the Senior Secretary's letter of the 16th ult., addressed to the Oriental Section of the Society, I have the honour to submit to you, for your consideration, a few suggestions respecting the publication of the *Vedas*, and request the favour of your able advice for the guidance of the Society in this important undertaking.

* *Former members*:—Major Marshall, since resigned.—The Rev. Dr. Haerberlin—The Rev. Mr. Long.

Before I can, however, enter upon the proposition of a plan, according to which, I believe, we may commence the printing of the Vedas, it is imperative upon me to advert to some of the difficulties, connected with this work, as its success depends upon a correct estimate of the nature of these difficulties. For this purpose I beg to lay before you the accompanying letters, in which these difficulties are represented in a very strong light, and seemingly, for the present at least, unsurmountable. I believe, however, that all the impediments may be overcome, and as readily now as at any future time.

The difficulties are chiefly of two kinds, the collection of the Vedas and the understanding of the language of the same, as this last is essential to the correctness of the text.

Permit me to solicit your attention first to the former difficulty.

It has been insisted on in the letters before you, or I should not have ventured to detain you so long on this subject, that the language of the Vedas is antiquated and obsolete, and for this reason not intelligible without the assistance of Pundits who have studied the Vedas at Benares. I will not urge against this assertion, that some literary undertakings have been successfully completed of infinitely greater difficulty than the present, for instance to give a near and illustrious example, that the characters of the legends on the Bactrian coins, for which there was no living interpreter, have been deciphered, that the language of these legends, of which there are no other documents, and which has long ago died away, has been fully understood by study, perseverance and genius; but I would urge with regard to the Vedas themselves facts which cannot be controverted, that parts of these Vedas have been published, and with eminent success, without the assistance of any Pundit, by European scholars; I mean the Sanhita of the Sámaveda, by the Rev. Mr. Stephenson, and part of the Sánhita of the Rígvēda by the late Professor Rosen in London, the text in both cases accompanied by a translation. This success ought then to be a guarantee of our own success, if we have only perseverance enough, and use the means at our command.

These means are first, the very works just mentioned, by which the study and understanding of the Vedas is considerably facilitated, especially by Rosen's work, which is a mine of information with regard to the correct interpretation of the Vedas. In his notes all obsolete forms of

the language, occurring in the text, are explained, and reference is made to the interpretation of the same by ancient works of the Hindus.

Secondly, the language of the Vedas in its grammar is explained by Pánini and other Hindu authors on Sanscrit grammars, especially by Bhattogi Dixita in the Siddhánta Káumudi, the works of whom are partly printed and commented upon. The edition of Pánini by Boethlinck will give all the assistance that is required, completely to understand the grammatical forms peculiar to the Vedas. Further, the language of the Vedas with regard to its style is simple, and in this respect easy; there are no unusual combinations of words; the language of the Sanhitas (to which I here only refer, as it is the most difficult part) is that of prayer, connected with the daily routine of life. The only difficulty consists in the occasional want of the connexion of the ideas. This difficulty, however, is not of frequent occurrence, and will be removed by an attentive perusal of the whole prayer in which such passages occur.

Thirdly, we have those commentaries of the Vedas which, from the most ancient times until now, have been acknowledged as guides in the interpretation of the Vedas. These commentaries give a full explanation of the peculiar grammatical forms and obsolete words as well as of the sense, when it is obscure, or when allusions are made to usages and customs which disappeared at a later period, or they supply omissions in the text. They are at the same time not written in the dialect of the Vedas, but in a language which every one, acquainted with the Sanscrit, can understand.

On these grounds I consider any objection, raised upon the ancient form of the language against the publication of the Vedas, as of no weight whatever. By study, application and perseverance, which are required for the execution of every important literary undertaking, they will assuredly be overcome.

The second difficulty is to procure a complete copy of the Vedas.

There is no complete copy of the same in Calcutta, and also not at Benares, as appears from a statement of Mr. Muir which I have added to this Report. There are, however, considerable portions of them here, and still more at Benares, and judging from what we already possess we have every reason to expect, that we shall be able to complete

our collections in India, especially, if we follow Raja Radhakant's advice to apply for them in the Dekhan (Tailinga, Draviṇḥa, &c.).

Should we, however, fail in this, there is, as Colebrooke states in his *Essay on the Vedas*; and as is alluded to in Raja Radhakant's letter, a complete copy of the Vedas in London, brought there by Col. Polier. It is greatly to be lamented, that we have no catalogue of the Vedaic MSS. in the Library of the East India House. These collections must, however, be extensive, and we may confidently hope, that the Directors will open to us the resources of their Library for a publication of the Vedas.

If we have then grounds to believe that we may obtain a complete collection of the Vedas (and also of a commentary of the same), are we to delay the publication of them, until this collection is completed? I think not. To wait for this, is to postpone the publication to an indefinite period, nay, to decline it altogether. The commencement once made, we shall obtain assistance from many quarters in Europe as well as in India. If we do not commence, the public will withhold their aid in the belief, that our present intention of publishing contains as little meaning, as it has displayed for the last five years, during which time we have received the handsome grant of 500 Rs. per mensem, on the part of the Directors, to be expended for this particular purpose.

I therefore suggest, that the publication of the Vedas should be commenced without further delay, provided that the MSS. at our command suffice (as I think they do) to print a considerable portion of these works together with a commentary, and secondly, that, while the printing is going on, we increase and complete our collections here, and if necessary, in Europe.

To make myself understood with regard to the mode of the publication of the Vedas that I propose, I must premise a remark on the division of the Vedas.

There are, as is well known, Four Vedas, each consisting of two parts; the first is called *Sanhita*, and contains a collection of *Mantras*, or prayers directed to different gods, invocations and incantations. The second part of each Veda is called *Bráhmaṇa*, and contains precepts, moral maxims, explanation of religious ceremonies, &c.

I have now obtained in Calcutta four complete MSS. of the *Sanhita* of the *Rig Veda* (the first Veda) and a commentary on the first

book of this Sanhita (the whole Sanhita contains 8 books), and on a part of the second book. These are precisely those parts with which we ought to commence, if we would publish the Vedas in the same order, in which they are received by the Hindus, and although it would be a hazardous undertaking to publish the text of the Vedas from one MS. alone, however correct it may be, four MSS. are quite sufficient to prepare a correct text. Rosen had only two MSS., and the commentary, and the text he has given, are unexceptionable as regards correctness. There are no different versions of the Vedas, as there are for instance of the Rámáyana, they have been handed down to posterity with the utmost fidelity, since an alteration of them would appear to be a sacrilege, moreover the number of verses is known, nay even that of the single words. On these grounds it is evident, that an error, occurring in the text, can be only an error of the copyist, which can easily be rectified by the means of four MSS. I now enumerate these MSS.

1. MS. No. 8—36, A. from the Library of Bishop's College. This is in Debnagri characters, in small leaves, each of them numbered, and the number of Slokas, as also their division in lectures and books, most carefully marked. It is probably a pretty old copy, as the characters differ from those at present in use, and require some attention to read them. It is altogether a beautiful MS., and as I have reason to believe from a comparison of some parts with Rosen's Rig Veda, a very correct transcript.

2. MS. No. 433, from the Library of the Asiatic Society, containing the Sanhita of the Rig Veda complete. It is also in Debnagri character, and legible, although not to be compared in this respect with the MS. from Bishop's College.

3. MS. Nos. 1418—1425, from the Sanscrit College, in Debnagri character. This is also a complete transcript of the Sanhita of the Rig Veda, and in most perfect preservation. It is as good a copy as that from Bishop's College, and in modern character.

4. MS. No. 1417, from the Sanscrit College, containing all the Padas or single words of the Rig Veda, it is in modern Debnagri character, and copied with great attention. The Padas or words are separated from each other by perpendicular lines, which is of material assistance in the interpretation of the text. In Sanscrit many words are often

combined into one, so that if an error should occur in the combination, it is often difficult to find out the incorrect words, while in a succession of Padas the error is directly limited to a single word. At the same time there is a prejudice in favour of the correctness of the text, as great attention is directed to the correctness of each single word by the contrivance of the lines of demarcation.

Beside these MSS. of the whole Sanhita, there is in one more for the first book accompanying the commentary of Mádhav Áchárya.

We have no complete commentary on this Sanhita in Calcutta. Our library possesses the commentary of Mádhaváchárya on the first book of the Sanhita, (No. 17,) and the Library of the Sanscrit College the same on a part of the second book (No 1431).

After these remarks then I propose, that the whole Sanhita of the Rig Veda should be prepared for the press, and printed as far as the commentary goes. During this time we shall have opportunity to procure the remaining portion of the commentary from Benares. With regard to the commentary itself I have further to suggest, that it should be abbreviated in such places, where no explanation is necessary, and that especially such parts of the commentary which explain passages, already before commented upon, should be entirely omitted, as a reference to the place, where they are already explained, will be quite sufficient.

With the aid of the commentary the text of the Vedas can be easily understood, and thus will this most ancient record of the religious traditions of the Hindus for the first time be opened to them, but to afford access to the work to the European public also, I beg to suggest, that the text of the Sanhitas at least, should be accompanied by an English translation. There follows no necessity to translate also the commentary, as the English text may be understood by itself. With regard to the Bráhmanas I would not advise a translation, because the cost of the work would be considerably increased, and extracts, judiciously selected, will suffice.

For the collation of the MSS., the copying of the text and preparing of the work for the press, I propose, that the Society should employ, beside their own Pundit, two or three more, under the superintendence of the person whom the Society may entrust with the publication of the work. At the same time the Society should employ,

according to the suggestion of Baboo Debendernath Tagore, a Pundit who has made the study of the Vedas, and especially of the Rig Veda, the business of his life; such a person must, however, not be allowed to exercise any authority, but only to be an assistant, as the word of Pundits in the difficulties of translation or interpretation cannot be relied upon. If the Tattwobodhini Society can lend us the assistance of one of the young men, studying now on the part of that Society the Vedas at Benares, as is kindly intimated in Baboo Nrendernath's letter, we ought of course gratefully to accept this offer; but if there is a prospect of much delay in the arrival of the person, we ought to write to Benares at once for a qualified Pundit.

Should the Oriental Section approve of the propositions laid before them, the undertaking might be at once commenced with the collation of the MSS., and preparing the text and commentary (as far as we possess the latter) for the press. Meanwhile we should look about for the remainder of the commentary on Sanhita of the Rig Veda.

I have not adverted here to the other portions of the Vedas extant in Calcutta, because, according to the examination I have as yet made, none are sufficiently complete to authorize the printing of them, and because I have been anxious to lay before the Society a statement of those portions of which the publication might immediately be commenced. I shall, however, as soon as my time will permit, report on the other parts of the Vedas and on the measures we have to take to complete our collections.

I have the honor to be,
Gentlemen,

Your most Obedt. Servt.

E. ROER,

Co-Secretary, Asiatic Society, Oriental Department.

To E. ROER, Esq.

Co-Secretary, Asiatic Society, Oriental Department.

SIR,—I have the honor to acknowledge the receipt of your letter of the 24th ultimo, and in reply thereto to inform you that the Society has no complete collections of the Vedas in their library, the only portions of them which are at present in their possession being those which usually go by the name of Dasopanishad, or the ten Upanishads, and

another called the Swetwássataro with commentaries by Sankara Áchárya. The Society however had deputed four young bráhmans of our country to study all the Vedas in that head-quarters of Vedaic study and common resort of Vedaic students in India, Benares. They have already proceeded far in their tasks, and I believe whenever they return with complete copies of the Vedas, the Society will be glad to lend, through their medium assistance to the Asiatic Society in their very important and valuable undertaking.

I have the honor to be,

Sir,

Your most Obedt. Servt.

NREPENDERNAUTH TAGORE,

Secretary.

*Calcutta, Tuttobodhinee Subha,
8th March, 1847.*

To E. ROER, Esq.

Co-Secretary, Asiatic Society, Oriental Department.

SIR,—I have the honor to acknowledge the receipt of your letter, dated the 24th ultimo, and in reply thereto beg leave to inform you that I have no collection of the Vedas or fragments of them in my possession. I believe that complete copies of them are not at all procurable in Calcutta, the only portions of them obtainable and studied in Bengal being the ten Wupunishadas. I am however of opinion that though complete collections of the Vedas be obtained, yet on account of errors which invariably creep into manuscripts and the difficulty here experienced of getting men who can understand the Vedas, the language in which they and even many of their commentaries are couched being obscure, antiquated and obsolete, the assistance, in the intended publication, of Vedaic Pundits who have studied them regularly as scholars, ought to be procured from Benares ; a step which I think is essential to the satisfactory execution of that important undertaking of the Asiatic Society.

I have the honor to be,

Sir,

Your most Obedt. Servt.

6th March, 1847.

DEBENDERNATH TAGORE.

3 x

Report on the "Vedas."

To Dr. E. ROER,

Secretary, Oriental Department.

SIR,—I am exceedingly happy to learn from your kind letter of the 24th instant, that the Asiatic Society has resolved to publish the Vedas, together with a Commentary, as soon as practicable, and shall not fail to render my assistance in this important undertaking, as far as it lies in my power. Allow me however, to remark that the printing of the Vedas is not an easy task, for a correct and complete Manuscript of the sacred works are scarcely procurable here, and the Pundits of Bengal being not conversant with the Vedas, are hardly competent to correct the proof sheets of the same. I therefore, propose that the Society would be pleased to apply to Government, to write to their Agents at Benares and the Decan, (Tailanga, Dravīṇa, &c.) for transmission of accurate copies of the four Vedas with their commentaries, and also four brāhmins well versed in the four Vedas ; and then I doubt not, the resolution of the Society will be crowned with success.

On reference to the printed list of Sanscrit Books, which was some time ago published by the Asiatic Society, I find that all the Vedas and their commentaries are in the library of the Government Sanscrit College, and can easily be had by writing to the Secretary of the College.

A writer in the *Calcutta Review* (No. V. p. 108) states that a complete copy of the Vedas was carried to England by Colonel Polier, and deposited in the British Museum ; I think it would be highly desirable to get the loan of this original Manuscript, or in default thereof, a transcript of it, for a collation of the different manuscripts that might be procured, either in India or Europe, would be of infinite service in giving a correct and perfect edition of this most ancient work to be found in any language in the world, and that the Asiatic Society of Bengal, or the supreme Government of India ought not to grudge any expense in effecting this most laudable object.

I am much obliged by your bringing to my notice, that Mr. Koenig has requested the intercession of the Asiatic Society, to procure for him one or two copies of my Sanscrit Dictionary, and that he has with great liberality, placed at my disposal, a copy of all the Sanscrit works published by him, as well as by your extracting a passage from a letter of the most erudite and profound Sanscrit scholar, Professor Lassen, to

your address with regard to my Dictionary. I beg to assure you that nothing would afford me more satisfaction than to meet the wishes of those learned gentlemen. I shall do myself the pleasure of forwarding to you after our holidays, two sets of my Lexicon, (of which five volumes have already been issued from the press,) and hope you will have the goodness to despatch them with my compliments, for the acceptance of those two gentlemen.

I take this opportunity to inform you that Dr. H. H. Wilson wrote to me, that the emperor of Russia had agreed to pay the expense of printing a complete edition of the Rig Veda with the commentary of Sáyana Achárya, and that the first book of the Sanhita of the Rig Veda has already been published with an English translation, by a gentleman at Bombay. I have also seen the text of the Sáma Veda Sanhita, with a translation of it, by Dr. Stevenson of Bombay, printed for the Oriental Translation Fund of Great Britain and Ireland.

I have the honor to be,

Sir,

Your most Obedt. Servt.

RADHAKANT.

Calcutta, 29th Feb. 1847.

To DR. W. B. O'SHAUGHNESSY.

Sen. Sec. Asiatic Society.

SIR,—With reference to the question whether the Vedas should be printed under the superintendence of Pundits of this country or of Benares, I beg to state that Pundits from Benares ought to be preferred to those of this country, for the following reasons:—

1st. The Pundits of Benares make the Vedas the special subject of their studies, and are consequently the fittest persons to edit them.

2nd. The ancient dialect in which the Vedas are composed, is extremely difficult and obscure. It is impossible to find two consecutive lines of a Vedaic Sanhita, in which there is not some obsolete word, some antiquated form of construction or some unusual inflexion; so that without a knowledge of the *Niructa* and *Bhasya*, no Pundit however well versed in modern Sanscrita literature can understand the Sanhitas.

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3rd. The fact of there being no Vedaic school in all Bengal is well known, and therefore it cannot be expected that men educated in the Sanscrita schools of Bengal shall possess competency for the creditable execution of this important undertaking.

4th. All the Vedaic MSS. that I have seen are more or less defective, and it is impossible to produce a good edition of the work by the mere collation of those manuscripts, and by adopting such expressions out of the different "readings" that will occur in the various manuscripts that may be consulted, and deciding in all other questions of doubt, by the impulse of our own taste and predilections without consulting those who are best able to pass opinions on the subject.

5th. There being no difficulty about getting aid from Benares, I see no reason why the work should be entrusted to parties, who possess no special knowledge of the Vedas in preference to those who have devoted their lives to their study. I take this opportunity, further most respectfully to suggest that it is desirable that there should be a Committee appointed of men well conversant with the Sanscrita literature, to superintend the publication and co-operate with the Pundits who are to edit the Vedas, in collating and revising the manuscripts, so that there be sufficient guarantee for the authenticity, correctness and faithful execution of the task.

I am, Sir,

Your most Obedt. Servt.

RAJENDRALAL MITTRA,

Assist. Sec. & Librarian, Asiatic Society.

April 7th, 1847.

As four complete manuscripts of the Rigveda Sunghita have been procured, I think there exists no objection as to the commencement of the undertaking as proposed. With a view however to the satisfactory execution of the task, I would propose that no time should be lost in taking measures for the purpose of obtaining the services of a Pundit thoroughly versed in the Vedaic literature.

Agreed.

D. N. TAGORE.

J. LONG.

Dr. Roer's valuable suggestions with those to which he refers in his letter, should, I think, be recommended to the Committee of Papers.

G. A. BUSHBY.

I think Dr. Roer's suggestions, to commence the publication of the first Ved with an English Translation, a very good one, and would adopt it ; probably many Hindus will read it in an English Translation, who could not in the original. It is very desirable to bring these old books within the easy reach of men's minds.

WELBY JACKSON.

Statement of the Portions of the Vedas and their Commentaries which exist at Benares, communicated by J. MUIR, Esq. Civil Service, 1846.

Name of Veda.	Name of Śākhā.	Name & Extent of Mantra Sanhitā in Slokes.	Name and Extent of Commentary or Bhāshya.	REMARKS.
R̥ik,.....	1 Śākal,.....	12,000	On Sanhitā, Mādhanva's. On Brahman, Vid-yāranya's.	Benares S. C. Library has the Sanhitā of this Śākhā complete 12,000 Slokes, and 77,000 Slokes of Mādhanva's Commentary. It has also 4,250 Slokes of the Brahman but no Commentary on it.
"	2 Baskal,.....	each 12,000	Unknown.	I have not heard of any one in Benares, who read these 2 Śākhās Nos. 2 & 3.
"	3 Sankhayan,...	each 12,000	Unknown.	Coll. Lib. has the Vajrasunehee Sanhitā entire 4,000 <i>st.</i> Ubat's Bhāshya on the Sanhitā 10,000 and Mahidhar's Bhāshya on 4,000 <i>st.</i> nearly half, 22,200 <i>st.</i> also the Brahman (14 kānds) 24,000; also Haribara Śwami's Bhāshya on the 1st känd of the Brahman 4,200 and Mādhanva's Bhāshya, on one division, and part of another of the Brahman 9,600.
White Yajush,	1 Mādhyandinee,	Vajrasunehee 4,000 Sharpath 14 kānds, 24,000	On Sanhitā, Mahidhar's. On Sanhitā, Ubat's. On Brahman, Vid-yāranya's.	Coll. Library has 1st half of the Sanhitā of the Kāvī Śākhā, 2,000 and a small part of Vridharanyaka känd of the Brahman of this Śākhā 1,700.
"	2 Kāvī, (differs from the former),	4,000	On Sanhitā, Mādhanva's. On Brahman, Vid-yāranya's.	Library has part of the middle känd (there are 7 kānds in all) 2,200 but no Brahman.
Black ditto,....	Taittirīya,	Apastambī 9,000	On Sanhitā, Mādhanva's. On Brahman, Vid-yāranya's.	College Library has Chāndasi Sanhitā 2,000, Mādhanva's Bhāshya on ditto 10,900, Brahman consisting of six Upanishads 4,600.
Sāman,.....	Kauthumī,...	Chāndasi { 2,000 or 1st part Uktara Sanhitā or 2d part,...	On Sanhitā, Mādhanva's. On Brahman, Vid-yāranya's.	No one known in Benares who recites this Śākhā, which differs in accentuation only from the Kauthumī. The Brahman is said to be different, the size the same.
"	Rāvāyani,.....	
Atharva,....	Saunaki,.....	10,000	On Sanhitā, Mādhanva's. On Brahman, Vid-yāranya's.	College Library has this Sanhitā 6,000 and part of the Gopath Brahman 1,800.

N. B. Vid-yāranya is only another name for Mādhanva, at a another period of his life.

JOURNAL
OF THE
ASIATIC SOCIETY.

JUNE, 1847.

On the Local and Relative Geology of Singapore, including Notices of Sumatra, the Malay Peninsula, &c.—by J. R. LOGAN, Esq.

[The following paper was sent to the Asiatic Society of Bengal in January 1846. The delay which has taken place in its publication in their Journal, enables the writer to append an extract from a letter to Professor Ansted, in which he has given a summary of the results of his subsequent observations made in localities more favorable for geological inquiries than those to which his attention had been confined when the paper was written. It may save the reader some trouble if he be furnished at once with the key to the theoretical discrepancies which may be noticed between the paper and the letter. He thinks it better to do this, and to leave the former as it stands with all its faults, rather than to alter it in conformity with his more matured, but still imperfect, views. The geology of every fresh region has to be worked out amidst doubts and errors, and a record of the stages through which its theory, if at all new, passes in its progress towards complete truth, may often serve ultimately as its best demonstration, because it will show that it was not hastily adopted, but gradually grew out of a long continued and defeated effort to assign to every new phenomenon a place in familiar systems.

The principal result at which the writer had arrived when the paper was written was the opinion, advanced hypothetically in it, that the southern extremity of the Peninsula, &c., had been ruptured and upraised by subterraneous forces, and that through the rocks so affected

ferruginous gases, &c., had been emitted. The action of these gases on the rocks had, amongst other transformations, produced laterite. The paper was written under the impression that the formation of plutonic rocks and plutonic action in sedimentary rocks were confined to deep subterranean levels (see the writings of Mr. Lyell and other English geologists). Hence it seemed necessary to believe that the superficial igneous action with which the paper was mainly concerned, was wholly unconnected with the granitic and other plutonic rocks of the district; subsequent investigation of some of the best developments of these led to the conviction that the *Tartarean* theory was inapplicable to them at least. The disturbed sedimentary rocks were re-examined free from the bias of that theory, and it then appeared, that, while the evidence in favour of the metamorphic origin of the laterites, &c., was so strong and varied that it might be now recorded as a demonstrated fact; there were no apparent obstacles to the reception of the simple hypothesis that they were caused by plutonic agency, and that the plutonic rocks of the districts were themselves the agents of the alteration or the effects of one and the same hypogene agency. This hypothesis embraces at once the whole region of elevation in which Singapore is situated, with all the plutonic, volcanic and metamorphic phenomena which it exhibits. It refers the whole to one cause operating throughout a long period of time, and which has not yet entirely ceased to operate, as the volcanic emissions of Sumatra and the vibrations of the whole region, from time to time, and the thermal springs of Sumatra and the Peninsula, constantly testify to us. This cause is the existence of an internal plutonic intumescence, or nucleus, which has slowly swollen up, fracturing the sedimentary strata, saturating and seaming them with its exhalations, and as it forced itself up beneath them and through the gorges and fissures, at once upheaving them and feeding on their substance, till, in many places, it pressed and eat through them to the refrigerating surface, and rose, congealing, into the air or sea. It is this latter circumstance that distinguishes the region from all those which have been observed by European geologists, and it is this singularly high level which the plutonic reduction has reached that explains the extraordinary appearances which the unreduced superficial rocks have so often assumed. The metamorphosed rocks of Europe evinced a deep subterranean saturation with plutonic exhalations, and European

geologists concluded that plutonic action was necessarily deeply subterranean. But here, I think, we find a subaerial or subaqueous plutonic activity; and where the plutonic level has not reached that of the pre-existing rocks, a new kind of metamorphism appropriate to the new conditions under which the plutonic exhalations have operated.

The interest which the discussions respecting laterite have given to that rock, tends to invest it with undue importance geologically. The ferruginous emissions have affected all rocks indiscriminately, and their action on sandstones, grits and conglomerates is as well marked as that on clays, marls and shales, although the latter only produces proper laterite. Even in the clays, laterite denotes one only of many degrees and forms of alteration. To express the origin of these rocks and its unity, to record the cause of the difficulties which they have presented, and to distinguish them from true metamorphic rocks, I would propose, avoiding any new technical names, to term them simply the *iron-masked* rocks of the Indo-Australian regions. This term will include the principal or plutonically ferruginated rocks, which, without being either completely reduced or metamorphosed, have been either wholly disguised or partially altered by ferruginous emissions, which have saturated them in the mass,—or only affected them in fissures and seams,—or been interfused between portions of the rocks not actually separated by fissures, but intersected by planes of mere discontinuity, the sides of which have an imperfect cohesion, or having a common border of inferior density and increased porosity caused either by interruptions in the original deposition of the matter of the rock or by unequal stretching or incipient cleavage. The term may be also extended, perhaps, to those sedimentary beds in which the iron saturation, although coeval with the deposit of the other constituents of the rock, has served to obscure or conceal their true nature as well as the derivation of the beds themselves. These beds appear to have been sometimes formed by superficial layers of gravel, &c. being permeated by iron solutions. With these must not be confounded the broad bands lying over and beside the heads of iron-masked dykes, and which, having been in a loose gravelly or fragmentary state at the time when the plutonic emissions passed through them, became cemented into hard, and occasionally scoreous, ferruginated conglomerates, &c. and are therefore proper plutonically iron-masked rocks.]

Before entering on a detailed account of the mineralogical features of Singapore, it will be convenient to bring into a preliminary paper some discussions of a theoretical nature, which, if not thus separated from the former, might, in the sequel, occasion frequent interruptions and some confusion. A brief sketch of the topography of the Island will suffice as a basis for the remarks which follow it.

The Island is of an irregular figure, when correctly laid down, (for the published maps, with the exception of Mr. Thomson's, are very incorrect,) resembling a bat, the head being at Tanjong Sinoko, in the old strait, the tail at Tullah Blanga, or rather Blakan Mati,—the western wing being fully expanded and the eastern a little retracted. Its greatest length from Pulo Campong or Point Macalister, on the west, to Tanjong Changai on the east, i. e. between the tips of the wings, is 21 miles. Its greatest breadth from T. Sinoko to T. Blangah coast, i. e. from the head to the tail, is 12 miles. Its superficial extent is roughly calculated at 200 square miles.

The town of Singapore, to start from the best known point, is situated at the south-western extremity of a flat alluvial tract, of which the greatest length in a straight line near the sea-beach is about 6 miles, and the greatest breadth inland about $2\frac{1}{2}$ miles. Three well marked deposits occur in this flat. A stiff clay of a greyish hue, becoming in some places darker and even blackish; a whitish, greyish or yellowish sand; and a vegetable deposit, consisting, where most recent, of fragments of wood or masses of aquatic plants more or less decomposed, and, where older, of a soft peaty matter passing into a black mud. The mode in which these beds have been deposited will be described hereafter. The west side of this plain is marked by low rounded hillocks, separated by openings on the same level as the plain. On following these in a north-westerly direction, the former are found to be the extremities of distinct ranges of hills, and the latter the mouths of valleys between them, the principal extending about six miles inland. The largest valley, along which there is a public road, terminates a little to the south of a group of hills called Bukit Temah, the summit of which is 530 feet above the level of the sea, and the highest point in the Island. From this group the valley and the stream which drains it borrow their name. The coast of Singapore to the S. W. of this valley also follows a N. W. direction. The intervening space is occupied towards the sea by a

prominent range of hills rising abruptly to a height of 300 feet at Tullah Blanga, which has lately been made the signal station. Towards the Bukit Temah valley a broad irregular range of hills is united apparently with the Tullah Blanga range on the N. W., and as it proceeds the S. E. separates from it and gives room for a broad swampy flat, from which the Singapore River flows. Nearer Town the range bifurcates, one of the forks terminating in Government Hill and the other in Mount Sophia. These Hills approach close to each other, but proceeding inland the two divisions of the range draw further back, and a secondary valley of considerable breadth, and about two miles in length, is formed. The range on the N. E. of Bukit Temah valley springs from Bukit Temah, and terminates in a low broad sandy elevation which slopes almost insensibly till it emerges in the plain. It is in some places about $1\frac{1}{2}$ miles broad. The configuration of the range,—and most of the others have many features in common with it, may be partially observed in proceeding up the Bukit Temah valley. A succession of low hills present their rounded ends stretching into the valley which expands into the concave or sinuous hollows between them. The lateral valleys thus formed are of various figures and extent. Many resemble a horse shoe or amphitheatre. The upper extremities of most are of this shape, and similar indentations occur in the course of the more protracted, at the necks connecting the different hillocks which form their sides. When we strike across the range we are at first confused by the number of hillocks and hollows only partially cleared of jungle; but under patient observation they gradually assume a certain order; about the centre of the range the ground is a comparatively elevated and broad tract, but very irregular in its configuration. All these irregularities however, it is probable, have relation to the lateral ranges. These are seen to branch off to the north and south in a series of hillocks joined to each other by their sides and sometimes by an elongated neck. Towards the valley they often bifurcate, one limb sometimes taking a direction parallel to the range and then sweeping round and expanding into one of the broad hillocks whose ends approach the public road. The peculiar character of the topography of the country arises from the multitude and individual smallness of the hills, and the circumstance of the valleys which penetrate between the principal ranges and their branches, being, except towards the centres of the ranges, per-

fectly flat, and very little above the level of the sea, so that the winding outlines of the bases of the hills are nearly as distinctly marked as if they sunk into the level sheet of a lake. We have in fact regular mountain ranges in miniature, and so symmetrical with all the apparent irregularity, that if the highest or summit lines of the ranges and their lateral members were correctly laid down on a map they would present no remote resemblance to the section of a tree. Beyond the last mentioned range another long valley occurs.* The stream Balastier which flows through it has its rise in Bukit Temah. The further or N. E. side of this valley is formed by the Kallang range of hills, the upper extremity of which is also connected with Bukit Temah : its lower division is penetrated by a long secondary valley. One of its summits rises considerably above the general level of the hills. Beyond it the valley of the Kallang river stretches inland. This valley has not been examined up to the top, but it is believed the river rises to the north of Bukit Temah in a continuation of that range. All the preceding ranges terminate in the plain or to the west of it and the Kallang, Balestier, Bukit Temah and Singapore rivers all cross the plain, converge towards the town, the three former uniting their waters, and flow through it. The next range beyond the Kallang valley is the central range or backbone of the eastern part of the Island. It does not terminate at the line where those already described sink into the plain, but continues its course to the eastward, sending out lateral ranges, the southern and western extremities of which form the boundaries of the plain. This range terminates at the Red cliffs. All the hills on the east and N. E. sides of the Island appear to be expansions of it. The valleys between the lateral ranges are bolder and deeper than those in the ranges first described, owing to the hills being generally higher and steeper. This range is connected with the Bukit Temah range. In its central parts it displays broad undulating tracts on a larger scale than the other ranges. Amongst the multitude of valleys which its branches include there is one on the northern side of some size in which the Serangoon stream rises. This valley seems to be a peaty swamp. It passes into a broad tract of mangrove jungle where the stream is lost in a creek which opens into the old straits of Singapore. Other streams fall into the straits

* For much information respecting these difficultly accessible valleys I am indebted to Mr. Thomson, the able and indefatigable Surveyor to Government for the Straits.

from this range. This principal is the Soongie Saletar, which appears to flow through a long valley between a branch of this range and another range proceeding from the Bukit Temah group in a northerly direction. The western side of the Island consists of several ranges radiating apparently from the Bukit Temah group, and penetrated by valleys, some of them, such as that of the Kranjee, which flows northward to the old strait, and the Joorong, which flows southward to the Salat Samboolan, being of considerable length and terminating in broad creeks intersecting mangrove swamps. Between some of the ranges the only wide flattish tracts in the Island which are not alluvial are found. The lower parts of the valleys are mostly swampy, consisting of sand, clay and black peaty mud, of the latter there are considerable tracts constantly moist and exhibiting an extraordinary rankness of vegetation. Looking on one of these swamps covered with tall but slender trees, and dense underwood growing up rapidly, and from the looseness of the deep bed of black vegetable matter,—the accumulated remains of their short-lived predecessors,—destined soon to fall in their turn, and considering the deposits of clay and sand which accompany and give rise to it, it is impossible to doubt that we see nature repeating the precise process by which the materials of most of the ancient carboniferous strata were brought together. Towards the sea these forest marshes give place to mangrove swamps. An intelligent Chinese Gambier planter compares Singapore, not inaptly, if the eastern part of the Island be excluded, to an open umbrella, of which Bukit Temah is the top and the various rivers the ribs. If we suppose the Island to have been formed of a somewhat brittle material, and a strong blow from beneath to have struck it at Bukit Temah, from which cracks radiated in different directions, dividing or bifurcating in their progress, a rude idea of the lines of hills may be formed; or if we view the Island from west to east our old comparison to the section of a tree would serve us best. Bukit Temah and the adjoining hills form the stole from which one main trunk, about 12 miles in length, extends to the Red Cliffs with numerous branches. Several smaller trunks rise on the south side of the main trunk and extend for about 6 miles in a S. E. direction, also sending out a multitude of small branches. To the west the roots radiate to different parts of the coast, the tap root being about 7 miles long.

The hills of the first and second ranges in the order in which they are above noticed consist chiefly of sandstone (fine grained, gritty and conglomeritic) and shale strata. Towards the eastern extremities of the two next ranges similar rocks are observed. Further on soft clays of various hues, but mostly mottled white and red or purplish, passing into a soil of different shades of red, yellowish red, and brownish red, are observed near the surface, and occasionally protruding blocks of sienite and green-stone occur. The hills of the eastern side of the Island seem to be principally sandstone with slight traces of shale. The western side is also for the most part sandstone and shale. At the N. E. extremity granite or sienite appears and it is also seen at several places along the N. and N. W. coast.

The superficial deposits which occur at various places are very remarkable. On some hills a red stiff clay resembling laterite is found. On many, imbedded in clay of different red and brownish hues, in irregular sheets or in thin seams, occur blocks of a ferruginous clay, rock or smaller stones and pebbles of various kinds and sizes. These will best be described hereafter by selecting particular localities where they abound.

I now proceed to notice the different hypothesis that have been or may be suggested to account for these appearances. Of the alluvial plains and valleys which ramify through the Island in all directions I need say nothing here, as they, in exposed beds at least, have all or nearly all been formed subsequent to the hills and their superjacent deposits, and are separated from the latest accessions of matter which these received at a period when they formed a multitude of little bays and long narrow inlets of the sea.

The first class of the hypothesis that may be offered in explanation of the superficial formations of Singapore, embraces those that contemplate merely the position, external appearance and size of the detached rock fragments.

1.—ALLUVIAL HYPOTHESIS.

Of these the first supposes the blocks, gravel, &c. to be the debris of older rocks deposited in the sea before the extrusion of the hills. If it be conceived that the elevation of the hills above the level of the sea was the same act with the protrusion of the strata of which they

are composed from their previous horizontal bed to their present inclined position, we are met by the fact that the superficial deposits are not in layers conformable to these strata, but are spread over their uplifted edges. If again, it be supposed that the hills were formed under water, and that after the accumulation of the gravel, &c. upon them, the platform from which they rise was elevated so as to cause them to emerge from the sea, we are met by other insuperable objections. Of these it is only here necessary to specify one, although looking to single limited localities the gravel deposits appear to be regularly disposed like beds derived from currents; when we compare one hill with another we observe far too much irregularity to allow this idea to be tenable.

2.—DILUVIAL HYPOTHESIS.

As we extend our observations this irregularity is seen to be so great that we are irresistibly led to conjecture that its causes were diluvial instead of alluvial. In many places rock fragments of all sizes are confusedly intermixed with loose clay or sand, so that if due to aqueous action it must have been of an extraordinary and violent nature thus to have borne along rapidly masses of matter containing large blocks, and deposited them in such confusion, and that often on the summits of hills. A continued diluvial action of variable force might also account for the large quantities of rounded pebbly-looking stones, and the broad thin beds of smaller gravel-like stones that occur. Closer investigation however seems to discover an unanswerable argument against a diluvial theory in the fact that the larger rock fragments, and even the gravel, differ in different localities, often even when these adjoin each other, and that it has always been found that they have a certain correspondence with, or relation to, the subjacent rocks where these have been exposed. No decided boulder or drift has yet been noticed.

Colonel Low appears to have considered the scoriaceous, ferruginous rocks as boulders, but he gives no reason for this opinion. The gravel he refers to the concretionary tendency of soils impregnated with iron. I need not stop here to remark upon these evidently hastily formed views.*

* I cannot mention Colonel Low, during so many years of official toil, almost the solitary votary of science and oriental literature in the Straits Settlements, without expressing the hope that he will not long withhold from this Journal the fruits of his present "learned leisure."

3.—DECOMPOSITION OF ROCKS IN SITU.

This, which is the hypothesis that next most naturally arises, would embrace many of the facts that are inconsistent with the sedimentary and diluvial suppositions, such as the local character of the rock fragments. The outcrops of the strata, which are generally highly inclined, would under meteoric influence, down to a certain line of depth which would descend with the denudation of the surface, suffer different changes according to the nature of the rock. The harder sandstones and shales would, split and break down into irregular fragments. The softer sandstones, clays and shales,—and of the latter especially the finely laminated beds,—would, under the combined chemical and mechanical influences of the air, rain, rapid transitions of temperature, &c., lose their distinctive original characters and gradually become uniform masses of sandy or clayey soils. Every heavy fall of rain would wash away the more superficial particles. According to the declination of the sides of the hills, fragments of rock of different sizes would be carried down by the pressure of water-moved soil and gravelly fragments. Where the hills were steep, larger blocks, from the gradual loosening of their beds, would descend to lower levels by their own gravity assisted by similar pressure from above. The summits and ridges of the hills would be most exposed to the action of sun and rain, but generally least so to the denuding power of gravity. Where the soil was loose sand, or where there were narrow summits, the process of denudation would be more active than elsewhere. The soil as it was formed would disappear, and only fragments of rock be left where the latter was of a nature to yield with difficulty, slowly and superficially to decomposition. Where the fragments pulverized more quickly, some soil would generally be found, always drawing additions from the rocks, but always a prey to the rains.

These considerations certainly explain the present appearance of many of the hills, and in every locality phenomena occur evidently due to the forces of which I have been writing. Ridges and summits are often found consisting almost entirely of rock fragments, and it might seem that these forces alone would be adequate causes for their occurrence. But on hills with extensive flattish summits, beds of fragments, sometimes large,—sometimes of all sizes mixed—sometimes uniformly small and gravel-like, lying under or in the soil at various depths, from

an inch to many feet, below the surface, are frequently discovered by sections for roads and pits for planting spice trees, &c. It is obvious that the hypothesis which I am now considering will not explain such cases.

There is another phenomenon of frequent occurrence connected with the position of fragmentary rocks which this hypothesis ought to include if it be made the foundation of any general theory. In sections across strata they are almost invariably seen to be more or less curved as they approach the surface. Before reaching it however they sometimes gradually, but often abruptly, lose their compact form and become masses of fragments. In some cases these are almost insensibly mingled with the superincumbent soil till all trace of the stratum disappears. But it is not uncommon to see the curve pass into a line more or less horizontal, and even bent downwards, and the fragments streaming away as it were in a layer of which the direction seems to have no relation to the parent stratum, but which generally possesses or approaches to parallelism with the plane of the surface. It is true that of some of these cases the hypothesis which we are at present pursuing might seem to afford a solution. Thus suppose a thin layer of hard sandstone to rest on a bed of soft sandy clay or unlaminated shale, both inclined and having their outcrop on the slope of a hill, a certain depth from the surface of the slope would be subject to the action of meteoric forces which would cause the sandstone to break up into fragments and the sandy clay to become loose and open. The sandstone rubble, if heavy, might possibly tend to descend or settle in a perpendicular line *through* the upper pulverulent to the lower and more compact soil, and, at all events, as the soil below it was carried away, the rubble would descend along the line of the slope, the heavier fragments remaining at and near the point of outcrop, those of medium size streaming further down the slope, and the smallest borne away with the fine sand and clay to lower levels;—the possibility of the existence of such lines of rubble, their breadth down the slope from the line of outcrop, and the quantity and size of the fragments, being always determined by the texture of the recipient bed of clay or sand, and the declivity of the hill. Where the slope of the hill consisted of a succession of similar layers and beds, the lower layers of rubble would, in course of time and in favourable positions, become covered with soil brought

down from above. There are undoubtedly cases which, if taken by themselves, this explanation will satisfy. But when we seek to convert this hypothesis into a general rule we are at once met by numerous discordant appearances. Thus, of the extensive layers of rubble or gravel-like fragments beneath a thick bed of clay which, as before mentioned, are found on broad even summits of hills and ridges, there are many where the clay is too compact and aluminous or the rubble too fine, for the latter to have descended from the surface of the former, and where there are no adjacent higher levels from which the former could have been degraded and superimposed upon the latter. There are other allied cases too which simple atmospherical causes will not account for and which bring us to the next hypothesis—that of

4.—EARTHQUAKES.

The instances alluded to are where the heads of the strata are not merely converted into rubble and bent in the line of slope, but where they are in zigzag, crooked, or sinuous lines;—where adjacent layers are differently and irregularly deflected out of their planes; where the rubble is here in large pieces lying in the direction of the proper plane or of a regular curve from it, and there shattered into a confused mass of small fragments, sometimes much thicker and sometimes much thinner than the unaltered layer itself;—or where fragments of one layer are intermixed with those of an adjacent one, detached pieces of a sandstone layer for instance imbedded in a layer of clay above it, or portions of both layers confusedly mingled till all trace of their lines of demarcation is lost.

It is clear that no ordinary mechanical operations caused by atmospherical forces could have produced such results, and that violent convulsive movements of the earth have left these records. In the slight earthquakes felt at Penang in 1843 it was remarked that the residents on the hills described their effects differently from the residents on the plain, or in language more exaggerated. In Belmont-house, which is situated on the summit of a peaked hill rising freely out of the Pentland chain, the tremor was particularly strong. Upon general mechanical principles it is evident that the shocks will be most severely felt wherever the rocks acted on are freest. Through a dense homogeneous mass extending uniformly in all directions equable undulations and vibrations

may pass without disturbing the internal arrangement, because the motive force will meet with an equal resistance throughout. But where the mass acted on suddenly changes from a dense to a lighter rock, fractures and other internal disturbances will follow according to the intensity of the force, and where the mass of rocks is met externally by the rare elastic mass of the atmosphere, the resistance in that direction being removed *per saltum*, the general centrifugal tendency which will be impressed by the nether forces, even when their proper direction is more horizontal than vertical, will cause the upper rock to a certain depth to be fractured, loosened and expanded, the external fragments and particles being perhaps quite free and even projected. In this condition the whole superficial mass will readily yield to continuing vibratory action, and any or all of the phenomena above described may be the result. It is a further argument in favour of mechanical convulsions of considerable violence and irregularity, that although the general dip of the strata of Singapore be from westerly to easterly, cases are found of a hill resting on the same apparent base with an adjoining one where the general rule operates, having its strata inclined from east to west, and even in the same hill particular sides or outlying ridges or spurs, present deviations both in the direction and in the angle of the dip.

5.—VOLCANIC ACTION.

Hitherto we have remarked no phenomena that may not be referred to the ordinary mechanical or chemical forces acting at the surface of the earth, or to critical mechanical disturbances. But I have now to notice a large and varied class of facts which require different forces to be introduced. These facts are so numerous, so constant in their occurrence over every part of the Island which is open to examination, and not less than elsewhere in those parts from which the observations of writers on the geology or mineralogy of Singapore have been drawn, that it is difficult to conceive through what fatality they have hitherto, for the most part, escaped notice or been passed over as unimportant. The most obvious of these facts are dykes and veins of igneous rocks, masses *in situ* and scattered fragments of rocks, such as sandstone, clays, shales, granite, &c, altered by the action of fire; rocks in veins and joints often highly indurated, whereby sandstone has acquired sometimes a cellular structure, and at other times externally a honey-combed

appearance; congeries of curved, zigzag and radiating veins in sandstone, clays and shales, filled with crystallizations, and both from their own appearance and the alteration in the rock in which they are found showing chemical or electrical action of a volcanic nature; the presence of sulphur accompanying anthracite in shales denigrated and rendered fuliginous by fire; the slaggy appearance of many rocks and fragments which are often covered externally by a shining black, bluish-black, or dull iridescent varnish or glaze; the scoreous appearance of others, many being mere cinders; the abundant presence of oxides of iron, and particularly their intensity in those places where the other evidences of igneous action are most marked, and their absence where these are entirely wanting. It is impossible to refer these facts and others of an analogous character, which will be mentioned in a future paper in the description of particular localities, to any but volcanic causes. The reddish, reddish-brown and reddish-black rocks which are found so abundantly have been noticed by Lieutenant Newbold, Colonel Low and others. The general name of laterite has been sometimes applied to them. Colonel Low uses the terms "iron clay," "iron stone" and "iron ore." The red soils have been in like manner called laterite or iron soils. Both terms appear to be objectionable. Laterite is a particular species of ferruginous clay which indurates on exposure to the atmosphere like many other rocks: it ought to be restricted to the clay to which it was assigned by Dr. Hamilton, and not indiscriminately applied to every new rock strongly marked by oxides of iron. With respect to the term iron clay or clay iron stone, it has not yet been shown that any of the proper argillaceous iron ores, into the composition of which carbonic acid enters so largely, are found in Singapore. If there are any they have been disguised and changed by heat, decomposing into peroxides. The fact however is that these so called laterites and iron ores, externally as to colour and form differing little if at all, prove often on examination to be only fragments of the common stratified rocks, sometimes calcined, sometimes indurated, and sometimes partially fused by heat. We cannot therefore resort to a prevalence either of laterite or iron ores to explain the geology of the Island, and are by the rocks, which have been so designated, led back to volcanic causes.*

* *Laterite*.—Many of the clayey hills here appear to me to be decomposed sienite, sometimes unaltered by supervening volcanic action, but generally partaking in the metamor-

Such a comparatively small portion of Singapore has yet in any way been laid bare, and of the accessible parts, with certain exceptions, so little is open to inspection save the mere surface, that had my examination of the most favourable localities of the latter been much more minute and careful than it has been, I should still have hesitated to combine the results into any general hypothesis. But as such an hypothesis has been forced upon me while following up my inquiries, and no facts have hitherto been noticed to which it is irreconcilable, I shall endeavour to explain it, leaving to future observations to build it into a theory, or reject it as a fancy. And as I shall proceed in subsequent papers to furnish detailed accounts of different localities, the reader will be enabled to draw his own conclusions.

The general direction of the elevatory force to which the hills or Singapore and the neighbouring Islands owe their origin, was from W. by S. to E. by N. since their dip is generally in or near that direction. Although the undulations or upheavings had this general tendency, the causes to which they were due must have been of a somewhat irregular

phism which the matter of most of the elevated land has suffered from that cause. May I venture to suggest that the hypothesis which is developed in this paper for Singapore might, if applied to the laterite of India, perhaps explain its origin, and, in doing so, to a certain extent also reconcile the conflicting opinions that have been maintained regarding it. All that I have read of the great laterite formations of the south of India, and which extend to the heart of Bengal, where they are described by Dr. Buchanan, leads to the conclusion that they do not consist of purely volcanic, sedimentary or decomposed matter, but what I have termed semi-volcanic. The same formation is found at Malacca and analogous deposits at Singapore, and both inseparably associated and evidently contemporaneous with altered rocks of the kind previously noticed. If we conceive an area with trap, granite, sandstone, shale, &c. exposed at the surface (in the atmosphere or in the sea) and partly decomposed or disintegrated, to be subjected to a peculiar species of minor volcanic action like that which is described in this paper (*the distinctive phenomenon probably of one and the same geological epoch*) the result would be that, with the occasional exception of matter ejected from no great depth, and some dykes and veins, the previous soft surface rocks would be merely altered or metamorphosed by heat and impregnated with iron, derived perhaps from the basaltic and other ferrous rocks through which the discharged steam, gases, and water had passed in their ascent. Whether the action took place under or above the sea would be determined by the presence or absence of the ordinary marks of oceanic denudation.

When clays strongly ferruginous, and soft from saturation with water, are dried, the iron previously held in solution by the water is deposited between the particles and cements them into a hard compact rock. Hence the induration of laterite clays on exposure to the atmosphere.

nature, at one time producing a superficial effect, either uniform in its character, or small in degree, and at another time increasing in violence, and at particular points causing convulsive elevations of the rocks in the form of hills, frequently in undulating ridges and chains, the linear directions of which were, it may be, determined by a pre-imposed tendency to fracture, as will be noticed in the sequel. This force was apparently of a volcanic, or what, to distinguish it from concentrated well developed volcanic action, may be called a semi-volcanic nature, producing great heat at particular places, which sometimes merely indurated or calcined the softer strata and reddened the superjacent soil, but often in steam or gases, and occasionally in mud or semi-fused rock burst through them, or found a vent in fissures caused by ruptures during the process of elevation. When the heat was most intense, fused rocks or semi-fused fragments were cast up through these vents. As its intensity decreased fragments less altered and masses of clay and sand were ejected. The volcanic steam, gases, or fluids were charged with iron which left strong marks of its presence wherever these were most active, rendering most of the fused and semi-fused rocks, in dykes or ejected above the surface, highly ferruginous and impregnating all the softer adjacent rocks.

In some places the force, although of unusual violence, was at the surface chiefly mechanical, rending solid sandstones and tossing up and mingling the fragments with masses of soft clays and shales. Thus on some parts of government hill and the adjoining hill (Mt. Sophia) large angular blocks of solid sandstone, some from 600 to 800 cubic feet in bulk, are found at the surface and at various depths beneath it in a confused mass of clays and shales. In the same hills however there were also subsequently formed volcanic fissures, through which torrifed rocks were ejected into the air and strewed over the surface so as in some places to form a thick bed over the disrupted sandstone, &c.

This extreme degree of local mechanical violence unaccompanied by simultaneous igneous action reaching the surface, is, however, rare, and may have been in some measure caused by a greater thickness and compactness in the resisting rock. But in general the upheaving of the hills has been attended with a violent agitation or tremor, producing the phenomena alluded to in a former page as due to concussion.

From what has been said it will be seen that the volcanic forces were

not concentrated at one or two points, and of comparatively great power, so as to form regular craters of eruption or to elevate rocks to a great height, but that they extended over a considerable area, and that their intensity and mode of action varied greatly at different places.

Amongst the most common volcanic products is one, small in size, and varying in its character from common indurated argillaceous and lithomargic, to porcellanous and jaspidious, which occurs in very singular forms, vermicular, pseudo corraloidal, columnar,* and frequently resembling pieces of ginger root, externally smooth, granulated, corrugated, reticularly fibrous, &c. These are the compact forms, but there often occur vesicular, or rather rudely ramose cavities descending between the short thick irregular branches towards the centre, the branches being themselves also sometimes perforated.

Another product is a small smooth faintly shining black stone like a fine gravel.

At other places a gravel similar in shape but with a brownish or chestnut-coloured coat or enamel occurs. These latter products may readily be mistaken for water worn gravel, especially as they often occur in broad thin beds, but on closer examination it is clear they are of volcanic origin.

All the various forms of ejected substances met with are due, I conceive, in some degree to differences in the original mineral ingredients of the rocks, but chiefly to the inequality of torrefaction, and the circumstance of the heated, fused or semi-fused substances cooling in the air or in mud or loose sand or clay.

At an early stage in my inquiries I was led to think that the causes of the eruptions were in part what have been called pseudo-volcanic, and if coal shall be discovered it will then become a question whether many of the geological phenomena of Singapore are not due to volcanic action giving rise to and accompanying the conflagration of coal beds. This would account for the paucity of proper volcanic products at the surface, and the abundance of merely altered fragments agreeing in

* Amongst the common large slags which are generally of irregular rounded shapes, I have occasionally seen one agreeing in form with those small columnar stones and externally rugose and roughly fibrous. In fact one may say it is the same as one magnified in bulk from a few cubic inches to 10 or 15 cubic feet, and with all its characters rendered coarse in proportion.

character with the existing superficial strata, and of slaggy and scoreous rocks of which the materials, with the exception of the oxides of iron, might have been derived from similar strata at no great depth. The iron might, on this supposition, have been supplied by beds of ore occurring amongst the carboniferous rocks.

At present this view is inadmissible; and it would still remain so even if no other hypothesis derived from analogy were probable. But there have been many volcanoes without streams of lava, from which earth and altered rocks, gases, steam, water, or mud have been ejected, and there are abundant marks of igneous action throughout the series of stratified rocks, proving how frequently volcanic forces have operated from beneath, often without reaching the surface at all, and at other times producing mechanical, igneous, or electrical changes in the superficial rocks, unaccompanied by the more marked phenomena of proper volcanoes.

But the absence of such products in Singapore is not universal, nor are there wanting proofs of the direct connection of the superficial igneous action with a great nether fountain of volcanic power. It is clear that the action reached below the stratified rocks, for in some of the hills near town I have discovered fragments of unaltered sienite, and on one, a large block of sienite passing into basalt, which may either be an ejected fragment, or the protruded summit of a continuous mass, is now being quarried by Chinese. In the Bukit Temah group solid masses of sienite are exposed, and appear to compose a large part of one of the hills. At some places I found it passing into basalt. That the *elevation* of the sienite and basalt was contemporaneous with the production of the ordinary volcanic or igneous phenomena of Singapore (if the basalt itself was not also then formed) is, to say the least, highly probable. Not only the sides in general, but the summits of the hill, consist of a thick mass of soft ferruginous clay or mould, holding large quantities of the common igneous rocks found elsewhere, but often bearing marks of a more intense igneous action. Thus on the same side of the hill where the sienite and basalt are laid bare I found, in contact with soft sandstone, a piece of compact, dull, igneous rock of a light yellowish brown colour, with veins of a violet colour and vesicles whose sides were similar. At the plane of contact, the rock changed into a dark green translucent-glass, which included some

small opaque white specks. Within the glass, the igneous rock, for a narrow space, was finely vesicular, and violet-coloured like veins and some grains of the sandstone were scattered through this band. The opaque spots in the glass were evidently included grains of sand semi-fused at their edges. This specimen is identical in character with some products of proper volcanoes. In the slopes to the west of Bukit Temah, which are covered with thick beds of clays and sands, included layers, composed of fragments of torrified granite, occur.

Many of the islands and rocks near Singapore exhibit most decisive proofs of volcanic convulsions. Thus in a reef of sandstone rocks lying between the Island of *Blakan Mati* and *Pulo Sikijang*, a black ferruginous rock has been obtruded as a lava through seams and fissures in the sandstone, and at some places has spread over that rock and boiled up above it, assuming fantastic shapes, the sandstone is altered by heat in the same manner as the rock is often seen to be in Singapore.* Basalt and greenstone are found on Pulo Ooban, which lies close to the north-east coast of Singapore. Similar rocks of various structure and character, compact, vesicular, &c. with claystone, porphyries and other volcanic minerals, are brought from Islands in the neighbourhood to Singapore to be used for the foundations of houses. The original production of the latter rocks must of course be referred to an epoch long anterior to that of the former, which undoubtedly corresponds with that of the Singapore semi-volcanic rocks.

We are therefore, I think, justified in considering Singapore and the neighbouring Islands to have been the seat of volcanic convulsions spread over a considerable area, if nowhere of great intensity. There are many reasons, but not strictly local, to believe that their date was in a late era of geological time. The subject however is a difficult one, and there is not room for its full discussion in this paper. I may here only mention amongst the local facts tending to the above conclusion, the softness of some of the rocks which have not been altered by volcanic action, but have been elevated and greatly stretched or drawn out, contorted or compressed in the process; the absence of any superficial changes not due to atmospherical causes since the time of their eleva-

* Mr. Thomson describes to me an analogous injection of a reddish-black substance, lateritic in its appearance, into the fissures of a block of *granite* on the north coast of Butang. This I shall describe on procuring a specimen, if I do not visit the locality.

tion, and the very moderate effects of these causes; the apparent continuity of some of the hill beds of sand and clay in adjacent hollows, having a ferruginous and torrifed appearance in the former, while in the latter they are not distinguishable from soft modern alluvium; and lastly, some remarkable cases of the elevation of soft alluvial and vegetable deposits agreeing in their character with beds now forming in the Island or along its shores.* Unfortunately the non-observation hitherto of any organic remains, while it is perhaps a reason for assigning a higher antiquity to the soft rocks[†] above mentioned than their general appearance seems to claim, renders it very difficult to compare them with the observations of European Geologists, or to ascertain whether they can be made to occupy any determinate place in their systems. This last enquiry is however of the least importance for the present, and if entered upon before the phenomena of this locality, (so far removed from any of which the geology is, in any considerable measure, understood,) have been minutely and faithfully studied by themselves, is more likely to mislead than to aid research. I may state however that, in the present state of our knowledge, the only European system with which the rocks of Singapore, notwithstanding the apparently recent origin of some of them, can be *mineralogically* compared, is the New Red standstone. The sandstones, clays, marls, (noncalcareous) and shales, in many respects resemble the same rocks of that system. The rareness, if not the absence, of fossils, is a striking circumstance, and even if the two formations be remote in time from each other (for no chronological conclusion can be drawn from merely lithological characters), points to the existence of analogous conditions during the periods of their respective accumulation.

If we now recur to the present superficial igneous and ferruginous deposits of Singapore, the only remaining question under our hypothesis would be, whether their superposition on the hills (to which they are confined) took place before or after the emergence of the latter from the sea. In other words, was the present configuration of the Island

* It is to be remarked however, that in a climate like that of Singapore, clay rocks and aluminous sandstones at or near the surface, unless highly indurated, are liable to become soft. The age of the elevation of the Island will be more fully considered in the paper on the straits, in connection with several instances of recent elevation occurring along its borders where the evidence is of a more satisfactory nature, being derived from organic remains.

assumed under the level of the sea, and then the whole tract of land from which the hills spring, elevated by one movement, or is it more probable that before the hills were upraised the general level of the land was the same or nearly the same as it now is, and the hills consequently obtruded from that level in whole or in part in the air? The action of the waters of the sea in spreading out the materials brought to the surface by volcanic forces might seem an obvious explanation of some of the facts formerly noticed. But if this cause be admitted at all, its operation must have been transient and limited, otherwise the surface accumulations on the different hills and parts of the same hill would not have retained their striking local characters.* If the agency of the sea is to be admitted, the most probable hypothesis, with our present information, would be, that when the process, which dislocated and pushed up the strata in different places into hills, began to operate, the general level of the sea bed was much lower than it now is, and that the same action caused its general elevation. In this way the surfaces of the hills may have emerged so gradually from beneath the sea as to admit of a partial action of its waters on their summits and sides during and subsequent to the eruptions of matter, and yet not so slowly as to give time for such extensive denudation as to obliterate the local peculiarities of the ejected substances. My own opinion at present is, that all the phenomena may be accounted for by purely volcanic, succeeded by ordinary meteoric causes. At one time rock fragments and semi-fused matter would be voided, heaped up at particular places, or ejected into the air and showered over the surface. At another time, when the heat was less intense or when steam or gases, not ignifluous or melted matter, burst out, masses of soft clays and sandstone might be disembowelled and spread over the bed of fragments. At other places the rocks might be broken and pulverized *in situ*, and receive a considerable vertical pulsion so as transiently to form an incoherent and agitated mass, especially towards the surface, but without the fragments or sand being freely projected into the air.†

* See ante page 527, *Diluvial hypothesis*.

† Whether the mechanical action by which the hills were upraised long preceded, or was accompanied or soon followed by, semi-volcanic action in the most intense degree which it here attained, or rather whether the semi-volcanic emissions and eruptions continued during a long period to find vent through the fissures formed when the hills were elevated, is a question that must lie over for the present. It is probable that they

One of the most common features of the hills is the occurrence of a bed of igneous stones,—at one place large (30 to 60 cubic feet) slaggy and often scoreous or amygdaloidal, and gradually but irregularly diminishing in size until they become a coarse and then a fine gravel, in some places dwindling into a seam of minute grains. The beds are of various thickness,—from three or more feet to a few lines,—and so, often, is the same bed at different places. They may consist of a uniform aggregate of stones, or of stones mingled with loose clay, sand, &c. Over this deposit there is generally a bed of soft clay, or sandy clay. Sometimes more than one bed of gravel occurs. Layers of unaltered angular fragments are occasionally, but rarely, found beneath these beds. Layers of the small porcellanous, jaspideous, and varnished stones before noticed, and of large grains of quartz, are more common. All these layers sometimes appear in the same section, but this seldom happens. The localities where the large scoriform rocks abound are often at or near the summits of hills, or where thick dykes of igneous rock come to the surface, and probably in every case they mark the places where the largest fissures or vents were opened. Where they are most abundant they appear at the surface, and that not only in spots exposed to denudating influences, but in flattish and gently sloping tracts. There appears in many cases to be a connection between the direction of the dykes and fissures, and that of the hills or their spurs. Where good sections of the summits of dykes have been obtained fragments of the rock of which they are composed, not angular but scoriform, can generally be traced as a horizontal layer on the surface, or disposed beneath a bed of clay, &c. to a considerable distance from the head of the dyke. When the dyke is vertical these stones are accumulated over and strewed on both sides of it. When it is inclined they are spread out in the direction towards which the inclination is. Two dykes adjoining each other at the surface have sometimes beds of scorïæ diverging from them in opposite directions, owing to their dips being opposed. The above and other observable facts are all, I think, explicable by the species of volcanic action which I have suggested, susceptible as it is, of various modifications, without resorting to oceanic agency. At all events no fact has yet come under my notice unqui-

originated on, but lasted, or were from time to time repeated, for sometime after the elevation of the hills.

vocally attesting the abrading, sorting, or transporting operation of a large body of water, or which could not be referred to some known form of volcanic agency. It must also be borne in mind that the convulsive mechanical action which enters so largely into the general hypothesis, would be most powerful in shattering compact and loosening soft rocks, when the stratified masses were ruptured and raised into highly inclined, vertical or reversed positions. In such cases the exposed basaltic edges, in their fragmentary or pulverized state, and before they were protected by any vegetation, would be more acted on by meteoric causes than at present.

The system of hills with their dykes and veins affords an interesting field for the application of the principles of mechanical science. But it would be premature to enter on this subject before the country is better opened up, as it will soon be by the lines of road now in progress. There can be little doubt however that the directions of the hills agree with the ramifications of fissures which in those places where the intensity of the elevatory force caused their extension to the surface, have formed vents through which the superficial volcanic deposits were expelled. The principal ranges, we have seen, are nearly parallel and have directions approximating to N. W. and S. E. The lateral hills are placed on lines at right angles to these, and the secondary lateral hills again on lines parallel to the principal ranges.

My remarks have been hitherto confined to facts entirely local, and inferences or hypothesis strictly deduced from, or applicable to them. Before concluding this paper, however, let us extend the limits of our observations, and see whether a wider geological area presents phenomena repugnant to the large influence which has been assigned to volcanic causes.

That the movements which elevated the central mountains of the Malayan Peninsula had an intimate relation with those that elevated the mountains of Sumatra, seems evident, whether we regard the hypothesis of De Beaumont, the more recent observations and theories of Mr. Darwin, or the mechanical researches of Mr. Hopkins. Both form long chains which pursue parallel lines not more than 3 or 4 degrees distant. But we must probably take in a much wider geographical range if we would seek a general geological theory for the region which they traverse. The mountain chains of the Peninsula of India

are parallel, or approximately so, to the Malayan, and like them, spring from the great central system of Asia. The chain of the Peninsula of Malaya is directly continued to this region, and from it descend nearly parallel chains through Burmah, Siam and Cochin China. These ranges determine the general direction of the sea coasts wherever these are exposed to waves sufficiently strong to prevent the formation and extension of alluvial plains. The western coasts of India and of the Tenasserim Provinces, Siam, the gulf of Siam and the eastern coast of Cochin China are thus fixed. A wide and interesting field of inquiry is opened up by the probable geological connection between the regions of these ranges and those of the Indian Archipelago generally, Australia and the Archipelagoes of the Pacific, evidenced by the prevalence of parallel lines of elevation, and perhaps also by organic remains, such as the fossil elephant and some of the carboniferous plants of New South Wales. The former existence of a great Australasian continent, an extension probably of the present continent of Asia, which seems to result from Mr. Darwin's theory of Atolls, would be an inference in accordance with these facts. Viewing the whole region, interspersed with peninsulas and islands, from the Indian Ocean to the heart of the Pacific, as one, it appears that De Beaumont's theory of parallel rectilinear or oblong areas of elevation and subsidence, which Mr. Darwin has applied to the eastern tracts, requires modification, and that if we conceive curvilinear lines or systems of parallel curvilinear lines proceeding from centres and often meeting similar lines or systems from other centres, and again lateral and secondary lines diverging from the principal, the arrangement of the observed ranges will assume greater symmetry, and be found perhaps to accord with the hypothesis that *one* widely extended mechanical pulsion, accompanied by local foci of intense development from weakness in the rocks or increased plutonic or volcanic action, gave the first direction to all the main lines of elevation. Thus let us conceive such a centre to be situated in the western half of New Guinea, and we have some independent warrant for doing so, in the circumstance that the mountains of its unexplored interior appear to attain a magnitude unusual in the Archipelago. From this focus we may trace one great curvilinear fracture or band of rupture of the earth's crust through the Sunda Islands to Chittagong; a second through the mountainous volcanic islands of Ceram and Bourou, and

along the southern coasts of Celebes and Borneo (Ganonng Ratos), Billiton, Banda, the Malay Peninsula, &c. ; a third through the Philippines, Formosa, Japan, &c. ; a fourth along the southern coast of New Guinea, and through the Solomon Islands, New Hebrides, New Zealand, &c. ; a fifth along the southern coast of New Guinea, across Torres Straits and along the eastern coast of Australia, and a sixth perhaps through the north-western division of Australia. Other principal lines probably proceed across the Moluccas and Celebes, through Borneo and the islands of the China sea (now a subsiding tract), and join the mountain chains of Cochin China and Siam, but the geography of Borneo is not sufficiently known to allow of our positively ranking these as seventh and eighth lines. The intermediate areas may be occupied by numerous other lines, but the subsidence of various tracts renders it difficult or impossible, particularly to the eastward, to trace the original courses of vertical movement until the soundings of the Polyneesian seas are ascertained. Subsequent shifting subterranean action would cause many other fractures in various directions, but it would not, at least until the lapse of a long geological epoch, obliterate the primary lines. It would often cause cross fractures, of which many instances might be pointed out. It is no objection to this hypothesis that many of the lines seem to proceed from the central table-land of Asia. Because if at the time these fissures were being extended southward, a great local action took place at or near New Guinea, they would, according to the mechanical laws examined by Mr. Hopkins, diverge from their original direction towards that point, or to meet the lines radiating from it. Thus we observe the two least broken lines to pursue a southerly direction till they reach the parallel of 8° N L., when, at the Nicobars in the one and at Junk-ceylon in the other, they are deflected to the S. E. When they cross the meridian of 106° E. they make a more decided bend to the eastward. If we follow these lines and the chains of Siam and Cochin China northward we may trace them upwards to the Bayan Khara mountains, and thence to the vast central mass of Kul-kun, from whence great ranges are said to proceed towards all the points of the compass. But in the north-western part of the province of Yunnan and north-east of Burmah and Assam their continuity is interrupted, and we seem to have ascertained another central region whence radiate not only the lines which afterwards converge to New Guinea,

but various other curvilinear ranges proceeding S. E., E., N. E., and N. through China, and N. and N. W. through Thibet, and lastly, the Himalayas and a minor range proceeding south-eastward on the south of the valley of Assam, and continued perhaps in the Vindyas,—for a subsequent line of subsidence passing down the plain of the Ganges and through the Bay of Bengal, of which there is some evidence, may have destroyed the pre-existing continuity. Many of these ranges proceed primarily from the Kulkun, but it is remarkable that they converge towards the region indicated. The region where the Himalayas attain their sublimest proportions and give birth to rivers that embrace them and all India in their courses, is another grand focus. From this centre the range proceeds on the one side to the eastward, and on the other to the N. W. To the north of the former a secondary and approximately parallel range also proceeds eastward, and includes with it the valley of the Sanpao, and to the south another and smaller secondary parallel range traverses upper India. To determine the original centres of maximum intensity and directions of the forces that elevated the great connected mountain system that forms the skeleton of the Asiatic continent, is a problem beyond the present reach of geology.*

The Malayan chain I have mentioned as a series of groups, and from the breadth of country which their members occupy compared with their height and apparent bulk, and their general appearance as viewed from the Straits, I am led to believe that they consist of connected systems, each analogous to that of the Singapore hills, or of principal undulating masses from which parallel ranges proceed in a N. W. and S. E. direction. The rivers probably have their sources at the heads of the valleys included between these ranges and turn seaward at the

* There can be little doubt that an extensive knowledge of the physical and mineralogical constitution of mountain ranges will form the true basis of the highest department of the science, now only dawning,—the Mechanism of the Earth. But the day is probably not far distant when the geologist, like the astronomer, will need to be thoroughly indoctrinated with the principles of mechanical science in its widest sense. Fortunately for the worshippers of nature of humbler acquirements, geology is so immersed in matter, so wrought into every inch of the earth, that its Priests have need of a whole tribe of Levites. Wherever a man finds himself placed he has but to employ his eyes to become a useful labourer, and so far will a little knowledge be from proving dangerous to him that it may be safely said, that while even entire ignorance is not a bar to the collection of facts, every little accession of knowledge from any of the sciences becomes an instrument of observation.

extremities of the ranges. The most southern rivers, such as the Johore, Sakadai, &c. which flow southward, would also bend to the east and west, where the last system of the continent terminates and that of Singapore begins, did they not meet with a depression so low as to be accessible by the sea.

Singapore is merely separated from the mainland by this depression, which forms a narrow tortuous river-like arm of the sea, and is in fact sunk into the continent and embraced by it on three sides, so that its southern shore seems to be the proper continuation of the southern coast of the Peninsula. Its geographical connection with it is therefore complete. When we cross the strait no difference in the topography is observable. And the low hills which give the surface an undulating appearance like that of Singapore, probably resemble those of the latter in their internal structure as much as they do in the superjacent soils and in the stunted jungle. The interior of the Peninsula is almost wholly unexplored. In coasting along its western shore from Pinang to Cape Rachado a high chain or rather series of ranges of mountains is observed inland nearly the whole way, which from their generally sharp-peaked summits, the nature of the detritus brought down from them by the rivers, and the evidence afforded by the few points where they have been reached, we are justified in believing to consist in great measure of plutonic rocks. In front of this range we observe a broad tract of country often appearing to be perfectly flat and very little above the sea level for miles together, but from which sometimes low hills rise like Islands out of the sea. These hills are frequently quite solitary and at a great distance from the central mountains, or near the coast. Further inland they seem to be generally in groups, and towards the mountains the country at some places appears hilly and undulating. At Malacca these low hills are so much grouped as to resemble some parts of Singapore, and they are covered by gravel and fragments precisely similar to those found on some of the Singapore hills. In some of the hills opposite Pinang I observed similar fragments. In both cases the soil had a deep red ferruginous aspect.* That most of the hills scattered along the western plains of the Peninsula were Islands in the sea at no remote date, there can be no doubt. The plains from

* Cape Rachado is described by Crawford to consist of quartz rocks interspersed with frequent veins of clay iron ore.

which they spring are flat, generally only a few feet above the sea level, alluvial and at some places abounding in marine shells of the same species that at present inhabit the straits. The rivers of the Peninsula, although generally small, are exceedingly numerous, and bring down large quantities of sediment. In March last, off the mouth of the Salangore river, the steamer in which I was, passed through a broad tract discoloured by the sediment. Extensive mud banks have been formed in the straits and are constantly increasing. For evidence on this subject I must refer to a separate paper containing some remarks on the Straits of Malacca and the alluvial tracts along its sides. It is not therefore unreasonable to conclude that the whole chain of these hills from Pinang to Singapore has a strict geological connection. At Malacca hot springs exist, and the hills nearest to them are of the nature before mentioned. We naturally resort to the mountain chain of the interior for the seat of that central volcanic force of which the manifestations on these outskirts are of so peculiar a character, so wide in their extent yet so devoid of intensity. But we find that there is no evidence whatever of any volcanoes ever having existed in this chain. If there ever were any their fires have long been quenched.

If we now direct our attention to the southward of Singapore, we find that it is but one of an extensive archipelago of Islands, stretching to the south-east, and which after a slight interruption, is continued in Banca. That the geological chain continues to the latter Island is clear from the account which Dr. Horsfield gives of it. According to him the elevated parts of Banca consist principally of granite, but in the secondary elevations "*red iron stone*" is extensively distributed in single rocks, or in veins of many united together covering large tracts of country.* This circumstance and the general topography of the Island, as described by Dr. Horsfield, assimilate to Singapore. The paucity of tin ore in the latter arises from the want of granitic hills. Bukit Temah, the only hill yet explored in which sienite abounds, contains tin,

* See memoirs of Sir S. Raffles, p. 150. Major Court, in his account of Banca notices the gravelly nature of the soil (Court's Palembang). Professor Jameson, in Murray's Encyclopædia of Geography, mentions the circumstance of the primitive mountains being immediately bounded by a formation of red iron stone doubtfully, and adds, "Crawford who makes this statement gives no description of the formation." From Crawford's meagre notice of Banca I presume he does not write from personal observation, and like Sir S. Raffles, he probably derived his information from Dr. Horsfield's manuscript.

and in fact derives its name from the circumstance, as it literally signifies "Tin Hill." We thus find that what we may call the semi-volcanic band of the straits of Malacca may, to a certain extent, be disconnected from the Peninsula, and viewed as a chain of Islands extending probably from Junk-ceylon to Banca, and including the existing Islands and numerous rocks and reefs in the straits of Malacca. It appears therefore, that its southern extremity is almost in contact with Sumatra,* and the question arises whether its volcanic connection be not with this great Island rather than the Peninsula. May it not be reasonably presumed that if the origin and partial elevation of the Sumatra chain was contemporaneous with that of the Peninsula, the line of greatest intensity of the subterranean forces, in whichever it was originally, was ultimately determined to the latter chain, and that at some now ancient era the former was left to comparative repose? The height of the plutonic mountains of the Peninsula is greatly inferior to that of the mountains of Sumatra. But all the elevated peaks of the latter appear to be volcanic, and perhaps the purely granitic ranges are not more elevated than those of the Peninsula. The elevation of the two plutonic ranges and the shallow bed of the strait between them may have been contemporaneous and antecedent to the period when volcanoes burst out along the Sumatra chain. These volcanoes, from their number and power would arrest the rise of the region, or cause any subsequent elevatory movement to be rare and of small amount. Until the interior of the Peninsula is explored these inquiries to a large extent must be merely speculative. But it is certain that the Sumatra chain has in recent eras been the seat of great volcanic energy, and that it is still subject to convulsive movements, the tremors or undulations of which are transmitted as far as what I have termed the semi-volcanic band of the straits on the one side, and which are felt much more severely in the less distant chain of Islands on the west coast of Sumatra.

Marsden states that a number of volcanoes exist† and describes one which opened in the side of a mountain about 20 miles inland of Bencoolen, and which during his residence at that Factory scarcely ever failed to emit smoke. To the S. E. the three volcanic peaks of Gunong

* It will appear however in the paper formerly referred to that this approximation is due to modern external, not to ancient internal forces.

† History of Sumatra, p. 24.

Dempo, Lumut and Berapi, rise to the height of 12,000 feet. Gunong Dempo was ascended by Mr. Church, the present resident councillor at Singapore, with the late Mr. Presgrave in 1818. An interesting account of the ascent is inserted in Raffles' Memoirs, (p. 323.) Mr. Presgrave states that he had frequently seen smoke issuing from the mountain, and the natives informed him that within their memory it had emitted flames attended with a loud noise. In the upper region of the mountain the party found the trees dead and externally burned quite black. Further north is the great central volcanic region, partially at least included in the ancient kingdom of Menang Kabu. This is described by Raffles, (Memoirs, p. 347) as being exclusively volcanic. The rocks are mostly basaltic. Two lofty volcanic mountains rise near the large lake of Sincara. From one of these, Gunong Berapi (fiery mountain) which is above 13,000 feet high, smoke issued. Hot springs also exist here. To the east of the lake at the rocks consisted of felspar, granite, quartz, &c mixed with a great variety of volcanic productions in the greatest confusion. Iron ore of various kinds lay in the path of the travellers. To the west of the lake were found granite, marble, great varieties of limestones, masses of calcareous spar and many other substances. On the N. E. of the lake near Pageruyang numerous stumps and trunks of trees in a state of petrification protruded from the ground. The limits of the region on the north and south are not ascertained. About 60 miles south of Mt. Talong another Gunong Berapi occurs. Near Mt. Ophir a volcanic mountain is marked in Marsden's map, and Mt. Ophir itself is probably an extinct volcano. Further north still lies another of the ascertained volcanoes Mt. Batagapit. Mr. J. Anderson, who visited the east coast in 1823, mentions* a native tradition of an engagement having taken place between two of the mountains in the interior of Delli (Sebaya and Senaban) when part of them fell into the valley. From these mountains sulphur is procured, which if it does not prove that they are formed of volcanic materials as Mr. Anderson conceives, at least leads to the inference that they have been the seat of volcanic action. At Acheen abundant supplies of sulphur for internal consumption and exportation are obtained from a volcanic mountain in the neighbourhood.† Lastly, one of the western chain of Islands, Si Beero, according

* Mission to the E. coast of Sumatra, p. 199.

† Marsden, p. 313.

to Marsden, possesses a volcano. Earthquakes are of frequent occurrence. Marsden notices one of unusual severity, which occurred in 1770.*

Sir T. Raffles mentions that on the east coast they are said to happen every 5 or 6 years.† The Malays on the east coast represented to Mr. Anderson that slight shocks were occasionally felt‡ and the same information was received by Lieut. Croke at Jambi.§ In the interesting memoir on this state by that officer appended to Mr. Anderson's work, it is likewise mentioned that a violent earthquake was stated to have been experienced about 20 years or more previous to his visit in 1820, and to have been preceded by a period of great heat and drought, which ruined the crops and occasioned a distressing scarcity of food. It is not improbable that this earthquake was simultaneous with one which happened in 1797, of which the effects on the opposite coast is mentioned by Raffles. "It is stated that the vibratory shocks continued for 3 minutes, and recurred at intervals during the space of 3 hours till the shock completely ceased. At Padang, the houses of the inhabitants were almost entirely destroyed and the public works much damaged. A vessel lying at anchor was thrown by the sudden rise of the tide upwards of three miles on shore. The number of lives lost there amounted to above 300 : of these some were crushed under the ruins of falling houses, some were literally entombed by the

* "The most severe that I have known, was chiefly experienced in the district of Manna, in the year 1770. A village was destroyed by the houses falling down and taking fire, and several lives were lost. The ground was in one place rent a quarter of a mile, the width of two fathoms, and depth of four or five. A bituminous matter is described to have swelled over the sides of the cavity, and the earth, for a long time after the shocks, was observed to contract and dilate alternately. Many parts of the hills far inland could be distinguished to have given way, and a consequence of this was, that during three weeks, Manna river was so much impregnated with particles of clay, that the natives could not bathe in it. At this time was formed, near to the mouth of Padang Goochie, a neighbouring river, south of the former, a large plain, seven miles long and half a mile broad; where there had been before only a narrow beach. The quantity of earth brought down on this occasion was so considerable, that the hill upon which the English resident's house stands, appears, from indubitable marks, less elevated by fifteen feet than it was before the event." *Id.* p. 26.

† *Memoirs*, p. 295.

‡ Anderson, *ut supra*, p. 199.

§ *Id.* p. 402.

earth opening on them, and others were drowned by the sudden irruption of the waters of the ocean."

On the 18th April, 1818, another violent earthquake was experienced on the west coast. Sir T. Raffles, who arrived at Bencoolen the day after, found that every house was more or less shattered, and many in ruins. In the Island of Pulo Nias, on the west coast, earthquakes appear to be felt very severely. The same remark may possibly apply to the other Islands in the same chain, for our knowledge of these phenomena in the native countries has been hitherto almost entirely accidental, and our information regarding Pulo Nias arises from the connection of Europeans with it. Marsden mentions that in 1763 a village in that Island was swallowed up by an earthquake, and a recent shock, which will be immediately noticed more at large, was still more disastrous in its effects. That the undulations in most cases extend across the straits to the semi-volcanic line is highly probable. Although our connection with the straits now extends over a period of 60 years, unfortunately no connected records have been preserved of the critical geological and meteorological phenomena that have been experienced during that time. In Pinang during the last 12 years several shocks have been felt. These occurred in November 1833, August 1835, September 1837 and January 1843.*

Those of 1837 were the most violent, and the undulations appear to have been from south to north, and to have lasted a minute and a half.† The shocks in 1843 happened about half an hour after midnight on the morning of the 6th of January, and at $\frac{1}{2}$ past 2 P. M. on the 8th. The

* Pinang Gazette of 7th, 14th and 28th January, 1843.

† "It is said that on that occasion several herds of cattle in the neighbourhood were observed running in the utmost confusion in all directions, that lamps and picture frames oscillated, that the Roman Catholic Church bell rang of its own accord, that quantities of large shot piled up in the Fort were thrown down and scattered about, that a stone wall of a substantial building in town was rent, and that the whole inhabitants were thrown into a state of consternation. The shipping in the harbour did not experience this shock, nor did the sea appear agitated. Five days subsequently, however, another smart shock was felt and was followed by a very heavy squall from the N. W. and great agitation and rise of the sea in the harbour. The tides overflowed the Northern beach, and flooded the compounds and lower rooms of the houses in the neighbourhood. This convulsion was experienced about the same time at Acheen and along the Pedier coast, and it is said that these places sustained considerable damage." Pinang Gazette of 28th January, 1843,

first shock was more severe than the second, but both were slight, producing no other mechanical effects than a tremour of the ground which caused articles suspended to oscillate, stopped a clock, and occasioned in some persons a giddiness in the head. The first shock although only felt by a few persons in the plain, who happened to be awake, caused the residents on one of the hills to spring from their beds under the apprehension that robbers had attacked their houses, so violent was the noise of rattling venetians, bolts, &c. The undulations on this occasion, as in 1857, appeared to be from south to north. The shock on the morning of the 6th was experienced precisely at the same instant at Singapore* and at Malacca.† The undulations at Singapore are said to have been from east to west, very slight, and to have lasted 8 or 10 seconds. About half a year afterwards it was first learned in the Straits that a most violent earthquake had devastated Pulo Nias, commencing about midnight, between the 5th and 6th January, or nearly the same time when the undulations were felt along the western coast of the Peninsula. The shocks were at first from the west, shifting to the north, but as they increased in violence they appeared to lose any fixed direction and became a complete trembling of the earth, which lasted 9 minutes; houses were destroyed, trees uprooted, a portion of a mountain fell, and the ground opened in wide fissures, from which "a black frothy liquid trickled." After a brief interval of inaction, the undulations recommenced and the sea suddenly rose in a vast wave which rolled in from the south-east, overwhelming a considerable tract of country and sweeping away whole villages and their inhabitants. The shocks were felt at intervals of 2 minutes until $\frac{1}{2}$ past 4 in the morning, when another paroxysm even more violent than the first took place, lasting about 6 minutes. The shocks were from the west, veering to the north, but changing directly to the south. Tremours of the ground were experienced for several subsequent days. Thus the latest earthquake that has occurred in this region was experienced in its greatest violence a little to the west of the volcanic chain of Sumatra, and the undulations were transmitted or induced so widely and so rapidly as to reach Penang, Malacca and Singapore simultaneously and at or about the same time when the first shock was felt at Pulo Nias.

It appears therefore that the volcanoes of Sumatra still communicate

* Singapore Free Press of the 12th January, 1843. † Id. of 2nd February, 1843.

with an internal igneous sea, and from time to time emit smoke and gases, that to this day the Island is subject to frequent earthquakes, that several of those that have occurred within the last hundred years have been of great force, rending the ground, and at least on two occasions giving vent to liquid volcanic matter, and that their operation extends, though with diminished violence, to the western coast of the Peninsula. When we consider the height and bulk of the crateriform volcanic mountains even viewed only relatively to the level of the hilly country above which they rise, and the large belts of volcanic rocks which exist in the neighbourhood of some of those that have been explored, if they do not connect the whole chain, we are carried back to a period in the history of Sumatra during which its volcanic phenomena were on the grandest scale. If at this day, when the fires of her mountains have ceased, or are dormant, the coast of the Peninsula is agitated by the comparatively feeble shocks which disturb the repose of the Island, it is reasonable to believe that when her volcanoes, whether simultaneously, successively, or alternately, were in full activity along a line of nearly a thousand miles, the neighbouring regions to the distance of 100 to 200 miles must have been subject to earthquakes of great violence, and accompanied, according to the degree of their intensity, by volcanic emissions and eruptions in greater or less abundance. That portion of the volcanic belt where the evidences of violent igneous action are most striking, appears to be Singapore, and the neighbourhood, although it is not improbable that the whole tract from Cape Rachado to Banca, exhibits more extensive and continuous disturbance than the northern part of the belt. That region of Sumatra which, so far as observation has extended, may be termed the principal volcanic tract, is about 3 degrees distant from Singapore, and lies in a parallel about a degree and a quarter to the south of this Island. The direction of the Singapore strata is across or approximately at right angles to parallel lines forming the sides of a plane connecting the Island with this part of Menangkabu, and the dip of the strata although, as formerly observed, exhibiting much irregularity, is generally from the point of the compass where Menangkabu lies.

There seems, upon the whole, to be strong grounds for the opinion that the hill system of Singapore has its volcanic* connection with

* Our meagre information regarding the formations of Sumatra does not admit of our instituting a comparison between them and the rocks of the opposite coast of the Penin-

Sumatra and not with the mountain chain of the Peninsula. If this view shall be found to be borne out by further observations, we must conceive that the old granite mountain chain of the Peninsula (which, as is shown in the paper before mentioned, terminates apparently between Parcelar Point and Pulo Varela, although a few minor groups exist in the interior to the southward) had its extremity in this direction washed by the sea. The region below which operated the expansive volcanic fluids or gases whose effects we are considering, extended from Sumatra to the Peninsula, and probably a little to the westward of the one and considerably to the eastward of the other, for the whole vast platform or partially emerging and partially subsiding continent that rises out of the depths of the Indian ocean and stretches eastward far into the Pacific, rests on one region of connected though shifting subterranean excitement. The line of most intense force would be the ordinary one, the volcanic chain of Sumatra. Thence the waves of the volcanic sea would travel in parallel lines to the north-eastward, causing a tension of the region and a tendency to split in the direction of those lines. That portion of the region intermediate between the western and eastern mountain chains which had not been disturbed and fractured during the process of elevation like that from which the chains were obtruded, or of which the fractures had not reached the surface, would offer most resistance. But on arriving at the western limit of the old fractures caused during the elevation of the Malayan chain, the space so fractured would yield in various points of weakness. The old fractures at the southern extremity of the chain would, by the tension, be prolonged in the same direction, that is to the S. E., and cross fractures being established and the vol-

sula. The central mountains are chiefly plutonic and volcanic. The granite or sienite of the southern regions would appear from Marsden's slight notice to resemble that of Singapore. The lower tracts of the west coast as described by him possess a remarkable resemblance in their general configuration to the surface of Singapore. Like the latter, they consist of rounded elevations of no great height, separated by winding flat swamps penetrating for miles between them. The hills "not unfrequently exhibit the appearance of an amphitheatre." A co-incidence in a configuration so uncommon when other analogies are also considered, can hardly be viewed as accidental. The soil he describes as a stiff reddish clay. The rock exposed in sea cliffs and in some places at the bottoms of rivers is a species of clay called by the natives *nappal*, which is common in Singapore. The country between the mountains and the eastern coast of Sumatra is little known, but what information has been obtained respecting its geological features I have collected in the paper before alluded to.

canic forces sufficing to elevate the rocks and produce eruptions at different places along the lines of fissure, the system of semi-volcanic hills extending from the termination of the Malayan plutonic chain to Banca would be produced. Whether we admit the notion of a translation of waves or suppose that under the region a general volcanic pressure was in operation, producing an expansive tendency whose superficial manifestations varied according to the mineral structure and composition of the rocky crust and particular local intensity of force, the same results would follow under the assigned conditions.

Having in the above paper had occasion to bring together several scattered notices of recent volcanic action in Sumatra and the west coast of the Peninsula, it may be remarked that some general facts appear which it may be useful to separate from the local matters with which they are mixed up.

1. The advance of a great wave upon the land, is a circumstance common to most earthquakes on sea coasts. Mr. Darwin considers it to be caused by a line of fracture being formed beneath the sea. If there is a consequent sinking of the sea bed along the line, the rush of the waters on both sides to restore the level would occasion first the retirement of the sea from the shore and then the production of a wave rolling in upon the shore. But might it not also be caused without any sinking or even rending of the sea bed? A strong blow beneath the earth's crust imparting a momentary centrifugal tendency would cause the sea above the point or line of impact to rise violently to a height proportioned to the force of the concussion. But this wave would necessarily be partly above and partly below the general level, or have a hollow on each side towards which the neighbouring waters would rush, and thus the same effect be produced along the adjacent coast as in the former case. Mr. Darwin also mentions that places situated on shallow bays suffer great damage from these waves, while those seated close to the edge of profoundly deep water escape. In the same manner the waves of the Indian ocean, on reaching the shallow coast of Sumatra, rise as they advance until they acquire a great height. This is probably attributable to the friction of the bottom retarding the waves while a constant succession press on from the sea behind. When bays are narrow the wave will have a greater tendency to rise

owing to its progressive lateral contraction, as is seen more markedly in bores.

2. The opening of fissures and evacuation through them of black fluid matter. The spasmodic expansion and contraction of fissures continued after the shock.

3. The disruption of portions of mountains or landslips.

4. The elevation of tracts of land.

5. The greater violence of earthquakes on hills. This was observed at Piuang in 1843. Marsden remarks that houses situated on a low sandy soil are least affected, and those which stand on distinct hills suffer most from the shocks.

6. The connection between earthquakes and the condition of the atmosphere. To what is stated by Lieut. Crooke respecting the great drought which preceded the earthquake at Jambi, the following extract from Marsden relative to Sumatran earthquakes in general may be added:—"Earthquakes have been remarked by some to happen usually on sudden changes of weather, and particularly after violent heats; but I do not vouch this upon my own experience, which has been pretty ample." The earthquake of 1843 occurred during one of the longest and severest droughts that had ever happened in Pinang. This drought, which was attended with oppressive heat and occasional hot winds, never before experienced within the memory of the residents, appears to have extended over the northern part of Sumatra.

NOTE.

When the foregoing paper was written I had not seen the talented and elaborate memoir on Indian Earthquakes by Lieutenant R. B. Smith, which I received by the *Hooghly*. The portions at which I have had time to glance suffice to show that it contains a mine of wealth. The above notices of Malayan earthquakes, however meagre, may serve to connect his researches with the Indian Archipelago, respecting the general geology and recent volcanic disturbances of which I am collecting information. Meantime the subjoined account which has been furnished me by my brother, abridged from the official report of the Alcalde Mayor of the province of Cagayan in the Island of Luzon, of an earthquake attended by the subsidence of two hills and by a violent hurricane which occurred there on the night between the 7th and 8th October last, may prove interesting. It will appear in the

Singapore Free Press, but I presume that will form no objection to its being put on record in the more permanent pages of the *Journal*.

“The Casa Real of LALLO, a brick-building, and one of the most solid edifices in the province, was destroyed. The rector’s house was destroyed, and the roof of the Church suffered much damage, and many other of the public edifices were more or less injured. The Tribunal stood it out well, and will only require a new roof. All the wooden houses were levelled with the ground. None of the attap houses escaped, and the greater part were blown over with many of their unhappy owners in them, and their little stores of paddy. The people notwithstanding, had been since occupied in repairing the serious injuries which the Renta de Tabacos had suffered, and the wages, which were paid daily, served as some consolation to them in the midst of so much misfortune. Five persons are reckoned to have been killed and 11 wounded. In CALAMANIUGAN the Church and rector’s house were entirely destroyed, and the priest was living in the Royal Tribunal which had escaped injury, and in which he had erected an altar. The wooden houses suffered more than those of Lallo. The attap houses were all destroyed. The people experienced the misfortune of being caught by the hurricane with the greater part of their grain still on the ground, the whole of which was destroyed. Eleven persons were killed, and 20 seriously injured. At APARRO the majority of the houses in the district are of wood which were mostly all destroyed. The Royal Tribunal, a new and solid building, was overthrown—the rector’s house destroyed and the Church much injured. Nearly all the wooden houses were destroyed, and none of the attap ones escaped, the greater part going to block up the river or into the sea, which rose into the village and contributed to make the night more frightful, and to augment the number of victims, who amounted to 27 killed and 53 wounded. All the harvest that had been gathered in perished, being carried into the sea with the houses. The destruction of buffaloes, horses, cows, and other property was excessive. In BUGUEY nearly all houses and buildings were destroyed :—one man killed. The Convent of ABULOG was entirely demolished, the Church lost its roof and belfry, and nearly all the houses were levelled with the ground :—8 persons were killed. To the north of this village, at the distance of 6 miles, there is a high hill on the top of which dwelt a number of natives who pay allegiance

to Her Majesty. These people relate that on the evening preceding the hurricane they felt great and frequent tremblings of the earth,—that at nightfall they began to hear in the midst of it a frightful noise which impelled them to abandon their abode, and fly, full of fear, to a creek for shelter from the fury of the tempest which was increasing :—on the ceasing of the storm, on the morning of the 8th, they returned to their dwelling, when they found that it and the hill on which it stood had sunk,—there appearing in its place a large lake of black water, of a fetid odour, and smoking. In PAMPLONA the Churches and Tribunal were destroyed, as well as the rest of the houses, with the exception of the Church of the division of Masi, which being of very solid construction, escaped with trifling injury ; 5 persons were killed. At the entrance of the river of this village there was a hill sixty feet high separating the sea from the river, which having disappeared, the two waters are now joined and a wide and practicable passage opened. Five victims are reported. Within the boundaries of all these districts nature presents a most sombre picture, not a single green tree is to be seen, the thickest trunks alone remaining, and these as if only left at last to show that vegetation had ceased ; which is no doubt owing to the great quantity of electricity with which the atmosphere was charged during the hurricane.”

(To be continued.)

On the Refnage, on a large scale, by means of Nitre, of brittle or understandard Silver, for coinage purposes ; and on a ready mode of approximative assaying of silver, by W. B. O'SHAUGHNESSY, M. D. and F. R. S., Co-Secy. Asiatic Society of Bengal.

Although the subject of the refnage of silver for coinage purposes may appear of too special and technical a character to warrant my affording to it any portion of the pages of this Journal, it still presents some collateral points of general interest. It affords an opportunity too of conveying in a simple and intelligible form a few observations regarding our silver standard and the approximative testing of silver coin and bullion, which may prove useful to some of the readers of this Journal who have to manage bullion transactions with native states.

The East India Company's new rupee is by law composed of 11 parts by weight of *pure* silver and 1 of copper. A pound of this alloy is divided into 12 ounces, each ounce into 20 penny weights. In the receipt of bullion tendered at the mints, the alloy of 11-12ths is taken as *standard*, and according to the number of half penny weights of *pure* silver, above or below *eleven* ounces, or 220 dwts. the bullion is on assay reported *better* or *worse* than *standard*. The composition of a few of the most remarkable varieties of bullion and coin received at the Calcutta mint will illustrate this statement.

1 lb of contains— <i>Fine silver—Alloy.</i>	Dwts. of		Assay Report.
Standard Silver,	220	20	Standard.
Silver Coin of Great Britain, . . .	222	18	2 Dwts. Better.
New Dutch Guilders,	226	14	6 Br.
Old Sicca Rupees,	235	5	15 Br.
Sycee silver of best quality, . . .	236½	3½	16½ Br.
Silver ingots from mint refinery, .	240	0	20 Br. <i>Pure</i> .
Spanish Dollars,	215½	24½	4½ Worse.
Five Franc pieces,	216	24	4 Wo.
Nanashaye Rupees of Jaloun, ..	202	38	18 Wo.
Debmohree Rs. of Assam, . . .	130	110	90 Wo.

These few instances are sufficient to exemplify the practical range of proportion in the silver and alloy of the bullion usually presented. By the mint rules a charge for refinage is levied on all such bullion, which is alloyed to a greater extent than 26½ parts or penny weights in 240. technically 6½ "worse" than standard.

In alloys however of silver and *copper only*, it is generally found that however large the proportion of copper, the bullion does not require refinage for coinage purposes, if mixed with the requisite quantity of *pure* silver, or superior silver alloyed with copper only. Thus Dollars and Five Franc pieces may be used for alligation without risk of rendering the resulting ingots unmanageable in the subsequent stages of coinage. But if the bullion, whether worse or better than standard contains lead, tin, brass or sulphur in a larger proportion than two dwts. in the pound, it affords ingots which generally prove brittle in the course of manipulation, or give a mixture of uncertain fineness and unfit to be coined. To illustrate this I may mention that I have fre-

quently known Sycee silver at $16\frac{1}{2}$ Br. alloyed with $2\frac{1}{2}$ copper, to yield bars as brittle as slate or cast iron; and these when assayed to prove 2 or even 3 dwts. better than *standard*. This proceeds from the presence of lead or sulphur in the Sycee silver, part of which burning off leaves the resulting mass richer in silver than before, but brittle from the small portion of lead which remains. On the other hand I have still more frequently seen alloys of silver and copper, 50 to 80 *worse* than *standard*, affording with the due proportion of richer silver, a perfectly malleable and standard metal.

The object of refinages for the mint is therefore usually to remove the lead, tin, zinc or sulphur and to leave the silver and copper, or occasionally, when pure or rich silver is not available, to bring up inferior alloys to standard or even superior fineness.

The process followed by the native refiners in the bazar is that of *cupellation*, and is performed by them with great success and economy. They use for the cupel a mixture of one part by weight of recently burned lime, sifted but unslaked, and two parts by weight of chaff ashes. With this they make a basin like mass, usually eighteen inches in diameter below and 4 to 6 inches deep. This they moisten well with water and beat with the hands into firm consistence. Pieces of brick are placed round the sloping sides to give support, and two pairs of bellows are arranged so that by their alternate use a constant blast of air is kept up during the process.

While still wet the basin is charged with charcoal and an active fire kindled, the silver is then introduced and lead added till all is melted and red hot. Two large logs of firewood are then placed over the charcoal so as to form a dome to the heap, and at the interstices torch-like pieces of wood are continually introduced, so that a powerful flame is reverberated from the blazing dome above.

By this manipulation the lead is oxidized, and the oxyde of lead (litharge) formed is absorbed with the oxides of copper, and other base metals usually present, by the porous mixture of lime and ashes. None of the litharge is removed by skimming. In refining 2500 tola wt.* from 16 "worse" they use 1200 tolas of lead, and the operation is completed in less than 3 hours, yielding a cake of silver 16 to 17 dwt. "better" than standard. The bazar refiners contract to return all the silver according

* The tola is 180 Troy grains. 32 tolas = onc Troy pound.

to official assay ; and finding all materials, they receive for their labour 8 annas, or $\frac{1}{2}$ per 100 on the value of the metal. The cake of litharge when cold is ground and sifted and yields granules of silver. The sifted powder is made into a paste with cow-dung, and the lead recovered in a furnace of particularly ingenious and effective construction—of which the following is a sufficient description.

A barrel-shaped clay cylinder is made, open at both ends, nine inches diameter below by 12 to 15 above, and usually 24 inches high. A bellows pipe of refractory clay 3 inches in diameter enters at the side about 4 inches from the top, and is led down the cylinder so that the nozzle of the pipe is within six inches of the bottom. The cylinder stands over a cup-shaped hollow made in the ground and sifted over with a little wood ashes. To use this furnace it is first half filled with charcoal and the fire kindled. The mixture of litharge and cow-dung is then introduced in balls the size of an orange, with layers of charcoal and the fire urged. The litharge is quickly reduced to the metallic state, and the lead containing any silver present in solution, collects in the cup-shaped hollow—100 lbs of litharge can be thus worked off in about 4 hours. This process is applied with remarkable success to the treatment of sweepings and other rubbish containing not more than 1 per 100 to 2 per 100 of silver, but in this case a small and variable quantity of borax is added to the mass of litharge, sweepings and cow-dung.

The basin below the cylinder is open at one side, but during the process is kept partially closed by a heap of charcoal and a brick. This being removed occasionally, the surface of the melted lead is raked free from earthy slags by an iron rod, and the firing is continued till the balls are all consumed. The cylinder is then removed, water thrown on the lead—and this containing silver, is used for the next cupellation refinage.

The skill exhibited by the native refiners in conducting these processes is beyond all praise, and for the scale on which they have to operate, it would, I conceive, be scarcely practicable to effect any improvement on their system. But it has serious inconveniences when we attempt to follow it in large operations. Each operation is limited to about 2500 tola wt. and this may be repeated, so as to give 5000 as the day's work of 6 men. The heat is almost intolerable, the lead fumes most dele-

terious. These objections might be obviated by the erection of suitable screens and hoods, but the refinance never proceeds so successfully as when the native operator is left to his own fashion. Superintendence and the prevention of pilfering become exceedingly difficult also when a large quantity of bullion has to be operated on, from the great number of people employed, the large space occupied by each gang, and the dense smoke and fumes which fill the refinery.

In the new mint there are three cupellation furnaces by Maudslay, constructed on the most approved plan, and in which the operation could be carried on very effectively and economically were it practicable to work the furnaces continuously, night and day; but as all work must terminate in the mint and the fires be extinguished daily at 4 P.M., the furnaces are quite useless. At best no more than 3000 tola weight of silver can be refined in each daily, but with such wasteful expenditure of fuel as to render the operation much more costly than the charge of the native refiners.

The cursory description above given suffices to explain the object I had in view in attempting, towards the close of 1845, to effect the refinance of silver in large, indeed, I may say immense quantities, and to conduct the operation so that the mass of bullion acted upon should be brought into a malleable state, *and safely stored*, within a period of six or seven hours. How effectually this has been accomplished is shown in the sequel of this paper.

My process is based on the old French system of the *poussée* or saltpetre refinance. This I witnessed in the Laboratory of my friends, Messrs. Johnson and Cock, the eminent refiners in London, and it is minutely described in the works of Dumas and Berthier. The silver to be refined is granulated, the granules mixed with one-tenth their weight of fine saltpetre, and projected gradually into a red-hot EARTHEN crucible. The nitre oxydizes the base metals, having but little effect on the silver—when the mass has become red hot the fire is urged till the silver is melted; the whole is then poured into ingot moulds; and the scorïæ, consisting of potash, oxides of copper, lead and other base metals, with granules of silver and oxide of silver in considerable quantity, are reserved for subsequent treatment by methods varying according to circumstances afterwards explained.

The practical drawback to this system as it existed previous to my experiments, was the supposed necessity of using *earthen* crucibles.

This at once limited each batch to some 30lbs weight of metal, or about 1000 tolas, and where we had to deal with tons and lacs its adoption seemed hopeless. It occurred to me however, to make trial of the ordinary cast-iron melting pots of the mint, and I soon found to my great satisfaction that by a little management these could be used with complete success. The object in view was accordingly gained to the fullest extent required, and in September, 1846, this system of refinage was applied in one working-day (the 4th Sept.) to the very large quantity of 188,264 tola wt. of coarse silver—Troy pounds 5,883, value Co.'s Rs. 172,860 10 2, or £17,286 1s. 3d. which was refined and returned to the mint in bright malleable ingots, and registered for assay in less than six hours from the commencement of the operation. I believe I am justified in asserting that in point of rapidity, economy and quantity, this day's refinage has never been equalled in any refining establishment in any part of the world. I now proceed to the detailed description of the process—its expenses and total results.

The cast-iron silver melting pots used in the mint, are of cylindrical shape, with round bottoms, 17 inches external height, $11\frac{1}{2}$ inches, internal diameter, $1\frac{1}{2}$ inch thickness of metal. The quantity of silver usually melted in each pot is 10,000 tola wt. or $312\frac{1}{2}$ Troy pounds. If the silver to be refined is in the state of coin the operation may be commenced at once. If in bars or other solid masses it must be granulated. For this purpose about 8000 tola wt. are melted and poured from the pot placed on a suitable frame over a tank of water, beneath the surface of which two or three brooms are kept in constant motion. This reduces the silver to granules like small shot.

6000 tola wt. of understandard coins or granules are placed in each iron pot, and heated to low redness in the ordinary melting furnace, of which there are 16 in the mint. When at a low red heat the mass of silver is hollowed out with an iron rod with flattened end, so as to make a funnel-shaped depression of the metal in the centre. About 2 pounds weight of saltpetre are thrown into this hollow. The saltpetre rapidly melting percolates through the granules or coins, and, as it filters through parts with its oxygen to the base metals. After a few minutes the fireman with the same rod stirs up the silver from the bottom of the pot and works it in every direction, again cupping the centre as before. The heat is slightly urged and the saltpetreing is

repeated in the same manner, until from 5 to 7 seers (10 to 14lbs) are used, the quantity being determined by the coarseness of the silver. In half an hour from the beginning the whole mass of metal becomes pasty, and when pressed towards the bottom of the pot coheres in a mass upon which there floats a very liquid scum, composed of melted potash and litharge with some oxide of copper and a little oxide of silver in solution. *This liquid scum is skimmed off with an iron ladle,* and when as much is removed as is practicable, the pot is covered and the fire run up by the register to a degree somewhat higher than that usually given in silver meltings, and which experience can alone teach.

In about half an hour the silver is found to be quite melted, its surface being covered with thick but loose and dry crusts of oxide of copper. It is now ready for pouring, and a piece of coke being placed across the lip of the pot, the refined silver is cast in ingots in the usual manner, without any of the dry scorïe entering the moulds. The ingots when cool are perfectly clean and bright, and fit in every respect for delivery in the Bullion department, to be registered for assay.

On the 4th of September 1846, this process was, as above stated, performed on silver to the value of Co.'s Rs. 172,860 10 2, =£17,286 1s. 3d. sterling. At 8½ A. M. the fires were lighted in the 16 furnaces. At 9½ A. M. the silver (consisting of Nanashaye rupees, average 18 worse than standard, and containing about 4 dwts. of lead per lb.) in the state of coin was charged into the pots—at 10 A. M. the saltpetreing was commenced—by 11½ the first pot was poured off, and all sixteen by ¼ past 12. The pots were replaced in the furnaces, charged once more and by 2½ P. M. the refined silver again poured off. The refined bars were returned to the mint. The subsequent assays showed some of the pots to have been refined to 13 dwts. better, and the whole silver returned averaged 5 "better." All the ingots without exception were soft and malleable and fit for alligation.

When the scorïe and sweepings were subsequently worked up, and the account closed, it was found to stand as follows :

Value of silver delivered to be refined Co.'s Rs.	172,860	10	2
Returned refined silver, value,	172,488	10	3

Loss, Rs. 371 15 11

Being three annas and five pie per cent. in value, or about $\frac{1}{3}$ th per 100, which was found by experiment to be the mere loss on melting this kind of silver.

From the 9th of October 1845, to the present time, May 1847, I have refined in this manner coarse and brittle silver to the value of over ten lacs of rupees—£ 100,000; of the Jaloun silver alone there were refined in 1846 Rs. 882,510 11 8. In one operation about Rs. 50,000 worth of silver, containing over 30 per 100 of *lead* was thus treated, and the resulting ingots, though 40 to 50 dwt. *worse* than our standard, were cured of brittleness and rendered fit for alligation for coin.

From these numerous and large trials it results that when the salt-petreing is managed in the mode I have described, the iron vessel is entirely uninjured. In fact the saltpetre has become inert before it touches the side or bottom of the pot. Accordingly the same pot has in many instances been used more than six times over, and after this has borne the average number of common meltings, as shown by the official report of Mr. Casperz the melter to the mint.

Treatment of the Scoriæ.

This part of the operation is done at leisure, and on its careful and precise management depends the economy of the process.

The scoriæ well mixed together may be represented as composed of fused potash, oxides of copper and base metals, granules of metallic silver with oxide of silver, and a minute quantity of chloride of silver.

The mass is first bruized in iron mortars and steeped in water for two days in a leaden tub, the water then drained off and replaced, and this repeated a second time. The potash is thus dissolved out, the mass disintegrated and rendered pulpy, and its oxide of silver reduced to the metallic state. It is now in successive portions rubbed in iron mortars, and sieved on fine cane or bamboo sieves floating on water in the leaden tub. The pulp of oxides passes through, and nearly all the silver in granules remains on the sieve. This silver only needs to be melted and returned.

The oxides, with finely divided metallic silver, metallic copper, and chloride of silver, after settling to the bottom of the tub, and the water decanted or syphoned off, are placed on dry tiles, which soon absorb the moisture; of this mass from 4 to 5 cwt. weight are placed in a reverberatory furnace and calcined at a low red heat for four hours.

This converts the metallic copper into oxide of copper. When cool the mass is boiled, 100 lbs. at a time, in a leaden boiler, for about an hour, with 40 lbs of sulphuric acid and 200 lbs of water. Most of the copper is thus recovered in the state of sulphate of copper solution, which is poured off into tanks to crystallize. What is undissolved by the acid is tile-dried, and a small portion, about ten tola weight, of the residue melted for trial. If the trial ingot is malleable and soft the whole mass may now be melted into ingots to close the account. For although these ingots will be much *worse* than standard, they are free from lead and devoid of brittleness, and consequently fit for alligation. On the other hand if the trial ingot be brittle the mass should be again roasted and treated with sulphuric acid as before. And according to the original quality of the silver this may need three such operations.

In refining 100,000 Rs. value of such understandard coin, about 90,000 Rs. value will be returned at once refined above standard—5000 will be found in granules—4000 to 5000 will be recovered by roasting and by sulphuric acid, and from 500 to 1,000 will remain as chloride of silver and very finely divided metallic silver, which is slowly deposited from the sulphate of copper liquid, as a white slime or mud, consisting of the chlorides of silver, copper and lead, sulphate of lead and metallic silver. This mud is tile-dried and treated as follows:—

100 parts by weight are well mixed with 50 of dried carbonate of soda, and 20 of powdered charcoal, the mixture melted in black lead pots and poured into conical moulds—on cooling a mass of lead containing all the silver is found at the point of each cone. This lead usually contains 20 to 25 per 100 of silver, and the precious metal is extracted by cupellation. The quantity of argentiferous lead to be cupelled from the refinage of 100,000 tolas of silver will range from 2000 to 4000 tola weight. If black lead pots are not available this part of the operation may be conducted successfully in the native cylinder furnace above described, merely substituting cow-dung for the charcoal, and mixing the mass into balls.

By careful attention to the above description no failure or difficulty need be dreaded in large silver refinages. The advantages of the process may be briefly summed up—rapidity, economy, salubrity and safety of the bullion. Before this method was introduced in the Calcutta mint the refinage of silver to the value of a lac of rupees was the work

of six weeks to two months. It can now be effected in four hours. The sulphate of copper removed in clearing up the scorise is in another department of the mint brought to yield the copper it contains in an absolutely pure state, so enhanced in value that it sells for 44 Rs. the maund of 100 Troy pounds, and thus pays for the saltpetre, acid, fuel, wages of workmen and melting losses. The poisonous fumes of the lead cupellation are avoided—and the rapidity with which 95 per 100 of the bullion is returned to the mint strong room, being taken there directly from the furnace, reduces the risk of loss by pilfering to an insignificant amount. The importance of this can only be estimated by those who may have to manipulate large quantities of bullion with native workmen and overseers, under whose care silver is apt to acquire the volatility of mercury, and disappear in a way that would appal a refiner only accustomed to the habits of the metal in European establishments. Against this cause of loss experience teaches me there is no safeguard but the concentration of the processes under the director's eye, the employment of the smallest possible number of persons in the manipulation, and the return of the bullion under refinage with the least avoidable delay.

[*Assay of silver.*]

In the commencement of this paper I alluded to our silver standard, and to my desire to afford a few useful hints to officers having bullion transactions with native states. Vast sums are annually paid in native coinages of almost innumerable variety, of which the Nanashaye and Balashaye rupees of Jaloun and the Deb-mohree rupees of Assam may be cited as examples. It may be confidently stated that whatever be the nominal fineness of these coins, the practice of the native mints is to debase as much as possible, and their workmen are moreover well acquainted with all the arts of pickling and blanching, hot stamping, &c. which give the debased coin a most respectable surface. Some ready method of assay, not affecting to be exact, but one closely approximative, would, I have been often assured, be deemed of much utility to many public officers in the transactions referred to. Such a method I take this opportunity to describe, prefixing a few words on the exact systems of assay followed in the mints.

In the English and Indian mints the ancient process of cupellation is followed. Through the great kindness of my friend, Mr. Dodd, the

present Assay Master, I have been enabled to convince myself that in skilful and conscientious hands this method ensures all the accuracy which is required in the operations of the mint and for commercial purposes. Its range of error will not exceed 2 parts in 1000, and be still within the deviation permitted by the law with reference to the impossibility of ensuring an exact mathematical alloy in all minting operations. But this system of assay demands the appliance of so much skill and such cumbrous apparatus that to the experimentalist "in the jungle" it affords no resource.

The French method, by solution in nitric acid and precipitation of the silver as chloride by common salt, is only applicable where the silver under assay is alloyed with copper only. If it contain lead, mercury, tin or iron, the results are fallacious. I enter upon no details, as I am not addressing these remarks to assayers. It is enough to say that the solution becomes so milky from the presence of chloride of lead, calomel, or peroxide of tin, that it is impossible to see and note correctly when the proper quantity of the salt test-liquor has been added; or on the other hand, if the experimentalist desires to weigh the precipitate, he is liable to be deceived by the quantity of insoluble chlorides of base metals united with that of silver.

I pass therefore to another and a ready resource, which only requires a Florence flask or two and a little nitric acid for its performance, and by which the experimentalist may proceed as follows:—

Weigh 24 grains of the silver to be examined, and dissolve it by means of one fluid drachm of *pure* nitric acid, about sp. gr. 1350, and half an ounce (fluid) of rain or distilled water. When dissolved dilute the fluid to two ounces with distilled water and introduce a clean slip of *pure* copper. Boil the contents of the flask over a lamp or on a pan of sand over a charcoal fire, so long as silver is deposited on the copper, and until a fresh slip of copper introduced is not tarnished—then let the liquid settle, decant the blue liquid, replace with water, decant once more, placing the thumb on the mouth of the flask invert it and let the silver escape upon a small China saucer—let the moisture drain off and dry the silver thoroughly over the hot sand. Weigh it now in your medicine chest scales, which ought to turn fairly to $\frac{1}{16}$ th of a grain or less. Now if your silver be the Company's standard, the 24 grains (= to 24.00) should give you 22.00. An English shilling

should give 22.20 ; an old Sicca rupee 22.15,—each tenth of a grain being the equivalent of one dwt. If more than 22.00, the silver is better, if less than 22.00, it is worse than our standard. But the silver obtained in this experiment is usually somewhat heavier than it should be, being associated with a little copper. The error is nearly compensated by the slight loss in the manipulation, and moreover it does not amount to more than one dwt. of excess. This may be safely allowed for, and the extempore assayer may rest satisfied that he knows the true value of his silver within 1 per 100. Thus for example, he dissolves 24 grains of a Debmohree rupee, and he finds his dry silver weighs 13 grs. It is therefore 9.0 grs. (or 90 dwt.) worse than 22 grs. which should be the standard. Now as $24.0 :: 13.0 :: 100 :: 54.16$, or 100 tolas of this silver contain *fine* silver 54.16 = 59.08 Co.'s Rs. But if an error had occurred increasing the weight of the silver precipitate to 13.20 the per centage of fine silver would be $55.00 + \frac{1}{11}$ alloy = to Co.'s Rs. 60, the difference being 0.84 per 100 on the fine silver, or 9-10ths of a rupee. But in the transactions to which these remarks bear reference an error of even one per 100 at either side is of but insignificant importance, the object being merely to obtain a good approximation, not an absolutely correct result.

The use of *pure* copper is essential for this simple process, inasmuch as the impurities of the metal usually met with may lead to very deceptive results. I shall be happy to supply any reader of this paper with electrotype copper in sufficient quantity to enable him to try his skill as an amateur assayer—for *pure* nitric acid I must refer him to the Hon. Company's Dispensary, or to any of the eminent Calcutta druggists.

Observations on the Ovis Ammonoides of HODGSON, by Capt. T.

HUTTON, F. G. S.

Having lately procured a pair of skins of the (so called) "*Ovis Ammonoides*" of Hodgson, and as the specimens are both in winter pelage, as indicated by the beautifully soft wool under the hair, it may be interesting to compare the description of them with that lately published by Mr. Hodgson, in the Journal Asiatic Society, No. 173 of 1846.

“*Ovis Ammon*”? Pallas. vel. “*O. Ammonoides*,” Hodgson. The “*Nian*” or “*Nyan*” of the Bhoteahs.—(Pronounced nasally in one syllable.)

Measurement of a male of five years, according to the markings on the horns ;

	ft.	ins.
From nose to base of horns,	1	1
Thence to insertion of tail,	5	1
Tail to end of hair,	0	3
	Total, ..	
	6	5

	ft.	ins.
Circumference of horn at base,	1	4½
Length on the curve,	2	10½, tips broken.

Winter pelage ; above deep brown interspersed with grey, with a distinctly marked darker dorsal line, passing, (as in *O. montana*) in a narrow stripe through the disc on the croup, even to the tip of the tail. Sides mixed hoary or slaty grey brown ; disc on the croup well defined and dirty white, the hair appearing as if rubbed. The throat and neck beneath to the breast, white, sprinkled with scattered brown hairs ; the hair long, bushy and pendent ; and from 6 to 7 inches in length, while that of the back is barely 2 inches, except on the dorsal line, where it is 3 inches, and on the ridge of the neck above 3½ inches. Tail, above, brown ; whitish at the sides, naked beneath. Under parts dirty white ; medial line blackish ; outside of the limbs with a dark list ; lips, whitish ; face, paler brown than the body.

Front surface of horns,	3½ inches wide.
Inner lateral surface,	6 inches wide.

Measurement of the bare skull of a male 7 years old ;

	ft.	ins.
Length of face to base of horns,	1	1
Length of horn on the curve,	2	10
Basal circumference,	1	4½

These horns are weathered and much broken at the tips, and were probably about 3 ft. 3 inches long.

Description of a female, 6 years old by the marking of the horns ;

	ft. ins.	
Nose to base of horns,	0 10½	
Thence to insertion of tail,	4 5	
Tail,	0 3	
	Total,	5 6¼
	ft. ins.	
Length of horns on the curve,	1 4½	
Basal circumference,	0 8	

In the female the colouring is lighter than that of the male, having more grey ; and the throat and foreneck are slatey instead of white, and devoid of the long pendent frill which graces the other sex ; the dark dorsal line, which in the male runs in a narrow stripe through the pale disc, ends in the female at the commencement of the disc, and the tail and croup are of the same canescent fawn colour ; the disc is far more extensive than that of the male. Along the ridge of the neck above, from the base of the horns to about 10 inches beyond them, there is a mane of true woolly hair 6½ inches long, gradually fading into the crisp quilly hair of the dorsal line. There is no dark list down the outside of the limbs, but the colour is pale fawn,

	ins.
Front surface of horns,	1½ broad.
Inner lateral surface,	3 inches.

In both sexes there is a beautifully soft inner coating of fine push-meena wool of a pale mouse colour.

The height of the animals I have not given, as the limbs are defective in my specimens.

The above measurements were taken with care, and although my male appears somewhat superior in size to Mr. Hodgson's, the general correspondence is evident enough.

	ft. ins.		ft. ins.
Mr. Hodgson's male over all is,	5 11½	mine	6 5
Ditto ditto to base of horns,	1 0	ditto	1 1
Ditto ditto basal circumference,	1 3½	ditto	1 4½
Mr. Hodgson's female over all,	5 6½	mine	5 6½
Ditto ditto to base of horns,	0 11	ditto	0 10½
Ditto ditto basal circumference,	0 8	ditto	0 8

This species appears to differ from "*Ovis montana*" of America, in having the hair on the throat elongated into a pendent fringe, while in the latter species, as described in Griffith's Synopsis, it is distinctly stated that there are "*no long hairs under the throat.*" Dr. Richardson (as quoted by Mr. Blyth in No. 35, J. A. S. for 1841) states in speaking of the Rocky Mountain Sheep, that "as the ends of the hairs (in which the colour resides) are gradually rubbed off during the progress of the winter, the tints become paler, and the old rams are thus almost white in the spring." In the male specimen before me, this could not take place, for the colouring instead of being confined "to the ends of the hairs," pervades them, though less intensely, to the base, and the animal by rubbing would assume a slatey grey hue, except on the throat, disc, and belly, where it would be white. In the American species again, the tail is said to be 5 inches long, whereas in the Thibetan animal it is only 3 inches, and the length from nose to tail appears to be superior to that of "*O. montana.*"

On the other hand it would appear to agree very well with the descriptions of "*Ovis Ammon,*" except, that Col. H. Smith states, that the female of that species *wants the disc on the croup*, while in my specimens the pale disc of the female is larger and more conspicuous than in the male.

Secondly, in the Synopsis, the horns are said *to touch* on the forehead, while in Mr. Hodgson's description they are $\frac{1}{4}$ th of an inch apart, and in my specimen they are $\frac{3}{4}$ th of an inch apart;—in the bare skull they are $1\frac{1}{4}$ inches apart. This character however is nullified in the text, where it is said that they are "*nearly touching.*"

Thirdly, it is stated that the horns of "*O. Ammon*" have "*the broadest side towards the forehead,*" and if this means *towards the front*, as I suppose it does, then it would seem to prove that our animal is distinct from *O. Ammon*, inasmuch as its horns have the *narrowest* side to the front,—the base of the triangle being $3\frac{1}{2}$ inches, and the inner side 6 inches wide! "*O. Ammon*" is likewise said to be "*nearly five feet in length,*"—whereas the Bhotan species is *more than 6 feet in length!*

Unless therefore these published characters of *O. Ammon* can be satisfactorily proved to be incorrect, it would appear that Mr. Hodgson has good and sufficient grounds for declaring the two animals to be

distinct, and therefore for establishing his "*Ovis Ammonoides*." The point can only be determined by those who may have the opportunity of comparing specimens of both.

On the Hispid Hare of the Saul forest.—By B. H. HODGSON, Esq.

Lepus hispidus. Pearson.

Caprolagus hispidus. Blyth.

Habitat, The great forest at the base of the Sub-Himalayas and of their offsets, from Gorakpur to Tipperah.

Having been recently so fortunate as to obtain a fine living pair of the Hispid Hare of the Saul forest, together with some trustworthy information about the habits and location of the species, I purpose to give the results of my examination and inquiries to the Society, the animal being extremely rare, and moreover being one of those species the right understanding of which, in relation to its congeners, is calculated to throw light upon the difficult question of the true nature and limits of generic aggregations.

The sub-Himalayas and that portion of their south-eastern continuation dividing the basins of the Irawadi and of the lower Bruhmaputra, are accompanied all the way from the point where the Ganges intersects them to the sea, by a vast forest which forms their skirt towards the plains of Hindostan and Bengal. This forest, which is one of the largest and most unbroken in the world, having a breadth or depth of from 10 to 20 and even 30 miles throughout its extended course of some 1500 miles, and being inhabited only in spots here and there, is one of the most important features of the Geography of India for the zoologist, owing to the number of animals that are now peculiar to it, because they have found probably in its immense malarious recesses a last refuge from the gradual encroachments of man. Swainson observes that there are no forests or tenants of the forest like those of the new world: but those who have followed the Gaur and Elephant, the Arna and Rhinoceros, the Samber and Barasinga though the 'Saul forest' as above defined, have felt little disposition to acquiesce in that remark. The popular designation of Saul forest is derived from the prevalence of that



T. Mead's American Zoölog. Voy. Calcutta.

THE HISPID HARE of the Saul Forest.

stately and valuable timber tree (*Shorea robusta*) throughout the tract in question, except near the sea, where it is replaced by the Teak, which may be aptly denominated the pelagic saul.

This primeval forest is the peculiar and exclusive habitat of the Hispid Hare, a species that never ventures into the open plains on the one hand, or into the mountains on the other; and hence it is so little known, deep cover and deadly malaria contributing alike to its happy obscurity. As the black-necked Hare or *Nigricollis* is the single species of the Deccan, and the Red tail *Ruficaudata* of Hindosthan and Bengal, so is the Hispid of the vast sub-Himalayan forest; and it is remarkable that the mountains beyond the forest, even up to the perpetual snows, have no peculiar species, the Red tail of the plains being alone found there. Two specimens only of the Hispid Hare are yet on record.* These were obtained respectively on the banks of the Tista and in Assam. My two were got near the Cossi, and recently. Previously I had never obtained a specimen, though I have often heard of and even seen the animal as far west as the Gandac, and information on which I can rely convinces me that the species extends, within the saul forest, as far westerly as Gorakpur, and as far east and south as Assam and Tipperah. The Hispid Hare is a habitual burrower, like the Rabbit; but, unlike that species, it is not gregarious, and affects deep cover, the pair dwelling together, but apart from their fellows, in subterranean abodes of their own excavation, and having, it is supposed, two or three broods in the year, consisting of one or two young each time. Less highly endowed with the senses of seeing and hearing than the common hare or rabbit, and gifted with speed far inferior to that of the former or even of the latter species, the Hispid Hare is dependant for safety upon the double concealment afforded by the heavy undergrowth of the forest and by its own burrow, and accordingly it never quits the former shelter, and seldom wanders far from the latter, whilst the harsh hair of its coat affords it an appropriate and unique protection against continual necessary contact with the huge and serrated grasses, reeds and shrubs in the midst of which it dwells, and dwells so securely that it is seldom or never seen even by the natives; save for a short period after the great annual clearance of the Tarai by fire. The Meeches, to whom I am indebted for my specimens, call the

* Sporting Magazine, August, 1834. Asiatic Journal No. 160 of 1845.

animal the Black Hare or Saul forest Hare, both excellent names—and they tell me that it feeds chiefly on roots and the bark of trees, a circumstance as remarkably in harmony with the extraordinary rodent power of its structure as are its small eyes and ears, weighty body and short strong legs, with what has been just stated relative the rest of its habits. The whole forms a beautiful instance of adaptation without the slightest change of organism; for neither in the hard nor soft anatomy of the forest Hare is there the least essential deviation from those of the Hare of the open country, but only a modification of the same type suited to the peculiar life of each, as respective tenants of the open and cultivated country and of the rude and dense wild. Why the Hare of the plains, and not that of the forest, should pass into the mountains, apparently so much better suited to the latter species, we cannot conjecture: and, though this fact is an argument in favour of considering the Hispid or forest Hare as a separate type—an argument that may be yet further sustained by those differences in external form which very noticeably segregate it from the common Hares of England and of Hindosthan (*Timidus* and *Ruficaudatus*), yet, on the other hand, its essential anatomical identity with these animals, and the manner in which the marked diversity of external form just noticed, as well as other peculiarities of habit above recorded, are gradually lost as we pass to other species of true Hare, are arguments of weight against any generic or sub-generic separation. In the Timid and red-tailed Hares the long ears, the large eyes, the frame as well suited to extreme speed as the eyes and ears to effective vigilance, are certainly in remarkable contrast with the small eyes and ears, heavy frame and short equal legs of the forest hare: but all these distinctions, as well as those of domicile, become less and less tangible in the variable Hare, the Rabbit, the Tolai, and the Tapiti,* in which moreover we have variously reproduced, even to the subordinate peculiarities of the Indian forest Hare, such as its white flesh, its short tail, its subterranean retreat and creeping adhesion thereto, so unlike the dashing career of the red-tailed and English species. With these few remarks upon the propriety or otherwise of separating the Hispid Hare from his congeners, I now proceed to what will more fully illustrate that point, viz. a

* See Shaw, Vol. II. voce Tolai and Regne animal ad locum and Naturalist's Library, Vol. xiii. Pl. 28.

careful description of my specimens. They consist of a male and female of mature, or advanced age rather, and they were taken together, when in full fur in February. They were very impatient of confinement and died very soon, owing to injuries inflicted on themselves by vain attempts at escape. I describe them as they lie before me, dead, with fine specimens of the common hare and rabbit beside them. The sexes are as near as possible of the same size and colour; but, if anything, the male is rather the larger and darker. The male measures $19\frac{1}{2}$ inches from snout to vent—head to the occiput, 4; ears to the lobe $2\frac{7}{8}$; to the crown $2\frac{3}{4}$; foreleg from elbow to end of longest toe nail $4\frac{3}{8}$. Hindleg from true knee to longest nail $7\frac{1}{2}$. Planta from heel to long toe-nail $3\frac{7}{8}$; heel to knee $4\frac{1}{4}$; scut only $1\frac{1}{8}$; scut and hair $2\frac{3}{8}$; weight $5\frac{1}{2}$ lbs. The female is 19 inches long and $5\frac{1}{2}$ lbs. Both have a girth behind the shoulder of 12 inches: but the female's tail is the longer, being 2 inches, or 3 with the fur. Her other proportions are almost identical with the male's. Compared with the common species, which lies beside them as I write, these animals are conspicuously of darker hue and heavier make, but not larger. They have heavier heads, much shorter ears, smaller eyes, shorter tails, limbs shorter, stronger and less unequal—in that respect like a rabbit—and, lastly, their mystacal tufts are much less, and their fur much harsher. Looking closer into their structure it is observable that the profile of the head is less curved in the Hispid than in the common species, the nails somewhat larger, and the digits slightly different in gradation, the thumb in particular being less withdrawn and the little finger more so, from the front, in Hispidus. But the nails have no peculiarity of conformation and so far from being "very acute," they are very blunt and worn. The nose and lips agree precisely with those of the common species: but the eye is conspicuously smaller and placed less backwards, or midway between the snout and ears. The ears both in male and female considerably exceed one half of the length of the head, and are broader as well as shorter than in *Ruficaudatus* or *Timidus*; and it is remarkable that the tail in the male is shorter than in the female—in both more so than in *Timidus*. The teats are six, two pectoral, and four ventral, just as in *Ruficaudatus*; and the skulls and teeth of the two species are framed upon precisely the same model, general and particular, with this only and striking difference that the skull of the

forest Hare possesses greater strength and solidity with proportional augmentation of the teeth, but especially of the incisors. The skull is rather higher but scarcely so long as in the red-tail. It is also less curved along the culmenal line: the nasal bones are shorter yet more advanced to the front: the solutions of continuity in the bone of the cheeks and palate are smaller; the alæ of the frontals less developed, and the frontals consequently not sunk between them as in the common Hare and Rabbit: lastly, the groove in front of the upper incisors is continued to their cutting edge so as to notch it. But with all these minute diversities there is a remarkably perfect conformity to one model of conformation even in minutiae. So too in the internal viscera of the two species, though here the disparity appears somewhat greater and more material, for the intestinal canal of *Hispidus* is much shorter, the difference being, however, compensated in the greater size of the cæcum and of that portion of the intestine which resembles the cæcum. The stomach also exhibits a greater tumidity and thickening near the pyloric orifice, where there is less of these features, or, instead of them, merely a syphonic bend, in the red-tail and rabbit. The particulars of the viscera are set down in the sequel in figures, and I have only further to remark that the bicornate uterus, which in my specimen was unimpregnated—has precisely the character of the same organ in the red-tail; and that the diversity of the other viscera is the less important in as much as several individuals of the same species are apt to show much inequality in this respect, as I have proof before me in regard to the common Hare and Rabbit. With reference to the nature and colours of the fur in the common and forest species, how striking soever the differences at first sight appear, they diminish on closer inspection, for the structure of the hair is exactly the same in both, only with greater thickness and consequent strength in *Hispidus*; and the hues and their distribution into rings are surprisingly alike, with these differences merely that the rufous tints are deeper toned or browner; and that the dark shading is deeper and fuller, in *Hispidus*, owing chiefly to the greater abundance of the longer and wholly dark portion of the hairy piles. I have examined the hair and fur, both as to form and colours, with great care; and the above is the result. The general effect may be said to be that the Hispid Hare, as to colour, is of a dark or iron-grey with the ruddy-tinge embrowned, and the limbs shaded outside, like the body, with black, instead of being unmixed rufous.

<i>Dimensions of</i>	<i>Male.</i>	<i>Female.</i>
Snout to vent,	1 7½	1 7
Head to occiput,	0 4	0 4
— Greatest depth,	0 2½	0 2¾
— Snout to eye,	0 2	0 2
— Thence to base of ear,	0 2¼	0 2¼ ³ / ₈
Ear from antea base,	0 2¾	0 2¾
— From crown of head,	0 2¾	0 2¾
Foreleg, elbow to long toe-nail,	0 4¾	0 4¾
——— Palma and nails,	0 2	0 2
Hind leg, knee to end toe-nail,	0 7½	0 7½
——— Knee to os calcis,	0 4¾	0 4¼
——— Os calcis to toe-nail,	0 3¾	0 3¾
Girth of chest,	1 0	1 0
Weight,	5½lbs.	5¼lbs.

Length of Intestines.

	SMALL.	GREAT.	CÆCUM.
Male,	5 2	4 8	1 8½
Female,	6 4	4 6	1 10

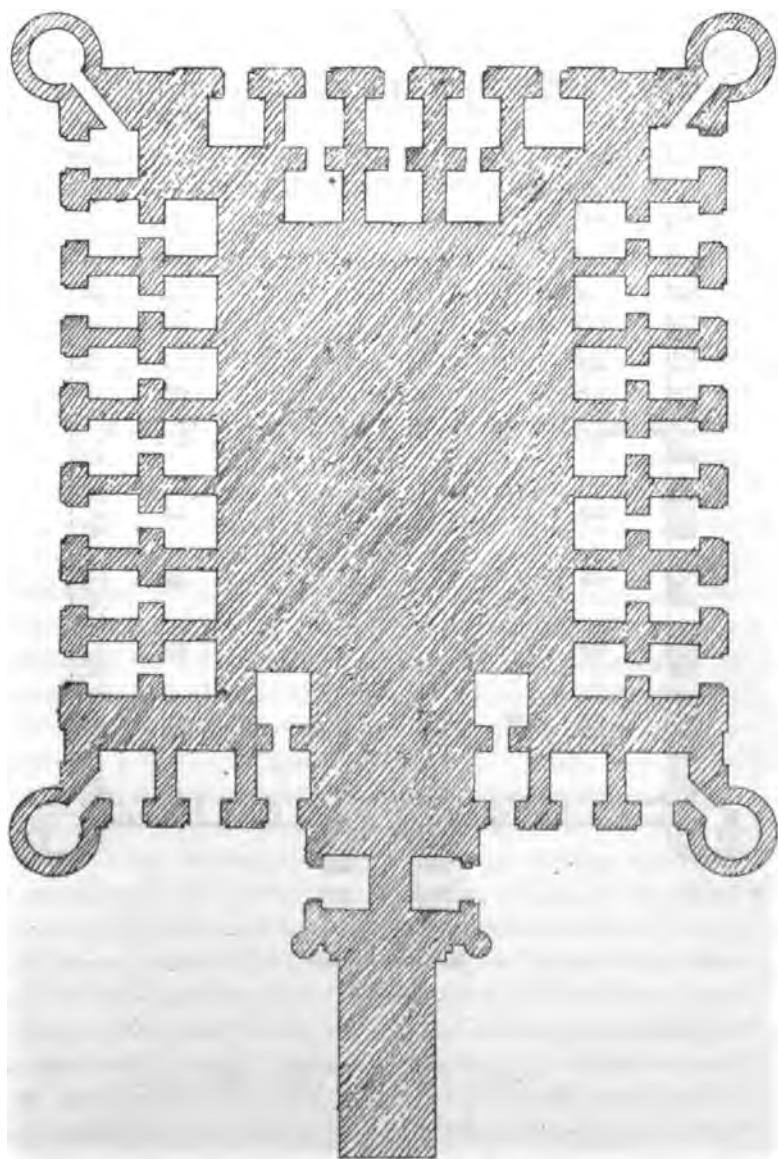
The cœcum is 2¼ to 2½ wide, and 20 to 22 inches of the great gut next it are of like width and similarly saccid. The last 4 to 6 inches of the cœcum are simple and narrow. Average width of intestines ¾ inches, exclusive of wide part.

*Some account of the "Kalán Musjeed," commonly called the "Kalee Musjeed," within the new town of Delhi, by Lieut. HENRY LEWIS, Artillery, Deputy Commissary of Ordnance, and HENRY COPE, Esq.**

The historian says of Feeroz Toghluq, that during a reign of thirty-eight years "he built fifty dams across rivers, to promote irrigation; forty mosques; thirty colleges; one hundred serais; thirty reservoirs for irrigation; one hundred hospitals; one hundred public baths, and one hundred and fifty bridges, besides many other edifices for pleasure or ornament."—*Elphinstone's History of India, Vol. II. p. 71.*

* Communicated by the Archæological Society of Delhi.

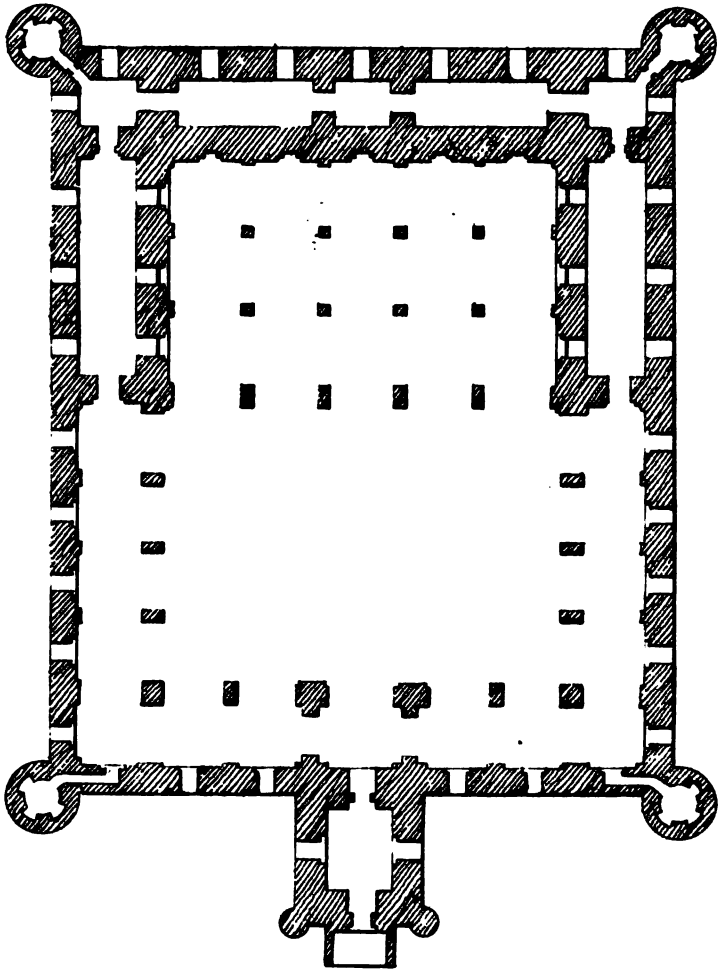
The distinguished writer here quoted remarks that the round numbers, as well as the amount, of some of the items, suggest doubts of the accuracy of this list, but that the works of Feeroz, which still remain, afford sufficient evidence of the magnitude of his undertakings. The evidence around, and even in Dehli, of the truth of this remark, is most striking; and though the whole of the structures which bear the impress of his period, may not have been, and probably were not, erected by this king architect himself, it is more than probable that the building mania in which he indulged, induced the great officers around him to follow his example, and thus earn a sure way to royal favor. In this manner the king may have obtained credit for many edifices which in reality owe their existence to the emulation he created. The inscriptional evidence of those times is, unfortunately, so very scanty, that this is a point which it must be extremely difficult to settle, and therefore that which is obtainable is the more valuable and deserving the particular attention of the Archæologist. Among the most perfect specimens of the age of Feeroz Toghluq (Feeroz III. of the historians) is the large mosque, within the walls of the present town of Dehli (Shajehanabad) known commonly as the Kalee Musjeed, or black mosque; but this designation, though there are grounds for believing it to be one of long standing, is in all probability a corruption of Kalán Musjeed, or chief mosque, in contradistinction to several smaller ones, said to be six in number, popularly reported to have been founded at the same time, and by the same person as the Kalán Musjeed; one of them exists at the present moment, though in a dilapidated state, at no great distance outside the walls of Dehli, between the Ajmeer and Lahore gates, and which has been converted into a lime-kiln and storehouse for fuel. The Kalán Musjeed is situated near the Toorkman gate of the town, in the Toorkman Thannah, and in the neighbourhood of the celebrated shrine of Toorkman Shah, of which some account may hereafter be given. It is built on ground somewhat higher than that which surrounds it, and, with the exception of the Jumma Musjeed and the gates of the palace, is the most prominent structure in the city of Dehli. It consists of two stories, the first or basement consisting, as shown in the annexed plan, Pl. xv. of a number of small apartments which were possibly built for the very purpose they now answer, namely, that of assisting by the rent



Basement Story Kalin Mosque.

Scale ———— " " " " feet

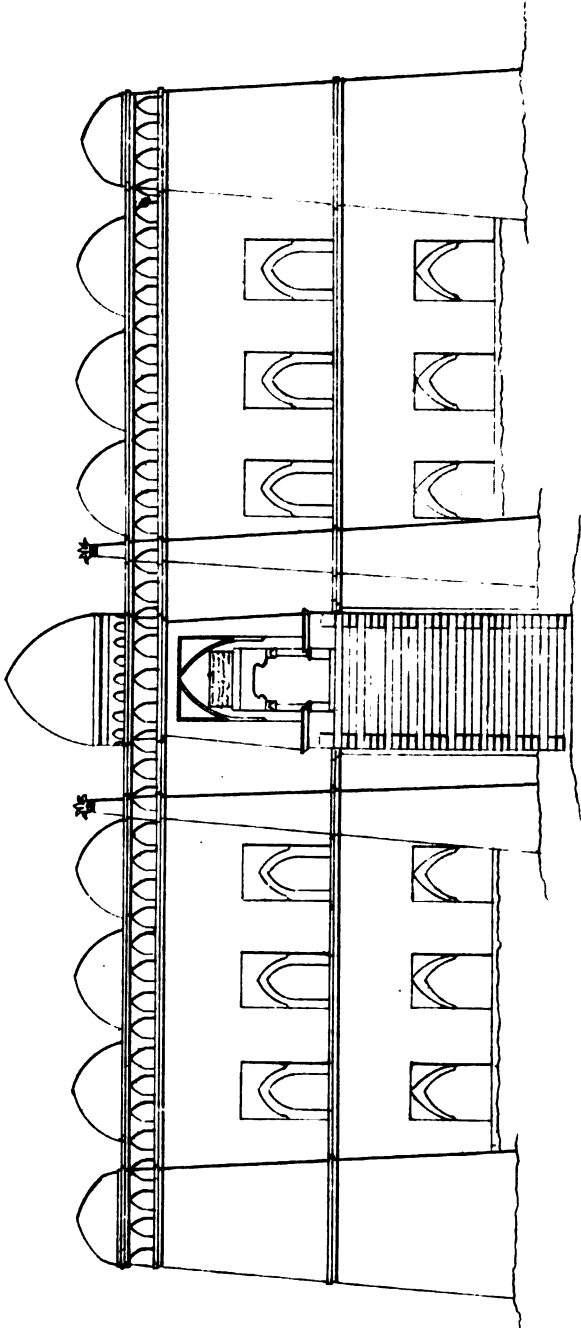
Reduced from M. Leprieu's plan.



Upper Story, Kaldn Musjeed.

Reduced from Mr Scotland's plan.

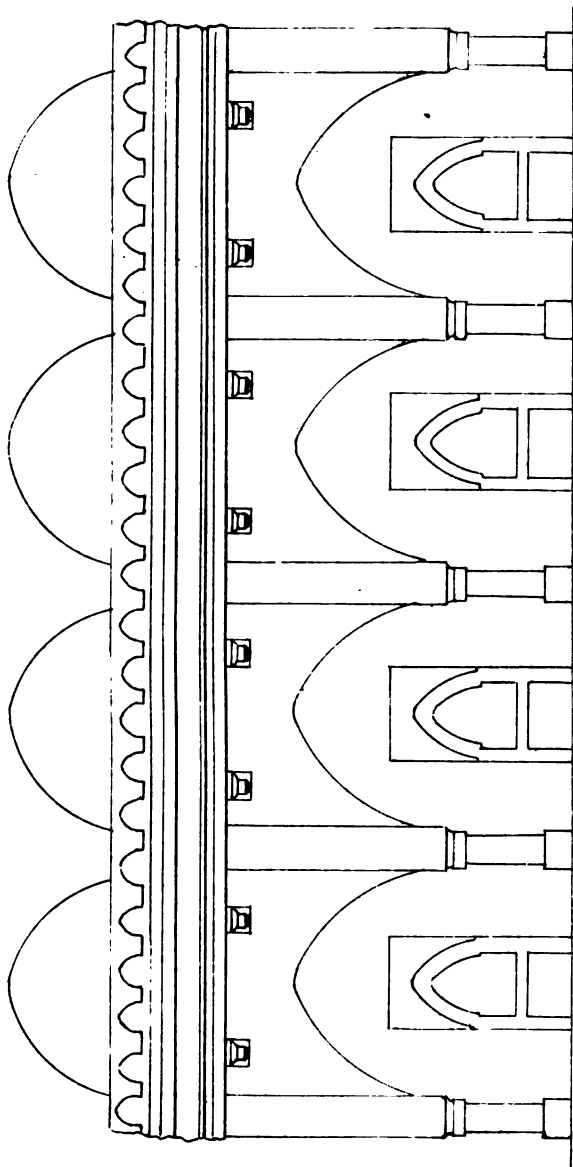
J.R.L.



Front elevation of the Kalan Masjid.

Reduced from Mr. James's sketch

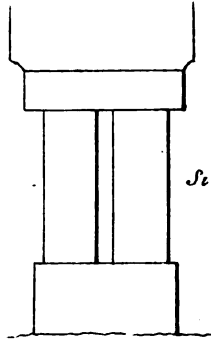
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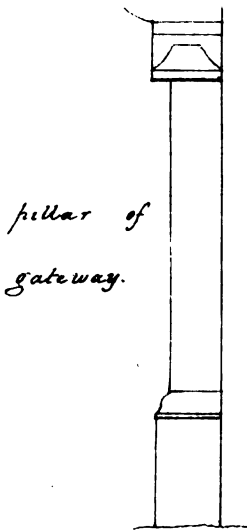
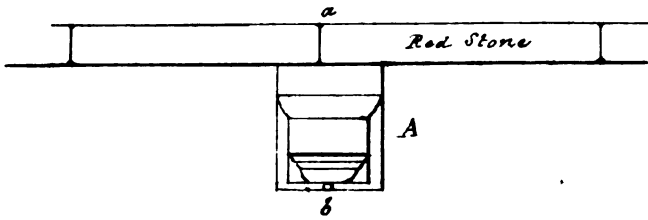
Elevation Southern and Northern Cloister, Kalán Masjid.

R. Lewis del.

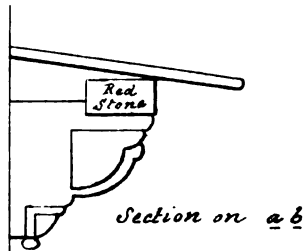
Public Architecture Department



Side view of pillars.



pillar of gateway.



Section on a-b

they yield, in defraying the expenses of the mosque, in conformity with a practice prevailing to this day. The apartments along the walls are accessible by doors raised one step above the ground; those in the towers by passages from the neighbouring rooms. The upper story will be described hereafter. The mosque is built of the materials which appear to have been generally in use at the time of its construction, viz. the common quartzose sandstone found in the immediate neighbourhood of Dehli. This stone which is in masses of various sizes, some, especially those towards the foundation, being of considerable dimensions, is unhewn, and cemented by chunam of the best quality, indeed so excellent that the strength of the domed roof seems to depend entirely on its adhesive properties, there being no attempt at placing the stones of which it is constructed throughout, into any thing like the arrangement now adopted in the building of arches and domes, crowned by a centre or keystone. This cementing chunam, in this, and it is believed in all other buildings of the period, with a view probably of saving the expenditure of lime, is mixed with a great proportion of brick soorkee, of which many pieces are upwards of an inch in diameter. It will be curious to elucidate, by a series of observations, whether the bricks of which this soorkee was prepared, were made at the time, solely for the purpose of being mixed with the mortar, or whether they were remains of what had been used as the principal material in buildings of older date, and been discarded on the introduction, by the western people, of the use of tougher and less costly material, procurable in the neighbouring hills. The whole of the edifice, both inside and outside, has been plastered over with chunam of the best description, to judge by what remains; and parts about the doorway show that the outside has been at some time or other coloured of that peculiar blue-black produced by the ground charcoal of cocoanuts, and other similar substances. Very little, however of the plastering remains, except in the body of the mosque, where some care appears to have been taken for its preservation, (by repeated whitewashing,) and on the roof and domes which its durability has preserved from destruction. The whole is in a very fair state of preservation, and where, here and there, stones have fallen out, especially at the base of the towers and walls, they have been carefully replaced by brick masonry. The steps leading up to the entrance

door, and the pillars of the doorways and of the arches, are constructed of square roughly-hewn, hard, grey stone, described by Capt. Cautley, as only a variety of the quartzose sandstone more commonly in use in the walls, &c. which is also used for the eaves (slabs not above two inches thick and about two feet square) projecting into the upper inner square or court of the mosque, and for the brackets which support them. These brackets as well as the pillars at the doorways, are carved, as shown in the annexed sketches. Under the eaves, and resting on the brackets, is a ledge of the Roopas red stone, now so commonly in use throughout these provinces, but which seems to have been much more sparingly employed about the time of Feeroz than it was 80 or a hundred years before, in the Kootub Meenar, the Mote Musjeed, and other structures of the time of Shaháb-ood-deen and Shums-ood-deen Altumsh. The red stone is also used, (on account, presumably, of its being softer and therefore more easily carved,) in the lattices of the windows, which are still open, and probably ornamented all the thirty-three windows which surrounded the upper story, some of which are now blocked up with the common stone masonry. There are also lattices of the same material between the main body of the mosque, and the vaulted passage leading on each side to the dark apartments behind, but none to the west. These lattices appear, notwithstanding their having been very well carved, to have been all covered with very fine chunam, after the fashion which prevailed to within the last hundred years, when the finely carved pillars, such as are standing in the ruins of the Koodseea Begum's Palace, built by the mother of Mahomed Shah (outside the Kashmeer gate) were similarly plastered over, to hide, it would seem, the piecings which here and there occur in the stone work. The stairs leading from below to the upper or main story are a flight of 29 steps, built upon three blind arches, with a landing place, and two more steps leading into the vestibule. Over the doorway, as exhibited in the sketch of the elevation, is a slab of somewhat rudely polished marble, with an inscription in the Nuskh character, of which the following is a copy in the common character of the present day :—

بسم الله الرحمن الرحيم بفضل وعناية افريدگار درعهد دولت بادشاه درپن دار
الوائق بقائيد الرحمن ابوالمظفر فيروز شاه السلطان خلد ملكه ابن مسجد

بناكرده بنده زاده درگاه جوانان مشهور مقبول الخطاب خان جهان ابن خان جهان
 خداى براى بنده رحمت كند هر كه درين مسجد بيايد بدعاء خير بادشاه
 مسلمانان و اين بنده بفاتحه و اخلاص ياد كند حق تعالى اين بنده را بيمارزد
 بحرمته النبى و الله مسجد مرتب شد بتاريخ دهم جمادى الاخر سنه تسع
 الثمانين وسبعتمائة *

(Translation.)

"In the name of God the merciful, the clement, and in the reign of the devout king, strong by the help of the merciful God, Ab-ool-Moozuffer Feeroz, Shah-ul-Sultan; may his reign continue; this Mosque was built by the son of the slave waiting at the threshold, Junah Shah, exalted with the title of Khan Jehan, son of Khan Jehan; may God be merciful to him. Any one coming to this Mosque is required to pray for the chief of the Mussulmans, and for this slave with the Fateha, with earnestness, and with the hope that God may forgive him at the day of judgment. By the grace of Mahomet and his posterity this mosque has been finished on the 10th of Jumda-ool-akheer in the year of the Hijra 789."

It appears that the letters were first cut into the marble with small deep round holes in each letter, or limb of a letter, and that subsequently lead was poured into the cavities, and then polished off even with the surface of the marble, the small deep holes assisting in keeping the lead firm in its place. The greater part has, however, fallen out, with the exception of that in the vowel points, which are almost all perfect, and of two or three of the letters in the first and second lines. The entrance to the main body of the building is through a square vestibule with a domed roof, to which there were an outer and an inner pair of doors moving in sockets of a singular description, but common in the architecture of the times. The latter have disappeared, the former are still in existence, and to judge from their antique appearance, their most rude construction, and the very coarse iron work about them, it is fair to infer that they are of a very ancient date, if not coeval with the mosque itself. The famous Somnath gates must be at least 800 years old, these would be only 459, and though sál is probably not as durable as sandal-wood, to any one who may see these doors it would afford no great stretch of the imagination to believe that they were put up when the mosque was built. On passing the second doorway you enter a

cloister surrounding, on three sides, the inner court of the mosque. This cloister supports four domes on the north and south sides, and six on the east, the part next the entrance being covered with a nearly flat octagonal roof, of superior construction. In the part of the court next this square are three principal tombs, and a secondary one, in a row, built of brick and plastered over, three of men and one of a woman. The three first have each head-walls about three and a half feet high, with recesses for lamps, and altogether look so modern that it is difficult to believe in the correctness of the tradition which has it that Khan Jehan, the father, and Khan Jehan the son, are both buried here, though it should be remembered that the tomb, still in existence, over the remains of the founder of the Toghluks dynasty, is also of brick. There is no trace of an inscription which could afford the slightest clue to the truth or falsehood of the tradition. On the west side of the court is the main body of the mosque, consisting of a system of arches and domes, supported by six double and eighteen single pillars, including the pilasters against the walls on three sides. There are consequently five arches in front, and three in depth, supporting fifteen domes all, but the centre one, which is about three feet higher than the others, of the same height and dimensions. Round this colonnade, which would be decidedly imposing were the pillars only two or three feet higher, runs an enclosed passage, the use of which it is difficult to explain at present. It is dark and divided in the rear (to the west) being there separated from the mosque by a dead wall into three apartments, the centre one the smallest. In the inner wall of this passage, on either side and to the right and left of the door leading into it from the surrounding cloister, are flights of steps leading to the roof. They are, as usual in all buildings of that time, narrow, but not difficult of access, as is frequently the case. It seems premature at present to attempt any general conclusion on the nature of the buildings erected in the time of Feeroz, and the light they throw on the history of the period, there being so many other contemporaneous structures in the neighbourhood of Dehli, the examination of which must further elucidate the subject, but the following points regarding the Kalán Musjeed, the most perfect specimen of those times remaining, seem worthy of remark.

1st. The sloping style of the architecture seems peculiarly illus-

trative of the buildings of that, and earlier periods. The Kootub Minar is a well known instance of this style, as adopted about 100 years before the time of Feeroz, and the conical towers on each side of the entrance to the Kalán Musjeed are, in their general conformity, not unlike the famous Kootub Tower. The sloping pillasters on each side of the main entrance give somewhat of an Egyptian appearance to the front of the building, which is not dissimilar from some of the more ancient remains of Hindoo architecture, the style of which is generally believed to have been derived from the Egyptians.

It will be an interesting subject of future inquiry,—being a question which has not, that we are aware of, been yet decided, whether the Mahomedan conquerors of India preserved the style of architecture of the countries from which they emigrated, or whether they did not imitate to a certain extent the Hindoo buildings which they found in India.

2nd. The very simple kind of column and entablature used in this building as supports to the arches, is a point also very worthy of notice. It consists of one, or in most instances, two upright stones or pillars, standing on a third, with a fourth placed on the top as an entablature. This is one of the most primitive styles of architecture known. The peculiar construction of the arches and domes, the stones of which are held together by the wonderful adhesive qualities of the lime used in those days, without any key stones, has been before remarked upon, and is another characteristic of the Mahomedan Indian buildings of the 14th century.

3rd. It is reasonable to infer that this mosque was built in the midst of a considerable population, and that the present site of Dehli, was either a suburb of the then Feerozabad, or if not, a portion of that town itself.

It has been mentioned that the apartments on the basement story are occupied. The tenants pay to the collector of Dehli the monthly sum of Rs. 6-3, of which 6 Rs. are handed over to the attendant Priest appointed by the local authorities who, out of that sum, defrays the expenses of sweeping, and water, and provides the *budenees* in use by the few frequenters of the mosque, chiefly Affghans residing in the neighbourhood, to perform their ablutions. The balance of 3 annas per mensem is carried to the credit of the state, which is however, at the expense of any repairs which may be required.

As it is desirable, that a biographical sketch of the founder of any building illustrated should, where possible, accompany the detailed accounts which will, it is hoped, be laid from time to time before the Archæological Society of Dehli, with the view of comparing the architectural with the written records of the times, some account of Khan Jehan, who built the Kalán Musjeed, is here annexed, derived chiefly from Ferishta. The inscription explicitly mentions that the founder was the son of another Khan Jehan, and we find this assertion supported by the historian, who informs us that the first Jehan was, in the year of the Hijra 754, (A. D. 1349,) two years after the accession of Feeroz to the throne of Dehli, and in the 44th of his life, appointed Viceroy of Dehli, while the Emperor proceeded to Bengal on an expedition against Elias (Ilyas Khaje Sultan Shums-ood-deen Bengara).*

* Since the above was written we have been favored by Major M. E. Loftie, 30th N. I., with the following account of Khan Jehan the elder, extracted from the *Tabakát Akbaree*, which confirms the above, and furnishes still more ample details :

Extracts from the Tabakát Akbari, regarding Khán Jahán the elder, the wazir of Sultán Fírúz Shah.

"And in the year 754, after having hunted in (the district of) Kalánúr, he (Fírúz Sháh) returned, and, at the time of his return, he laid the foundations of some lofty buildings on the banks of the river Sarasutí. And he conferred upon Shaikh Sadru'd-dín, the son of Shaikh Bahau'd-dín Zakariya, the title of Shaikhu'l-Islam, and, having honoured Malik Kabúl, who was the deputy wazír, with the title of Khán Jahán, he made him the wazír of the empire."

"And also in the month of Shawál, in the year 754, having invested Khán Jahán with the most ample authority, he (Fírúz Shah) left him in the city (of Dehli), and departed with a powerful force for Lakhnautí, in order that he might put an end to the tyranny exercised by Ilyás Hájí, who, having assumed the title of Sultán Shamsu'd-dín, and founded (or enlarged) the city of Pandúá, had taken possession of the country as far as the confines of Banáras."

"After that, in the year 760, the Sultán (Fírúz Shah) marched towards Lakhnautí, leaving Khán Jahán in Dihlí, as vice regent during his absence."

"In the year 772,† Khán Jahán died, and his eldest son, Júnán Shah, received the title of Khán Jahán."

* According to Ferishta, Khán Jahán was appointed wazír, by Fírúz Sháh, in the year 752, when that monarch was advancing to the capital from the neighbourhood of Thatha (Tattah) in Sind, where he had been called to the throne on the demise of Sultán Muhammad Taghlik Shah. Sultán Muhammad died on the 21st of Muharram 752, and Fírúz Sháh arrived at Dihlí on the 2d of Rajab, the same year, having been 158 days upon the journey. On his way, he passed through the city of Ajúdhan (also called Pattan), in the province of Multán, where he visited the tomb of the celebrated Muhammadan saint, Shaikh Farídu'd-dín Shakarganj. From Ajúdhan, he moved to Hánsí, and it was upon the march to that city, that Malik Kabúl, waited upon him, and was raised to the dignity of prime minister, with the title of Khán Jahán. (See Ferishta, Bombay edition, p. 260). M. E. L.

† Ferishta says 774 (v. Bombay edition), and Dow gives the same date. M. E. L.

This officer, who was subsequently raised to the dignity of Wazeer of the empire, died A. H. 774, (A. D. 1356,) in the 22d of the reign of Feeroz, and was succeeded in his titles and office by his son, (whose name was Jonah Shah, according to the inscription, though that fact is not mentioned by the historian.)* In A. H. 787, the 13th of his Weezarut, and the 35th of his master's reign, it is said that age and infirmity began to press hard upon Feeroz. "Jehan, the Wuzeer, having the sole management of affairs, became very powerful in the empire. The emperor was so much under his direction, in all things, that he had the effrontery falsely to accuse Mahomed, the King's son, of a design against his father's life, in conjunction with several omrahs. He brought the old man firmly to credit this accusation, and obtained his authority to secure the supposed conspirators." * * * "A party was sent to seize the Prince, who having previous intelligence of the design against him, began to provide for his security, placing guards, and fortifying himself in his palace. In this situation he remained shut up for some days; and at last, having obtained leave for his wife to visit the King's Zenana, he put on his armour, went into the close chair, and was carried into the Seraglio. When he discovered himself in that dress, the frightened women ran screaming into the emperor's apartment, and told him that the prince had come in armour with a treasonable design. The Prince having followed them, presented himself to his father, and falling at his feet, told him, with great emotion, that the suspicions he had entertained of him were worse than death itself. That he came, therefore, to receive it from his own hands. But first he begged leave to inform him, that he was perfectly innocent of the villainous charge which the Wuzeer had purposely contrived to pave his own way to the throne. Feeroz, sensible of his son's sincerity, clasped him in his arms, and weeping, told him he had been deceived, and therefore desired him to proceed, as his judgment should direct him against the traitor. Mahomed, upon this, went out from the presence and ordered 12,000 horse to be in readiness. With this body he surrounded the Wuzeer's house that night, who upon hearing of the prince's approach, put Ziffer (governor of Mahoba, lately imprisoned on the

* It is however in the *Tabakát Akbaree*, as will be seen in the extract translated by Major Loftis. We find that *Ferishta* himself also calls him *Junah Shah*, p. 256.

plea of his being one of the conspirators with the prince against the emperor) to death, and collecting his friends, came out to engage him in the street. Upon the first onset the traitor was wounded, and drew back to his house. He fled immediately towards Mewat and the prince seized all his wealth and cut off his adherents. Feeroz, *immediately after these transactions*, resigned the reins of government into the hands of his son, and abdicated the throne. The prince assumed the name of Mahomed (Naseer-ood-deen-ood Duncea), ascended the throne *in the month of Shaban 789*, and immediately ordered the Kootba to be read in his own and his father's name."—*Ferishta's History of Hindustan, translated by Dow, Vol. I. pp. 311, 312).*

From this detailed account by the historian it would appear that the **Kalán Musjeed** was finished by the Wuzeer Khan Jehan, only two short months, perhaps less, before his treason led to his downfall, his expulsion from the capital, and the loss of all his wealth, which fifteen years of unlimited power, under the declining energies of Feeroz, had doubtless made an object of desire to the prince who expelled him. His end was the end of most men in disgrace in those days. He had, it appears, taken refuge with a chief named Goga. On the appearance, in his district, of Sekunder Khan, a newly appointed governor of Guzrat, who was proceeding through Mewat to take possession of his office, Goga, fearing the resentment of the new emperor, seized Khan Jehan, and sent him bound to Sekunder Khan, who cut off his head, and forwarded it to Dehli. (*Ferishta as above*).* It is, therefore,

* Here again we are under obligations to Major Loftie for extracts from the *Tabakát Akbaree*, relating to the career and overthrow of Khan Jehan the younger:—

Account of the fall of Khán Jahán the younger, extracted from the Tabakát Akbari.

"In this year (787), the emperor (Fírúz Sháh) was greatly broken by infirmity and old age, and Khán Jahán, becoming possessed of unlimited authority, was desirous of getting into his hands the emperor's son, the prince Muhammad Khán, together with several of the nobility, such as Daryá Khán, the son of Zafar Khán, Malik Yaakúb, Muhammad Hájí, Malik Samá'ud-dín, and Malik Kamálúd-dín, who were friends and well wishers of the prince, and of depriving them of their power. He represented to the emperor, that the prince, in concert with the aforesaid noblemen, meditated a revolt, and Fírúz Sháh, putting faith in what he said, directed that the whole of those Lords should be arrested. Intelligence of this proceeding having been received by the prince, he absented himself for some days from the presence of his father. Khán Jahán then summoned Daryá Khán to appear before him, on the pretence of examining the accounts of the district of Mahoba, and (upon his arrival) confined him in his (Khán Jahán's) house. On hearing of this, the prince was filled with apprehension, and waited upon his father,

possible that his head may have been interred in the mosque beside the remains of his father, and that the tradition above alluded to might be considered as founded on fact, did not the appearance of the tombs themselves cast such a strong doubt upon it. We have, in the agreement between the dates of the historian, and that of the inscription, a confirmation of the accuracy of Ferishta in this part of his history at least, as it is scarcely likely that he ever saw or heard of the Kalán Musjeed, which must, in his time, (that of Jehangeer) have been outside the town of Dehli, surrounded, probably, by ruins, and as abandoned as it is now as a place of worship. Its massive solidity could alone have withstood the ravages of 459 years. In conclusion it may be remarked as a singular fact that a building of

whom he convinced of the treasonable designs of Khán Jahán. "He is anxious," said he, "to get rid of the principal members of the nobility, and after having removed them, he will turn his thoughts to the seizure of our persons." Upon this, the emperor ordered that Khán Jahán should be put to death, and released Daryá Khán from confinement.* The prince Muhammad now directed Malik Yaakúb to have the horses of the imperial stables in readiness, and also desired Malik Kutbúd-dín, the superintendent of the elephants, to draw up those animals, for the purpose of making an attack upon Khán Jahán. Towards the end of the night, the prince proceeded with a strong force against Khán Jahán, who sallied out of his house, accompanied by a few friends, and began to defend himself. At length, he was wounded, and his party being overthrown, he fled from the spot. The prince plundered his house, and put to death Bihzád-Fatah Kháni, Malik Imadúd-daulat, Malik Shamsúd-dín, and Malik Masálih, who had fallen into his hands in the course of the fight. After these events, the emperor entrusted his son with the sole management of affairs, made over to him the insignia of royalty, such as horses, elephants, and followers, and conferred upon him the title of Násirúd-dín wa-ud-dunyá Muhammad Sháh (the defender of the faith and of the World, the emperor Muhammad). Firúz Sháh then devoted himself to the service of God, and the duties of religion. On Friday, the Khutba was read in the name of both sovereigns—Sultán Muhammad Sháh mounted the throne in the month of Shaabán, in the year 789. * * * * On Malik Yaakúb he (Muhammad Sháh) conferred the title of Sikandar Khán, and he placed the province of Gujrát under his control. * * * * Malik Yaakúb, on whom the title of Sikandar Khán had been conferred, was sent by Muhammad Sháh, with a large body of troops, against Khán Jahán. When this force arrived in the neighbourhood of Mewát, Kúká Chauhán,† seized Khán Jahán, and sent him to Sikandar Khán, by whom he was put to death, and his head sent to Muhammad Sháh.‡

* I think there is an error here in my copy of the *Tabakát Akbarí*, and that for "released Daryá Khán from confinement," we should read "directed that Daryá Khán should be released from confinement." Daryá Khán was, at this time, imprisoned in the house of Khán Jahán, and was subsequently (according to Ferishta, by whom he is named Zafar (not Daryá) Khán, the son of Zafar Khán) put to death by the fallen minister, when the prince Muhammad Sháh attacked his house.—M. E. L.

† To whom, Ferishta states, he had fled for protection.—M. E. L.

‡ This occurred in A. H. 789.

this kind within the precincts of a large and modern town; and prominently conspicuous from almost all parts of that town, should have been so little noticed by modern travellers. Bernier has not a word about it; it is not alluded to by Franklin, whose description of Dehli, in the fourth Volume of the *Asiatic Researches*, forms the staple basis of all subsequent accounts. It is possible however that descriptions may exist; if so the writers of this have not seen them, and can only hope that in such a case their account may be found to contain matter not previously touched upon by others.* They may further be permitted to express a hope that they will not be considered presumptuous in suggesting to other members of the Archæological Society of Dehli, the plan they have adopted in this paper with regard to other edifices around Dehli, by which a large mass of valuable illustrative information might be collected in a very short time.

We may state in addition that we have learnt, since the above was written, that several years after Dehli came into the possession of the British government, the principal Mahommedan inhabitants of the neighbourhood of the Turkman gate, who noticed with grief the neglect with which this mosque was treated by the king in whose charge it appears then to have been, presented a petition to the local authorities to restore the mosque to its original use; that their request received favorable consideration, that a grant, said to have amounted to Rs. 1500, was made to clean and repair the mosque, that the silk-weavers who had

* The following is the account, a very disparaging one, given of the mosque by Bishop Heber in the narrative of his journey:—"The Kala Musjeed is small, and has nothing worthy of notice about it but its plainness, solidity and great antiquity, being a work of the first Patan conquerors, and belonging to the times of primitive Mussulman simplicity. It is exactly on the plan of the original Arabian mosques, a square Court surrounded by a cloister; and roofed with many small domes of the plainest and most solid construction, like the rudest specimen of what we call the early Norman architecture. It has no minaret; the crier stands on the roof to proclaim the hour of prayer.—Vol. II. p. 297, 8vo. edit.

Hamilton, in his *East India Gazetteer* (2d edit. 1828) says of the Kalán Musjeed: "Besides these there are forty other mosques, some of which bear the marks of considerable antiquity. This applies more particularly to the black mosque, a large and gloomy edifice of dark-coloured granite, whose rude internal columns, cloistered area, numerous low cupolas, and lofty outer walls, devoid of aperture or ornaments denote an origin coeval with the earlier Affghan dynasties." [This last paragraph clearly shows that the inscription had not been read at the time the *Gazetteer* was published, because the reading would have left no doubt about the matter].

taken possession of it, were turned out, and that the arrangements now subsisting were then made for letting out the ground floor apartments so as to provide the means for keeping up at least the small religious establishment still provided.

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*Translation of an Inscription on a Gun at Moorshedabad with Remarks, by Major ST. G. D. SHOWERS.*

I send you for insertion in the Journal of the Society a copy of a Persian inscription on a Gun at Moorshedabad. I forward also a translation of the inscription, with a sketch of the Gun. It is lying in a spot called the "Top-khanuh," which, with the "Qabuk-khanuh," in its immediate vicinity, took its name from the guns and ordnance stores collected here by the Nawab Mohabut Jung, otherwise called Ulee-vurdee Khan, when hordes of freebooters, known among the people here by the name of Burgees, (no doubt the Mahrattas,) roamed over the country in search of plunder. Several guns and some shot have been dug up and removed, and there are still two or three lying about or half buried in the earth. The gun on which the inscription is found is named the "Juhan Koosha," *the Subduer of the world*, and was probably brought by Moorshid Koollee Khan from Dhaka, where it was constructed, when he became invested with the administration of these Provinces. The following are the dimensions of the gun :

|                                       | ft. in. |
|---------------------------------------|---------|
| Extreme length, .....                 | 17 8    |
| Depth of bore, .....                  | 15 3    |
| From muzzle to 1st trunnion, .....    | 5 0     |
| Space between the 2d trunnions, ..... | 5 0     |
| From 2d trunnion to the breech, ..... | 5 0     |
| Diameter of muzzle, .....             | 1 9½    |
| Do. of bore, .....                    | 0 6     |

It was made, as the inscription states, at Dhaka during the reign of the Emperor Shah Jahan, and is formed in the old style of welding together a series of rings over bars of iron. The art of casting cannon was known at Dehli as far back as the reign of the Emperor Babur,

but it is probable it had not reached so distant a province as Bengal, or the Juhan Koosha, a gun with which so much trouble appears to have been taken, would not have been constructed on the older and ruder method.

Islam Khan, the Viceroy by whose order the gun was constructed, is said, according to the author of the *Siyur-ool-Mootakhureen*, to have been appointed to the Government of Bengal 1047 of Hijree, corresponding to 1637 of our era, and was transferred to the Dewanee of the Empire at Delhi in the month Rujub 1049, or A. D. 1639.

The rest that is known of this Governor is succinctly mentioned by Marshman in his *History of Bengal*. I extract the passage, as it will be interesting in connection with the account of the gun :—

“In 1638 Islam Khan Mushmedy, an old and experienced officer, succeeded to the Viceroyalty of Bengal. In the first year of his Government, Mukut Ray, who held Chittagong for the Rajah of Arracan, rebelled against his master, and delivered it up to the Moguls. This port originally belonged to the independent kingdom of Tipperah : it was next conquered by the Muhammadans ; but in the disputes which arose between the Afghans and Moguls, it fell into the hands of the king of Arracan. It was probably called Islamabad after the Governor who in this year acquired possession of it. Meanwhile the Rajah of Assam embarked five hundred boats on the Brumhapootra, and came down like a torrent on Bengal, plundering every town and village in the way. The Soobadar went out to meet him with his war boats armed with cannon. The Assamese could not withstand them. Their fleet was soon in flames ; of the crew, a part fled to the shore, but four thousand were put to death. Islam Khan pursued them to their own country, and took fifteen forts and much spoil. It was also under his Viceroyalty, which lasted but one year, that Cooch Behar was invaded by the Muhammadans.”

It will be observed there is a slight discrepancy between Marshman's account, and that in the *Siyur-ool-Mootakhureen* with regard to the date of the Viceroy's appointment to Bengal : but it is of little consequence, as it has probably arisen in computing the corresponding years of the Christian and Muhammadan eras, an error in such calculations being easily occasioned by mistaking the intercalary periods of the Muhammadan year.

To the naturalist and the general observer the "Juhan Koosha" is curious from the position in which it is lying. It is grasped by two trunks of a peepal tree, and supported by them about eighteen inches from the ground. Native tradition states that it was brought to the spot on a carriage, and was left there as the wheels sunk into the mud and could not be extricated. The tree must have sprung up under it, and the trunks as they grew, grasped the gun and continued to support it after the carriage had rotted away and fallen from under it. The back trunnion, on the opposite side from that whence the sketch is taken, is imbedded in the trunk and cannot be seen, but two stancheons and a ring are visible, which evidently belonged to the carriage. The front trunnion, with the iron work attached, was until lately also imbedded in the tree: but within the last six months a part of the trunk has been torn away by a storm, by which it has become exposed to view. The iron work on which the trunnion rested corresponds with the dimensions which may be supposed to be necessary to support so large a body on its carriage: and its bulk had no doubt so weakened the outer portion of the trunk as to make it yield easily to any force applied to it.

There is another peculiarity which it may be proper to notice as exhibiting a second phenomenon in the growth of the tree. There are two trunks that support the gun, but I am inclined to think they are branches of one tree. The trunk, obstructed in its growth, and pressed down by the weight of the gun, had first spread out under it; then forcing itself up one side and still hugging the gun, it met with a new obstacle in the trunnion, stancheons and the heavy iron work attached to them, and unable to press them aside yielded to the obstruction and parted and shot up in two large branches.

I cannot conclude this without acknowledging my obligation to Ensign Forster, of the 39th N. I. for the copy of the sketch I forward.

*Inscription.*

|       |       |       |      |       |       |       |         |
|-------|-------|-------|------|-------|-------|-------|---------|
| تبارک | الله  | قلمرو | مالک | ساخت  | چو    | ستوده | نام     |
| خدبو  | عرسه  | دوران | جناب | شاه   | جهان  | یگانه | ثانی    |
| بلند  | مرتبه | توبی  | که   | بر    | مپهر  | برین  | نهاده   |
| ز     | صیت   | دولت  | وفال | صلابت | وهیبت | باو   | فتاد    |
|       |       |       |      |       |       | زلازل | بسورهای |
|       |       |       |      |       |       | انام  |         |

بعهد معدلت داور ستوده سیر که ملک اعظم بنگاله زوگرفت نظام  
 صاحب مکرمت اسلام خان عالیشان که بردرش بود اقبال چزن کمینه غلام  
 چوگشت ساخته این توپ ازدها تمثال بی شکست عدو شهنشہ انام  
 بچستم ازرة اندیشه سال انماضی رسید — توپ جهان کشا الہام  
 توپ جهان کشا ساخت جهانگیر نگر عرف دہاکہ بدارونگی شیر محمد و مشرفی  
 ہرلیہ داس و کاریگری جنار جن اہنگر ماہ جمادی الثانی سنہ ۱۱ موافق سنہ  
 مقرر وزن مارے — بوزن می شش دام تل ثماري چوت ۲۸ نار •

*Translation of the Inscription.*

The first couplet is illegible, but it is probably connected with the second.

“The Lord of the world! the great Shah Jehan  
 Unequaled—a second Sahib Qiran, the king of Islam.—  
 Such the dignity of this gun, that in the highest heaven  
 The times assigned it a station in the most exalted place.  
 From the report of its power, and omens dreadful and awe-striking,  
 The fortifications of the enemy shook as by an earthquake.—  
 In the time of the chief of noble qualities—  
 By whom the kingdom of Bengal was organized,  
 The cloud of beneficence, the famed Islam Khan,  
 At whose door prosperity waited as the lowest menial,—  
 When this gun of serpentine form was constructed,  
 For the purpose of destroying the enemies of the king—  
 I sought in the path of reflection the year of its completion,  
 Came\* — the “top Jahan Koosha” by inspiration.

The Gun Jahan Koosha was constructed at Jahangeer-nuggur, otherwise called Dhaka, during the Darogaship of Sher Mahommad, and when Hur Bulleeah Das was Mashrif (Inspector), and Junar Jun Chief Blacksmith; in the month of Jumadee-oos-Sanee, in the year 11 † corresponding to the year 1047. Weight 212 maunds, the measure 36 dams til sumaree, charge of powder 28 seers.”

\* A word here elligible on the inscription.

† Of the reign of the Emperor.

*Postscript on the Pigmy Hog of the Saul forest, by B. H. HODGSON, Esq.*

Since my account of this rare animal was written I have had the great and unexpected good fortune to procure another specimen, a fine old male, which exhibits in perfection the characters of the species. I am still of opinion that the Pigmy Hog cannot be properly classed with the true Hog, or genus *Sus*, though the disparity is not so great as I was led to suppose. The following generic and specific characters will, I hope, accurately portray our animal in his general and special relations.

Pachydermata.

Suidæ.

Genus *Porcula*, *mih*.

*Generic character.*—Teeth 44, as in *Sus*; canines smaller and straighter. Facial bones contracted in length and void of the peculiar nasal bone and cartilage of *Sus*. Fourth toe small and unequal. Tail rudimental.

Type, *Porcula Salvania*, *mih*.

Pigmy Hog of the Saul forest.

Sáno Banél and Chota Savar of the natives.

Habitat, the Saul forest.

*Specific character.*—Pigmy Hog, of a medial brown colour, resulting from an irregular mixture of bristles wholly or partially black and sordid amber colour, the black part being generally basal and rarer. Young darker hued and unstriped. Iris hazel. Nude skin, dirty flesh colour. Hoofs glossy brown. Pelage ordinary, abundant, consisting of bristles. No mane. Tail not so long as the hairs of the rump, straight, nude. Length from snout to vent 22 to 24 inches. Height 10 inches. Weight 10 lbs, rarely 12. The skull of the Pigmy as compared with that of the common Hog is distinguished by a very considerable contraction of the great length of jaws proper to *Sus*, by a total absence of the special nasal bone and cartilage of that genus, by molar teeth carried back under the orbits so far as to exceed their postal margin, by greater compression of the facial bones and foramina, by zygomæ much less oblique or more horizontal, by smaller straighter canines, of which those of the lower jaw are very noticeably less divergent or more erect,

by orbits more nearly complete, there being distinct processes from the zygomæ as well as from the frontals, and lastly, by incisors unchanneled. The teeth are  $\frac{6}{8}$ ,  $\frac{1}{1}:\frac{1}{1}$ ,  $\frac{7}{7}:\frac{7}{7}$  and agree with those of *Sus* save in the straightness and erectness of the canines of the lower jaw. The following are the dimensions of a fine old male.

|                                |    |                |
|--------------------------------|----|----------------|
| Snout to vent, .....           | 2  | 0              |
| Head to occiput, .....         | 0  | $7\frac{1}{2}$ |
| Tail, .....                    | 0  | $0\frac{7}{8}$ |
| Hind leg, heel to hoof, .....  | 0  | $4\frac{1}{4}$ |
| Fore leg, elbow to hoof, ..... | 0  | 6              |
| Length of ear to lobe, .....   | 0  | $1\frac{3}{4}$ |
| Mean height, .....             | 0  | 10             |
| Snout to eye, .....            | 0  | $3\frac{1}{2}$ |
| Eye to ear, .....              | 0  | $3\frac{1}{8}$ |
| Girth behind shoulder, .....   | 1  | $3\frac{1}{2}$ |
| Length of fore hoof, .....     | 0  | $0\frac{3}{4}$ |
| Width of the same, .....       | 0  | $0\frac{1}{2}$ |
| Weight, .....                  | 10 | lbs.           |

*Skull.*

|                                            |   |                |
|--------------------------------------------|---|----------------|
| Length, .....                              | 0 | $6\frac{1}{4}$ |
| Width, greatest, .....                     | 0 | 3              |
| Height, greatest, .....                    | 0 | $4\frac{1}{2}$ |
| Front teeth to fore angle of orbits, ..... | 0 | $3\frac{1}{4}$ |

*Translation of the Inscription in the Nagarjuni Cave, given in Plate X. of the present Volume.*

In compliance with the wish of our indefatigable friend Capt. Kittoe, we had the inscription given in Plate X. of the last number transcribed in Devá Nágárí and translated into English. It proves however to be no novelty; an English version having been published long ago by Wilkins in the second volume of the Asiatic Researches! As this work is inaccessible to many readers of the Journal, we think it right, having published a facsimile of the original, to reprint the Eng-

lish version, together with the Deva Nāgarī transcript prepared by the Society's librarian, Babú Rajendra Lal Mitra.

आसीत्सर्वमहीक्षितां मनुखिव क्षत्रस्थितेर्वर्द्धकः श्रीमान्मत्तगजेन्द्र  
 तुल्यगमनः श्रीयज्ञवर्मा ऋषः ॥ येनाहृतसहस्रनेत्रविरहक्षामास देवा-  
 ध्वरे पौलोमी चिरमश्रुपातमलिनां धत्ते कपोलश्रियम् ॥ श्रीशार्ङ्गलनृ-  
 पात्मजः परहितश्रीयेन संसृज्यते लोके चन्द्रमरोचिनिर्मलगुणो  
 योऽनन्तवर्माभिधः । दृष्टादृष्टविभूतिकर्तृवरदम् तेनाङ्कतं कारितम्  
 विम्बं भूतपते गुंहाश्रितमिदम् देव्याश्च पायाष्णगत् ॥ मर्मान्ता-  
 द्वाष्टशार्ङ्गप्रविततसमरप्रस्फुरन्मखलान्त व्यक्तभ्रूभङ्गलक्ष्यव्यतिकरशवल  
 खर्षवक्त्रेन्दुविम्बः आन्तयोऽनन्तवर्मा स्मरसदृशवपुर्जीवितानिस्पृहद्भि  
 र्दृष्टः स्थित्वा ऋगीभिः सविरलनिमिषस्त्रिधसर्वेक्षणाभिः अत्याद्य-  
 द्वाङ्गुवरवनितास्पृङ्गिनःशार्ङ्गयन्त्रादयाविद्धप्रविततगुणोदीरितः सौख-  
 वेन । दूरेप्रायी विमथितगजो ध्वस्तवाजिप्रवीरो वायोरेस्त्रीव्यसन  
 पदवीदेशीकोऽनन्तनाम्नः ॥

1. The auspicious *Sree YAJNA VERMA*, whose movement was as the sportive elephant's in the season of lust, was like *MANOO*,\* the appointer of the military station of all the chiefs of the earth. By whose divine offerings, the God with a thousand eyes† being constantly invited, the emaciated *POULOMI*‡ for a long time sullied the beauty of her cheeks with falling tears.

2. *ANANTA VERMA* by name, the friend of strangers ; renowned in the world in the character of valour ; by nature immaculate as the lunar beams, and who is the offspring of *Sree Surdoola* : By him this wonderful statue of *BHOOTAPUTI* and of *DEVI*§ the maker of all things visible and invisible, and the granter of boons, which hath taken sanctuary in this cave, was caused to be made. May it protect the universe !

\* The first legislator of the Hindus.

† *Eendra*, a deification of the Heavens.

‡ The wife of *Eendra*.

§ *Siva*, or *Mahadev*, and his consort in one image, as a type of the deities, *Genitor* and *Genetrix*.

3. The string of his expanded bow, charged with arrows and drawn to the extremity of the shoulder, bursteth the circle's centre. Of spacious brow, propitious distinction, and surpassing beauty, he is the image of the moon with an undiminished countenance. ANANTA VERMA to the end! Of form like SMARA\* in existence, he is seen with the constant and affectionate, standing with their tender and fascinated eyes constantly fixed upon him.

4. From the machine his bow, reproacher of the crying *koorara*† bent to the extreme he is endued with force; from his expanded virtue he is a provoker; by his good conduct his renown reacheth to afar; he is a hero by whose unerring steeds the elephant is disturbed, and a youth who is the seat of sorrow to the women of his foes. He is the director, and his name is ANANTA. †

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Addendum to Capt. E. MADDEN's Notes of an excursion to the Pindree Glacier.

The subjoined note which came to hand some time after Capt. Madden's interesting article had been printed, should have appeared at foot of page 246. Speaking of the Thakil palm, *Chamærops Martiana*, Capt. Madden adds,—

"This Palm reaches the height of 30 feet, and is very abundant on the N. W. side of the Thakil mountain, where it flourishes from 6000 to about 7800 feet, along with Oaks, Maples, Rhododendrons, Yew, and *Primula denticulata*. I have also been informed that there are two tall specimens on the top of a mountain between Sutralee and Bagesur, to the right of the road, about three miles from the former place. *Trewia nudiflora* ("Toomree,") is found in the Turrai as far to the N. W. as Jounlasal, half way between Bhumouree and Burmdeo: to which point also reaches a semi-scandent *Dalbergia*, with pinnate leaves, apparently unknown further north, but very common towards Burmdeo. In the passes near this place, we find *Thunbergia coccinea*, "Kuljoka," in abundance; and *Hardwickia binata*, "Kuchlora"—attaining the size of a large timber tree. The *Clematis Nepalensis* of De Candolle (with an involucre) is abundant on the S. side of the Gaugur Pass, at the head of the stream called Jurra-panee, and apparently does not extend much further north: it grows at about 6500 feet elevation, and blossoms in December and January."

Capt. Madden further adds, that the kind of *shark* found in the Surjoo, called *gonsh*, is well known in the Ganges at Hurdwar.

* The Hindu Cupid.

† A bird that is constantly making a noise before rain.

‡ Eternal, infinite.

PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL,
MAY, 1847.

The usual monthly meeting of the Asiatic Society was held on Wednesday the 5th May.

The Honble Sir J. P. GRANT, in the Chair.

The Proceedings of last meeting were read and confirmed.

The accounts and vouchers for the past month were submitted as usual.

The following gentlemen, duly proposed and seconded at the April meeting, were ballotted for and elected :—

Capt. J. C. Hanyngton,
Rev. Jas. Thomson.
G. Udny, Esq. C. S.
R. Thwaites, Esq.
M. E. Gibelin, of Pondicherry.
J. R. Logan, Esq.
James S. Blakie Scott, Esq.
Falconer Chute Sandes, Esq.
Warren H. Leslie Frith, Esq.
Robt. Thomas, Esq.

The following gentlemen were named as candidates for admission (to be ballotted for at June meeting).

R. O'Dowda, Esq., proposed by Dr. O'Shaughnessy, seconded by Lieut.-Col. Forbes.

Lieut. Thuillier, Bengal Artillery, proposed by Dr. Stewart, and seconded by Dr. O'Shaughnessy.

J. B. Elliott, Esq. C. S. Patna, proposed by Mr. Laidlay, seconded by Capt. Munro.

H. W. Elliott, Esq. C. S., Sec. to Govt. of India, proposed by Dr. Roer, seconded by Mr. Bushby.

John Johnstone, Esq., proposed by Mr. R. W. G. Frith, seconded by Mr. Laidlay.

Capt. Thos. Brodie, 5th N. I. Principal Assistant Commissioner, Sibsagar, Assam, proposed by Major Jenkins, seconded by Dr. Roer.

Lieut. Ed. Tuite Dalton, 9th Regt. N. I. Asst. to Comr. of Assam, proposed by Major Jenkins, seconded by Dr. Roer.

C. B. Skinner, Esq. proposed by Mr. Laidlay, seconded by Dr. O'Shaughnessy.

F. E. Hall, Esq. of Harvard College, United States, proposed by the Lord Bishop, seconded by the Rev. Mr. Pratt.

Read letters from Secretary to the Government of India, Home Department.

From G. A. BUSHBY, Esq.

Secy. to the Govt. of India, to Senior Secretary to the Asiatic Society Home Department.

SIR,—I am directed to acknowledge the receipt of your letter dated the 16th ultimo, and to state that the Society's application to be permitted to indent on the Hon'ble Company's Dispensary for a monthly supply of 10 gallons of Spirits of Wine for the preservation of specimens in the Zoological Museum, has been submitted to the Hon'ble the Court of Directors, under whose authority the present monthly payment of 50 Rs. is made to the Society for the cost of preparing specimens and maintaining collections of natural history.

2. I am at the same time directed to request you will place before the Society the accompanying copy of a despatch from the Hon'ble Court, dated the 17th February last, No. 5, in which they convey their acknowledgments for the contributions made by the Society to the Museum at the East India House, and request that specimens of new subjects illustrative of the Natural History of India, may be furnished as they are discovered and collected.

I have the honor to be,

Sir,

Your most Obedient Servant,

G. A. BUSHBY,

Secy. to the Govt. of India.

Council Chamber, the 24th April, 1847.

*Public Department.**No. 5 of 1847.**Our Governor General of India in Council.*

1. Our attention having been directed to the contributions which have been made to our Museum in this House by the Asiatic Society of Bengal, and particularly to the collections received in this country during the last five years, we desire to acknowledge the friendly co-operation of the Society in furtherance of one of the chief designs of our Museum, viz. the establishment in certain departments of a complete series of subjects illustrative of the Zoology of India. The collections which we have thus received and which with some others have been the results of public missions on behalf of Government, have supplied to the Museum most of the common subjects of Indian Ornithology, and specimens in other departments of Zoology, but in order to carry out the design, it is highly desirable that specimens of new subjects as they may be discovered and collected should be furnished to us without delay.

In expressing as we now direct you to do our acknowledgments to the Asiatic Society, for the valuable additions which from time to time have been made to our Museum through their instrumentality, and which are highly creditable to the Society's officers, it is our wish that you should bring to the notice of the President and Council of the Society, the importance which we attach to the early contribution to our Museum of newly discovered subjects illustrative of the Natural History of India, and upon this point we would refer you to our despatch of the 18th September, 1839, on the occasion of the provision by the Court of a salary for the Curator of the Calcutta Museum.

We are, &c.

London, 17th Feb. 1847.

(True Copy)

G. A. BUSHBY,

Secy. to the Govt. of India.

From the Secretary to Superintendent of Marine with Meteorological Register kept at Kyook Phoo for March.

From Lieut. Thuillier, Officiating Deputy Surveyor General, with Meteorological Register kept at the Surveyor General's office, Calcutta, for March.

From the Secretary to the Military Board requesting information regarding the Timber Trees of Bengal. The subject was referred, on the recommendation of the Committee of Papers, to Captain Munro, who was solicited to report upon it through the Committee.

From Captain Newbold, through Mr. Piddington, forwarding a notice by Hekekyan Bey, late President of the Ecole Polytechnique of Cairo, on the temples and emerald mines in the eastern desert of Egypt.

Captain Newbold also forwarded some minerals referred to in a memorandum annexed to the Bey's paper.

From Mr. Hodgson, Darjeeling, on the *Megaderme* of the Terai, with plate—on the *Pigmy Hog* of the Sál forest, with plate,—returning thanks for the Society's present of M. Csoma de Koros' Grammar and Dictionary of the Tibetan language,—and announcing despatch of the Preface to and first part of a series of Essays on the Aborigines of the Eastern part of the Sub-Himalayas and Terai.

From *Captain Hutton*, Mussoorie, 4th April, on the *Ovis Ammonoides* of Hodgson, and corroborating Mr. H.'s views regarding that animal.

From *Major Showers*, Murshedabad, with copy of a Persian inscription (and translation) on a gun found near Murshedabad, and which formed part of the train of Mohabut Jung, usually called Aliverdi Khan.

From Vincent Tregear, Esq. for copies of certain Oriental works, to be disposed of for the Society.

The Librarian was directed to comply with Mr. Tregear's wishes.

From Dr. O'Shaughnessy, reporting the Assay by the Assay Master, Mr. Dodd, of the Gold dust from the Beas river, forwarded by Captain Jas. Abbott, and which was found to contain in 100 parts.

			<i>Assay Report.</i>
<i>Pure Gold.</i>	<i>Silver.</i>	<i>Alloy.</i>	<i>C. Gns.</i>
91.015	2.995	5.990	$\frac{5}{8}$ Worse than standard.

On the Land Shells of the Tenasserim Provinces, by the Rev. F. Mason, A.M. (Ordered for publication.)

From J. G. Delmerick, Esq. forwarding some copper and silver coins found at Pertabghur.

[The copper coins sent by Mr. Delmerick are of no interest whatever. The seven larger ones are Juanpore coins of "*Husain Shah, bin Ibrahim Shah, bin Mahmood Shah*;" and are very common. The smaller ones are very much corroded; but have evidently Buddhist emblems.]

The *Report on the "Vedas"* (see May number) was brought up, having been circulated to resident members for consideration prior to the meeting—and the several propositions made by the Committee respecting the publication were unanimously adopted.

The following propositions by the Committee of Papers were submitted and unanimously agreed to :—

1. That *Hekekyan Bey*, late President of the Ecole Polytechnique of Cairo, on the recommendation of Capt. Newbold, seconded by Mr. Piddington and Mr. Welby Jackson, be elected an Honorary Member of the Asiatic Society, and presented with copies of their Researches, Journal and Oriental publications.

2. The Rev. Dr. Hæberlin having officially addressed the Senior Secretary, declaring his inability from absence, to take that part he would desire to do in the Society's proceedings, and tendering his resignation as member of the Committee of Papers and Oriental Section, the Committee of Papers renew their proposition of Baboo *Debendro-nath Tagore*, as a member of the Committee of Papers, vice Dr. Hæberlin.

3. The Committee of Papers recommend that Mr. G. Wilby be requested to act as a member of the Section of Mineralogy and Geology.

The usual monthly Reports of the Librarian and Curators were submitted.

Books received for the Meeting of the 5th May, 1847.

PRESENTED.

Meteorological Register kept at the Surveyor General's Office, for the month of March, 1847.—FROM THE SURVEYOR GENERAL'S OFFICE.

Ditto ditto kept at Kyouk Phoo during March, 1847.—BY THE SECRETARY TO THE SUPERINTENDENT OF MARINE.

The Calcutta Christian Observer for May, 1847.—BY THE EDITORS.

The Oriental Baptist, Nos. 1 to 5.—BY THE EDITOR.

The Oopadeshak, a Bengali periodical, Nos. 1 to 5.—BY THE EDITOR.

Antiquarisk Tidsskrift, udgivet af det Kongelige Nordiske Oldskrift-Selskab, 1843—1845, Ancelet Hefte.—BY THE SOCIÉTÉ ROYALE DES ANTIQUAIRES DU NORD.

Annaler for Nordisk Oldkyndighed, udgivne af det Kongelige Nordiske Oldskrift-Selskab, 1844-5.—BY THE SAME.

Americas Arctiske landes Gamle Geographic efter de Nordiske Oldskrifter, ved Carl Christian Rafn.—BY THE SAME.

Journal of the Royal Asiatic Society, Vol. X. Part I.—BY THE SOCIETY.
 The Quarterly Journal of the Geological Society, No. 9.—BY THE SOCIETY.
 Bulletin de la Société de Géographie, troisième série, Tome V.—BY THE SOCIETY.

EXCHANGED.

Journal Asiatique, No. 39.

The London, Edinburgh and Dublin Philosophical Magazine, No. 199.

PURCHASED.

The Annals and Magazine of Natural History, No. 124.

The Edinburgh New Philosophical Journal, Vol. XLII. No. 83.

Journal des Savans, December, 1846.

The Birds of Australia, by J. Gould, F. R. S. &c. parts 24 and 25.

Tedelijkheid,—aan Maatschappelijk Belang.—Aan Bigbel en Evadgelic.
 Door S. A. Buddingh.—BY THE AUTHOR.

De Doodstraf, Getoetst aan Gezonde nede en Menschkunde, aan Godsdienst
 en.

DONATIONS TO THE MUSEUM.

List of Sculptures presented to the Society's Museum, by Capt. M. KITTOE.

Nos. 1 to 5. Buddhist Chaityas of different sizes.

6. A Chaitya with the Buddhist creed, "*Ye dharmaketu,*" &c. inscribed on its base.

7 to 10. Buddhist Chaityas without the inscription.

11. A Chaitya similar to the No. 6th.

12. A *calasa* or pinnacle of a Chaitya.

13. A figure of Buddha, in black marble.

14. A figure of Buddha, in potstone.

15. A ditto.

16. A figure of Parvati.

17. Figures of Hara and Parvati.

18. A sculptured stone having a human figure in a niche.

19. A sow with seven pigs in bass relief.

20. A miniature figure of Buddha.

21. A piece of sculpture with four rows of Buddhist figures.

22. A ditto.

23. A ditto with 3 figures of Buddhas in niches.

24. A ditto with 5 figures of ditto.

25. A ditto with 4 figures of ditto.

26. A ditto with 4 figures of ditto.

27. The plinth of a Chaitya bearing 3 figures of Buddhas—a horse, an elephant, a "bo" tree, and the creed "*Ye dharmaketu,*" &c.

28. Ditto with 4 figures of Buddhas—without the inscription.
29. The plinth of a pilaster.
30. The base of a dodecagon pillar.
- 31 to 33. Three highly sculptured plinths of pillars.
34. Portion of the shaft of a highly sculptured pillar.

Report from the Curator, Zoological Department.

At this season of the year, it is rarely that I have much to report upon, at least as relates to donations received for the Museum; but the past has been a very busy month with me, and due progress has been effected in various departments of the Museum, to which I invite the attention of members interested in the investigations which fall within the sphere of duty of the Society's Zoological Curator.

1. From G. T. Lushington, Esq., of Almorah, have been received another skin of the *Ovis ammon*, and one of *Pantholops chiru*. The latter will, I think, bear setting up as a stuffed specimen;* but the former is, I fear, too much injured: though its head and horns may be preserved, as the horns present considerable difference from those of the specimen already mounted, and the two certainly tend to exhibit the amount of variation to which the horns of this noble species are subject. Those of the present specimen are remarkable for increase of depth, in inverse proportion to their diminished width at base; and I think I may now safely conclude my *O. sculptorum* to be a mere variety of *O. ammon*.†

2. From E. O'Ryley, Esq. of Amherst, has been received a collection of sundries, comprising mammalia, birds, fishes, *Crustacea*, and *Mollusca*; some of the *Crustacea*, more especially, being new to the Society's Museum, and especially acceptable. There is a particularly fine series of the *Ocyropa ceratophthalma*, from youth to maturity; from which it is seen that the remarkable ocular peduncle only begins to appear when

* This has since been done.

† In p. 362 ante, I was necessitated to quote from memory respecting the Prince of Canino's statement relative to the suborbital sinuses of *O. musimon*. But I find that I quoted it erroneously. It appears, on reference to the volume on "Goats and Sheep," in the 'Naturalist's Library,' that his Highness states (bearing out my own recollection of a living specimen), that "There is a trace of a lachrymal sinus;" and that the Prince referred this animal "to the genus or sub-genus *Capra*, on account of the absence of the *interdigital* hole." This further complicates the subdivision of the group of Wild Sheep.

this Crab is nearly a quarter grown. An equally fine series is sent of the common *Gelasimus* of the Bay, the half grown young of which Crab I have taken from holes in the bank only a few miles below Calcutta. We have received the same species from the Persian Gulf.

3. From Capt. Thos. Hutton, of Mussoorie, a large collection (the majority, however, sent on loan, and for the purpose of illustrating a paper which he has confided to my editorship), of the birds of Afghanistan, with many also from the Deyra Doon, certain of which have been presented by him to the Society's Museum.

4. From J. W. Payter, Esq., the skeleton of an adult Tigress.

E. BLYTH.

Report of the Curator Museum of Economic Geology for the month of April.

We have received so little in the way of contributions this month that it is scarcely worth reporting upon, were it not to preserve the regularity of our reports; and my laboratory work of the month is not yet sufficiently advanced to enable me to conclude any paper or report as I desire.

Geology and Mineralogy.—We have received from Captain Kittoe a small box of specimens, but unfortunately without labels of any kind. Some of them require examination and will be referred to in a future report.

Economic Geology.—Capt. Sherwill has presented us with a box of specimens from the Mica quarries of Bchar, of which he has promised a note. They consist of the mica in plates of all sizes, with quartz, felspar and tourmalin, and in one specimen small decomposing garnets.

Lieut.-Col. Ouseley has sent us a supposed mass of Coal from the Mohun River, Sirgooja, but it is rather one of a good Coal-shale with a vein of promising Coal running through a part of it. It is no doubt a surface specimen. The Mohun is a tributary of the Sone, taking its rise a little north of Sirgooja. The Sirgooja coal field is well known by the labours of Col. Ouseley as reported by the Coal Committee.

The thanks of the Society were unanimously voted for all contributions acknowledged as above.

[The following letter has been sent to the Editors of the Journal for publication as a sequel to the proceedings for May.]

To Dr. W. B. O'SHAUGHNESSY,
Joint-Secretary of the Asiatic Society.

DEAR SIR,—I had expected to have been present at the Society's meeting last night, but was unavoidably prevented almost at the last moment; it becomes necessary, therefore, that I should trouble you with a few lines in correction of such portion of your report of the Proceedings, published in April, as refers to what you supposed me to have said on the subject of the Burnes and Cantor drawings. You did me the favour to ask me to give you a written report of the remarks I made, but other engagements prevented my doing so; any trivial inaccuracy, therefore, I should not have noticed; but you make me talk nonsense on a matter of figures, and, however apparent it may be thought as a mistake, I desire to repudiate it. I could have wished that you had thought what I said on the subject of the importance of keeping accounts in a business-like way (with reference to the unsatisfactory abstract before me) worthy a line or two, prefacing as it did that "categorical mode of questioning" which you pronounced "uncalled for and unnecessary among a society of gentlemen." I think it would have been better, when you repeated this expression in type, to have mentioned the substance of my reply, which was, that the money matters of even a Scientific Society were of serious moment, and that peremptory questioning was called for by lavish expenditure and unsatisfactory accounts, more especially when there were not funds to meet its professed liabilities; you may remember that I pointed out, *inter alia*, that it was impossible for any member of the Society to say what sum, between two and three thousand rupees, was debited to 14 of Dr. Cantor's drawings. This brings me to the particular misconception of what I said about these and the Burnes lithographs, to which I have above alluded. The Report in the Society's Journal is as follows:—"The sets of Cantor's collection had cost Rs. 2561, being 183 Rs. each set—now he had much experience in the expense of lithographs and would pledge himself to produce plates infinitely superior to those now before the Society at the cost of from 5 to 10 Rupees per 100." How it could possibly have been supposed that I said one hundred lithographed plates could be produced for any sum between these limits, I am at a loss to imagine. I stated it was certain the 14 Cantor drawings had cost Rs. 2,561, but the precise amount beyond was undiscoverable, from Chinese zoology being lumped with Mr. Thoby Prinsep's bust and other matters, in an item of considerable amount. I said it was an exorbitant charge; that I had people in my employ who could lithograph much better, whose wages were Rs. 15 a month, and that each of them could certainly do

four or five of the drawings in that time. Mr. Piddington had dwelt on the enormous expense of colouring in this country, not dealing in figures but leaving the Society to infer that this item of expenditure might account for the outlay complained of. In reply, without denying that colouring was a very heavy expense, I stated that better colouring than was on the table could be obtained for from Rs. 5 to Rs. 10 per hundred drawings, and I left it to members to look at the accounts and make their own calculations.

You will see that this is a very different statement from the one published, and I shall therefore esteem it a favour if you will allow this letter to appear in the next number of the Society's Journal.

I am, dear Sir,

Your's faithfully,

JAMES HUME.

Esplanade Row, May 6th, 1847.

NOTE.—The Editors willingly insert Mr. Hume's letter. Not pretending to possess the accuracy of professional reporters they applied to Mr. Hume for a correct statement of his remarks at the discussion regarding the "Burnes and Cantor drawings." Mr. Hume did not comply with their request and has accordingly suffered a most unintentional misrepresentation. As Secretaries, Dr. O'Shaughnessy and Mr. Laidlay have again to state prominently that they are in no degree responsible for any part of the expenditure referred to, all of which had been incurred prior to their appointment. The accounts, unpublished for several years, they printed as they received them from the late accountant. The Senior Secretary naturally objected to his being "peremptorily questioned" regarding accounts and transactions which Mr. Hume knew, he, Dr. O'S. had nothing to do with. When the accounts for this year are published Mr. Hume will be most welcome to question the Secretaries and Accountant as "peremptorily" as he pleases on every item they present. Pending publication, the accounts for each month are laid on the Library Table for the month ensuing, for the perusal of the members, who would confer a great favour on the Secretaries, and do good service to the Society by pointing out any irregularity in the expenditure or deviation from the rules laid down by the Society for the regulation of their outlay.

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