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JOURNAL
OF THE
ASIATIC SOCIETY OF BENGAL,
EDITED BY
THE SECRETARY.

VOL. XV.



"It will flourish, if naturalists, chemists, antiquaries, philologists, 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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JOURNAL

OF THE

ASIATIC SOCIETY.

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

[Continued from Vol. XIV, p. 602].

Buzzards. *Archibuteo hemiptilopus*, nobis. Nearly allied to the Mexican *Arch. regalis*, figured by Mr. G. R. Gray in his illustrated work on the 'Genera of Birds'; having the tarsi, as in that species, feathered to the toes in front and externally, bare and scutated behind, and reticulated for a slight distance on either side, the latter being hidden by the feathers. Length, of probably a fine female, about twenty-eight inches, the wing twenty and a quarter, and tail thirteen inches; beak, from point to gape, two inches; and tarse exceeding three inches. Colour (of the only specimen examined) a rich deep fuscous-brown, slightly glossed with pink on the upper-parts; the inter-scapularies shading laterally to fulvescent: on the nape, the feathers are merely tipped with dusky-brown, the remainder being pure white, which shews very conspicuously: head mingled whitish and brown, the latter predominating on the crown, the former on the lower ear-coverts and throat: from the base of the lower mandible proceeds a large blackish moustache: breast fulvescent, the feathers more or less largely tipped with deep brown; and the abdomen, flanks, vent, lower tail-coverts, with the long tibial and the tarsal plumes, are of an uniform rich very dark brown throughout, approaching to blackish: primaries dusky, paler above the emargination of their outer webs, and the smaller primaries and the secondaries are

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obscurely, though distinctly, banded : internally, the large alars are white at base, as in other Buzzards : tail barred throughout with many narrowish undulating bands, alternately dusky and paler, becoming successively more obscure towards the base, and the subterminal dusky band broadish ; beneath, the tail is albescent to near its base, and the stems of the caudal feathers are very white, both above and below. Beak dusky horn-coloured, yellowish laterally at base of mandibles, and with apparently a livid wax-coloured cere : the toes also, and hind portion of the tarsi, livid waxy ; and the talons horny-black. A very splendid species, from Darjeeling.

Another fine Buzzard, the *Buteo aquilinus*, Hodgson, nobis, *J. A. S.* (March) 1845, p. 176, has since been described by Mr. Hodgson by the name *B. leucocephalus*, in *Proc. Zool. Soc.* (April) 1845, p. 21, where he speaks of it as "peculiar to the Cachar and Tibet." I repeat my former suggestion, that it is probably the *Falco asiaticus* of Latham, described to inhabit China.

A third was described by Mr. Hodgson, in the 'Bengal Sporting Magazine,' for 1836, p. 182, by the name *Circus plumipes*, which he has since altered to *Buteo plumipes*, *Proc. Zool. Soc.* 1845, p. 37, though retaining his opinion of its near affinity to *Circus*.*

A fourth is the *B. canescens*, Hodgson, (vide *J. A. S.* XII, 308,) which is decidedly the 'Nasal Falcon' of Latham ; and Mr. Jerdon now identifies with it his *B. longipes*, and I much suspect that *B. rufiventer*, Jerdon, is merely a small male of the same. Also, I think that *B. pectoralis*, Vieillot, will prove to be no other, in which case this last specific name will have to be retained. I have procured specimens of this bird in the neighbourhood of Kishenaghur and Moorsshedabad, in Lower Bengal, and have picked up an undoubted feather of it in a mangoe tope much nearer to Calcutta ; but in the vicinity of Calcutta it must be very rare, if it occurs at all ; preferring a more open country.

* Mr. Hodgson has recently written me word that the *Buteo plumipes*, *loc. cit.*, "is a *Circus* osculant to *Buteo*, as *B. aquilinus* (v. *leucocephalus*) is a *Buteo* osculant to *Aquila*. The latter is not a typical *Buteo* or *Archibuteo*,—witness its reticulate tarse, &c. &c. This species is inserted incorrectly in the 'Proceedings of the Zoological Society.' Instead of *plumipes* belonging "to *Buteo* proper and not to *Circus*," it should have been 'belongs not to *Buteo* but to *Circus*.'—This species I have never seen, but must confess to theoretical doubts of its truly connecting *Circus* with *Buteo* : the latter genus and *Aquila*, on the other hand, are very closely allied, in fact but slight modifications of the same immediate subtype ; and species of intermediate character might have been looked for.

B. pygmaeus, nobis, *J. A. S.* 1845, p. 177, is a fifth decided species, from the Tenasserim provinces.

To the genus *Spizaetus* of Vieillot, Mr. G. R. Gray refers *Nisaetus* of Mr. Hodgson as a synonyme (as I formerly did, in *J. A. S.* XI, 456, and XII, 305); thus bringing together certain species of the Old World and of the New, concerning which suspicion at least of respective generic diversity had been entertained. *Morphnus* of Cuvier, however, which had generally been placed as synonymous with *Spizaetus*, is confined by Mr. Gray to certain naked-legged species of South America, as *M. urubitinga* and its affines; and, finally, *Limnaetus*, Vigors, is referred by the same systematist to *Spizaetus*, though to judge from Dr. Horsfield's figure and description of *L. unicolor* (its type), he would scarcely seem justified in doing so.

Upon a former occasion (*ante*, p. 176), I indicated the four Indian species of undoubted *Spizaetus* (vel *Nisaetus*), after describing what I conceived to be a new species of the form from Malacca, by the name *Nisaetus alboniger*.* This last, however, proves to be decidedly the true *Falco caligatus* of Raffles, (as was first pointed out to me by my friend Dr. Cantor,) and will therefore now range as *Sp. caligatus*, (Raffles): consequently, it remains to determine what specific name the common Bengal species, which I formerly conceived to be *caligatus*, should retain; and this will probably be *nipalensis*, (Hodgson,) since considerable doubt must attach at present to the identification of it with the Javanese *Falco niveus* of Temminck. The species in question is the *Bauj Eagle* and *Nerwied Eagle* of Latham, but does not appear to have received a distinctive systematic name prior to that bestowed by Mr. Hodgson, and which should refer exclusively to his supposed crestless variety of the species, which usually presents a mere rudiment of an occipital crest, very rarely further developed; though I have obtained one middle-aged specimen (out of several dozens,) with a crest two inches long.† This bird would appear to be very rare in the Himalaya, while in the plains of Lower Bengal it is extremely numerous. I lately saw one specimen in a large collection from Darjeeling: but Mr. Hodgson's supposed crested variety of the species, subsequently

* Also described under this name by Lord Arthur Hay, *Madr. Journ.* No XXXI, 145.

† More recently, also, another and younger specimen, with a slight crest, though still very unusually developed for the species.

termed by him *N. pallidus*, and which I refer to *Falco indicus cirratus* of Ray (v. *F. cirratus*, Shaw), seems to be exclusively a hill bird, as are also our other crested species, *Sp. pulcher* and *Sp. Kieneri*.

The variation in development of crest here noticed of *Sp. nipalensis*, is both curious and instructive: a tendency to such prolongation of the central occipital plumes being observable in various other *Falconidae*, as especially in *Hieraetus* (Kaup, v. *Aquila*.) *pennatus*, and slightly in *Buteo canescens*; while in the Indian *Pernis*, which is currently regarded as a peculiar species by the name *P. cristata*, the crest is very commonly reduced to a mere rudiment (which might remain unnoticed if not looked for), while in other specimens the feathers composing it are prolonged an inch beyond those they immediately impend. Hence I have some suspicion whether the species is really distinct from *P. apivora*; and I also doubt whether more than a single species of this very variable bird has been yet discovered. All those which are mentioned by Mr. G. R. Gray, I would thus provisionally reduce to one, with the exception of my *Lophastur Jerdoni*, (*J. A. S. XI*, 464,) which is erroneously referred by Mr. Gray to this genus; it being strictly an aberrant *Baze*, and perhaps identical with *B. magnirostris* of the Philippine Islands, mentioned by Mr. G. R. Gray, though I suspect as yet undescribed.* While on this group, I may further remark that *Buteo cristatus*, Vieillot, has been currently regarded as a synonyme of *Baza lophotes*; but, as described in the *Dict. Class.*, where moreover Australia is assigned as its habitat, it can neither be *B. lophotes* nor *B. subcristata* figured in Gould's 'Birds of Australia'; and if not a "*Buse Bondrée Huppée*," as he terms it (or Honey Buzzard), it is not improbably the young of *Aquila ? morphnoides*, Gould, exhibiting a coloration analogous to that of the immature plumage of its nearly allied congener, *Hieraetus pennatus*, and in such case ranking as *H. cristatus*, (Vieillot).

* I had scarcely written the above, when the Society received a second fine collection of Scandinavian objects of Natural History from the University of Christiania. A specimen of *Pernis apivora* is included, and I find the species is distinct from *P. cristata*: the great variation of plumage is the same in both, and the varieties correspond; but in *P. apivora*, in addition to there not being the slightest tendency to the formation of an occipital crest, the beak is conspicuously smaller, and the toes are much shorter. Thus, in two specimens of exactly the same general dimensions, the middle toe of *P. apivora*, from its separation from the next to the insertion of the talons, measures an inch and a half; while in *P. cristata* it measures an inch and seven-eighths, with the rest of the foot in proportion. The reticulate scutation of the leg and foot is also much more prominent than in *P. apivora*.

Among the true Hawks, we have a similar occipital crest in *Astur trivirgatus*, (Tem.,) to which may be referred *A. indicus*, Hodgson, (*Beng. Sp. Mag.* 1836, p. 177,) it being also the supposed *A. palumbarius* of Mr. Jerdon's Catalogue. The Society has lately received fine specimens of this Goshawk from Yé (Tenasserim), forming part of a valuable collection from that province, presented by the Rev. J. Barbe, R. C. M.*

Of Indian true *Aquila*, as Mr. G. R. Gray now adopts the genus, as many as nine species exist, which are as follow:—1. *Tolmaëtus† Bonelli*, the *Nisaëtus grandis*, Hodgson, and 'Genoese Eagle' of Latham: peculiar to hilly regions.—2, *Aq. chrysaëtus*: Himalaya, and perhaps Col. Sykes's Dukhun bird, though Mr. Jerdon's supposed 'Golden Eagle' of South India, refers to the next species.—3, *Aq. mogilnik, imperialis*, and *heliaca*, Auct. India generally, chiefly however the mountains. Of this robustly formed Eagle, there are two phases of plumage. One is the dark brown, with pale head and nuchal plumes, blackish forehead and throat, and often a great white patch on the shoulder: the other has pale central stripes to the feathers of the back, which are much broader on those of the neck and under-parts, where they have merely dark lateral margins, and the wing also is more or less spotted; in the latter plumage, the feathers of the back and especially those of the breast and under-parts are considerably more lengthened, attenuated and pointed, than in the other; and the dress certainly does not appear to be juvenile, but analogous rather to the spotted garb of *Aq. navia*. To judge from Hardwicke and Gray's figure, it might be thought the immature plumage of *Aq. bifasciata*, but such is not the case.—4, *Aq. bifasciata*, Gray, v. *nipalensis*, Hodgson, *As. Res.* XVIII, pt. II, p. 13. Equal to the last in size, but less robust; and colour a dead brown, with the secondaries and great range

* Dr. McClelland has lately favoured me with permission to look over his drawings of Assamese animals; among which is one of his *Spizaëtus rufitinctus*, *Proc. Zool. Soc.* 1839, p. 153, which I consider merely to represent the adult female of *Astur trivirgatus*.

† This group comprises *T. Bonelli* of Southern Europe and Asia, and I believe North Africa; and *T. bellicosus*, v. *armiger*, (Shaw,) of South Africa. Mr. Hodgson thinks that his name *Nisaëtus* should now stand for this form; but as he has figured *nipalensis* as the "type of the new genus *Nisaëtus*," *J. A. S. V.* 227, and subsequently characterized that form as short-winged, VI, 361, and elsewhere spoken of *grandis* as "an aberrant species," I am compelled in this case to dispute his claim to the sponsorship, however unwillingly.

of coverts tipped with fulvous-white, forming two conspicuous bars on the wing; lower tail-coverts also fulvous-white, and tail tipped with the same: wing twenty-two inches. A rare species, inhabiting mountainous territory, and chiefly the Himalaya. Capt. Phayre has favoured the Society with a very fine specimen from Arracan.—5, *Aq. navia*, (Gm.); 'Spotted Eagle,' 'Rough-footed Eagle,' and 'Brown-backed Eagle, Var. A', of Latham. A beautiful and very variable species in its colouring, allied in form to the last, but smaller; and larger, but less robust, than the next. Fine adult males are richly empurpled brown, with fulvous-white terminal stripes, more or less developed, on the interscapularies, scapularies, and smaller wing-coverts; larger and pure white spots on the greater coverts, and two white bars tipping the secondaries and largest coverts, as in *Aq. bifasciata*; tibial plumes similarly spotted, the under tail-coverts and generally the short tarsal plumes white, and the abdomen streaked with fulvous; cere, orbits, and toes, beautiful yellow: wing generally about twenty inches. Others have the streaks of the upper parts much more developed, but the white dingy and subdued, and the dark colour generally paler: such are mostly females; and others again, especially of the latter sex, are dull brown throughout (inclusive of the lower tail-coverts), with sometimes paler head and neck-hackles, the latter being however generally, though still not always, tipped paler. This Eagle is very common in the Bengal Sunderbuns, and I have seen it also from the Himalaya, and from Central India.—6, *Aq. fulvescens*, *fusca*, and *punctata*, Gray and Hardwicke: *Aq. vindhiana*, Franklin. Smaller and more robust than the last, a miniature of *Aq. mogilnik*; wing eighteen or nineteen inches, rarely twenty. Some (females?) are uniformly deep fulvous-brown throughout: others light fulvous, brightest upon the head and throat, obscured and dingy on the back and scapularies, and whitish below, with dark shafts and bases of feathers; these appear to be the young: but the most characteristic plumage (that of the adult male?) is tawney or fulvous-brown, more fulvous on the neck-hackles, which are tipped paler; head and throat dusky, the coronal feathers tipped paler; wings, breast, and lower-parts, deep fuscous, the breast slightly speckled—and the belly and wings spotted and streaked—with light tawny-brown; wing-bars, and tail-tip, as in the two preceding species. Common in the plains of Upper India, and along the banks of the Ganges above Monghyr, also in the

peninsula; but I have never seen it from the Himalaya, nor from the Soonderbuns, where *Aq. navia* is so abundant.—7, *Aq. hastata*; *Morphnus hastatus*, Lesson: *Spizaetus punctatus*, Jerdon, *Supp.* This so much resembles *Aq. navia*, that it requires some practice to distinguish the two species always, with certainty; and the same may be said of *Aq. navia* and *Aq. fulvescens*; but the last named species could never be confounded with the present one. It is altogether a more feeble bird than *Aq. navia*, with smaller bill and feet, and proportionally somewhat longer tarsi, but which appear considerably more so from their slenderness. Plumage variable; but colour always a dead brown, as in *Aq. bifasciata*; the neck-hackles smaller than in the other species. The finest adult male which I have procured has the coronal feathers lanceolate, and edged paler; a sort of supercilium formed by a range of feathers with small whitish tips; the nuchal hackles also tipped whitish, and the feathers of the lower neck have each a terminal white speck; three distinct ranges of white terminal spots on the wings; the tertiaries broadly whitish-tipped; the breast and flanks beautifully striped with a whitish medial streak to each feather, those of the belly having a further central dark one; and the lower tail-coverts and tarsal plumes are pale and mottled. Another adult male has the spots generally much less developed, but is otherwise nearly similar. Females are commonly darker brown, with no spots, except occasionally some on the smaller wing-coverts, and especially about the bend of the wing. The young are lighter brown, with sometimes, traces of streaks on the pectoral and abdominal feathers; and the interscapularies and tertiaries are dark, contrasting strongly with the whitish inner scapularies adjoining.—8, *Hieraetus pennatus*, (Br.) Kaup; *Spizaetus milvoides*, Jerdon: *F. lagopus*, Bengal variety, Latham. This form chiefly deviates from the robust typical Eagles in its small size, and proportionally small and Buzzard-like beak; also in shewing a tendency to exhibit an occipital crest; in which respect, as also in the whiteness of the under-parts in the young bird, it approximates the *Spizaëti*. *H. pennatus* has invariably a white shoulder-spot at all ages, and almost as constantly a white forehead. It is extensively distributed over the country.—9, *Ictinaetus malaiensis*, (Reinwardt) Jerdon; *Aquila*, *Heteropus*, and *Neopus*, *perniger*, Hodgson: *Spizaetus* ?? *ovivorus*, Jerdon, *Supp.* Remarkable for its very long wings; its blackish colour throughout, varied with white bands under the tail; and for the extraordinary disproportion of its front toes and claws, of which the inner is

particularly large, and the outer singularly small. Peculiar to mountain regions. This bird conducts in some respects to *Archibuteo*.

These several Eagles exhibit variation of habit, as of form. The *Ictinaëtus* is pre-eminently a nest-robber, and feeds much on eggs: vide *J. A. S.* XII, 128; where also is a notice of the nest-plundering propensities of *Aq. hastata*, under the supposition of the latter species being *Limnaëtus unicolor*. The more powerful of the tribe do not disdain to feed on carrion; and Mr. Elliot remarks, of *Aq. fulvescens*,—"The *Wokhab* is very troublesome in hawking after the sun becomes hot, mistaking the jesses for some kind of prey, and pouncing on the Falcon to seize it. I have once or twice nearly lost *Shakeens*" (*F. peregrinator*,) he adds, "in consequence, these flying to great distances for fear of the *Wokhab*." This is probably, therefore, the *Jimach* mentioned by Buchanan Hamilton, (in Montgomery Martin's compilation from his *MSS.* I, 505). "The only pursuit worth notice which I saw in several days' hawking," observes the author, "was from a large bird of prey named *Jimach*, which attacked a very strong Falcon as it was hovering over a bush into which it had driven a Partridge. The moment the Falcon espied the *Jimach* it gave a scream, and flew off with the utmost velocity, while the *Jimach* eagerly pursued. They were instantly followed by the whole party, foot, horses, and elephants, perhaps 200 persons, shouting and firing with all their might, and the Falcon was saved, but not without severe wounds, the *Jimach* having struck her to the ground. I have never been able," adds Buchanan, "to procure a *Jimach*; but it appears to be a small Eagle, and is said to live entirely on other birds of prey." *Aq. fulvescens*, however, is a very indiscriminate feeder, preying on rats, lizards, snakes, insects, and sometimes even carrion; besides hares, and in fact whatever, living or dead, it happens to meet with: still the fact of its attacking Falcons, or indeed of any bird of prey attacking another, except for combat, or as when a tame Falcon is flown at a Kite, (of Hawks thus "picking out Hawks' een,") is, I apprehend, little known to the majority of naturalists. Lastly, *Hieraëtus pennatus* is a noted robber of the dove-cot and poultry-yard; whose depredations, as Mr. Jerdon remarks, are probably often mistaken for those of the Kite.

Ephialtes spilocephalus, nobis, n. s. ? *Noctua auribarbis* (?), Hodgson, mentioned in *J. A. S.* VI, 369: *Athene badia*, (?), Hodgson, enumerated in Mr. G. R. Gray's list of the Raptorial birds in the British Museum.

This little Owl is certainly an *Ephialtes* (vel *Scops*, Auct., though it appears this latter name was first appropriated to the Crowned Cranes), and probably a young bird, from the loose and floccose character of its plumage; but the aigrettes are not easily made out in the only specimen examined, though I believe that I have distinctly traced them. Its size is that of *Eph. lettia*, but the bill, feet, and talons, are considerably smaller. Length about nine inches, of wing six, and tail three and a quarter; bill, in greatest vertical depth, seven-sixteenths of an inch; feathered tarse an inch and one-eighth; length of middle toe and claw but an inch, the claws slender, delicate, and of a whitish hue; beak pale yellowish, or yellowish-white. The plumage of the head is very full and puffy, the feathers loose and light; each of them having two pale-coloured spots, set off with blackish, and the rest of the feather a dull light bay or tawney, a little pencilled: facial disk fulvescent. Upper-parts uniform dull tawney, pencilled with blackish; and the ordinary white spots occur on the outer scapularies: the primaries have also a series of three white bands on the unemarginated portion of their outer webs (the emargination being very slight): the secondaries and tertiaries are principally bay on their outer webs, with imperfect blackish bands; and the tail is barred with the same colours in about equal proportions, the central feathers having six tawney-rufous bands. Under-parts paler than those above, minutely speckled with dusky, and with some larger whitish spots set off with blackish: lower tail-coverts white, a little barred, except the longest which are distinctly so; the tarsal plumes tawney-rufous, with dusky bars. From Darjeeling.*

Syrnium niviculum, Hodgson, XIV, 185. Since describing this species, I have seen several fine specimens. One, from near Simla, presented by L. C. Stewart, Esq., now of H. M. 50th Ft., has the wing twelve inches and a half: colour dusky above, mottled with larger spots of fulvous. white than in that formerly described; but the under-parts are much the same. Two males and a female, the former with wing eleven inches,

* In the 'Madras Journal,' No. XXXI, 120, Mr. Jerdon describes a *Scops* (*Ephialtes*) *griseus*, which = *lettoides*, Jerdon, nobis, *J. A. S.* XIV, 182. Dr. Stewart has recently favored the Society with a specimen, from near Futtehpore, on the route from Allahabad to Cawnpore, which tends to indicate the specific identity of *Eph. lettia* and *Eph. lettoides*.

the latter twelve and three-quarters, from Darjeeling, are dusky, with the light mottlings much deeper fulvous, and there is a considerable admixture of pure white below the facial disk. Not improbably these were younger than the others.*

In XIV, 188, I suggested that *Buceros bicolor*, Eyton, is probably the *B. malabaricus* apud Raffles, and *B. albirostris* apud Horsfield; but I have since seen several specimens of a Malayan species intermediate to those two, combining the bill and casque of *B. albirostris* with the size and white outer tail-feathers of *B. pica* (vel *malabaricus*): this, Lord Arthur Hay considers to be *B. violaceus*, Wagler†; and the Society lately received a young bird of the species in question from Penang. The large head and casque referred to *B. albirostris* in XII, 995, I now consider to belong to the allied Penang species. The Society has lately received specimens of true *B. albirostris* from the Tenasserim province of Yé, undistinguishable from the bird of Bengal, Nepal, Assam, and Arracan: we had previously a Tenasserim specimen of the young of *B. albirostris*, presented on a former occasion by Mr. Barbe.

* The Norwegian collection has supplied us with three fine specimens of *S. aluco*, all of the non-rufous variety, and very different from the one we previously possessed. *S. niviculum* is very nearly allied, and the under-parts of some specimens of the two species are undistinguishable: but the dusky ground-tint is much more predominant on the upper-parts of *S. niviculum*, to an extent that the two could scarcely be confounded.

Here it may be remarked that the common *Ninox scutellatus*, which occurs in most collections from Malacca, has, in addition to its various other synonymes, been recently designated *Athene malaccensis* by Mr. Eyton, *An. and Mag. N. H.* 1845, p. 228: and in the same paper,—*Criniger gularis*, (Horsfield), is termed *Pycnonotus ruficaudatus*;—*Ixidia cyaniventris*, nobis, = *Malacopteron aureum*;—*Timalia pectoralis*, nobis, = *Malacopteron squamatum*;—*T. striata*, nobis, = *Brachypteryx maculatus*;—*T. erythronotus*, nobis, = *Br. nigrogularis*;—*T. erythroptera*, nobis, = *Br. acutirostris*;—*Muscipeta plumosa*, nobis, (of which it seems I described the female only,) = *Philentoma castaneum*, which must accordingly be altered to *Ph. plumosum*;—and a state of plumage of the bird I described as *Hemicercus concretus* (XI, 195,) is described by the name *Dendrocopus sordidus*. Mr. Eyton's *Izos metallicus* would seem to be nearly allied, except in size, to the species which I designated *Brachypodius melanocephalus*, XIV, 176.

It is to be regretted that Capt. Charleton did not permit me to look over his collection of Malayan birds, when he had them in Calcutta; for all these useless synonymes would then have been avoided. I offered to have them labelled for him.

† Described by his lordship in the *Madras Journ.* No. XXXI, p. 148: and following this are descriptions of *B. comatus*, *B. malayanus*, and *B. Elliotti*, which last is *B. bicolor*, Eyton, apud nos, and, as I still think, rightly identified with the latter.

Hoopoes. This group is treated of in XIV, 189. I have now to add that the Tenasserim Hoopoe equals *Upupa epops* in size, but is considerably more rufous, and conspicuously so on the crest, which resembles that of *U. minor* of S. Africa: one specimen is also very rufous at the shoulder of the wing, and another moderately so; bill of each two inches and a half to forehead; and wing five and a half to five and three-quarters.

Halcyonidae.—*Todiramphus varius*; *Halcyon varia*, Eyton, P. Z. S. 1839, p. 101. What I take to be the adult male, (and perhaps the adult of either sex,) of this species, is a beautiful bird, the colouring of which serves to connect *Todiramphus* (as exemplified by *T. collaris* and *T. sacer*.) with *Halcyon atricapillus* (v. *albiventer* of Scopoli, a name too inappropriate to be retained); but the beak is strictly that of *Todiramphus*. Length about nine inches, or nearly so; of wing four inches, and tail two and three-eighths; bill to forehead (in rather the larger of two specimens,) an inch and three-quarters; and the gape two and a quarter; tarse five-eighths of an inch. Cap green, rufescent on forehead, and margined posteriorly with verditer; a broad black stripe commences at the lores, and meets its opposite behind; above this is a slight rufous supercilium, and below it a broad rufous streak continued to the nape, and comprising the lower ear-coverts; below this again, is a very large rich purplish-blue moustache, commencing at the base of the lower mandible: the nape and breast are brilliant ferruginous, paling on the throat and belly, and the mantle, wings, and tail, are deep purplish-blue, each feather touched with ultramarine-blue on the wings, while the rump and upper tail-coverts are vivid verditer: bordering the ferruginous of the nape is a band of deep black. Bill dusky above, the rest apparently bright yellow; and legs probably coral-red. From Malacca.

In XIV, 190, I described a new Kingfisher from Darjeeling, by the name *Alcedo grandis*; which otherwise resembling *A. ispida*, is as much larger than that bird, as *A. bengalensis* is smaller: *A. ispida* is common in Afghanistan. Another closely allied species, which perhaps has not yet been distinguished from *A. bengalensis*, inhabits the Moluccas, and which I may provisionally call *A. moluccensis*: this differs from *A. bengalensis* in having a vertically much deeper bill, and from all its allied species in having the ear-coverts not rufous, but deep indigo-blue; the mottled feathers of the crown and neck, moustache, and wings, are also

more of a Prussian blue than in *A. grandis*, *ispida*, and *bengalensis*: wing three inches; depth of bill about three-eighths of an inch. Another closely allied species is the *A. meninting*, Horsf., v. *asiatica* of Swainson's Illustrations, which has the crown, neck, and wings, mottled indigo blue, scarcely any moustache, the back and upper tail-coverts ultramarine, and the breast and flanks deeper and richer ferruginous than in the others.—*A. biru*, Horsf., is another beautiful little Malayan Kingfisher, of a predominating light verditer-blue above and across the breast, but the marking of its under-parts allies it to certain African Kingfishers, as *A. semitorquatus*, and another which I have been unable to determine.

Bucconidæ (Barbets). There are three, if not four, species of Indian Barbets, having the general plumage of *B. caniceps*, Franklin, the distinctions of which may be advantageously pointed out.—1. *B. lineatus*, Vieillot, apud *Dict. Class.*; described to inhabit Sumatra. Length about ten inches, the wing five to five and a quarter. Upper-parts green, weaker on the flanks, and still paler and more yellowish on the vent and lower tail-coverts, spreading over the abdominal region in some: head, neck, throat, and breast, whitish, confined on the crown to an ill defined medial streak on each feather, the rest being dusky; on the nape, these streaks are contracted and better defined, often upon a green ground, and they gradually disappear on the back; throat spotless whitish; the sides of the neck and breast having each feather laterally margined with dusky-brown, the whitish however much predominating. Common in some parts of Bengal, and in Nepal, extending westward to the Deyrah Doon; also in Assam, Sylhet, Arracan, and the Tenasserim provinces, whence it probably extends into Sumatra.—2. *B. caniceps*, Franklin; *B. lineatus*, apud Tickell. Rather smaller, the wing measuring from four inches and a half to four and seven-eighths, though rarely exceeding four and three-quarters. The general plumage also similar; but the head, throat, and breast, much darker; the throat dusky-brown instead of whitish; and pectoral feathers with merely a narrow, ill defined, pale central streak, often scarcely present; lower breast paler: the back commonly more streaked with whitish than in *B. lineatus*: and, what constitutes a ready distinction of *B. caniceps*, the wing-coverts and tertiaries have each a terminal whitish speck, of which there is never the slightest trace in the other. This species inhabits the peninsula generally, and Upper India, meeting *B. lineatus* in the Doon; but

I have not seen it from Nepal, Bengal, or any of the eastern countries which are tenanted by *B. lineatus*.—3. *B. viridis*, Gmelin. Much smaller than the preceding: the crown spotless dusky-brown; mere traces of the lineation on the neck, and scarcely any on the breast; the throat and breast paler than in *B. caniceps*; and no whitish specks on the wings. Inhabits the Indian peninsula, and chiefly, I believe, to the southward.—4? *B. zeylanicus*, Gmelin, founded on the "Yellow-checked Barbet" of Brown's Illustrations. This is described (but not figured) to have the "coverts of wings green, with small white spots in the middle of each feather:" hence, Mr. Jerdon has referred to it the *B. caniceps*; but as the figure is stated to be "more than two-thirds of the size of the living bird," whereas it is but one-third of the linear dimensions of *B. caniceps*, and but half that of *B. viridis*, it probably represents a distinct species, approaching the last in size, and with the wing-specks of *B. caniceps*.

Of the other Indian Barbets, two are confined to the Himalaya, *B. grandis*, Gm., and *B. Franklinii*, nobis. *J. A. S.*, XI, 167. *B. indicus* (vel *philippensis*) is common throughout the country, also in the Tenasserim Provinces, and Sir Stamford Raffles includes it in his list of Sumatran birds; but I have never seen it from Arracan. *B. asiaticus* (the *Trogon asiaticus* of Latham and Gmelin), vel *cyanocollis*, Vieillot, and *cyanops*, Cuvier, abounds in the Sub-Himalayan region, in Nepal, Bengal, Assam, and Sylhet, but becomes comparatively rare in Arracan, and also in the Indian peninsula. *B. barbiculus*, Cuv., or a species which agrees sufficiently with the description of this in the *Dict. Class.*, inhabits Malabar; though *barbiculus* is said to be from the Moluccas. I add a description of an Indian specimen, sent on loan by Mr. Jerdon. Length five inches; of wing three and one-eighth; and tail an inch and three-eighths; bill to forehead five-eighths; and tarse three-quarters of an inch. General colour deep green; the forehead, around the eyes, and the throat, crimson, the last margined with yellow; occiput and cheeks pale blue. In Arracan, there is further the *B. australis*, Horsfield, v. *gularis*, Tem.; but the crimson of the cheeks, sincipita, and moustaches, seems invariably to be much less brilliant than in Malacca specimens.

Five species occur commonly in collections from Malacca, (besides the *Caloramphus Lathamii*, v. *Megalorhynchus spinosus* of Eyton, which is there common): viz. *B. chrysopogon*, Tem.;—*B. versicolor*, Raffles.;—*B. armil-*

laris, Tem.;—*B. quadricolor*, Eyton;—and *B. australis*, Horsf.:—a *B. trimaculatus*, Gray, is also mentioned by Mr. Eyton from the same locality; and without having a specimen of his *B. quadricolor*, *P. Z. S.* 1839, p. 105, for present comparison, I rather suspect its identity with *B. mysticophanes*, Tem., and with *B. Rafflesii*, Lesson, *Rev. Zool. de la Soc. Cuv.* 1839, p. 139. The following description is from specimens in Lord A. Hay's collection. Length about nine inches; of wing three and three-quarters; and tail two and a quarter: bill to forehead an inch and three-eighths; and tarse an inch. Colour green, with an emerald margin to the feathers of the nape; forehead bright yellow; crown, throat, lores, and a spot on the side of the breast, crimson; beneath the eye, and middle of fore-neck, also crimson; sides of the crown, above and posterior to the bare ocular region, black; and a yellowish tinge towards the base of the lower mandible: emarginated portion of primaries edged with dull yellow; and tail bluish underneath: bill, legs, and the bristles at base of bill, black. A presumed female has the crown, lores, and spot at side of breast, crimson, but less defined than in the (presumed) male; throat mingled green and yellowish, passing to bluish on the fore-neck; forehead bluish, with yellow shafts to feathers, and some blue beneath the eye and at the base of the lower mandible; the latter is for the most part white. Length of wing, three inches and three-quarters.

Picidae. Woodpeckers. Typical *Picus*, apud G. R. Gray: *Dendrocopus* of Swainson. I attempted a synopsis of the Indian species of this group, in XIV, 196 *et seq.*; since the publication of which, the Society has been favoured by the Natural History Society of Batavia with a very interesting collection from Java and the Moluccas, which has enabled me to compare various Indian species with their Malayan representatives. Among them is the little *Picus moluccensis*, which, though closely approaching to the Indian species referred to the same, yet exhibits some differences upon minute comparison. Both are certainly distinct from *P. canicapillus* of Arracan. As compared with the Indian species, that of Java has rather larger bill and feet; the crown is darker-coloured, passing to blackish, or deeply infuscated, on the occiput and median line of nape; the wings are shorter, measuring two inches and seven-eighths, while in the Indian species they are three and one sixteenth; and, lastly, there is a difference in the barring of the tail-feathers, and in the form of the tips of the more outer ones, which

in the Indian bird are more rounded, or somewhat truncated, with a slight emargination at the tip of the shaft, while in the Javanese bird they attenuate and are obtusely pointed; the white bars also assume more the appearance of transverse bands in the Javanese species, and of separated round spots in that of India; while the outermost feather is in the former tipped with white, and the penultimate has an all but terminal white bar, both these feathers in the Indian bird being broadly black-tipped, with a more interrupted white bar above. Should these differences prove constantly distinctive, Mr. Jerdon proposes the name *Hardwickii* for that of Southern India,* and which Dr. Stewart has recently obtained near Cawnpore, a vicinity in which it was also procured by Gen. Hardwicke.

With a few Australian birds, I lately purchased a Woodpecker, allied to *P. Macei*, which I have not been able to determine. There is no reason to suppose it inhabits Australia, where not a single Woodpecker has yet been discovered; and while the known Australian species in this small collection (including *Eudynamys australis*, Sw., quite distinct from the Indian Coël,) were brought as skins, the Woodpecker alone was mounted and wired. General aspect that of *P. Macei*; but with merely a faint tinge of red on the lower tail-coverts, and that of the crown is also much less developed, but slightly tipping the feathers, which elsewhere are black (there is an appearance, however, of the crimson having been much abraded on the crown of this particular specimen): all the tail-feathers are barred with white, the middle pair on each web alternately, and the rump is confusedly rayed with white and dusky black: breast spotted with linear streaks; and the flanks and belly marked with obscure transverse rays. Length nearly seven inches; of tail two and a quarter; (wings imperfect in the specimen;) bill to forehead (through the feathers) barely seven-eighths of an inch. If new, *P. pectoralis*, nobis. Hab. — ?

Sub-genus *Gecinus*. The *Picus affinis*, Raffles, is identified with *P. dimidiatus*, Tem., in the Zoological Appendix to Lady Raffles's 'Life of Sir St. Raffles, p. 668; and *Gecinus viridanus*, nobis, is certainly another synonyme of the same. This bird seems common throughout the eastern coast of the Bay of Bengal, as in Arracan and the Tenasserim

* *Madras Journal*, No. XXXI, 138.

provinces; in which latter range of territory *G. occipitalis*, (Vig.) v. *barbatus*, (Gray,) undistinguishable from the Himalayan bird, appears likewise to be of plentiful occurrence.

G. chlorigaster, Jerdon, *Madr. Journ.* No. XXXI, 138: *Picus mentalis* apud Jerdon, *Catal.* Though closely allied to *G. chloropus*, Vieillot, v. *nipalensis*, Gray, with which I formerly identified it, this Woodpecker proves on comparison to be a distinct species. It is rather smaller than *G. chloropus*, and readily distinguishable by the crimson of its whole occiput, which is transversely separated from the dark green of the crown, and forms a pointed crest behind, which completely overhangs the silky yellow feathers of the nape: in *G. chloropus*, this yellow nuchal crest is much more developed, and the crimson is confined to the sides of the occiput, the central portion being green continued from the forehead, and the partly red and partly green occipital crest is not prolonged to the length of the yellow feathers beneath it. *G. chloropus* has the colours generally brighter and more contrasted than *G. chlorigaster*: the dusky green of the neck and breast contrasts with the brighter green of the upper-parts; there is a greater admixture of white about the throat and ear-coverts, which last are uniform dark green in *G. chlorigaster*; and the loral feathers are conspicuously white, with a black streak above, this white being scarcely observable in *G. chlorigaster*: the mottling of the flanks is also of a different pattern. Length of wing four inches and three-quarters; in *P. chloropus*, five inches to five and a quarter. Inhabits Southern India.

In XIV, 193, I distinguished three species of the three-toed Woodpeckers forming the division *Tiga* of Kaup; and in a note to p. 551, I mentioned the existence of a splendid fourth species from Malacca. The latter proves to be the *P. Rafflesii*, Vigors, of the 'Appendix to Sir St. Raffles's Life' by Lady Raffles, p. 669. I took the following description of a female, in the collection of Captain Thomas, of the 39th Regt. B. N. I. Length a foot; of wing five inches and three-quarters, and of middle tail-feathers four and three-quarters: bill to gape an inch and five-eighths. Colour dull uniform golden-green above; the crown, much lengthened occipital feathers, primaries and their coverts, and tail, dusky black, with whitish tips to the primaries; forehead ruddy orange; throat and moustaches, pale yellowish-buff; and lower parts of a dingy, ruddy, somewhat dusky, greenish-brown, with some transverse whitish spots

on the flanks; ear-coverts blackish, bordered above and below with a white streak, and bounded posteriorly by a white patch; and below the inferior white line and patch is another broad streak of black. Bill dusky-greenish towards base of lower mandible; and the legs appear to have been green. The male (describing from memory, assisted by the latin definition cited,) resembles the female, except in having the whole crown and the much lengthened occipital feathers, very brilliant crimson.* This beautiful species obviously connects the subdivision *Tiga* (v. *Chrysonotus*, Swainson,) with *Gecinus* (v. *Chrysophilus*, Sw.): indeed, were it not for the absence of the fourth toe, I should scarcely have hesitated in referring it to *Gecinus*, regarding it, however, as a link between that division on the one hand, and *Brachypternus* and *Tiga*, on the other. In the Appendix to Lady Raffles' work cited, *P. Rafflesii* is stated to be of the size of *P. tiga*; which latter (as here referred to) I believe to be my *T. intermedia*, which is common in the Tenasserim Provinces, and that it is the Sumatran *P. tiga* of Raffles; while the Malacca species is of the same small size as that of Java, lately received by the Society, (the females of which have the head differently spotted from those of *T. intermedia*,) and to which I have appropriated the name *Tiga tridactyla*.†

With regard to the species of *Brachypternus*, (p. 550 and note), Mr. Jerdon informs me that the common species of Southern India is identical with true *Aurantius* (v. *bengalensis*), of which I sent specimens for comparison; and the same gentleman has favoured the Society with an example of his *P. (Micropternus) badius* of Southern India, which Lord A. Hay considered (p. 551) to be distinct from both its Bengal and Malayan representatives: it is, indeed, intermediate to the other two, both in size and colouring; and combines the infuscated crown of *M. phaeiceps* with the dark throat of *M. badius* (verus), its tail-bars being also closer than in the others, amounting to six in number on the middle feathers, additional to the dusky tips, whereas the other species have only five. Mr. Jerdon designates it *M. gularis*.‡ The range of *M. phaeiceps* ex-

* Correct; and the colours also generally somewhat brighter.

† In the same Appendix, I find described a *Phenicophaps caniceps*, which is the young of *Rhinoritha chlorophæa*;—*Dicæum croceiventris*=*D. trigonostigma*, (Scopoli), v. *cantillans*; *Chloropsis zosterops*=*Phyllornis Sonneratii*, fœm.;—and *Vinago giganteus*, which there can be little doubt refers to *Treron Capellei*.

‡ *Madr. Jour.* No. XXXI, 191.

tends southward to the Tenasserim Provinces, and one female from thence has the wing fully five inches long; that of *M. gularis* measures four inches and three-quarters.*

Cuculidæ. The oriental species of true *Cuculus* are still far from being definitively understood. First, there is the deep-coloured bird, otherwise resembling *C. fugax* of India, described as *C. nasicolor*, Hodgson, in XII, 943, but which I renounced as a species in XIV, 204. A Malacca specimen in Lord A. Hay's collection, however, renders this again doubtful, and it will perhaps prove to be the veritable *C. fugax* of the Malay countries.† Then, I suspect that I have confounded three species under *C. micropterus*, Gould: viz.—1, *C. saturatus*, Hodgson, (XII, 942,) the supposed old birds, with upper-parts "uniform pure dark ashy," mentioned in my description of *C. micropterus*, in XI, 903; and these seem also to have the under-parts more closely barred than in true *C. micropterus*, and are altogether more complete miniatures of *C. canorus*, having the dimensions of *C. micropterus*. It inhabits the Himalaya. (This must be regarded as a doubtful species, however, as yet.)—2, *C. micropterus* verus, with a larger bill than in *C. canorus*, the under-parts more distantly barred, the upper-parts of a bronzed ash-brown, and not pure dark ashy, the irides pale dusky, and the orbits and feet light wax-yellow: the *Bokuttácko* of the natives. Inhabits India generally, but is more numerous in the hills.—3, *C. affinis*, A. Hay. Decidedly a good species, resembling *C. canorus* in size, and *C. micropterus* in form and colouring; length of wing eight inches and a half, or an inch more than in *C. micropterus*. Common in Malacca, and not improbably the Javanese variety of *C. canorus* of Dr. Horsfield's list. In addition to these, we have *C. sparverioides*, of the same minimum group as *C. fugax* and *C. nasicolor*; and also *C. canorus*, and the little *C. poliocephalus* (*v. himalayanus*, Vigors), pertaining to the same minimum group as the other species mentioned. I kept for about a year a pair of *C. canorus* (*indicus*), for a long while in the same cage: upon separating them, the

* *P. ceylonus*, Forst., (*v. P. neglectus*, Wagler,) is a species obtained in Ceylon by Lord A. Hay.

† Since writing the above, I have seen Mr. Jerdon's statement to the same effect, *Madr. Jour.* No. XXXI, 140. Mr. J. thinks that the common Indian species should be termed *C. Lathamii*, Gray. I may add that his specimen of *C. Sonneratii* which he refers to, is perfectly identical in species with others from Malacca.

male soon began to utter his cry, *cuckoo*, generally of a morning and evening, ten or twenty times successively. The note was certainly harsher and less musical than that of the English bird, whether heard near or at a distance. It is very desirable that observers who have the opportunity, should strive to elucidate this very difficult little group of Cuckoos: it is probable that attention to their notes would essentially assist the study of them; and to naturalists located in the hilly parts of the country, we must chiefly look for conclusive information on the subject.

Simotes, nobis, n. g. Nearly allied to restricted *Cuculus*, but differing in the great breadth and depression of the beak, which considerably resembles that of *Casuarhynchus*, Tem., in general outline, being however flatter, especially underneath; where the rami are united for their terminal half or more, measuring from the gape; the nostrils being also formed as in other *Cuculi*; and the tip of the upper mandible entire, or unemarginated. Rest as in ordinary Cuckoos.

S. albivertex, nobis. Glossy black, with a broad white vertical medial band from the forehead to the occiput. Some white feathers also on the throat; and slight whitish tips to the outer tail-feathers. In immature plumage, the black is less intense, and the feathers are looser in texture; but there are no cross-bars. Bill black, paler below; and the interior of the mouth wholly yellow: legs dark brown, the tarsi half-feathered externally. Length about fourteen inches; of wing six and a half, or seven inches; and tail the same: bill to gape an inch and three-eighths, and half an inch broad at the nostrils: tarse seven-eighths of an inch. From Borneo (I have reason to believe); being sent with other birds from that island by Mr. Jerdon.

Taccocua affinis, nobis. Three species of this division are distinguished in Vol. XIV, p. 200; and subsequent observation has confirmed the propriety of the separation: but I find that the *Sirkeer* of the Rajmahl and Monghyr hills requires further to be distinguished from that of the Cawnpore district, higher up the Ganges in the WNW. direction. Dr. Stewart has favoured the Society with a Rajmahl specimen, which he justly remarks can be reconciled with neither of my descriptions. It combines the size of *T. sirkeer* with the colouring of *T. infuscata*; but has the bill rather more abruptly curved over than in either, and coloured as in all its congeners. Wing six

inches ; middle tail-feathers nine inches ; and tarse an inch and a half. The deeper shade of colour of this bird distinguishes it from *T. sirkee*, to which it approximates most nearly, as also the decided brownish hue, concolourous with the back, of its tibial plumes, which in the other are highly rufescent ; and a further marked distinction from *T. sirkee* consists in the hue of the pectoral region, which has no rufescent tinge in the specimen before me of *T. affinis*, while in *T. sirkee*, the ferruginous tinge of the abdomen suffuses the breast and throat, passing insensibly, with no decided line of demarcation. The abdominal plumage of this bird is of a less dark tinge than in *T. infuscata* ; but the general colouring is much the same as in that species, from which the more slender legs and vertically deeper and more abruptly curved bill help to distinguish it. A further description is quite needless.

Centropus bicolor, Lesson ; *C. celebensis*, probably of Temminck. A description of this species will be acceptable to British students of ornithology. Length of wing seven inches, of middle tail-feathers a foot, the outermost shorter by one-half ; bill large, measuring to gape an inch and three-quarters in a straight line ; long hind-claw seven-eighths of an inch. Colour of wings and tail, a peculiar dull vinous-ruddy, nearly the same on the flanks, vent, and lower tail-coverts, and with a ferruginous tinge on the rump and upper tail-coverts : head, neck, throat, and breast, dull isabelline, paler towards the throat, and browner on the crown and back ; wing-coverts tinged with the same brown ; and all passing backwards into the vinaceous hue of the great alars and tail. Bill blackish, with horny-white tip : legs apparently plumbeous. Plumage not very spinous, its general character and colouring being much that of the Sirkeers (*Taenococcyz*). Inhabits the Celebes and the Moluccas.

Caprimulgidae. The Indian and Malayan species of true *Caprimulgus* resolve into three different subgroups, each characterized by a particular style of marking : viz.—1, the *C. macrourus* group, comprising *C. albonotatus*, *C. macrourus*, *C. mahrattensis*, and *C. asiaticus*, which last differs from the three others in having unfeathered tarsi ; these have the two outer tail-feathers on each side broadly tipped with white, which in the females is sullied, more or less reduced in quantity, and sometimes altogether wanting :—2, the *C. indicus* group, with a terminal or subterminal white spot on all but the middle pair of tail-feathers, rarely seen, and the white then much reduced in quantity, in the females ;—probably

three species, at present not well determined (vide XIV, 208*) :—3, the *C. monticolus* group, of which the males have their two outer tail-feathers wholly white to near the tips : also apparently three species,—*C. monticolus*,—another allied to this in Scinde,—and *C. affinis*, Horsf., of the Malay countries, which last merely differs from *C. monticolus* in its smaller size, and the greater admixture of black on the upper-parts, more especially upon the crown. Length of wing six inches and a half,—that of *C. monticolus* being an inch more,—and the rest in proportion. The Scindian species (?) is figured in one of Sir A. Burnes' drawings, as mentioned in Vol. XIV, note to p. 547. It would appear to be still more uniformly coloured in the drawing than *C. monticolus*, of a light fulvescent-grey or sandy hue, with dark pencillings, but no scapulary pale streak nor white mark crossing the breast ; tail closed, but its middle feathers (which alone are seen in the drawing) have narrower cross lines than in *C. monticolus* ; the lower parts are represented somewhat paler than the upper, as is also the inner anterior margin of the wing (towards the body). Length of wing six inches and a quarter (not "nine inches and a quarter," as formerly misprinted). Should this be verified as a distinct species, it might bear the name *C. arenarius*, in allusion to the sandy soil which its colour would certainly denote that it frequented, and which is a very prevalent hue of the birds and other animals from Scinde, as M. Temminck has remarked of those from Egypt.†

Cypselidæ. Macropteryx coronatus ; Hirundo coronata, Tickell, J. A. S. II, 580. This has hitherto been undistinguished from *M. klecho* (Horsf.) v. *longipennis*, (Tem.) of the Malay countries, which in India is represented by the present species. The two are, however, obviously

* The true *C. indicus* extends its range to Malacca. It is not rare in the Calcutta Botanic Garden.—*C. monticolus* I lately observed in a patch of open jungle, surrounded by cultivated fields.—*C. pulcher*, A. Hay, *Madr. Journ.* No. XXXI, p. 161, = *Lyncornis Temminckii*, Gould. The Society has specimens of this bird from Malacca and Java.

† The Norwegian collection before referred to, contains a female of *C. europæus* ; and the resemblance of this to some specimens of *C. indicus* is extremely close : but the latter may always be distinguished by having the tarsi wholly feathered ; by the abdominal region being much less rayed ; and the males by having a white spot on four of the primaries, and upon the four outer tail-feathers on each side. The Society has also a Tenasserim specimen of undoubted *C. macrourus*, which very much resembles both *C. indicus* and *C. europæus* ; but may be distinguished from the latter by having the tarse wholly feathered, and by the white basal portion of its rectal bristles.

distinct upon comparison of specimens. *M. coronatus* has the tail much more deeply forked, and its outermost feathers are much more attenuated, being commonly prolonged two inches beyond the extremities of the next pair, and an inch and a half beyond the tips of the wings; whereas in *M. klecho*, the tail does not reach to the tips of the wings, and both alars and caudals are considerably broader than in the Indian species. The colour of the upper-parts is also much greyer in the latter, with but a faint tinge of green, instead of being brightly glossed with green; and the chin and sides of the throat of the male, besides the ear-coverts, are ferruginous. Colour greyish above, darker in the male, and glossed with purplish-green; the tertiaries more or less pale, but never albescent-grey as in *M. klecho*: lower-parts ashy, with a slight green gloss, and passing to white on the belly and lower tail-coverts. Crest as in the other species, and structure in all respects typical. Length eight inches, by thirteen in alar expanse; of wing six and a quarter; and of outermost tail-feather five and a quarter. Common in Central and Southern India, and most probably the only species met with in the country.

We have accordingly now four species of this beautiful genus, which appears to be peculiar to India and the Malay countries:—viz. *M. coronatus*,—*M. klecho*,—the very beautiful *M. comatus*, (Tem.)—and *M. mystaceus*, (Lesson,) of which last I have seen neither figure nor description: the three others are in the Society's Museum.

Collocalia, G. R. Gray. Several specimens from the Nicobar Islands differ a little from *C. fuciphaga* of Java, in having more white underneath, the crown and back darker and tinged with blue more than green, and the wing somewhat longer, and straighter or less sickle-shaped. These characters obtain, both in the old and young; but separation of them seems hardly justifiable. In specimens recent, or preserved in spirit, the outer toe is as opposable as in other Swifts.*

* Since the first portion of the present paper was printed off, the Society has been favoured by Capt. Lewis with numerous specimens, of various classes, collected in the Nicobars, and comprising several interesting novelties. In the class of birds, the most remarkable discovery is that of a species of *Megapodius*, having the same extraordinary habits as Mr. Gould's *M. tumulus* of Australia: there is also a new *Macropygia*, more nearly resembling *M. phasianella* of Australia, than *M. amboinensis* of Java and the Moluccas; specimens of a new *Treron*, previously however brought from thence; also of a new Heron, which likewise inhabits Arracan; and some *Insessores* which I shall describe in their respective places in the present paper: but the following species can only be introduced here, instead of in p. 11, *passim*.

Corvidæ. The Indian true *Corvi*, though so particularly numerous in individuals, are referable to but three species (that I know of), and of these the Raven (*C. corax*, Lin.) is confined to the north-western Himalaya and its vicinity, being unknown at Darjeeling, and equally so

Todiramphus occipitalis nobis. Nearly allied to *T. collaris* and *T. sacer*, but especially distinguished by its strongly marked rufescent supercilia, which are continued quite round the occiput, forming a narrow band; beneath this is a broader black band, continued from the ear-coverts; and then a still broader fulvescent-white collar, as in the allied species: immediately bordering the last, the back is more infuscated than in the other, and the crown is likewise very dark, with some rufous lateral edges to the frontal feathers: under-parts white, a little tinged with fulvescent, but less so than in *T. sacer*; and the back, wings, and tail, are much, as in *T. collaris*: bill black above, and the tip of the lower mandible; the rest of the latter white: legs brownish. Length of wing four inches and a quarter; tail three inches; and bill to gape two and a quarter. Young rather smaller, with dusky margins to the pectoral feathers; and the beak shorter, with a white and hooked extreme tip. It may be remarked that in *T. collaris* and *T. sacer*, there is a much less developed white occipital band concealed beneath the surface of the feathers, but which shews conspicuously when the coronal plumes are a little raised.

The following two species of *Palæornis* appear also to be quite new.

P. caniceps, nobis. This is a very strongly marked species; but I can now merely indicate rather than describe it, as but one specimen was obtained (alive, from a native), which had lost its tail, and the wing-primaries were also mutilated. The size approaches that of *P. Alexandri*, which at once distinguishes it from all other known species of the group. General colour vivid yellowish-green, with the winglet and base of the secondaries indigo-blue, and the medial portion of the secondaries inclining to emerald-green; primaries black, the longest of them tinged with indigo towards their base: cap grey; a broad frontal band continued to the eyes, (this mark corresponding with that of *P. pondicerianus*, but very much broader,) and likewise a broad black moustache, with some black feathers also on the throat: above this moustache, between it and the frontal band, the feathers are of the same grey as those of the crown. The beak has the upper mandible coral-red, with a white tip; and the lower mandible black: the form of the bill is both narrower and less deep than in *P. Alexandri*, and angulates above towards the base.

P. erythrogenys, nobis. Allied to *P. malaccensis*; but readily distinguished by the blossom-red hue of the cheeks not being continued round the nape, and by its larger size, and differently shaped tail. Length of wing seven inches and a quarter, and of tail ten inches; the middle pair of tail-feathers exceeding the next by three inches and three-quarters. General colour bright-green, more yellowish below, and tinged in the male with hoary greyish-blue on the nape and back; winglet and primaries blue, the latter margined and broadly tipped with green; middle tail-feathers also blue, margined with green for the basal half, and the rest of the tail-feathers chiefly or wholly green above, and all of them dull yellow below; the cap is not of a distinct emerald-green, as in *P. malaccensis*, but uniformly coloured with the back (save where the latter is tinged with grey in the male); there is a well defined narrowish black streak from the nostril to the eye, and the same black moustache as in *P. malaccensis*; and the lores, cheeks, and ear-coverts, (only,) are blossom-red. Upper mandible coral-red, with a white tip; the lower one black. The female merely differs

throughout India generally.* The common Indian Black Crow (*C. culminatus*, Sykes,† is often erroneously termed 'Raven' by Europeans, and as often confounded with the European *C. corone*: it is eminently a "Carriion Crow" in its habits, and especially frequents the vicinity of the great rivers, being less confined than the next species to the immediate neighbourhood of human habitations. The common Indian Crow (*C. splendens*, Vieillot,) has sometimes been mistaken for the Jackdaw (*C. monedula*), and sometimes for the Hooded Crow (*C. cornix*), of Europe; as in the 'Proceedings of the Zoological Society' for 1839, p. 163, where the specification of the "Rook" and "Carriion Crow" both refer, as I believe, to *C. culminatus*, and the Raven is also there mentioned as an inhabitant of Assam (a statement which it would be satisfactory to have verified). *C. culminatus* is the Common Crow of Arracan; the *C. splendens* being only known in the northern part of that province, as about Akyab, (according to Capt. Phayre,)—and to the southward, upon the eastern side of the Bay of Bengal, I am told that it is the species of the Tenasserim Provinces. Proceeding further southward, a very distinct species of black Crow (*C. macrorhynchos*, Vieillot,) abounds towards the Straits of Malacca, which is probably the Sumatran *C. corax* apud Raffles; and the Javanese *C. enca*, (Horsf.), is distinct again, as I am informed. I have also been told that *C. macrorhynchos* is a much shyer bird than *C. culminatus*, with a very different *caw*; and the elongation of the beak, remarkable in *C. macrorhynchos*, would seem to be still further carried out in *C. enca*, insomuch that the latter species was ranged by Dr. Horsfield as a Chough (*Fregilus*). Professor Temminck states that the European Raven, Carriion Crow, Hooded Crow, and

in having the crown, nape, and back, quite uniform green, without the hoary-blue tinge conspicuous in the male; and the upper mandible is more or less black, like the lower one.

In *P. pondicerianus*, the upper mandible of the female is usually black, but often more or less mingled with red; that of the male being always bright coral-red: and the same is probably the case with both the foregoing new species, as well as with *P. malaccensis*. The young female of *P. pondicerianus* has recently been described by Mr. Fraser, by the name *P. modestus*. This latter species is common in Bengal, Assam, and along the eastern side of the Bay to the Malay countries generally; but is very doubtful as an inhabitant of Pondicherry, or any other part of the Indian Peninsula.

* It is common at Ferozepore, at least during the cold season.

† In the *Dict. Class. d' Hist. Nat.*, this bird is erroneously referred to *C. major* of Levaillant.

Rook, occur in Japan*; but Mr. Gould has distinguished the so called "Rook" of *Chusan* by the name *C. pastinator* (*P. Z. S.* 1845, p. 1); and another species inhabiting China and Chinese Tartary, is the *C. dauricus*, Pallas, which should be looked for by our trans-Himalayan travellers. Mr. Gould has also recently distinguished the common Australian black Crow by the name *C. coronoides*.

The Red-legged Chough (*Fregilus graculus*,) and Alpine Chocard (*Pyrhocorax alpinus*,) are both well known tenants of the bare Himalayan crags, and appear to be identical in species with their European brethren. Captain Hutton mentions the former as a winter visitant in Afghanistan; and also that the Raven (*Corvus corax*,) and the Rook (*C. frugilegus*,) occur in that country, the former in summer, the latter in winter.†

Of the Nutcrackers (*Nucifraga*,) but three species have been ascertained; *N. hemispila* of the Himalaya, *N. caryocatactes* of Europe, and *N. columbianus* of North America (the *Corvus columbianus*, Wilson, first properly classified by the Prince of Canino). These birds are peculiar to the pine-forests, and the Himalayan species appears to be particularly abundant.

Magpies. *Pica*, Ray. The only species of true black and white Magpie proper to Indian Zoology, is the *P. bottanensis*, Ad. Deless., v. *megaloptera*, nobis, *J. A. S.*, XI, 193. It is remarkable for its great size, very large wings, and tail of moderate length. Inhabits the more eastern Himalaya.

The other species of this genus, which I at present know of, are as follow:—

2. *P. media*, nobis, *J. A. S.*, XIII, 393. The next in point of size. From the Chilian Andes.

3. *P. caudata*, Ray. The common European Magpie. This appears

* Some of the Japanese birds referred by M. Temminck to European species, are certainly quite distinct; e. g., the Jay, which differs from *Garrulus glandarius* in having the space between the eye and moustache filled up with black (I think the same as in the Syrian Jay, *G. atricapillus*, Geoff., which has additionally a black cap); also the Japanese Robin, which has a rufous tail; and the Bullfinch, of which the male has a pale abdomen and lower breast, and both sexes are without the red mark on the outer margin of the smallest tertiary, which is constant in the European species, and in *P. nipalensis* becomes deep shining crimson; the female is also of a different shade of colour from that of its European congener.

† *Calcutta Journ. Nat. Hist.* 1, 558.

to be the species of Afghanistan, though I have never had the opportunity of comparing an Afghan with an European specimen. One I examined some time ago, from that country, had the wing seven inches and three-quarters long; tail eleven inches; bill to frontal feathers an inch and a quarter; and tarse an inch and three-quarters. Mr. Yarrell gives the wing of the English bird as seven inches and a quarter, and Mr. Jenyns as seven inches and eight lines; that of a British specimen in the Society's Museum (probably a female,) has it but seven inches. I fully believe that the Afghan Magpie is identical with the British species.* It has also been generally considered identical with that of China and Japan, and with the ordinary species of Western North America. Mr. Gould, however, has recently described the Chinese Magpie as distinct; but it would seem that the European is one of three species inhabiting the North American continent, all different from *P. media* of South America. For the identity of the North American species found westward of the Rocky Mountains, with that of Europe, we have the authority of Mr. Swainson; though he also regards the Chinese Magpie as the same: remarking—"We have been able to compare English and Arctic [American] specimens, with one from the interior of China, and we cannot perceive the slightest difference whatever to build even the character of a variety, much less of a species. The tails of the Arctic specimens are very beautiful." *Fauna Americana-borealis*, II, 292. Perhaps, therefore, there may be two species of Magpie in China, one of them identical with that of Europe.

4. *P. sericea*, Gould, *Proc. Zool. Soc.* 1845, p. 2. From Amoy. "Closely allied to the common Magpie, but differs in the wings, being blue instead of green, in the rather less extent of the white, and in having a longer bill and much longer tarsus; the latter measuring two inches and a quarter."

5. *P. hudsonia*, (Sabine), 'Appendix' to the Narrative of Franklin's first Polar Expedition, p. 671. The Magpie of Hudson's Bay. "Of less size in all its parts than the European Magpie, except in its tail, which exceeds that of its congener in length; but the most remarkable and obvious difference consists in a loose tuft of greyish and white feathers on the back: * * * tail from eleven and a half to twelve inches long."

* A Norwegian specimen just arrived, has the wing fully eight inches, and the rest as in the Afghan specimen above noticed.

Most of the Magpies have more or less greyish over the rump, and the absence of this is one distinguishing character of *F. bottanensis*.

6. *P. Nuttalli*, Audubon, 'Ornithological Biography.' This species is at once known by its yellow bill. From Western North America.

7. *P.*———? The small species noticed in *J. A. S.* XIII, 393, which is considerably inferior in size to the European Magpie, and has the tail glossed as in *P. Nuttalli*. I certainly do not think that it could have been *P. hudsonia*, and am unaware of its habitat. The only specimen I have seen was an unmounted skin in the collection of the Zoological Society.

Psilorhinus, Ruppell. The Blue Magpies. Mr. G. R. Gray, in his recent enumeration of the species of this group, gives only four; three of these being American, and the fourth Asiatic. I find, however, that several nearly allied Asiatic species, as many as five apparently, require to be discriminated.

1. *Ps. sinensis*; *Cuculus sinensis*, Lin., founded on the *San-hia* of Buffon: *Corvus erythrorhynchos*, Latham, founded on *le Geai de la Chine à bec rouge* of Buffon; also *Coracias melanocephala*, Latham. This Chinese bird, according to Levaillant's figure and description, has too much white upon its crown for the common Himalayan species, figured as *Pica erythrorhyncha* in Gould's 'Century'; and as the other oriental species of this group differ especially in this particular, and as Levaillant examined "at least six specimens" of his *Pie Bleue*, I think we may confide in his accuracy as regards the marking in question. He expressly states that the forehead, cheeks, throat, and the front and sides of the neck, are of a decided black; the whole top of the head is covered with bluish-grey feathers, which are long and broad, and form a kind of pendent crest: but he is doubtless wrong in correcting Buffon respecting the colouring of the beak, the original bright coral-red of which had faded in the specimens which he saw and drew from.

2. *Ps. occipitalis*, nobis: *Pica erythrorhyncha*, apud Vigors and Gould. Bill coral-red; a large oval white patch confined to the occiput, and pointed posteriorly, with terminal white spots on the hinder coronal feathers immediately impending it. The common species of Nepal and to the NW., as at Mussoorie, &c.

3. *Ps. magnirostris*, nobis. Resembles the last, but is still more richly coloured, especially on the wings; the bill much larger than in the

others; and a *great* naked space surrounding the eyes; the legs and claws also are large and strong. Length of bill to gape, an inch and three-quarters, that of *Ps. occipitalis* barely exceeding an inch and a half; and its depth and strength also considerably greater. Inhabits the Ya-ma-dong mountains, separating Arracan from Pegu.

4. *Ps. albicapillus*, nobis. This is evidently distinct, though I only know it in its immature garb, which differs from that of *Ps. occipitalis* in having the entire cap white; the extreme frontal feathers, and those impending the nostrils, being alone black. From the neighbourhood of Simla. The Chinese species would seem to be intermediate to this and *Ps. occipitalis*.*

5. *Ps. flavirostris*, nobis. General plumage of a *much* duller colour than in the others; the bill of the recent specimen bright yellow, instead of deep coral-red; and the white of the occiput reduced to a narrowish *transverse* band, with a broad collar of black below it, surrounding the hind-neck, and never any white tips to the feathers immediately above it; legs and toes small and slender. This is the most distinct from the rest of all the species here indicated; and it is the first which I distinguished from *Ps. occipitalis*, though I waited to obtain the young of the latter before attempting to describe it as a separate race. It is the common species of Darjeeling, and the only one I have seen from that locality; but I have now seen many specimens from thence, all true to their distinctive characters. Upon shewing the three Himalayan races to Mr. Hodgson, (*Ps. albicapillus*, *Ps. occipitalis*, and *Ps. flavirostris*,) that gentleman informed me that he had long ago distinguished them, and that he had exhibited coloured drawings of the heads of each at a meeting of the Zoological Society in London. It is probable that naturalists in Europe will not at once be prepared to accept the distinctions that have been here indicated, but I am content to await their future decree, when they shall have obtained the requisite data to judge from; as in the matter also of the Hoonuman Monkeys, (XIII, 470,) concerning which Mr. Gray, I perceive, regards as varieties merely of the same species, the very distinct

* Lord A. Hay writes me word, that he has recently obtained this white-capped species at Simla: it being the only specimen of the genus which his lordship did there meet with; though *Ps. occipitalis* abounds at Mussoorie, and as Capt. Hutton informs me, is very terrene in its habits, feeding almost entirely on the ground.

racés which I still insist upon are different species, if any meaning is to be attached to the latter term. With sufficiently perfect specimens to form an opinion upon, I own I cannot conceive how any other conclusion can be arrived at, in the latter instance, than that upon which Mr. Elliot and myself are agreed.

Cissa, Boie : *Corapica*, Lesson : *Chlorisoma*, Swainson. Here, again, I think that three species require to be distinguished. 1, *Cissa sinensis*, (Gm.), founded on Buffon's plate, of which a copy has been obligingly sent me by Mr. Jerdon. This would seem to be distinguished from *C. venatorius*, (Gray,) of the Himalaya, Assam, Sylhet, and the Tenasserim Provinces, by having much less black behind the eye; and it would appear also to have the wing entirely blackish, except the tips of the tertiaries which are white : and as the upper-parts are represented more green than blue, the inference is, that the hue of Buffon's specimen had not faded.—2, *C. venatorius*, (Gray);—and 3, *C. thalassina*, (Tem.)—*C. venatorius*, when newly moulted, is of a lovely green, with the wings bright sanguine-red; and the bill and legs deep coral : but whether alive, (wild, or in confinement,) or mounted as a stuffed specimen and exposed to the light, the green soon changes to verdigris-blue, and the red of the wings to dull ashy : at this time of writing, a specimen in the Museum which was of the finest green and red when set up, has completely faded on the side exposed to a moderate light, and retained its pristine colours on the other side; and I am obliged to keep another specimen protected from the light, to shew the great beauty of the species in its unchanged *verdure*. I have had many of these birds alive, which combine in their manners the traits of the Jay and Shrike; they are very amusing birds, soon become tame and quite fearless, are very imitative, sing lustily a loud and screeching strain of their own, with much gesticulation, and are highly carnivorous in their appetite. The Shrike-like habit, in confinement, of placing a bit of food in each interval betwixt the bars of their prison, is in no species more strongly exemplified then in *Cissa venatorius*.

The genera *Psilorhinus* and *Cissa*, with *Cyanacorax* of South America, form a little group by themselves*; and I consider that Mr. Strickland was quite justified in separating from the last the blue Jays of

* *Corvus cyanus*, Pallas, exemplifies another form that should rank with them.

North America, which constitute his *Cyanocitta*, *An. and Mag. Nat. Hist.* 1845, p. 260; but as *Corvus cristatus*, Lin., is the type of Mr. Swainson's *Cyanurus*, I conceive that this must take precedence of *Cyanocitta*, Strickland.

Crypsirina, Vieillot: *Phrenotrix*, Horsfield: *Dendrocitta*, Gould. Some attempt was made at collating the Indian species of this group of Magpies, in XII, 932. I now add another species, and shall endeavour to assort the synonymes.

1. *Cr. rufa*; *Corvus rufus*, Scopoli, Lath., founded on *la Pie rousse de la Chine* of Sonnerat, badly figured by Levaillant: also *Coracias vagabunda*, Latham; and perhaps *Pica rufiventris*, Vieillot, Shaw's Zoology, XIV, 73. India generally.

2. *Cr. pallida*, nobis. Distinguished from the last by its considerably smaller size and paler colouring. Length about fifteen inches, of which the middle tail-feathers measure eight and three-quarters, the outermost four inches and five-eighths less; wing five inches and a half; bill to gape nearly an inch and a quarter; tarse an inch and one-eighth. Plumage as in *Cr. rufa*, but altogether much paler: the back and scapularies isabelline with a shade of dusky, but devoid of any decided rufous tinge; rump paler, the belly and lower tail-coverts pure isabelline, or buffy cream-colour. The hue of the lower-parts approaches that of the young of *Cr. rufa*; but the much firmer structure of the plumage, indicative of maturity, at once distinguishes it from the latter. Hab. Western Himalaya. This species, and the young of *Psilorhinus albigapillus*, were obtained in a small collection from that part, purchased in Calcutta by Prof. Behn, of Kiel University, who first called my attention to the distinctness of each of them from its near congener, and kindly permitted me to draw up descriptions for publication.*

3. *Cr. sinensis*.†—4. *Cr. leucogastra*.—5. *Cr. rufigastra* (*non vidi*), vide XII, 933.—And 6. the *Cr. altiraptris* will, I suspect, prove to be the same as *Cr. frontalis*, from the description of which it deviates only in

* Both would seem to be rare. Capt. Hutton never met with *Ps. albigapillus*, during the long time that he has collected in the W. Himalaya; and Capt. Boys has only once obtained *Cr. pallida*, many years ago.

† Very doubtful as an inhabitant of Southern India. Jerdon.

having the *vertex* black like the forehead, not grey like the occiput.* Hab. Darjeeling, and the mountains of Assam. This last species has the beak compressed so as to resemble that of a *Callæas*, Forster (v. *Glaucopis*, Gm.), to which genus M. Temminck has referred certain other *Crypsirine*, as also the *Temaorus leucopterus*, (Tem.), Lesson.

Of the two Himalayan species of *Garrulus*, or true Jay, Mr. G. R. Gray arranges the synonymes as follow:—1, *G. ornatus*, Gray, Hardwicke's *Ill. Ind. Zool.*; *G. bispecularis*, Vigors and Gould.—2, *G. gularis*, Gray, Hardw., *Ill. Ind. Zool.*; *G. lanceolatus*, Vigors and Gould; and *G. Vigersii*, Gray, Hardw., *Ill. Ind. Zool.*—The *G. striatus*, Vigors and Gould, though extremely Jay-like in form, pertains to a different series of birds; and Mr. G. R. Gray ranges it under *Turnagra* of Lesson, which he considers synonymous with his own *Keropis*. *G. gularis* is the great Kemaon Shrike of McClelland's 'Geology, &c. of Kemaon,' p. 244.

After the *Corvidæ*, might be arranged the *Paradiseidæ*; to which family I suspect the curious Australian genera *Ptilinorhynchus* and *Chlamidera* should be referred. Then the great family of *Sturnidæ*, commencing with an Australian sub-family, which comprises the genera *Strepera*, *Gymnorhina*, *Cracticus*, *Vanga*, *Neomorpha*, and *Grallina*. Then the great series of Old World *Sturnidæ*, forming the sub-family *Sturninæ*; from which perhaps that of *Lamprotorninæ* might be separated, though it is not easy to trace the line of demarcation of this group. I described apart the two Indian *Graculæ* in XII, 178 (*bis*); but Lord Arthur Hay has since distinguished the Malayan Grackle from that of Bengal, &c., which necessitates a revision of the synonymes of all three species.

1. *Gr. religiosa*, Lin. (apud Lord A. Hay): *Gr. indica*, Cuvier; *Pastor musicus*, Tem.; *Mainatus javanus*, Lesson, apud Jerdon, *J. A. S. XII.* 178 (*bis*); *Lesser Mina* of Edwards, quoted by Latham and Gmelin as *Gr. religiosa*, L., var. *A.* (the *Greater Mina* of Edwards being quoted by them as var. *B.*). Inhabits Southern India.

2. *Gr. javanensis*, Osbeck; *Greater Mina* of Edwards; and no doubt *Sturnus indicus Bontii* of Ray and Willughby; probably also *Mainatus major*, Brisson. This, the common Malayan Grackle, differs

* Dr. McClelland's coloured drawing of *Cr. frontalis* accords with the description: having the forehead broadly black, passing laterally over each eye to beneath the vertex, as in *Cr. sinensis*, and leaving the vertex greyish-white, continuous with that of the occiput and nape; whereas in *Cr. alirostris*, the black anterior portion comprehends the vertex, as in *Cr. leucogastra*.

from that of Nepal, Bengal, Assam, Arracan, and the Tenasserim Provinces, (the common Hill Mynah of the Calcutta dealers,) in its rather larger size, as regards linear dimensions, but much more robust conformation, with much larger occipital lappets, &c. The closed beak measures eleven-sixteenths of an inch in vertical depth, whereas in the Bengal species it does not commonly attain to half an inch; the feet are also much thicker and stronger, with far more powerful toes and claws, the tarse measuring an inch and three-eighths, and middle toe and claw nearly one and seven-eighths; while in the Bengal species the former measurement is one and a quarter, or less, and the latter about one and five-eighths; wing respectively seven inches, and six and a half or less; and tail the same in both. All the specimens I have seen have been from Malacca*: of a number received from the Tenasserim Province of Yè, not one could be mistaken for this Malayan bird. Edwards' statement that his "Greater Minor, or Mina, for bigness, equals a Jackdaw or Magpie," is intelligible of the present species, but scarcely so of the next.

3. *Gr. intermedia*, A. Hay, probably the *Mainate* of Buffon, and perhaps *Mainatus sumatranus*, Lesson: *Gr. religiosa*, apud nos, *J. A. S. XII*, 178 (*bis*). The range of this species has already been indicated. It is always less robust, with a less powerful beak, and smaller occipital lappets, than in *Gr. javanensis*.†

Ampeliceps coronatus, nobis, *J. A. S. XI*, 194. In XII, 985, I indicated a grand defect in the specimen originally described, and noticed the near affinity of this genus to the preceding one. Our indefatigable contributor Mr. Barbe has now supplied us with fine specimens of both sexes, of which the beak essentially resembles that of *Gracula*, but is smaller and shorter, and of a dark greenish colour with yellowish tip and along the tomix (in the scarcely dry specimens). There is a tolerably large naked space surrounding the eye, which appears to have been yellow; but the orbits are black; and there are no short velvety feathers on the sinciput, or nude skin beneath and occipital lappets,

* It likewise inhabits the Nicobar Islands and Penang. In this species, the occipital lappets are generally united at base, but sometimes only approximated; in *Gr. intermedia* they are smaller and more distant apart.

† In the 'Madras Journal', No. XXXI, p. 154 *et seq.*, Lord A. Hay terms these three birds *Gr. religiosa*, *javana*, and *indica* (nec *intermedia*).

as in *Gracula*; though in other respects the form is barely separable. The presumed female differs from the male in having less yellow on the crown and throat: in the male, the whole crown, lores, throat, extending laterally to the naked skin beneath the eyes, are bright yellow; whereas in the females, the lores, and a considerable space both above and below the nude orbital skin, are black. The rest of the plumage is exactly as in the *Gracula*, with yellow instead of white barring the primaries. Inhabits the Tenasserim Provinces. This is an exceedingly pretty Mynah, and I doubt not would be much esteemed as a cage favourite.

The other Mynahs were treated of in XIII, 361 *et seq.*: and the common arboreal Bengal species there referred, and also by authors generally, to *Acridotheres cristatellus*, (L.), of China, proves to be distinct, and apparently referable to *Pastor griseus*, Horsf., of Java, which that naturalist imagined to be the same as the *cristatellus*. To Lord Arthur Hay, I am indebted for the loan of a Chinese specimen of true *Acr. cristatellus*, the young of which I described as *Acr. fuliginosus* in XIII, 362. I now supply descriptions of each, which will suffice to shew their differences.

Acr. cristatellus, (Lin.); figured by Edwards, pl. XIX: *Acr. fuliginosus*, nobis (the young). Length about eleven inches: of wing five inches and a half; and tail three and three-eighths; bill to gape an inch and three-eighths; and tarsi an inch and a half. Colour throughout greyish-black, with a bronzed gloss on the upper parts; tail-feathers, except the middle pair, and the lower tail-coverts, tipped with white; base of the primaries, and greater portion of their coverts, also white, forming a broad band on the under surface of the wing; erect frontal feathers above three-quarters of an inch high, in the specimen under examination: the bill appears to have been yellow, with the base of the lower mandible carrot-red; and the legs are also yellow. The young is browner, with the white patch at the base of the primaries much more developed: but there is no white at the tip of the tail, or of its under-coverts; and the frontal crest is barely indicated.

Acr. griseus, (Horsfield): *Pastor cristalloides*, Hodgson. Smaller and paler, with the under-parts of a much lighter ash-colour, paling and in some specimens passing to vinaceous-white on the abdomen, and always to pure white on the lower tail-coverts: the tail-feathers are

much more deeply tipped with white than in *Acr. cristatellus*; there is a similar white wing-patch; and the frontal crest is commonly under half an inch in height. Terminal half of the bill orange-yellow, the remainder with the inside of the mouth deep black: legs orange-yellow: irides bright yellow. Length nine inches and a half, by fifteen inches; wing five inches; and tail three inches: bill to gape an inch and a quarter; and tarse one and three-eighths. The young are browner than those of *Acr. cristatellus*, and are at once distinguished by having the throat whitish, more or less pure, and the middle of the belly and lower tail-coverts white. This bird takes much the same range as *Gracula intermedia*, only that it is not confined like that species to the hill country: it is common along the eastern coast of the Bay of Bengal, to the Tenasserim Provinces at least; and it appears to be Dr. Horsfield's Javanese *Pastor griseus*.*

Also very closely allied to the latter, is the *Acr. fuscus* of the Indian Peninsula, which is distinguished from *Acr. griseus* by its smaller size, browner colouring, white abdominal region, and greyish-white irides. Wing four inches and three-quarters.

The *Acr. ginginianus*, one of the commonest birds in the vicinity of the great rivers of Upper India which have high banks, does not occur so low down the Hoogly as Calcutta, but abounds as soon as the banks of the Hoogly become of sufficient height for it to burrow in with tolerable security; and on ascending the river makes its appearance soon after the common Indian Bank Swallow (*Hirundo sinensis*, Gray). Mr. Hodgson well named this species *Pastor gregicolus*, for it constantly associates with the herds of cattle on open pastures; and populous communities of them perforate deep holes in the perpendicular banks of rivers, in which they repose and breed. This bird is the *Turdus suratensis*, var. A, of Latham; his *T. suratensis* being no other than *Pastor roseus*: it is also the *Gung-Salik* ('Ganges Mynah') of the Bengalees, and should be compared with the African *Martin gris-de-fer* of Levaillant, upon which is founded *Gracula grisea*, Daudin, and *Cossyphus griseus* of Dumeril.

Sturnia erythropygia, nobis, n. s. This beautiful species would seem to be nearly allied to the Javanese *St. tricolor*, (Horsfield), v. *melanoptera*,

* I think that I have seen it from Malacca, but am not quite sure. A gentleman from Java considered it to be, decidedly, the species common in that island.

(Wagler). Head, neck, and lower-parts, pure silky-white; the wings wholly shining black; the scapularies and interscapularies pale satiny-brown; the rump, vent, upper and lower tail-coverts, deep ferruginous; and the tail black, with more than half of its outermost feather ferruginous, and the rest successively less deeply tipped with ferruginous to the middle pair: bill yellow, with the base of the lower mandible livid blue; and legs (apparently) orpiment-yellow. Length approaching to nine inches; of wing four inches and a quarter to four and a half; and tail three and a quarter to three and a half; bill to gape nearly an inch and a quarter; and tarse an inch. From the Nicobar Islands.

To the same genus, *Sturnia* of Lesson, must be referred the *Pastor malayensis*, Eyton, *P. Z. S.* 1839, p. 103; but as an aberrant species, with the bill short, and approximating that of *Calornis*,—more slender, however, than in that genus, and having the outline of its upper mandible less curved. Length about seven inches and a quarter, of wing four and one-eighth, and tail two and a quarter; bill to gape seven-eighths, and tarse an inch. Head, neck, and under-parts, of a silky subdued whitish or drab-white; whiter on the belly and lower tail-coverts, and tinged with purplish on the crown and nape: an occipital spot, the interscapularies, proximate scapularies, shoulder of the wing, and rump, black with a rich purple shine; outer scapularies, and the second range of wing-coverts, subdued white; as also an elongated central terminal spot on some of the greater wing-coverts, and more or less developed on the tips of the tertiaries; rest of the wing, and the tail, glossy green-black, with some admixture of purple; the secondaries shaped at tip and margined with deep black, as in *Sturnus vulgaris*; the outermost tail-feather having a whitish-brown exterior web, and most of the upper tail-coverts are of the same dull pale brown colour: bill dusky, whitish towards base of lower mandible; and the legs apparently plumbeous. What appear to be the females have a large triangular drab-coloured spot at the base of the secondaries, and the exterior half of the outer webs of the primaries are of the same hue; a trace of this appears also on the wings of some (presumed) males. The young are brown above, paler beneath, passing to whitish on the belly and lower tail-coverts; the back and scapularies are darkest; and there is a blackish occipital spot in place of the shining black spot of the adult: the wings are marked nearly as in the adult, but are much less bright; the secondaries brown

with pale outer margin; and the bill pale, with dusky on its terminal half. Common at Malacca.*

Calornis affinis, A. Hay. This differs from the Malayan *C. cantor* in its larger size. Wing four inches to four and a quarter, instead of three and a half to three and five-eighths; and tail three inches to three and a quarter, instead of two inches and a half; tarse seven-eighths, instead of three-quarters of an inch; and bill about the same in both: plumage of the two species absolutely similar at all ages, and glossed as brightly in fine specimens of either. *C. affinis* inhabits Tipperah, Arracan, Tenasserim (?), and the Nicobar Islands: while *C. cantor* is common at Malacca.

Pastor temporalis, (Tem., noticed in Vol. XIII, note to p. 366,) proves to be from China, and will rank in *Sturnopastor*, Hodgson. Lord Arthur Hay has favoured the Society with a specimen from Hong Kong: and his lordship first called my attention to the distinction of size between *Calornis cantor* and *C. affinis*. Here, too, may be noticed that I no longer regard *Sturnus indicus*, Hodg., as distinct from *St. vulgaris*.

Fringillide, sub-fam. *Estreldinæ*. In Vol. XIII, 949, I endeavoured to give a list of the Indian Mooniahs, &c., which was partly corrected in XIV, 554. I now offer a revised list of them.

1. *A. malacca*, (Lin.): *Coccothraustes javensis*, Brisson: *White-breasted Indian Sparrow* of Edwards. Hab. Peninsular India.

2. *A. sinensis*: *Coccothraustes sinensis*, Brisson: *Loxia malacca*, var. *A.* Latham; *Munia rubronigra*, Hodgson; *Lonchura melanocephala*, Horsfield: *Chinese Sparrow* of Edwards. Bengal, Nepal, Assam, Arracan.

3. *A. maja*: *Loxia maja*, (nec *Fringilla maja*), Lin.: *Loxia leucocephala*, Raffles. As a rare Bengal species, this rests on the authority of a most correct observer, Mr. Frith. It is common in the Malay countries.

4. *A. pectoralis*, Jerdon. South India.

5. *A. molucca*, (L.): *Munia acuticauda*, Hodgson. Nepal, Malacca.

6. *A. striata*, (L.): *Fringilla leuconota*, Tem. South India, Arracan. Such at least is the range of the Indian species, which Mr. Jerdon thinks is distinct from its Malayan representative: the latter I have not seen; but, if different, it will retain the name and synonyme here applied to the Indian bird.

* *Pastor chinensis*, (L.), as figured in the *Pl. Enl.*, to judge from a copy of that figure sent me by Mr. Jerdon, would seem to be an aberrant species of *Sturnia*, having some affinity for *St. sericea* and *St. malayensis*.

7. *A. undulata*, (Lath.): also *Losia punctularia*, var. *A*, Lath.; *Mania lineoventer*, Hodgson. India generally. From the nearly allied Malayan species—*L. punctularia*, (L.), v. *nisoria*, (Tem.),—this Indian bird is distinguished by having its upper tail-coverts ochreous, and tail tinged with the same; whereas *A. punctularia* (vera) has the tail ashy, and its coverts barred dusky-ash and white. Mr. Jerdon first informed me of their distinctness.

8. *A. malabarica*, (L.): *Lonchura cheet*, Sykes; *Losia bicolor*, Tickell (nec Latham). India generally; common in Bengal. *L. malabarica* apud Latham, is the young of *A. sinensis*; and his *L. bicolor* is evidently the immature plumage of some other species.

The *Estrela formosa*, (Lath.) as I am informed by Capt. Wroughton, occurs in immense flocks in the high lands where the Nerbudda takes its rise.

Fringillidæ.* Several of the species described in my 'Synopsis of Indian *Fringillidæ*,' J. A. S. XIII, 944 *et seq.* (1844), have since been described by Mr. Hodgson in the 'Proceedings of the Zoological Society' for April, 1845. *Pyrrhuloides epauletta* is there termed *Pyrrhoplectes epauletta*. The generic name *Propyrrhula* is transferred to *Pyrrhospiza* of my synopsis, and *Pr. punicea* described as *Pr. rubeculoides*. *Carpodacus* (v. *Erythropsiza*, Bonap.) *erythrinus*, is designated *Pyrrholinota roseata*; and *C. rodochrous* and *C. rodopeplus* are styled *Propasser*.—I lately saw fine specimens of *Pyrrhospiza punicea* from the Boorendoo Pass; and with them a new species of restricted *Fringilla*, from Huttoo mountain, near Simla, in the collection of Capt. Thomas, 39th Regiment Bengal Native Infantry. *Pyrrhospiza* is but slightly removed from typical *Fringilla*, which group it connects with the various roseate Finches; and will most probably contain the *Fr. sanguinea* of Gould: and another nearly allied form is *Leucosticte*, Swainson, figured in the *Fauna Americana-borealis*, to which may seemingly be referred Mr. Hodgson's

* It may be remarked here that *Passer montanus* is the common Sparrow of Java, from which island it was long ago mentioned to have been received, in the *Dict. Class.* I had before traced it to Arracan and Malacca, and suggested its being the Siamese Sparrow of Crawford. It is common in China and Japan, also in the Himalaya, and in Afghanistan, extending westward to the British Islands.

Of the common Indian Sparrow (*P. indicus* of Jardine and Selby, and 'Black-breasted Finch' of Latham), I find that some males, especially in breeding aspect of plumage, are fully as rufous as represented, and the under-parts of both sexes are always whitish: but the size accords with that of the ordinary European Sparrow, to which it is so very closely allied.

Fringillauda; and his *Procarduelis* is also not far removed. A new species of *Leucosticte* has lately been figured by Mr. Gould, in the 'Zoology of the Voyage of the Sulphur,' by the hybrid name *griseogenys*, under which it is described in *P. Z. S.* 1843, p. 104. The new Finch may be thus described—

Fringilla erythrophrys, nobis. Length of male about seven inches; wing three and seven-eighths; and tail two and five-eighths; bill to gape above five-eighths, and tarse three-quarters of an inch. Female rather smaller. Colour of male ruddy-brown above, darkest on the tail-coverts; below dull buffy-red, mingled with weak crimson on the chin and throat, also on the forehead, and this red passing as a broad streak over the eye, and becoming deeper crimson posteriorly: fine specimens in summer dress have probably the whole under-parts, with the forehead and eye-streak, crimson, and the back deeply tinged with the same: the crown, ear-coverts, wings and tail, are black, not very deep, with the three outer tail-feathers chiefly white towards the tip, and with dark outer webs to near the end; and the other tail-feathers are white-tipped, except the middle pair: wings marked with white, the greater coverts of the primaries having their terminal half white, those of the secondaries broadly tipped with the same, as are also the outer webs of the tertiaries, and (successively more slightly) those of the secondaries and primaries. Bill yellow, and legs light-coloured. The female is plain brown, paler and tinged with yellowish below, darker and a little tinged with yellowish on the crown, and having a bright saffron eye-streak, and duller saffron-coloured or ochreous forehead; the wings and tail are marked as in the male, but the white is less developed; and the back is yellowish-brown. This is a true restricted *Fringilla*, of the form of *Fr. montifringilla*, &c.; but having obvious affinities for the red Finches (*Carpodacus*, &c.), and shewing also a marked relationship for *Coccothraustes*, and even for *Carduelis*.*

* Lord A. Hay informs me of what he suspects to be a new Finch, and terms *Fringilla rubrifrons*, procured during his sojourn at Simla. "Size very small; and colour olive-green, striate and mingled with dirty yellow: forehead red." The particular subdivision of Finches is not stated.

There is also a very curious-looking, diminutive, Finch-like species, figured among Dr. McClelland's drawings of Assamese birds. The size and plumage are very *Wren*-like; with a bill approaching in form that of a Chaffinch: colouring deep isabelline or buff, with dusky rays on the wings and tail, and the primaries edged with white. The immediate affinities are by no means obvious.

Emberiza cia, Lin. (mentioned in Royle's list): *E. barbata*, Scopoli; *E. lotharingica*, Gm. Length six inches and a half: of wing three inches; and tail two and three-quarters. Upper-parts rufescent-brown, brighter on the tail-coverts, and marked, except on the latter, with a black central streak to each feather: crown dusky, with some inconspicuous rufous edges to the feathers, a pale medial coronal line, and a broad whitish supercilium; a black line passes beneath the latter through the eye, and partly surrounds the pale ear-coverts, and another black streak proceeds downward from the base of the lower mandible; the chin, throat, and breast, are dingy grey, with slight dusky spots in front of the neck; and the rest of the lower-parts are uniform light ruddy-brown, with traces of dark streaks on the flanks: wings dusky, the feathers margined with the rufescent-brown of the back; and the two outermost tail-feathers on each side are chiefly white, except on their narrow outer webs. Bill pale plumbeous, and legs light-coloured. Also procured in the vicinity of Simla by Capt. Thomas, who has obligingly presented it to the Society.* According to Messrs. Dickson and Ross, this bird is common in the vicinity of Erzeroum, being found near mill-streams, and in burying grounds. *P. Z. S.* 1839, p. 132.

Mr. Hodgson, in *Proc. Zool. Soc.* 1845, p. 35, states that, in Nepal,—“We have four species of *Emberiza*, three of which are the *erythroptera*, *chlorocephala*, and *aureola*, of authors; and the fourth,” he adds, “is, I think, new,—*Emberiza oinops*, mihi,—a new subgenus, *Ocyris*, mihi.” Of these four, the first now bears the name *Lathami*, Gray†; the second is, beyond doubt, my *melanops*, *J. A. S.* XIV, 554, which was recognized by Mr. Hodgson when in Calcutta, as a species familiar to him, and it is quite distinct from *E. hortulana* (v. *chlorocephala*), of Europe‡;

* I have since been informed that it is there common. Lord A. Hay procured many specimens; and mentions also another species “closely allied to it, but differing in having a large liver-brown spot on the cheek, and in some other particulars.” The liver-brown spot in question is possessed by *E. fucata* and by *E. pusilla* (?).

† Lord A. Hay possesses this bird from Hong Kong; and Mr. Jerdon considers it to be the *Moineau de Macao* of Buffon, “and if so it will bear the prior, but certainly inappropriate, name of *melanictera*, Vieillot.”

‡ Since the above was penned, the Norwegian collection has supplied us with a specimen of the European Ortolan, *E. hortulana*: its upper-parts are nearly as in *E. melanops*, but the face and abdominal region are wholly different; the latter is nearly of the same rufous tint as in *E. cia*, but mingled with yellowish; while in *E. melanops* the abdominal region is pure light yellow, with dusky streaks on the flanks.

the third, *E. aureola*, is common also in Tipperah and Arracan; and the fourth, I greatly suspect, is *E. pusilla*, Pallas, and certainly the same as that described from a female specimen in XIII, 958, by the name *E. sordida*, Hodgson. I add the description of a male, which I lately saw from Darjeeling.

E. pusilla (?), Pallas. Length about five inches and a half, wing two inches and three-eighths, and outermost tail-feather two and a quarter; the tail forked to the depth of five-sixteenths of an inch: bill to forehead three-eighths, and tarse above five-eighths, of an inch: Upper-parts streaky, the feathers black-centred, set off with rufous, and this margined with greyish-brown; the rufous colour more developed on the scapularies and rump: crown, lores, and ear-coverts, rufous; supercilium and chin pale rufescent, and above the supercilium is a broad black streak, the feathers of which are slightly rufous-edged: wings dusky, the feathers externally margined with ruddy-olive, and tipped paler: tail having a broad oblique white streak on the outermost feather, and a narrow one on the penultimate: lower-parts whitish, with a dusky line on each side of the throat, and streaks of the same on the breast and flanks. Bill horn-coloured, and legs pale. This species is somewhat allied to *E. fucata*, Pallas.*

Alaudinæ. Alauda raytal, Buch. Ham., nobis, XIII, 962. This bird abounds on the white sand-dunes of the Hooghly, where the stream, unchecked by the tide, deposits only fine sand, and the alluvial country round (from this cause) is everywhere light and arenaceous: this Sand Lark being scarcely ever seen except on the flat deposits of white sand within each bend of the stream; but there they are very numerous, and (as usual) their colour approximates that of the surface. Fine specimens measure five inches and five-eighths, by ten inches; wing three and a quarter; and tail two inches: bill to gape five-eighths, and tarse three-quarters of an inch; toes short, the hind-claw

* *Loxia flavicans*, var. *A.*, Latham, = *Emb. icterica*, Eversh.: his *Emb. luteola* is perhaps the female of *E. melanocephala*, but agrees with that of *E. aureola*: his 'Goura Finch' is *E. Lathamii* (v. *melanictera*?): his *Fringilla butyracea*, L., is *Crithagra chrysopogon*, Sw. ('Birds of W. Africa'), which is occasionally brought alive to India from the Mauritius, and kept as a cage-bird: *Fringilla stulta*, Ind. var., is doubtless *Gymnoris flavicollis*: and his *Loxia totta* and *madagascariensis* of India, = *Carpodacus erythrinus*, as was long ago pointed out by Mr. Jerdon.

barely exceeding a quarter of an inch.* Irides very dark brown ; bill whitish, with a slight tinge of dusky above ; and legs albescent-corneous, the toes pale dusky-brown. The young have a very whitish appearance, from the downy character of their feathers ; and all the usual mottlings of young Larks are exhibited by them, though less conspicuously than in most other Larks. *A. raytal* is not much of a musician ; but often ventures on short snatches of song, frequently without rising from the ground, and I never saw it mount high like its musical neighbour, the *A. gulgula*, whose habits and song closely resemble those of *A. arvensis* : the haunts of these two species border, and they may commonly be seen and heard at the same time ; but this will be on the confines of each others territory. Upon ascending the river Hoogly, a considerable change both in the animal and vegetable productions of its banks is soon perceptible, with the change of the face of the country that has been alluded to. The White Vulture (*Neophron percnopterus*) makes its appearance, which is never seen lower down upon the argillaceous or mud soil ; *Buteo canescens* is common ; and various little insectorial birds which I have never seen near Calcutta, as *Malacocercus caudatus*, *Chrysomma sinense*, *Cisticola cursitans*, the true British *Curruca garrula*, *Amadina malabarica*, &c., &c., abound more or less ; the fauna altogether more approximating that of Hindoostan Proper, and I have no doubt that it would soon yield various novelties to a diligent collector.

Genus *Certhilauda*, XIII, 962. There are two closely allied species of Indian *Certhilauda*, differing only in size : the larger of which, with wing four inches long, must be the true *C. chendoola*, (Franklin,) described to be of the size of the British Sky Lark ; while the smaller, referred to *C. chendoola*, *loc. cit.*, has the wing but three inches and a half, or less, and the rest in proportion : the latter may now rank, is *C. Boysii*, nobis (the Society being indebted to Captain Boys for a fine specimen of the former species, which has led to its discrimination). One of them is the 'Crested Calandre Lark' of Latham.†

* The hind-claw of this *Alauda* resembles that of the *Certhilauda* and *Pyrrhulauda*, as does also its light sandy-coloured plumage ; but its other characters are those of restricted *Alauda*.

† Latham's 'Aggia Lark' is *Alauda gulgula* ; his 'Finch Lark'=*Mirafra assamica* ; his 'Baag-geyra Lark'=*Calandrella brachydactyla* ; his 'Slender Lark'=*Anthus malayensis* ; his 'Yellow-headed Lark' can only be *Budytes citreola* ; and his 'Wagtail Lark' is the female common *Budytes*.

In the 'Madras Journal,' No. XXXI, 136, Mr. Jerdon considers his *A. deva* (*A. malabarica* apud nos,) to be an aberrant *Certhilauda*, nearly allied to *C. Boysii*: but, if so, he must have sent the Society another species as his *A. deva*; for the specimen referred to, is a true *Alauda*, closely allied to *A. gulgula*, but with a pointed crest, and quite agreeing with Scopoli's description upon which is founded *A. malabarica*, Gmelin; whereas *Mirafra affinis*, Jerdon, which Mr. Strickland considered to be the *malabarica*, has too short a wing for that bird, and also does not accord in other particulars.

Genus *Accentor*, Bechstein. This remarkable genus seems to come in no where better than on the extreme verge of the *Fringillidæ*, which I believe to be its natural location.* Mr. Hodgson has recently described (in *P. Z. S.* 1845, p. 34), in addition to *Acc. nipalensis* and *Acc. strophiatius*, *J. A. S.* XII, 958-9, an *Acc. cacharensis* and an *Acc. immaculatus*. Specimens, however, with which that gentleman favoured the Society, having those names attached, I consider to be decidedly of one and the same species in different states of plumage; and I have described each of these phases in my notice of *Acc. nipalensis*. Referring now to Mr. Hodgson's specimens which were so labelled, I still consider his *Acc. immaculatus* to be the adult in worn plumage, which I mentioned in my description of this bird to have been forwarded as distinct; but I cannot equally well reconcile the description of *Acc. cacharensis* with the only young specimen retained for the Museum, though I still greatly doubt its distinctness. I know four well marked Himalayan species of *Accentor*, all of which have been described by me in the Society's Journal, viz. *Acc. nipalensis*, *Acc. variegatus*, *Acc. strophiatius*, and *Acc. mollis*, (vide XIV, 581).

The *Fringillidæ* pass to the softer-billed birds through the great American series of the *Tanagrinxæ*; and from them I believe there is a pretty complete gradation to the *Cerabinxæ*, or South American Honey-suckers. The latter are quite distinct from any of the nectar-feeding genera of the Old World, which may nevertheless follow, and we commence the series of them with the *Nectariniadæ*, (passing over the true *Promeropidæ*, in which *Irrisor* does not rank).

Genus *Arachnothera*, Temminck, treated of in XII, 981, and fur-

* When writing the above, I had not remarked Mr. Hodgson's expressed opinion to the same effect. *P. Z. S.* 1845, p. 34.

ther noticed in XIV, 557. The Society has now eight species of this genus, a revision of which has become necessary.

1. *A. magna*, (Hodgson) : vide XII, 981. Hab. Nepal, Assam, and Arracan.

2. *A. flavigaster*, (Eyton) : vide XIV, 557. Malacca.

3. *A. chrysogenys*, Tem., vide XV, 981. Malay countries. This and the preceding species are allied, but differ much in size : and *A. flavigaster* has a broad circle of yellow feathers surrounding the eye, in addition to the ear-tuft ; whereas *A. chrysogenys* is naked under the eye, and has a semi-circle of yellow feathers above it.

4. *A. inornata*, Tem. (nec apud nos, XII, 982) : *Cinnyris affinis*, Horsfield. Closely allied to the next, but larger, of a brighter and more yellowish green above, the under-parts greyer, and marked more decidedly (especially on the breast) with a dark central streak to each feather. Inhabits Java.

5. *A. modesta*, (Eyton) : *A. latirostris*, nobis, vide XII, 982. Malacca.

6. *A. ———* ? Temminck. Allied to the next, but much larger ; the throat and breast dull albescent-green, with an obscure central dusky streak to each feather ; belly and lower tail-coverts pale yellow ; and a tuft of orange-yellow feathers on each side of the lower breast, ordinarily concealed beneath the wing. Length of wing three inches and a quarter ; of tail two and a quarter ; and bill to forehead two inches. From Java.

7. *A. longirostra*, (Lath.) Smaller than the last, with the same pectoral tufts under each wing ; but the throat and fore-neck are spotless clear dull white, and the abdomen is much deeper yellow. Also from Java.

8. *A. affinis*, nobis ; *A. inornata*, apud nos. XII, 982. Very like the last, but always smaller, and duller-coloured ; the abdomen of a weaker and greener yellow, and rarely a trace (and at most a very slight one) of the orange pectoral tufts. Inhabits the Eastern coast of the Bay of Bengal, from Arracan to Malacca ; and Mr. Jerdon obtained a single specimen of it in the Mysore district, bordering the Neilgherries.

Respecting the other genera of this group, I have little now to add : the *Nectarinie* are treated of in XII, 969, *et seq.*, and XIV, 557 * ; and

* *Nectarinia malaccensis*, (Scop.), *lepida*, (Lath.), and *javanica*, Horsf., refer to the same species.

the *Dicaeum* group also on the latter occasion.* Mr. Gould has recently figured a curious little Australian bird by the name *Smikrornis flavescens*, the form and colouring of which approximate those of *Piprisoma agile*; and it seems to lead thence to the hitherto isolated Australian genus *Pardalotus*. Should this affinity be real, a gradation would be here shewn from the Malayan *Prionochilus* to the Australian *Pardalotus*; and the position of the latter genus be thus affirmed.

Fam. *Meliphagidæ*. The most decided Indian representative of this Australian group, occurs in the genus *Zosterops*, treated of in XIV, 562 *et seq.*; and the sole Indian species is evidently the *Sylvia palpebrosa*, Temminck, p. c. 292, f. 3, as described in Griffith's 'Animal Kingdom,' VI, 451; but whether this, or the name *annulosus*, (Swainson), should hold precedence, I have not the means of determining. The *Z. borbonicus* doubtfully referred to this genus in XIV, 564, is, I perceive, on more minute inspection, a decided *Zosterops*, having the same circle of feathers round the eye, only of a dusky hue, instead of the silky-white which renders this circle so conspicuous in its congeners. It is the *Z. cinerea*, Swainson, 'Menageries,' p. 294.† Perhaps the genus *Iora* (treated of in XIII, 380, and XIV, 602,) may come within the extreme confines of the *Meliphagidæ*: and though not much allied to *Iora* (so far as I can perceive), I have less hesitation in bringing the Orioles under the same group.‡ An Australian species of true Oriole (*Gracula viridis* of Shaw) has, indeed, been long regarded as a *Meli-*

* Lord Arthur Hay has discovered a new *Dicaeum* in the neighbourhood of Simla, which he designates *D. sanguinifrons*. "Forehead, occiput, and chin, a rich blood-orange red—more orange than red in dry skins; lower-parts golden-yellow: upper-parts the same, mingled with olive." Dr. Horsfield's Javanese *D. cruentatum*, described in XIV, note to p. 558, is *D. rubrocanum*, (Tem.)

† I named one Mauritius species, *Z. curvirostris*, in XIV, 563; but I find this name has been anticipated by Mr. Swainson, for the "*Dicaeum chloronotus* of the Paris Museum" (vide 'Birds of W. Africa,' *Nat. Libr., Orn.*, VIII, 44). If, however, the latter had been described by the specific name *chloronotus*, Mr. Swainson could have no right to change it, at least without assigning a sufficient reason for so doing; and if undescribed before, it does not appear that Mr. Swainson has published any description of it, that should establish his right of nomenclature.

My *Z. nicobaricus*, XIV, 563, would seem to be merely the young of *Z. palpebrosus*; though I have never seen an Indian specimen in the same plumage. Examples in the ordinary adult garb of *Z. palpebrosus* have now been received by the Society from the Nicobars.

‡ This is an opinion to which I have long been leaning; and I pointed out the affinity of *Plectorhyncha lanceolata*, Gould, to the Orioles, even to the form of its nest, in XII, 180 (*bis*).

phagideus bird, and under the generic name *Mimeta*, has been classed in the present family. Mr. Gould, in his great work on the birds of Australia, has lately established its true generic position; which indeed had been previously indicated by various other systematists.

In XI, 797, I made some attempt to review the Asiatic Orioles, and shall now (with much more extensive materials) resume the subject. The species are as follow:—

1. *O. Traillii*; *Pastor Traillii*, Vigors and Gould. Common in the eastern Himalaya, and occurs in Assam, Arracan, and Burmah. This bird has been placed in all sorts of genera, certain of which have been established for its reception, as *Psarophilus* of Jardine and Selby: Mr. Hodgson long ago recorded his opinion that it is a true Oriole, and in this I quite coincide. Mr. G. R. Gray refers it to *Analcipus* of Swainson, founded on *Ocypterus sanguinolentus* of Temminck, p. c. 499; and another species which Mr. Swainson arranges with it, is his *An. hirundinaceus*, (*Nat. Libr.*, 'Menageries', p. 284.) a bird which he also assigns to India; but Mr. Strickland, who has recently examined the originals (now at Cambridge) of many of Mr. Swainson's descriptions, writes me word that the species in question is scarcely separable from *Artamus* (*v. Ocypterus*), and that it is labelled from Madagascar. How, therefore, such a bird can have any near affinity for an Oriole, and a most decided Oriole (in my opinion), is far from being easy to understand.

2. *O. melanocephalus*, Lin.: *O. maderaspatanus*, Franklin (the female); *O. McCoshii*, Tickell (young male). Very common in Bengal, also in Nepal, Assam, Arracan, and southward to the Tenasserim Provinces; and in some parts of the Peninsula of India, whilst in other parts it is rather scarce. Length of a male nine inches and a half, by sixteen inches; wing five and a quarter, and tail three and a half; of a female nine and a quarter, by fifteen inches: bill to forehead an inch and three-eighths; to gape, one and five-eighths; tarse seven-eighths of an inch. The black-headed Oriole of South Africa, considered identical by Sykes (*P. Z. S.* 1835, p. 62), is a conspicuously different species, with no yellow on the wings: it is the *Turdus monachus*, Gm., termed *O. capensis* by Swainson; who also names another black-headed Oriole, more nearly allied to the Indian species, but from Sierra Leone, *O. brachyrhynchus*, ('Birds of West Africa.' *Nat. Libr.*)

In his "Two centenaries and a quarter of new or little known birds," appended to his volume on 'Menageries,' in the 'Naturalists' Library,' Mr. Swainson has also described an *Oriolus Hodgsoni*, said to be from Nepal; but of numerous Nepalese and other Himalayan specimens, I have seen none that could be referred to it. It is stated to resemble *O. melanocephalus*, except that it is "much smaller, and the tips of the quills are white instead of yellow: middle feathers of the tail yellow, with a black bar nearly across their centre. Total length about seven inches: bill from gape, an inch; to front, eight-tenths: wings four inches and eight-tenths; tail beyond, seven-tenths: tarse seven-tenths." This notice may perhaps lead to its recognition.

3. *O. chinensis*, Lin.: *O. cochinchinensis*, Brisson; *O. acrorhynchos*, Vigors, P. Z. S. 1831, p. 97: *Coulavan* of Buffon. This bird, which is not Indian, is remarkable for its very large and highly carinated beak, which is particularly deep at base, and drawn out to a fine point. Forehead yellow, not extending back beyond the hind-part of the eye: lores, spreading above and below the eye, and forming an occipital patch broader than the yellow of the forehead, deep black; this does not, however, reach forward quite to the nares: posterior half of the wing, comprising also the winglet and coverts of the primaries, black; the rest of the wing, or anterior half, bright yellow: tail black, its middle feathers tipped with yellow for three-eighths of an inch, the next for an inch and a half on its outer web, and the outermost for two inches on both webs. Length of wing six inches; of bill to forehead an inch and a half, or nearly so; and of tail four inches. Inhabits China and Manilla.

4. *O. macrourus*, nobis. Closely allied to *O. chinensis*, from which it is distinguished by its longer tail, rather smaller and less carinated beak (which however is always conspicuously larger than in the next species), and by the greater patch of yellow upon the forehead of the male: another distinction consists in the disposition of the yellow upon the tail, which has scarcely any of this colour at the tips of its middle pair of feathers, while the outermost is in old males wholly yellow, with merely the shaft black towards the base,—some specimens shewing one or two insulated patches of yellow, chiefly at the extreme base of the outer web,—and younger males having the tail coloured more as in the adults of the Chinese species, but still with scarcely a trace

of yellow at the tips of the middle pair of feathers. The wings have their longest primaries slightly margined externally with whitish, and in some specimens there is a slight yellow border to the secondaries and tertiaries; while younger males have the whole exterior portion of the secondaries and tertiaries washed with yellowish-olive. The coverts of the primaries are always tipped with yellow, producing a slight spot of this hue, which does not occur (at least in the adult male of) *O. chinensis*. Younger males have, as usual, the back and wings tinged with dusky greenish; and in females (and perhaps still younger males), the same dull colour prevails on the head and neck, the broad black occipital crescent is merely indicated, the feathers of the under-parts have each a black central stripe, and the tail is wholly dusky yellowish above, prevailing throughout the outer webs of all the feathers, while the inner webs are successively more deeply terminated with yellow,—this colour being alone seen underneath, in adults of both sexes. Length about eleven inches, or rather more; of wing six; and tail four and a half to five inches: bill to gape an inch and a half, and tarse an inch. Inhabits the Nicobar Islands.

5. *O. indicus*, Brisson, Jerdon, *Ill. Ind. Orn.* pl. XV: *O. chinensis* et *cochinchinensis* of India, auctorum; *le Lorient des Indes*, Buffon. This differs from the two preceding in its considerably smaller bill; in the yellow of the forehead extending further back beyond the eye, reducing the black occipital crescent, which latter is continued forward in adults, through the ocular region, quite to the nares; in the greenish tinge of the back, even of old males; and very conspicuously in the much greater extent of the yellow upon its wings, while the tail has less than in *O. chinensis*, and its middle feathers have rarely distinct yellow tips: in *O. chinensis*, and some specimens of *O. macrourus*, the secondaries and tertiaries are wholly deep black; whereas, in the present species, the secondaries are broadly margined, and the tertiaries have their whole outer web and part of the inner web, greenish-yellow; the primaries are tipped with the same; and a bright yellow wing-spot is formed by the tips of the coverts of the primaries. Younger males have much more of the green tinge above and on the wings, and the under-parts are much weaker yellow, with black stems to the breast-feathers, more or less developed. They evidently increase in brightness of colouring for several years. Females are yellowish-green

above, with little or no trace of the occipital crescent; whitish beneath, with dark central lines; bill infuscated, instead of pinkish-white, as in the males; and the shape of the beak will always readily distinguish them from the same sex of *O. kundoo*. Length of wing six inches to six and a quarter in bright old males, often not more than five inches and a half in younger males; bill to forehead an inch and one-eighth, or a sixteenth more. Rather a rare bird in India generally, and I have never seen it from the Himalaya. About Calcutta it is very rare; but in the countries eastward of the Bay it is generally common, as in the island of Ramree (Arracan), in the Tenasserim Provinces, and Malay peninsula. The Society also possess it from China.

6. *O. coronatus*, Swainson; *O. hippocrepis*, Wagler. With this Malayan species I am unacquainted, and shall merely cite the following passage from Mr. Jerdon's description of the last, in his 'Illustrations of Indian Ornithology.' "Swainson's *O. coronatus* from Java (as described,) differs from our peninsular *O. indicus*, in its smaller size, shorter wings, tail, and tarsus, and in the narrowness of the black nuchal band. Its bill appears to be somewhat larger than in ours, but shorter than in *chinensis*. Wagler's description of *O. hippocrepis* (which he considers the same as *chinensis*, auct.,) corresponds with it in the yellow tips of the central tail-feathers, and with our peninsular bird in having the black ocular band extending to the nares, and in other points. As, however, his specimens were obtained chiefly from Java and Sumatra, it is most probably Swainson's *coronatus*, with which it indeed agrees pretty nearly in dimensions. The latter are given as nine inches and a half total length, wing five and three-tenths, tail three and a half, bill to forehead an inch and two-tenths, and tarse eight-tenths."

7. *O. tenuirostris*, nobis. An evident young male, resembles the corresponding age of *O. indicus*, except in the shape and colour of its bill, in the much greater extent of the yellow on its forehead, and proportionate contraction of the black occipital crescent, also in its rump having much less yellow, relieving the greenish hue of the back and wings. As in the young male *O. indicus*, and fully adult *O. chinensis* and *O. macrourus*, the black of the lores is not continued forward to the nares; but the separation of colours is abrupt and decided, probably indicating a similarity of extent in the adults: the whole crown is yellow, the black of the occiput not rising above the level of the eye. Wing mostly greenish, the

coverts which show externally not being tipped with yellow, as in the corresponding age of *O. indicus*; but the tertiaries have narrow yellow tips, which also are less developed on the secondaries, and uppermost primaries. Bill longer and much more slender than in *O. indicus*, and of a slightly arched form; its colour fleshy apparently at base, but red for the remainder as in *O. galbula*. Length about ten inches, of wing five and three-quarters, and tail three and a half; bill to forehead an inch and a quarter, and tarse seven-eighths. I believe, but am not sure, that the specimen here described is from Central India. There can be no doubt of its distinctness as a species.

8. *O. kundoo*, Sykes (the female): *O. galbula* apud Sykes (the male), and of Franklin's catalogue: *O. aureus*, Jerdon's *Catal.*: and doubtless *O. galbuloides* of Gould, mentioned in *P. Z. S.* 1841, p. 6. This is the Indian *O. galbula*, auctorum. It invariably differs from the European species in having a larger bill, and in the black streak from the bill being continued backward beyond the eye in the males: from the African *O. auratus*, Swainson, it differs in the colouring of its wings, which resemble those of *O. galbula*. This bird, so very common in the Indian peninsula, and which extends up to the N.W. Himalaya, occurs also in the hilly parts of Bengal, as Rajmahl and Monghyr, and at Midnapore; these hills being off-shoots from the ranges of Central India, and partaking of the fauna of the latter in numerous other instances; but in the vicinity of Calcutta I have never met with it, nor seen it in any collection from the countries eastward: the Calcutta specimens which, on a former occasion, I referred to *O. galbula* (and afterwards termed *aureus*), proving to be females of *O. indicus*.

9. *O. xanthonotus*, Horsfield: *O. leucogaster*, Reinwardt: *O. castanopterus*, nobis, *J. A. S.* XI, 795, (the young male). Peculiar to the Malay countries.

Another very distinct group as a genus, which, though less allied to other *Meliphagidæ* than I consider the Orioles to be, yet offers (in at least the majority of its species) those adaptive characters which many would term the essential features of the family, is that of *Phyllornis* (vel *Chloropsis*), treated of in XIV, 364 *et seq.* To what is said there, and before, concerning this group, I shall now only add that the young of *Ph. Hardwickii* may as well be described, in order perhaps to check its being brought forward as a new species. The plumage is green, more yellowish underneath, the throat pale yellowish, and there is a

little blue mingled with the yellowish on the moustaches : a trace of blue also on the shoulder of the wing, and upon the outer primaries and butermost tail-feathers.*

The *Phyllornis* group conducts to the Bulbuls, treated of in XIV, 566 *et seq.* : and the affinity of this distinct family for that of the *Meliphagidæ* is, I think, undeniable. I have little now to add elucidative of a group so lately under review ; but may remark, that Lord A. Hay considers the *Pycnonotus hæmorrhous* of the Upper Provinces to be distinct, from that of S. India, and proposes the name *intermedius* for the former. There is this much difference, that it would be generally easy to pronounce whether a specimen was from Northern or Southern India, the former having the colours generally better defined, especially the pale margins to the feathers of the upper-parts, and the tail also is commonly longer : but looking to a series of these birds, from Goomsoor, Agra, and Arracan, I do not see that they can be defined apart. Of *P. leucogenys*, Capt. Boys informs me, that it is common down the Indus from Buhawulpore ; and that he has lately obtained it near Ferozepore. A *P. rufocaudatus* has recently been described by Mr. Eyton, *An. and Mag. N. H.* 1845, p. 228, which must be put as a synonyme of *Criniger gularis* (Horsf.), *J. A. S.*, XIV, 571. Mr. Eyton also describes an *Ixos metallicus*, which would seem to be allied, except in size, to *Brachypodius melanocephalus*, XIV, 576. The *Turdus indicus*, Gm., as represented in Buffon's figure, of which a copy has been obligingly sent me by Mr. Jerdon, would certainly appear to be a very different species from *Criniger ? ictericus*, Strickland, which Mr. Jerdon had referred to *T. indicus* (as noticed in XIV, 570). Lastly, the name *Isodia*, nobis, XIV, 577, has been forestalled in Botany ; as *Ixodes* (as I first had it) had been previously applied to a genus of Spiders ; so I shall now take refuge in *Iridia*, which I trust has remained hitherto unattached.†

Among our late acquisitions from the Nicobars, I must not omit to mention several specimens of *Ixocincla virescens*, nobis, XIV, 575 ; and of all ages, from youth to maturity. The species is quite distinct from

* The 'Blue-chinned Thrush' of Latham refers to *Phyllornis Jerdoni* ; and *Chloropsis gampsohynchus* (mispelt *cæsmarhynchus*), apud Tickell, should have been assigned to the same : my originally mistaking this bird for the female of another species, occasioned me to give it as a synonyme of the latter.

† Latham's 'Hooded Thrush' refers to *Pycnonotus leucogenys* ; his *Turdus capensis*, Ind. var., probably to *P. flavirictus* ; his *T. cafer*, from India, to *P. bengalensis* ; and his 'Tufted Thrush' to *P. melanocephalus*.

Hypsipetes malaccensis, nobis, but can scarcely be placed in a different sub-generic group; and I think it will rank best as an aberrant *Hypsipetes*, showing a marked affinity for *Iole*. The bill is rather shorter than in *H. malaccensis*, and the coronal feathers tend less to assume the pointed form: length about eight inches and a half, of wing from three and a half to nearly four inches, and tail three inches and a half; bill to gape an inch, in some an eighth more; tarse three-quarters of an inch: the tail is a little graduated, but inclines to assume the true *Hypsipetes* shape. Plumage of a uniform olive-green above, the crown infuscated, or of a brownish-nigrescent hue: throat and breast dingy-whitish, a little tinged with yellow; the rest of the lower-parts more deeply and conspicuously tinged with yellow. Bill dusky, with yellow tomiae, and elsewhere an appearance of its becoming ultimately wholly yellow: the tarsi plumbeous. The nestling tertiaries remaining on the specimen formerly described, and the outer webs of the nestling primaries, are of a dingy chestnut colour; and there is a shade of the same upon the tail. The same appears to be the case with the young of *H. malaccensis*; and the two species considerably resemble at first sight, but the present may readily be distinguished by its infuscated crown, and its unstreaked throat and breast. E. B.

(To be continued.)

POSTSCRIPT.—I have already to acknowledge another interesting collection, partly from the Nicobars and partly from Penang, just received from our esteemed contributor, the Rev. J. Barbe.

Among the birds, is a finer male of *Palæornis erythrogenys* (note to p. 23, ante,) than that previously described; having the nape and interscapularies light yellowish, rather than tinged with hoary-grey, and the under-parts also more yellowish than in the other.*

Of *Todiramphus occipitalis* (*loc. cit.*), it would seem that I described females and young only; for what I take to be the males are considerably brighter, with the wings and tail much bluer, of a decided Prussian blue, the black nuchal collar (continued from the ear-coverts) is much narrower, and in some tinged with blue, and the white supercilia (carried round the occiput) have little or even no tinge of rufous.

* Dr. Cantor possesses a female of *P. caniceps*, nobis (*loc. cit.*), from the Malay peninsula. It has the tail developed to the usual length in this genus; and green above with some blue on its middle feathers, and dull golden-yellowish below; the head less pure grey than in the male; and the bill wholly black, as I suggested it would be in this sex.

Picus moluccensis (verus, p. 16), identical with the Javanese species, is sent from Penang; and I find that it is Mr. Eyton's *Tripsurus auritus*, *An. and Mag. N. H.*, 1845, p. 229,—another synonyme to be added to those reduced in p. 14: Mr. Eyton also describes (*loc. cit.*) a *Picus rubiginosus*, which is a *Gecinus* most nearly allied to *G. malaccensis*, and has been subsequently described by Lord A. Hay as *P. melanogaster*, *Madr. Journ.* No. XXXI, p. 153: but *Bucco quadricolor*, Eyton, is distinct from both the species with which its identity is suggested at p. 14 ante.

The most interesting specimens, however, in this collection, are a pair of adults of the *Megapodius* of the Nicobar Islands, and also two undoubted eggs of this bird, of which Captain Lewis prepared only a chick. So remarkable a species may be at once described, however, out of its place in the present series.

M. nicobariensis, nobis. Length about fifteen inches, and of wing nine inches; tarse two inches and a half; middle toe an inch and five-eighths, and its claw three-quarters of an inch; hind-claw seven-eighths. Foot rather small for a *Megapodius*, the middle toe and claw but little exceeding the two lateral in length. General hue of the upper-parts deep olive-brown with a tinge of ochreous, which becomes more decided on the wings; lower-parts dingy greyish-brown, with a slight tinge of ochreous on the breast, and which prevails throughout the under-parts of a presumed female: crown slightly rufescent-brown, prolonged into a short crest, and the occipital feathers impended by the coronal are light greyish: lores, cheeks, and throat, almost naked: the primaries light ochreous on their outer webs, and dusky internally: bill yellow: and legs and claws dark horn-coloured. The chick is coloured nearly as in the adult, but is mottled with faint russet on the wings, and the abdomen has a rufous tinge; the feathers of the head, neck, and breast, having a peculiar hair-like structure. The presumed egg is of a true elliptical shape, or with the small end just distinguishable, measuring three inches and a half in length, and being of an uniform somewhat ruddy stone-colour. The habits of this bird would appear to resemble precisely those of *M. tumulus* described by Mr. Gould. Captain Lewis had seen the mounds, and the birds upon them; but was unaware that the latter had been the accumulators of such huge heaps of material. Upon shewing him Mr. Gould's description of the habits of the Australian species, he remarked that the same account would equally apply to the Nicobar bird, except

that he had observed no heaps quite so large as some of those described by Mr. Gould. The eggs were sent by Mr. Barbe, with merely a notice that they had been "found in the sand."

I have further to acknowledge a rich collection of New Holland specimens, just received from the Australian Museum at Sydney. In Vol. XIV, p. 548, I made a few remarks on Mr. Gould's magnificent work on the birds of Australia, and therefore I shall further notice here, that Mr. Gould's *Carpophaga leucomela* is not a *Carpophaga*, but a *Dendrotreron* apud Hodgson, ranking with *C. Hodgsonii*, *C. arquatrix*, and *C. guinea*, anctorum, having but twelve tail-feathers, &c. &c. : and that Mr. Gould's distinctions of *Eurystomus australis* from *Eu. orientalis* are very erroneous ; as these two species exactly agree in size and structure : but the former is readily distinguished by having the black of the head confined to the lores, and by the brownish hue of the crown and nape, of which no trace occurs in the species of India and the Malay countries ; which latter has the whole head and cheeks blackish, and the nape and back concolorous with the scapularies, in addition to its blue being of a deeper tint. Lastly, the *Anous melanops* figured by Mr. Gould, is certainly identical with a species in the Society's Museum, from the Bengal Soonderbuns ; and which I can scarcely doubt will prove to be the *Sterna tenuirostris*, Tem., from the western shore of the Indian Ocean, or, in other words, the eastern coast of Africa.

Chrysococcyx smaragdinus, nobis. In XI, 917, I considered certain little Cuckoos to be specifically identical, which are respectively inhabitants of India, the Malay countries, and Australia. A better series of specimens now convinces me that three species are here confounded. That of India has already received a name, being the *Trogon maculatus*, Gm., founded on the spotted Curucui of Brown's Illustrations, which certainly represents a variety, or incidental state of plumage, of this species ; but the name is so very inapplicable to the species generally, that it cannot justly be adopted. The presumed male and female described, *loc. cit.*, as *C. lucidus* refer to this species : another presumed female, from Arracan, tends to the *hepaticus*, plumage common to many Cuckoos, having the head chesnut, the back still more cupreous than in the supposed female formerly described, and the lower-parts closely barred throughout with coppery-green upon a white ground, except the lower tail-coverts which are chiefly banded with green and deep rufous :

the tail has its middle-feathers shining green, with a dusky purplish band at tip,—the next pair similar, but with deep rufous broadly margining the basal half of their outer webs,—this rufous is successively more developed on the two succeeding pairs,—and the outermost has its exterior web and the contiguous portion of its inner web pure white, banded with shining green, which extends also over the rufous portion of the inner web : terminal third of the bill dusky, the rest translucent pale straw-yellow in the dry specimen. Another supposed female is throughout in the *hepaticus* plumage, or rufous above, white below, with greenish-dusky bars throughout, the outermost tail-feather marked with white chiefly on its exterior web, and the two next tail-feathers slightly tipped with white : bill, with the basal half amber-coloured, the remainder dusky. Another, again, is of a predominant dull glossy green above, with the same rufous and white on the tail, but its middle-feathers are also obscurely barred with rufous, and most of the wing-feathers are margined with the same : bill wholly dusky. Lastly, another is chiefly of a dusky hue above, scarcely glossed with greenish, the feathers having slight rufous margins more developed on the wings ; and tail as in the last. In all, however, the under-parts are *much* more closely banded than in the Australian species ; and the wing measures generally four inches, or sometimes four and a quarter in adults. Inhabits the hilly parts of India, but seems to be everywhere rare. Brown figures it from Ceylon ; and I have seen it from Central India, Rajmahl, Arracan, &c.

Chr. basalis : *Cuculus basalis*, Horsfield : *C. chalcites*, Tem. : *C. malayanus*, Raffles. This seems exactly to resemble the last, except in its constantly smaller size ; and it is equally variable. Wing three inches and a half to three and three-quarters. It holds the same relationship to the Indian species, which *C. lugubris*, Horsfield, does to *C. dicruroides*, Hodgson, and *C. flavus* does to *C. tenuirostris*. The specimen described in XII, 944, was not, I believe, from Macao (as I was informed), but from Malacca. Specimens corresponding to the adult male of *Chr. smaragdinus*, have not hitherto fallen under my observation.

Chr. lucidus (?), Gm. : *C. metallicus*, Vig. This is the Australian species, corresponding in size to the first, but having constantly, so far as I have seen, a black bill, the under-parts much more distantly-banded, and presenting various other distinctions.

Note on the Geological features of Zillah Behar. By Lieut. W. S. SHEERWILL, B.N.I., Revenue Surveyor.

The geological features of zillah Behar may be divided into four great divisions, viz.—the granitic, the quartzose, the hornstone, and the sandstone. Commencing from the eastern boundary of the zillah, where it abuts upon zillah Monghyr, the hills are in general composed of confused masses of fatty quartz abounding with mica, which is generally found adhering to the quartz. In many places fine veins of mica are worked and the produce exported to Patna. The principal mines are to the south of Rajowlee, both in the granite and quartz ranges. The country at the foot of these hills is thickly strewn with minute particles of silvery mica, brought down from the hills by the rains, and entering largely into the composition of the soil: much of it is collected by the natives and used for whitewashing their houses, ornamenting pottery, toys, &c., giving to the articles thus smeared, a lively sparkling appearance and an unctuous feel; the roads and beds of Nullahs sparkle in every direction from the abundance of this mineral. Immediately on the boundary of zillah Monghyr the granite peak named Kawa Kho rises, from out of the quartz hills, to the height of 1,165 feet; another small patch of granite also appears about five miles to the S.W. from the peak. The quartz hills are covered to their summits with forest trees, brushwood and bamboos, but as they advance to the westward and become granite, they rise into bold and lofty peaks, some upwards of a thousand feet in height.

After leaving Rajowlee, the granite of these hills is found of every hue and texture that it is possible granite can possess or be composed of. In some places porphyritic granite is found, the individual component parts of which are enormous; in others eurite, where the individual component parts are undistinguishable from their minuteness, and in other places syenite is found. Also occasional masses of ponderous black mica are found scattered about in company with large masses of the gassy and fatty quartz so common to granite formations.

At the spot where the Calcutta Trunk Road crosses these hills, large blocks of gneiss are seen protruding from the fine black soil, and in most of the ravines and deep water-courses the same mineral is found. In the bed of the Mohunneh river, to the west of the Dunghye Ghat, on the old Calcutta Road, and where it issues from the hills, the water

has laid bare a beautiful bed of gneiss several miles in extent, crossing the Behar boundary and entering zillah Ramgurh : but from the great depth of soil and from the dense forest on the banks of the river, I was unable to trace how far it extends east and west. In the Dunghye Pass, gneiss of peculiar beauty is scattered about in every direction. The summit of this pass at the village of Tillee Tand I found to be 1,300 feet above the level of the sea : it is covered with thick forests, haunted by tigers, who destroyed some men of my establishment whilst engaged surveying these hills. A spur of this granitic range strikes off from the main body and suddenly terminates in the bold mountain, known as the "Muhair hill," (vide map and vignette.) The volcanic range of hornstone hills appear at this spot to overlay the granite, which again appears on the other side of the hornstone, distant about eight miles. This granite extends westward to ten miles beyond the Koël river, or 120 miles from the mica mines at Rujowlee, varying in height from a hundred to a thousand feet : some of the peaks are bold and imposing, but much of this range is composed of a low, undulating and broken plateau of table land, especially the great mass which forms a spur from the Vindhya mountains and lies in pergunnah Sherghotty. This irregular mass, averaging from five to eight miles in width, is composed of coarse granite, covered with a dense jungle of underwood, intermixed with forest trees, affording an inexhaustible supply of the coarser wood, for building, manufacture of ploughs, yokes, sugar mills, &c. besides yielding a plentiful supply of bamboos, grass, a variety of medicinal herbs, barks, roots, leaves and fruits which are collected at various seasons, and used in the zillah or exported. The wild silk (tusser), is also collected from the Asun trees (*Terminalia alata tomentosa*) and exported. The principal tree is the Saloogunje or Salè, a tall handsome tree, with a smooth shining white bark, high clear stem, wide spreading branches, and of a highly resinous nature, and from which a gum or resin is collected and used as a varnish chiefly by the Palanquin makers. This tree answers to the description of the North-African frankincense tree. The dhak tree, byre, kheir, mimosa and semul, are the most common trees in these woods.

The Samba stag (Rusa), spotted axis, neelghaee, tigers, leopards, and a variety of smaller animals inhabit the depth of these woods. At Deoree, a series of low hills are detached from the body of the table land, and are much impregnated with veins of serpentine. Near the

village a meagre bed of this mineral has been quarried for a few years by natives, who manufacture cups, knife-handles, &c., from the best specimens. Captain Richard Ouseley, Principal Assistant to the Governor General's Agent S.W. Frontier, had a shaft sunk, or rather a huge pit opened, in the hopes of reaching a good bed, but without success; at the depth of thirty feet only a coarse friable granite was found; nor did I perceive in the sides of the pit any traces by which hopes could be upheld of ever finding any at that spot. Perseverance may perchance yet discover a valuable bed of this handsome mineral. Several slabs, three feet in length, were obtained by the Honourable E. Drummond, Magistrate of Gya, but being from the surface and much decayed, were good for nothing, although very handsome both in colour and texture.

To the north of this great plateau, numerous little granite hillocks are dotted over the plain, extending for twenty-five miles north, amongst which is the large Chirchanwan hill, five miles in length, but to the N.E. they extend for forty miles as far as the Burabur hills, a range of black sterile granite rocks, in which are some very curious groups, peculiar to the granitic formation; particularly that of Kawa Dhole, a conical peak, rising to 365 feet in height, on the summit of which rests a conical block of granite of immense proportions. It is upwards of forty feet in height, standing on its base, without flaw or crack, a landmark for miles around.

On the summit of this group, iron ore of a rich quality is scattered about in profusion. This is the most northern point to which granite can be traced in Zillah Behar.

Returning to the west, a group of very curiously formed peaks are clustered together, six miles south of Kootombah. One in particular from its appearance is styled the Kothila (vide Map and Vignette) or granary. In these hills is found, in small quantities, the sulphate of alumina adhering to some of the rocks; it is styled *silajet* by the natives.

The granite range after crossing the Koël Nuddee suddenly ceases in numerous small hillocks, and is here joined by the sandstone, an offset from the Kymoor sand and limestone range. Eighteen miles further up the Sone river, the granite again appears in one or two hillocks piercing the sandstone. After crossing the Koël river from the east the country undergoes a complete change. The *Tar* tree (palm) becomes scarce and eventually ceases altogether, the surface of the country be-

comes covered with the *Mimosa catechu*, a few ebony trees and an abundance of *salogunje* trees. The hills are clothed with the fragrant *rhoussa* grass, from which a powerful spirit is extracted, so beneficial in rheumatism, and known in Malwa as "Grass oil." The surface of the country is undulating, the soil tinged with bright yellow and red hues, the effects of the oxide of iron, which ore is found in its soil. The hills are low towards the north, and higher to the south; exceedingly steep to the south, and sloping away gradually to the north. The long range of hills skirting the Sone river, are so steep to the south that a stone may be jerked from the summit to the base, but on the north the termination of their base is a mile removed from the plumb-line of their crest. Ten or fifteen miles south of the Sone river, on the table land of Oontaree, iron ore is collected and smelted by the *Aghurreeas*. Immediately under the ruined fort of Srinugger, the waters of the Sone have denuded a series of nearly vertical strata of hornstone, arranged in narrow serpentine ribbons; this hornstone again appears about half a mile down the river, at Darehdeh, and has the appearance of having been fused, being of a dark pitchy hue, smooth, rounded, sonorous when struck, difficult of fracture, and heavy. A belt of the same rock appears in the bed of the Sone jutting out from the Shahabad or north side, about two miles above Darehdeh: the rock at this spot has exactly the same burnt appearance. Embedded in this hornstone are found masses of a hard claystone of a bright red colour, also common amongst the pebbles of the river, which pebbles generally consist of rounded pieces of agate, hornstone or quartz, possessing but little beauty or variety. The rocks at this spot, projecting more than half-way across the stream of the Sone, create rapids of about six feet fall in a quarter of a mile. At a village named Phoolwurreea, about four miles inland from the Sone, there is a spring of good water. At this spot a fair is held during the months of *Kartik* and *Chait*. At a spot (marked S.) in the sandstone a small quantity of alum is manufactured from alum slate, but by what process, I could not learn. Specimens of the slate were sent marked 359.

The natives call this sulphate of alumina, *silajeet*: it is the same substance as that brought from Nepal, and sold under the same name at the enormous price of one rupee the tola. The sandstone, on the eastern and western banks of the Koël river, is similar to that in which are situated the Rajhurrah coal mines, eighteen miles from the Behar

boundary, and is of various textures, some exceedingly hard, others very soft.

The stone from the Khyra peak, which rises to 1,086 feet, is much used for hand-mills, curry-stones, and for other domestic purposes. The whole of this sandstone is covered with a thin covering of forest trees, underwood, and bamboos; the Saloogunge tree predominating every where. The valleys are filled with the Mimosa catechu, many hundreds of which trees are yearly destroyed in the manufacture of the catechu.

The next group is that of the hornstone, or Rajgheer range of hills, which although slightly mixed with quartz and jasper, must nevertheless be considered as a hornstone range. The hornstone is of both kinds, conchoidal and woody: the former is found of endless varieties, bright-red, purple-blue and other lively colours, uniting to render this an elegant stone: the latter is universally of a greyish-green colour. This double range of hills presents a series of ragged peaks, offering views of great beauty: their extent is about forty miles from S.W. to N.E. A small hill, evidently a portion of the range appears at Behar; another small hill, about eighteen miles due east of Gireenk, and another again twelve miles to the south, uniting with the quartz range and granite peak of Kawa Kho. In this range are numerous hot and cold springs, especially at Rajgheer, where there are nineteen hot wells and four cold: on the southern face of the hills, there are a few hot springs similar in character to those of Rajgheer. Half way between the Rajgheer and Burabar hills is situated a collection of hillocks, from which is quarried hornblend of a beautiful texture; the crystals are large and glossy: also a quantity of potstone, which is much used at Gya by the natives in the manufacture of dishes, plates, mortars and pestles, likewise by the image cutters, who are famous for the elegance of their carvings. A small quantity of potstone, but of an inferior quality, is quarried from the Bruhmjonee hill, overhanging the city of Gya. A small hill, west of the station of Gya, yields an indurated reddle used for dyeing clothes of an orange colour, also for metalling the roads in the station; this mineral is either of an orange, purple, light-red or yellow colour.

These few notes, combined with the accurate and minute details by Dr. Buchanan, will I hope, render the accompanying Map intelligible.

A Note on some Hill Tribes on the Kuladyne River ;—Arracan. By Lieut.

T. LATTER (67th N. I), of the Arracan Local Battalion.

Φοιτῶ γὰρ ὑπὲρ ἀγρίαν ὕδαν, ἀνὰ τ' ἄντρα καὶ πέτρας.

There are few facts more remarkable in India, than the vast number of tribes which occupy its mountain fastnesses, and which roam through its interminable forests ; all speaking distinct dialects. In many instances such tribes are, as far as distance is concerned, near neighbours ; though in reality almost perfect strangers ; a state of alienation, in a great measure arising from the dense and impervious vegetation, always occupying the lower mountainous ranges of this country. And in no part perhaps is this peculiarity more strikingly exemplified than in the Yooma range of hills, which separate the province of Arracan from the Empire of Burmah. On the banks of the Kuladyne river, which runs down the 93° parallel of longitude, and within a space over which a bird might speed in a summer's day, may be found the following clans—the *Khúmis*, the *Mrús* (of which there are two tribes, speaking distinct dialects), the *Anoos*, the *Kyaus*, the *Khóns*, the *Shentoos*, and finally the *Khyoungthas*. Although the languages of all these may have originated from the same stock, yet there is quite as much difference between them as between French and English. The most powerful among them are the *Shentoos*, who being beyond our frontier, are known to us only by their devastations on those tribes which pay us tribute ; the suddenness, secrecy, and never-failing nature of these attacks, cause them to be held, by the rest, in a dread of which it would be impossible to give an idea. The *Khóns*, who are likewise beyond our frontier, are employed by the *Shentoos* as guides and spies, and are on that account obnoxious to the vengeance of those clans, who may owe a blood feud to the *Shentoos*. They reside during the night in huts built on high trees, and return with the day to their regular habitations below. The remaining tribes are all more or less under our rule, and have consequently given up their feuds. With the exception of the *Khyoungthas* or “Sons of the Stream,” all the rest of the tribes, above enumerated, go under the general term of *Toungthas*, or “Sons of the Hill.” I shall proceed to give a slight sketch in the following order of the *Khyoungthas*, the *Khúmis*, and the *Kyaus*, which three clans fell under my observation during a short trip up the Kuladyne.

KHYOUNGTHAS.

The *Khyongthas* are only found on the banks of the Kuladyne river, and their livelihood is principally gained from plantations on its banks. They may be viewed as the type of the *Arracan* race; they speak the Burmese language, but with all the harsh provincialisms of the Arracanese. There are many terms in the Arracanese dialect totally distinct from Burmese: as *shay*, "little, small;" *ara*, "more;" *shán*, "thing," and many others, just in the same way as words are found peculiar to certain counties in England. The *Khyongthas* appear to have been a portion of the original inhabitants of Arracan, driven up the river at the time of the invasion and occupation of the province by the Burmese. Their religion is a simple type of Buddhism, but mixed up strangely with the *Ndt* or "spirit" worship of the hills; which appears in some instances almost to have absorbed their original faith. Their parent stream is looked upon with a holy love, not only as affording them sustenance, but likewise a ready passage by which to flee from the attacks of their foes. At the northern outskirts of each village from which quarter alone they dread the advent of any danger (all to the south being in possession of the English), in the direction of the forest, and under the shade of the comeliest tree may be seen the shrine of their two *Ndts*, the one male, the other female. They are represented by two pebbles picked from the banks of the river. The female is considered the most powerful, and is meant to represent the *Mayoo Ndt*, or spirit which presides over the mouth of the Mayoo river: she is believed to be a most powerful spirit, the guardian of Arracan from all the dangers from the sea. The road from Akyab to Chittagong crosses the mouth of the Mayoo river; here all natives, whatever may be their faith, invariably make their offering to this powerful spirit by letting loose fowls, &c. The other or male spirit is styled *Rwátsaung Ndt* or "the village guardian," to whom, as his name implies, is intrusted the care of the village. They believe, to use their identical words, that "should he withdraw his favour, the evil eye would glare upon their children; sickness would devastate their hearths; the floods would sweep away the foundations of their homes; and their most favourite haunts would become the prowl of the tiger, and wild cat o'mount." Whenever a new shrine is to be erected, fresh stones are chosen, the village is tabooed for

seven days, sentinels are placed on all the surrounding heights to prevent the ingress or egress of any person, and sacrifices of fowls, and pigs are made. Around each stone is wound some cotton thread, coloured yellow with turmeric.* These objects however are still further curious, for it will be perceived by inspecting the plate that they are rough representations of the *lingum*, and *yoni*. The colouring with turmeric is Boodhistic, for yellow is the sacred and royal colour of Boodhism. In the simpler types of Boodhism which have come under my observation, whenever the worship of the powers of nature has been introduced, it has been invariably that of the united male and female; of which the latter has been the most powerful. This is the true explanation of those monuments which abound in the Cossyah hills, figured in a very interesting paper from the pen of Lieut. Yule, in a volume of the Journal of the Asiatic Society of Calcutta. Another interesting fact illustrated by these objects, is the invariable predilection of the human mind to identify the object of its worship with the realities of its every-day life. This circumstance might be exemplified by instances throughout the whole history of man; whether we take the objects of worship themselves, as that god, "downwards fish, and upwards man," worshipped in the fish coasts of Azotus; or their consecrated residences from the dark cave temples of the Troglodyte, to the spired fanes of the dweller in tents. And, as we shall see, whilst the *Toungtha*, or "Son of the Hill," looks for sustenance to the clearings of the forest patch, or the scant verdure of his rock-bound hills, and conformably represents the idea of his adoration; so here we find the "Child of the Stream" fitly choosing from the rolled pebbles of his parent flood a simple fetich, wherewith to identify the object of his worship, and his love.

THE KHUMIS.

The *Khumis*, as I have already remarked, are a member of the general family of the *Toungthas*, or "Sons of the Hill." They are a numerous tribe, having several villages, each under a distinct *Toungmeng*, or "mountain chief." This authority appears originally to have been

* These stones are represented two-thirds their real size in Plate I, fig. *a* being the female, and fig. *b* the male. They are shewn erect for the sake of giving their forms; they are in reality however placed lying down in a flat position; each having a sort of baby house erected to receive it; they are in the Plate shewn in their relative positions with one another.

hereditary; whilst in those villages within the British territory, it being necessary that the village chief should be acquainted with the Burmese language for the purpose of transacting Government business, an individual on account of such qualification is often raised to that dignity; and thus in some villages there exist two *Toungmings*, the one hereditary, the other elected. The religious system of the *Khúms* appears to be very vague; it consists of the worship of numerous *Ndts*, or spirits, and indeed of every thing that strikes their fancy. They worship the earth as the author and giver of all they possess; the sun also, in its noon-day height, as the pledge of safety from their foes—for the attacks of these mountain tribes are never made except during the night; no single night passes over their head that is not replete with terror. They reverence also the spirits of the dead; these, they say, at times flit over their ancient haunts, at others wing their way like birds over mountain and vale. The spirits of the good they think ever happy, those of the wicked miserable. Each house likewise has suspended from its walls the skulls of the animals it may have killed for food; to these likewise they pay a simple adoration, by placing before each individual a handful of its wonted food, as an acknowledgement of the sustenance it has afforded them in its time. The skulls also of the animals slaughtered by their fathers are in like manner preserved as much in remembrance of those deceased relatives as a monument of their wealth; frequently will a chief point to them with pride, and tell you how many mountain bulls his father could spear for a marriage feast. Their religion may be said to consist of nothing but the worship of spirits; to every object that strikes their fancy, they accord a spirit of its own. Each peak in their native hills, they hold to be the mountain watch-tower of a god. Nothing could illustrate this better than the accompanying translation of part of a *Khúms*' prayer. Previous to an undertaking or expedition he lets loose a fowl as an offering to the spirits, and utters the following: "Oh! spirit of the day-sun; Oh! spirit of the rock-ledged gate*; Oh!

* These are two very singular wall-like ridges of sandstone, running across the Kuladyne, about twenty miles the one above the other. They are not rocks like those of Colgong on the Ganges; but ridges perpendicular on each side, and only a few feet in width; the river has forced itself a passage through the centre. The tradition is that when the spirits found their domains invaded by a new faith from the plains, they endeavoured to raise a barrier; this was forced: a second attempt in like manner failed, and in despair they have given up the idea of a third.

spirit of the streams of the *Hoosalong**; Oh! spirit of the surges of the *Kolak*†; Oh! lords of the mountain peaks‡; One, two, three, four, five, six, seven, eight times; take ye this my offering."

Every object which is in motion they conceive to be so, in virtue of a spirit, and a motion of its own: in fact to be animate. This is a belief which has been shared by all primitive and savage tribes; and is one that will at once appear to be most natural. The simple savage, judging from the movements of his own person, gives a spirit and a will, as inherently the cause of movement in all things. It is the predilection of the modern mind to count all as phenomena; the cold results of causal agencies beyond. And when in this its last stage the mind carries itself back to the first; when it spiritualizes the dull realities of this every-day world; and writes down every sensuous object in nature as impelled by a spirit and motion like its own; then, having achieved a communion with all existing things, it becomes seized of the highest poetry, and purest ideality. This is the simple reason why the poetry of a rude age is to us, as rich in its ideality as is that of the most polished epoch. In this respect the human mind may be conveniently classed into three stages—The 1st and savage, where it believes all objects whatever to have life and spirit. The 2nd, where it has so far advanced as to accord a separate individuality to the spirit, and to hold that, like a guardian, it presides and watches over the inanimate. And finally, the 3rd and last, that which we have above described. Those peculiarities which are the source of poetry in the last, are unideal, mere common place matters of belief in the first. And even in poetry, such as that of Homer, which we may look upon as the annals of the mind in what we have described as its second stage, many of those wondrous figures which appear to us, the living transcripts of mysterious portraitures traced upon the secret wall of the chambers of the poet's imagery, may in reality be but the simple and unimaginative record of the beliefs of his every day existence.

The *Khámis* have no religious superiors, although they pay a certain respect to some who, profess to have converse with familiar spirits.

* The name of a stream among the Hills.

† The original is *vóm* of the *Kolak*, the latter being the name of a stream; *vóm*, in their dialect is a place partaking of a character of both, a waterfall and a rapid: at the mouth of the *Kolak*, the river rattles its way over a shallow rapid, and being impeded in its course by a great number of ridges of rock, it has the appearance of a huge seething chaldron.

‡ Here they generally enumerate the most remarkable peaks.

When a man marries, he gives what he can to the parents of his bride, feasts his native village, and the ceremony is concluded. The dress of the *Khúwí* female, in common with that of the *Toungthas*, is a parody on Eve's apron; the men have a small cloth over the loins but are still next to naked; the women wear a petticoat about a cubit in length, which is kept on in a most indescribable manner by heavy strings of brass rings. They have a singular tradition accounting for the scantiness of their costume. In former ages, say they, all the world was of one tongue, and of one kind; there was then a god upon the earth—his name they do not know,—when he was about to depart from among men, he divided them into nations and tongues, and gave to each the peculiar costume by which it was to be distinguished. The poor *Toungthas*, however, were at the time wandering over their native mountains, and engaged in their plantations in the hills, so that they came last. The god told them he had given away all that he had, except one small piece of cloth, a cubit broad, which their women were to wear; the men to shift as they could. The only visible objects of worship of the *Khúwís*, are the trunks of three or four trees, which have been cut down in clearing a space for the village; also the same number of pillar-like stones. These are fixed in the earth together, in the middle of a large shed, which is also employed as the place of reunion and festivity of the village.

The cultivation of the *Toungthas* is styled *Jhoom*. A hill, the best covered with vegetation, is cleared, the rubbish burnt to fertilize it, and the space sown with an indigenous species called hill or red rice. As the soil on these steep hills is necessarily scanty, and becomes more liable to be washed away by the periodical rains when denuded of its forest covering, a piece of ground rarely yields more than one crop; in each successive year other spots are in like manner chosen, till all those around the village are exhausted: a move is then made to another locality, fresh habitations are erected, and the same process gone through. These migrations occur about every third year, and they are the means by which long periods of time are calculated; thus a *Toungtha* will tell you that such and such an event occurred so many migrations since. In forcing one's way through the forest, one often comes suddenly on a deserted village, which presents a peculiarly melancholy appearance; a dense vegetation rapidly reclaims it as a domain of ancient wood; the very bamboos long since decayed and old, the materials of a once merry home, become covered with luxuriant creepers, and appear mockingly to vegetate

with a new-born life at the absence of man. Compelled thus to wear away an errant life, and in continual dread of being massacred by their foes, the poor *Toungthas* know not what comfort or security is; all their valuables are secreted in some hidden cave, known only to themselves. Should the maiden weave for herself a choice petticoat, or the young man fashion a favourite bow, it is forthwith taken and stowed away: and yet, in spite of all, they are a merry and laughter-loving race, fond to a passion of beads, with which they profusely decorate every thing that belongs to them: one little *Khúmi* damsel showed me her pet pipe so ornamented.

Having thus endeavoured to give a general sketch of the *Khúmis*, I will proceed to a few remarks on their language.

The *Khúmis*, in common with all the *Toungthas*, have no written characters. Their dialect is evidently cognate to the Burmese, that is, the pure and original Burmese, but it presents itself under the harsh type of the Arracanese, not softening down any of its sounds in the usual manner of the Burmese language. It is monosyllabic, and expresses the relations of its parts of speech by means of affixes; of these some seem to be merely euphonic, as *mă, gă, vă, tă*, &c., these generally occur between the root and its affixes. In like manner, for the sake of euphony, some of its roots are slightly inflected, as *tchau*, "to eat," when preceding the past affix *bau*, or *bauk*, is changed into *tcha*. It is moreover necessary to premise that all final consonants such as the *k* in the above word *bauk*, are invariably mute, that is, not pronounced, but *formed* in the mouth. Indeed by a person whose ear was not rendered sensible to the value of these finals by an acquaintance with the Burmese language, of which they are a marked characteristic, the above word *bauk*, would be written *bau*. As we might expect in a rude, and unformed tongue, the affixes, above alluded to, are omitted whenever the sense can be conveyed without them; as *kai*, 1st pers. pron. and *pè*, "give," form *kai pè*, "give me," or it might equally convey "I give;" *kai*, "as above," and *yu*, "wife," *kai yu*, "my wife;" *bok* "food," and *tchau*, "eat," *bok tchau*, "eat food."

NOUNS.

Mau signifies "in;" as *um mau*, "in the house." *Hloyó*, "under;" as *um hloyó*, "under the house." *Hí loungó*, "on the top of;" *um hí loungó*, "on the top of the house." *Téó*, "near;" as *um téó*, "near the

house." *Báo*, "from;" as *um báo*, "from the house." *Brăn*, "outside;" as *um brăn*, "outside the house." *W'ó*, "by or by means of." The final *ó*, in all these, implies "to, towards," which sometimes for the sake of euphony, is pronounced *vó*.

Tchee is the affix of the plural number with nouns, but it is not made use of when numerals are employed, they being sufficient to express plurality; as *um*, "a house," and *nú*, "two;" *um nú*, "two houses."

Like the Burmese, the *Khúms* have only one affix to express the *female*, whilst several affixes express the *male* of animals.

Tcháu is a male affix for human beings. *Tchă* is a female affix for human beings. *Nú* is the general female affix. *Poh* is a male affix; as *tchí poh* "a son;" *tchí nú*, "a daughter."

P'ting, is a male affix for large animals; as *tchié p'ting*, "a bull;" *tchié nú*, "a cow." *Painoh p'ting*, "a male buffalo;" *painoh nú*, "a female ditto." *Kounggnau p'ting*, "a stallion;" *kounggnau nú*, "a mare." *K'sai p'ting*, "a male elephant;" *k'sai nú*, "a female elephant."

Loh is a male affix for smaller animals; as *úí loh*, "a dog;" *úí nú*, "a bitch." *Miyaung loh*, "a male cat;" *miyaung nú*, "a female cat." *A'úk loh*, "a male hog;" *úk nú* "a female hog."

Lúhi is a male affix for birds; as *áa lúhi*, "a cock;" *áa nú*, "a hen." *Tawo lúhi*, "a male bird;" *tawo nú*, "a female bird."

Hái is a superlative affix; as *hauí hái*, "very beautiful."

VERBS.

The relations of verbs are expressed by affixes.

Au is the substantive verb; as *kai au*, "I am."

The present tense has properly no affixes; as *yé*, "to fear;" *kai yé*, "I fear."

The future tense and present tense are often used synonymously.

There is an affix *tán*, implying present time, used with some roots signifying "quality;" as *khūmđi tán*, "is cold," *roch tán*, "is dear;" but it is very irregular in its application.

The future is formed by the addition of the affix *nák*, which, when the roots end with a mute consonant, often has the euphonic vocal *gă* intervening; *kai tói nák*, "I speak, or will speak;" *kai tchêk gă nák*, "I go, or will go."

The past tense is expressed by the affix *bauk*; as *kai tchêk bauk*, "I have gone."

The imperative is expressed by the simple root, and is distinguished from the present tense by having no nominative case.

Môn, or *mawm*, are interrogative particles.

With reference to the negation of sentences, there appear to be various negative particles. *B'* is used to negative the substantive verb: as *kai b'au*, "I am not." *Mok*, *mawk*, *auk*, *av*, *âmôn*, are all variously used as particles of negation, the first two are prohibitive.

They do not appear to have an affix of number for verbs; the noun which is the nominative being sufficient to shew the time of the verb; as *kai tchêk gǎ nák*, "I go, or will go;" *kai tchee tchêk gǎ nák*, "we go, or will go."

In the formation of sentences, the nominative comes first, the objective next, and the verb last. There are however some cases in which this order appears varied.

NUMBERS.

We now come to the mode of numeration, and in this dialect it presents some interesting peculiarities. The numeral system of the *Khúms* is emphatically decimal; of the ten fingers. It is moreover so intricate as to be somewhat difficult of explanation. This fact admits us into a very peculiar phase of "savagery." We are apt to consider the mode of reasoning and every thing appertaining to an uncivilized race, as necessarily bearing the impress of simplicity; and this may be said to be generally the case, but at times the savage mind seems to take to itself flights of intricate and almost obfuscated reasoning.

The first peculiarity which we shall notice is, that the decades, or multiples of ten, up to hundreds have two names; thus as they count on their fingers when they get to "twenty," they call it first *horé laik* *horé*, which means literally "ten and ten," and then throwing their fingers on an imaginary heap they exclaim *apáng ré*, "a score," and so on. *Ré* is an affix used with numbers, and implies "full."

The next circumstance to be noticed is, the number of different terms used to convey the idea of "and, more."

1, *hnák*. 2, *nu*, (*u*, like the simple French *u*). 3, *t'hoan*. 4, *p'ly*. 5, *páng*. 6, *t'ru*. 7, *s'ru*. 8, *téya*. 9, *t'khau*. 10, *ho*, or *horé*. 11, *horé laik hnák*.

(from here *laik* implies "and, more"). 19, *horé laik t'khou*. 20, *horé laik horé*, or *apóng ré*, 21, *apóng p'hai hnák*, (here *p'hai* commences to convey "and, more"). 29, *apóng p'hai t'khou*. 30, *apóng p'hai horé*, or *p'haire*. 31, *p'haire p'lu hnák*, (here *p'lu* conveys "and, more"). 34, *p'haire p'lu p'lu*. 39, *p'haire p'lu t'khou*. 40, *p'haire p'lu horé*, or *wí p'lu ré*. 41, *wí p'lu páng na hnák*, (here *páng* no represents "and, more"). 44, *wí p'lu páng na p'lu*. 45, *wí p'lu páng na páng*. 50, *wí p'lu páng na horé*, or *wí páng ré*, 51, *wí páng t'ru hnák*, (here *t'ru* expresses "and, more"). 55, *wí páng t'ru páng*. 56, *wí páng t'ru t'ru*. 60, *wí páng t'ru horé*, or *wí t'ru ré*. 61, *wí t'ru s'ru hnák*, (here *s'ru* expresses "and, more"). 66, *wí t'ru s'ru t'ru*. 67, *wí t'ru s'ru s'ru*. 70, *wí t'ru s'ru haré*, or *wí s'ru ré*. 71, *wí s'ru téya hnák*, (here *téya* represents "and, more"). 77, *wí s'ru téya s'ru*. 78, *wí s'ru téya téya*. 80, *wí s'ru téya horé*, or *wí téya ré*. 81, *wí téya t'khou hnák*, (here *t'khou* conveys "and, more"). 88, *wí téya t'khou téya*. 89, *wí téya t'khou t'khou*. 90, *wí téya t'khou horé*, or *wí t'khou ré*. 91, *wí t'khou ho hnák*, (here *ho* expresses "and, more"). 99, *wí t'khou ho t'khou*. 100, *wí t'khou ho horé*, or *tchoon wairé*. 101, *tchoon wairé aikhlók hnák*, (here *aikhlók* signifies "and"). 110, *tchoon wairé aikhlók horé*. 120, *tchoon wairé aikhlók apóngré*. 200, *tchoon wai nuré*. 202, *tchoon wai nuré aikhlók nu*. 303, *tchoon wai t'hoon ré aikhlók t'hoon*. 1000, *tchángré*. 2000, *tchángnuré*.

1845 would be thus written—*tchángré aikhlók tchoon wai téya ré aikhlók wí p'lu ré páng na páng*.

It will be remarked in the above, that not only for 31 do they say "thirty and one," or "thirty more one;" and for 45 "forty and five," or "forty more five;" but that moreover they have several different terms to express this increment "and, more." We will recapitulate them. Between 10 and 20, the term is *laik*; between 20 and 30, it is *p'hai*, which it will be seen is likewise the term for "thirty;" and from "thirty" upwards each decade has the unit next above its own to represent the increment "and, more." Thus the third decade, that of "thirties," has "four;" and for "thirty more one," they say "thirty *four* one," &c. The fourth decade, or "forties," has "five," and for "forty more five," they say "forty *five* five;" and so on with the rest. Above a hundred, *aikhlók* represents the same term.

It would not be easy to give a reason for this peculiarity, unless perhaps that the true "more" of a number is the one immediately

above it; and that therefore the "more" of the third decade is aptly "four," and so on. It will be remarked, that from 40 to 90, the term *wí* represents "ten;" thus *wí*, "ten," and *p'lu*, "four," make *wí p'lu* "forty." It will be moreover perceived, that between 40 and 50, the term *pangno*, is used instead of *pang*. It is probable that the first is the correct term, and that the latter is merely an abbreviation. The name *t'hoon*, "three," is the same as in the Burmese language, only that in the latter it is pronounced softly *thoon*. The term *pang* or *pangno*, "five," is evidently derived from the same root *pāgnya*, "wisdom," as is the Pali term *pēgntsa*, "five."

A peculiarity which so remarkably characterizes the Indo-Chinese languages does not exist in this dialect; and that is, that there are no numeral generic affixes; thus *um*, "a house," and *aw* "two," are sufficient to express "two houses." In the case however of human beings there is a kind of adjunct used either with or without numerals; as *khúmi*, "a man;" *khúmi laungnu*, "two men;" *ichípau*, "a child;" *tchipau laung t'hoon* "three children."

THE KYAUS.

There is only one village of this tribe in existence; it is situated on the banks of the Kuladyne, and in the midst of the large clan of the *Khúmis*. The *Kyaus* relate that their tribe was originally numerous, but that now this single village is all that has been spared from the attacks of the *Shentoos* and other powerful neighbours. The *Kyaus* are viewed by the rest of the *Toungthas*, with a kind of estrangement; few among these latter being able to master their dialects. The first thing that strikes one on entering the village of the *Kyaus* is their marked difference in physiognomy from that of all the other hill tribes. Indeed the general physiognomy of the *Toungtha* is a Tartar-like family face, but the *Kyaus* in feature, dress, and appearance could scarcely be distinguished from the lower class of the Bengali peasantry of Chittagong. The *Khúmis* are fair, with small features: the *Kyaus* are dark, with large features. The *Khúmis* invariably wear a cotton head-dress, and their hair tied upon the crown, and shave no portion of their head: the *Kyaus* on the other hand shave a few inches of hair from the forehead, tie it low down on the

neck, and wear no head-dress. On first seeing them I felt convinced that I had fallen in with the original type; the etymon, as it were, of the Bengali. Though repeatedly asked whether they had any tradition of having come from Chittagong, they invariably replied they had none. On this however much stress could not be laid, as from the wandering and miserable life they lead, no tradition could well extend among them above a couple of hundred years. I consequently turned to their language, and found it presenting the marked characteristics of the dialects of Trans-Gangetic India, being monosyllabic, and having affixes to express the various relations of its parts of speech, and even not possessing the euphonic inflexions which sometimes occur in the *Khúmis*. If the *Kyaus* are an archaic type of the Bengali, as their extraordinary physiognomical similarity and their marked estrangement from the tribes around renders to my mind most probable, it goes far to prove that the original dialect of Bengal was monosyllabic and consequently rude; and that its nature and structure has been entirely revolutionized by the polished polysyllabic languages of Hindoostan. The *Kyaus*' ideas of worship are very rude and simple like that of the rest of the hill tribes. They erect upright stones in different portions of their village, which they consecrate to the *Náts*, or spirits of the hills.

With reference to the dialect of the *Kyaus*, not having had the same time at my disposal, or the same means of making enquiries into it, as I had for that of the *Khúmis*, my remarks are necessarily more scanty. The *Kyaus* dialect, as has been already remarked, is monosyllabic, and possesses affixes.

Ka is the nominative affix, chiefly used with a noun, in construction with a verb in the present tense; in which case the verb dispenses with its own affix of time. This idiom is singular, as it shows that the time of the nominative case, and that of the present tense are the same. *T'k'té*, or *t'k'tau* are future and present affixes. The two finals *té* and *tau*, I suspect to be nothing more than expletive. In this dialect as well as in that of the *Khúmis*, the future and present tenses are the same.

Mau, affix of the interrogative mood, occurs last in a sentence after all others. It may also be applied directly to a noun without the intervention of the substantive verb, as *sípa* "child," and *mau* interrogative from *sípa mau* "child?" i. e. "Have you any children?" This is one of abundant instances of how crudely ideas are expressed among a rude people.

Rau and *t'rau*; imperative termination: as *tshé* "to go," *tshé t'rau*, "go." *Mă* is a negative affix, and always occurs *after* the root; as *tshé m'rau*, "don't go." In this it differs from most dialects, the particle of negation, generally and correctly, preceding the statement of the act which it is meant to cancel. In asking however a negative question, the order is somewhat varied. The interrogative pronominal occurs first, the negative next, then the personal pronoun, and finally the verb; thus *arong*, "why—" *ma*, "not—" *na*, "you—" and *houng*, "come," make *aroung ma nahoung*, "Why don't you come?" In this case it is peculiar that the interrogative model-affix is not used, the interrogative pronominal being sufficient to mark the clause to be a question.

Ak is an auxiliary affix of negation used only with the substantive verb *ám*, "to be," in which case the true negative *má* is united with it, into one word *m'ak*; *m'tshál* "husband," *ám* "is," *m'ak* "not."

Ien is likewise an auxiliary affix of negation, similar to the Burmese *bhoo*; as *tshé m'ien* "(I) won't go."

NUMBERS.

The numeral system of the *Kyaus* is not intricate like that of the *Khumis*. It is decimal.

1, *khát*.—2, *niek*.—3, *t'hoom*.—4, *m'lí*.—5, *nga*.—6, *órook*.—7, *s'ree*.—8, *rúet*.—9, *kó*.—10, *tchúom*.—11, *s'mré khát*.—12, *s'mré niek*.—13, *s'mré t'hoom*.—20, *tchúom niek*.—21, *tchúom niek lé khát*.—22, *tchúom niek lé niek*.—30, *tchúom tchoom*.—33, *t'chúom t'hoom lé t'hoom*.—40, *t'chúom m'lí*.—50, *tchúom nga*.—60, *tchúom órook*.—70, *tchúom s'ree*.—80, *tchúom rúet*.—90, *tchúom kó*.—100, *r'za*.—101, *r'zalé khát*.—200, *r'za niek*.—222, *r'za niek lé tchúom niek lé niek*.—1000, *sankha*.—2000, *sankha niek*.—1846, *sankha lé r'za rúet lé tchúom m'lí lé órook*.

It is to be noticed that one very peculiar and characteristic idiom of the Indo-Chinese languages, such as the Burmese, Siamese, Malay, is entirely wanting, as far as I could make out, in these two dialects above described. I allude to numeral generic affixes. The numeral, as in English, is placed in immediate relation with the noun, whereas in the others it is placed in relation to a generic affix; as where the Burmese say "dog," two animals; the *Kyaus* and *Khumis* say merely "dogs two." But still as these hill dialects are so evidently cognate to the Burmese, it is singular if they do in reality lack so characteristic a trait; and

therefore I cannot but suspect, that a better acquaintance with these dialects would reveal them; and that I was unable to make myself understood in that part of my enquiries.

None of the tribes to which we have referred in the above pages are in possession of any alphabetical system. Unless indeed we except the *Khyongthas*, who being in reality pure Arracanese, have consequently the Arracanese or Burmese characters. With reference to the remainder, it is as yet a matter of doubt, among those who have turned their attention to the subject, whether, for the purposes of education, their dialects should be adapted to the Roman, or the Burman alphabet. With reference to the first, the only thing that can be said in its favour is, that it will save their European instructors the trouble of learning the Burmese alphabet. With reference to the second, a crowd of arguments appeal in its favour. In the first place all these dialects are evidently cognate to the Burmese language, not only so in sound, but also in structural peculiarities; all their finals are exactly similar to those of the Burmese language, being required to be formed in the mouth but not uttered; this single peculiarity, which in Burmese is represented by a mark called *that*, would require some outlandish configuration to be conveyed in an European alphabet. Secondly, the instruction which these people could possibly receive *directly* from European instructors must be comparatively small; as with the exception of a few short months, their mountain-fastnesses are inaccessible to an European constitution; and therefore native teachers formed in the plains, where Burmese is vernacular, would necessarily become the principal instruments. Thirdly, the Burmese language is used as the medium of communication with the English Government, and therefore there are always a number of persons in every village familiar with it. Fourthly, there are fewer sounds foreign to the Burmese than to the English language. I remarked but two, viz. the *v* in "*van*," and the *u* in the French "*plume*," "a feather;" these could easily be supplied by characters conformable to the general type of those of the Burmese alphabet; as has been done by the American Missionaries at Tavoy in the case of the *Karen* language.

In the following list the coronna as in the word *p'laung*, represents the *a* considered by the Burmese as inherent in every consonant, similar in sound to the first *a* in "*papa*:" the *u* with a dot under it represents the *u* in the French word *plume*, "a pen." The other accentuated letters will explain themselves.

<i>English.</i>	<i>Burmese.</i>	<i>Arracanese.</i>	<i>Khúmt.</i>	<i>Kyāū.</i>	<i>Bengali.</i>
air	lé	li	alí	khli	boiy'r
ant	pärwottshiet	päróttshiet	paleng	m'rtshi	hpín yrá
arrow	hmyá	mrá	tái	t'har	tír
bird	gnhët	gnhák	tawó	vá	thóróí
blood	thwé	thwí	t'hí	t'hí	lónh
boat	hlé or thám- bhán	hlí	p'laung	m'laung	náón
bone	äyó or yó	äró	ähók	rú	hánr
buffalo	kywai	kywai	painoh	chaláwé	mónhis
cat	kyoung	kroung	míyaung	meng	bílé-i
cow	nwámá	nwámá	tchí-nú	charráp'nú	gái
bull	nwáhpó	nwábóh	tchíp'ting	charrá tsál	arú
crow	kyëë	tchägín	óák	w'-á	qáoóá
day	né	rät	ní	níding tá	dín
to-day	khóné	goní	wänní	—	ájiya
sun	né	nín	k'ní	ní	thoorúj
to-morrow	nëthpän	hnaprän	kondam	—	kulya
yesterday	yámáné	yámáné	yandoo	—	kulya
dog	khwé	khwí	úi	úi	koonr
ear	ná	ná	kánnäü	ná	kán
earth	myé	tamIn	k'l-lóng	níung	bhooin
egg	áo	áo	k'dúl	ärtúi	bauda
elephant	tsheng	tshan	k'sái	sái	hátí
eye	myëttsie	myatsie	ámík	më-et	thókh
father	áhpá	ahpa	ng'-á-i	pá	bábá
fire	mëë	meen	mái	má-i	ágún
fish	nga	nga	ngäü	—	máns
flower	pän	pan	k'tshón	—	fooll
foot	khýé	khripoá	ákók	—	t'héeng
goat	tshiet	tshiet	m'è	kiear	sághul
hair	tshän	tshän	tchám	tchám	thúl
hand	lët	lát	ákú	kúet	hát
head	ookkhong	oogoung	álú	lú	mát'há
hog	wët	wát	áük	vauk	hoorr
horn	gyó	gró	t'kí	—	thíng
horse	myëng	mrán	kaunggnäü	korá	gorá
house	ieng	ieng	um	eeng	ghórr
iron	thän	thän	t'mäü	tírr	lóar
leaf	ärwët	paroa	ägnám	ärr-nú	pháthá
plaintain	nghtë py-	ngha pyau-	tchaung	kiluen na	kéla ká
leaf	aurwët	roa	gnám	—	pháthá
plaintain	nghtë pyau	ngha pyau	kúttí	kiluen	kéla
plaintain	nghtë pyau	ngha pyau	kúttíátáit	ámrá	kéla p'hol
fruit	thëë	thee	—	—	—
dawn light	leng	lan	kúwang	kawátá	bhor
mankind	loo	loo	khúmi	m'tshí	mánoos
monkey	myouk	myouk	h'láit	j'úang	bandur

<i>English.</i>	<i>Burmese.</i>	<i>Arracanese.</i>	<i>Khúmi.</i>	<i>Kyāu.</i>	<i>Bengali.</i>
moon	lă	lă	lău	khya	chán
mother	ámie	amie	gna-au-í	noo	mán
hill	toung	toung	mău-í	kh'lang	phár
mouth	khăndwəng	pát-sa	l'baung	m'khă	moonkh
musquito	khyəng	khrań	chăng-răng	tcheen- tchămp	mónsha
name	amee	namee	ă-mún	n'rmíng	nám
night	gnyee	gnyee	wúm	kulloh	răit
oil	tshěē	tshee	ătauk	tchírut	téil
river	myeet	mriet	yangpáng	típó-e	dórdjeá
road	lăm	lan	lám	lămm	p'hónt
skin	ăré	aré	ăpik	ăvún	sám
sky	koungkeng	goungkan	k'ní	mítshəm	ăthmán
snake	mywé	mrwí	púwí	mrúi	hănp
star	kyay	kray	k'tshí	ărshí	tará
bracelet	létgouk	lagók	k'tshí	—	károo
stone	kyouk	kyouk	lóngtchaung	lúng	shíl
tiger	kyá	kyá	t'káí	kăúí	băkh
tooth	ăthwá	thwá	haw	há	dánt
tree	theetpəng	theetpan	díngkaung	tíng	gáas
fruit	ăthěē	athěē	ătăit	—	p'hól
village	ywá	rwá	ăwáng	kó	p'hára
water	yé	rí	túi	tói	p'hání
yam	myoukōō	myoukōō	ăhó	bál	ălōo
wife	măyá	mieyá	ăyú	napoi	bóh
husband	lěng	lan	yú-wó	m'tshál	khushum
white	hpyōō	hproo	k'loong	ăgnoung	dhóph
black	mee	mee	p'noong	ăvaum	kálá
red	něē	nee	p'líng	ătshen	láll
blue	pyá	gnyoo	k'dáp	ărait	măshyeh
good	koung	koung	ăhauí	atshá	góm
bad	tshó	tshó	hauí-ăuk	tsha măk	khrań
beautiful	hlă	hla	ăhauí	ămenhlă	shoondur
ugly	măhlă	mahlă	ăkoochí	tsha măk	góm noi
I	nga	nga	kái	keema	ámie
thou	thəng or něng	than	nán	nama-tá	t'hoomí
he and she	thōō	thōō	ní	nengmăgata	ói
to go	thwá	la	tshěk	tshé	jáná
to fear	kyouk	krouk	yé-e	tchí	dórr ash
to be	shie or hie	hie	aun	ăm	ăshie
to give	pé	pí	pé	pé	déna
to speak	pyau	prau	tói	tchong	khótá khaú
to come	la or youk	la rouk	youk	houng	ái
here	theehma	dièhma	hee	tó	eenyüt

English.	Burmese.	Arracanese.	Khúmt.	Kyāü.	Bengali.
year	āhneet	ahneet	—	khúm	busr
milk	nó	nó	—	tchok	dhoot
child	ākhlé	ashay	doungdí	—	hpooá
offspring	tha	tha	tchípau	sípá	hpooá
male	youkyá	youkya	noungboo	m'tshí	morod
(man)			tchiáú		
female	miemmă	miemmă	noungboo	n'pang	máiyunla
(woman)			tchă		
a boy	loogălé	kolay shay	noungboo	m'tshál	morod
			tchiáú		hpooá
			doungdi		
a girl	miemmă gă- lé	miemmă shay	noungboo	noukté	máiyunlá
			tchă doung- dí		hpooá

The following is a list of *Khúmt* words. The English is the meaning they have in that dialect. The Burman is the term that comes nearest to them ; although often the Burman term does not express all the meanings of the *Khúmt* one.

Burman.	Khúmt.	English.
hluot	p'th'lau	to abandon, leave, let go
shie or hie	aun	to be, remain, abide dwell in
hnōing	pyák	to be able, can
hpooăt or khyó	āhóp	to bathe, wash
hpooăt	t'mooi	to rub
htá	khăt	to put, or place
shé	mon	front
ăpáú	hiloung	above
thó	wau	to, in direction of
nouk	ningthon	behind
tshairé	angyok	to abuse, insult
pyoo or look	pan	to do, act, work
ienghtoung	póng	marry a husband
ienghtoung	neng	marry a wife
théthwa	dók	to die
shēng	ahíng	to live
yay	pānoo	to laugh
gnó	ăwóh	to cry, weep
shōikshoo	ătăhó	to breathe, pant
goo-yăkhoo	wái	now, soon
kó kókway	ăní	to worship
hóh-hma	hóh	there
wa	p'lóp	cotton

<i>Burman.</i>	<i>Khúmi.</i>	<i>English.</i>
hneet thét	gnaing	to love, to want
kya	klá	to fall
mógh ywá	k'ní nǎik	to rain
átoo	wán ré	alike, similar
aáloon	pèpè	all
tsiet tshó	p'lu náí	angry
khyá-t'khyá	tākā or krá	another
iet	ǎ-í	to sleep
nó	anlau	to wake
iet	tchā khón	a bag
htoung	htoung	a basket
wá	úvv	a bamboo
khá	ǎkhó	bitter
khwai	khéi	to break, snap
yoo	youhai	to bring
yoo	lólh	to take
meeloung	p'tau	to burn
thenggyóh	ōō	to bury
khān	hǎin	to call
hpān kōing	p'too	to catch, hold, seize
ǎhpó-nee	átien	cheap
ǎhpómyá	róik	dear in price
khyam	khūmdí	cold
ǎtsiet	amáí	a bead
tsiet pǎdie	lǎing	a necklace of beads
kyét	áa	a fowl
hlēe htoo	báik	to cut, carve
tsootswot	tchooí	wet, damp
thé thwá	d'wí	to die
nēt	htók	deep, as water, also to drag,
thouk	nǎ-í	to drink [pull, draw]
thwé	p'hooí	dry
pyee	khóí	full
ǎlāt	k'khók	empty
thee	hí	this
dáyay thǎmēng	tchoo tchook	a deer
oodoung	touk dái	a peacock
átoung	ǎmó-í	a feather
toungpǎn	p'khí	a wing
nwé poo	bhí	warm
yǎ	ná	to find, get, obtain
twé	ǎ-wóm	to meet with, find
khyoung	tawó	a stream, a bird
pyān	ankhan	to fly as a bird
kázá	ámák	to play, jest, amuse
phōrá	k'ní y'long	God

Burman.		Khúmi.		English.
thé nat	{ "the an- gel of death"	mái { pauk {	mái "fire" pauk "tube"	a musket
bhayhneet		ayé ré		how many
htăměng		bók		dinner

The Bengali terms given in the first part of the above are those of the dialect of Chittagong. With reference to the *Khúmi* and *Kyāū*, there are some that are interesting, as presenting instances for that predilection to onomatopœia so characteristic of archaic dialects. The first we will notice is the term *tawó*, a sound which may be heard echoing through the still forest, and emitted by many of its winged denizens. The next *oák*, and *w'-á*, especially the first, admirably represent "a crow." The term *úi* "a dog" is uttered with a strong and sudden intonation on the first syllable; it is a sound constantly in their mouths employed to frighten those animals from their never-varying occupation of pulling every thing about in search of food. It is probable also that the Burman term *khwé*, had the same origin. The terms *m'-è* "any thing of the goat species," and *ăúk* "a hog," *mí-yaung* "a cat," are likewise instances of the same kind. It will be remarked, that in the *Khúmi* dialect the term for "Sun" enters into composition for that of "God;" as also that in Burmese, *Khúmi*, and *Kyāū*, the term for "Sun" conveys also the idea of "day," in contradistinction to "night."

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Diary of an Excursion to the Shatool and Boorun Passes over the Himalaya, in September, 1845. By Captain MADDEN, Bengal Artillery.

The writer of the following notes has been induced to commit them to paper, in the hope of their proving interesting, from the fact that a portion of the route traversed is comparatively little known, and so far as published information is concerned, is nearly new ground in botany; though of ornithological and entomological tours, several have appeared from the pens of Captains Hay, Hutton, &c. The tract in question is scarcely ever quoted for plants in 'Royle's Illustrations,' and the writer is therefore induced to believe that the new habitats here given, may not be without their use to some of the many travellers, who now annually cross the Himalaya, from Simla to Kunawur. To those amongst them who are novices in the mountains, he would recommend attention to the following particulars, as tending considerably to remove the difficulties, and enhance the pleasures of the trip.

1st. Avoid forming a party of more than three, in consequence of the difficulty, increasing in a geometrical ratio, of obtaining supplies and porters for a greater number.

2nd. Change the latter daily; one may thus halt at pleasure without expense, when desirable; the rate of payment is only three annas per diem instead of four, as near Simla, and the difficulty, often a serious one near the snowy range, is obviated of procuring large supplies, and of adjusting the fair rate to be paid for them; a frequent source of angry

and interminable discussion. It is also advisable to secure the coolies from fraudulent deductions by paying or seeing them paid in person. A heavy bag of pice is useful in many villages, where the inhabitants cannot often produce change for a rupee.

3rd. Encumber yourself with the least possible number of servants; but let these be able-bodied, in sound health, and warmly clothed; their falling sick will cause much delay and inconvenience: and on no account start without a small tent for their use.

4th. Let this tent (and your own) be only of such a weight that one strong man can carry it well, even when soaked with rain; and to effect this the better, let each of the party have his own tent.

5th. As the heat in the low vallies is very great, take some light clothing, and a copious sola-feather hat. If inclined to hepatitis, a doubly-lined umbrella is indispensable; and a green gauze veil or pair of goggles to protect the eyes from the glare of the snow, especially in spring: many have been temporarily blinded from this 'cause defective.' The traveller should avoid the vallies as much as possible; many of them are infested by flies of which the bites are exceedingly poisonous, and when irritated, terminate in dangerous sores. A double wax-cloth, to keep one's bedding dry, is essential, and five times as many pairs of shoes as you would expend at Simla in an equal period. The country-made articles sold in the shops there, will not, particularly during wet weather, stand more than a hard day's work on the rugged paths of the interior; and in the end, the purchase of European shoes will be found to economize cash, space, and skin.

6th. Let your cups, jugs, plates and dishes be of metal; with these only may you defy fate and falls; and as for provender to adorn them, an ample supply of tea, sugar, Carr's biscuits, hermetically sealed soup and bouilli, fowls, sliced bread re-baked into everlasting rusks, with a liberal allowance of beer, wine, and brandy, the latter precious article insured against damage by being decanted into curaçoa or other stone bottles. Nor lastly, must a liberal proportion of tobacco be excluded from the category; be assured Molière was not far wrong when he said 'Quoique puisse dire Aristote et toute la Philosophie, il n'y a rien d'égal au tabac'—at all events when jaded by a severe walk, and all other creature-comforts out of sight. Amidst the fulness and listlessness of Simla, one may dispense very stoically with many of these things, but

after the hard exercise and keen air of the mountain tops, nature asserts her rights, and speaks through the stomach, in tones which can be neither mistaken nor denied. The direction of the journey being determined before-hand, much trouble and expense will be saved by the establishment of a *dépôt* at some convenient spot on the return route.

7th and last. Some quarter of a century since, Stalker, Welsh, and other out-fitters used to furnish the innocent Cadet with certain pounds of tobacco to be given to the sailors "for doing little jobs;" such, as well as presents of coarse powder and small shot—will be found really serviceable in the Himalaya, where they are all scarce and bad. A judicious exhibition of these coveted articles will often secure a cheerful endurance of cold, wet, danger, and fatigue; the fumes of the tobacco stimulating the sensorium of the mountaineer, as those of loyalty and chivalry do, or did, that of the Frenchman. It is needless to add that the contrary method of abuse, blows, and violence, irrespective of its immorality in contravening the expressed will and orders of our honourable and honoured masters, is almost sure to defeat its intention, and to lead to the desertion of those subjected to it.

September 3rd.—Left Simla with Lieutenant Bouchier, of the Artillery, and walked to Fagoo, distant eleven or twelve miles, in four hours and forty minutes. The rocks at Simla are chiefly clay and mica slate, with quartzose sandstone towards the west, and a crystallized limestone at Jutog; the road lies along the northern face of Jaka mountain, which is here composed of a deep-blue clay slate, and not of limestone, as erroneously stated by Captain A. Gerard. The forest is here chiefly formed by the Ban oak (*Quercus incana*); and in the steep precipitous ravines to the right, grows abundantly the *Deutzia Brunoniana*, which bears a considerable resemblance to the common *Syringa*. Quitting this, the road gradually ascends the south or bare side of the ridge which connects Jaka with Muhasoo: the north side is covered with a forest of Mohroo oak (*Quercus dilatata*): and at 8 or 9 miles from Simla, the summit of Muhasoo is attained, upwards of 9,000 feet above the sea; the route is latterly through a fine forest of cedar, Rai (*Abies Smithiana*), and the Kreoo or Kurshoo oak (*Quercus semicarpifolia*), and descends to Fagoo, 700 feet below, through beautiful hanging woods of maple, pindrow, or Jhunera pine (*Picea pindrow*), horse chestnut (*Pavia*

indica), below the road, and a multitude of shrubs, *Viburnums*, *Leycesteria formosa*, *Limonia laureola*, black currant, &c., under which in May and June, the large pure white ladies' slipper (*Cypripedium cornigerum*) flowers in abundance. The Putees (*Aconitum heterophyllum*), *Circæa cordata*, and the blue-flowering chereyata (*Halenia elliptica*) are also both common on Muhasoo and at Fagoo. On the pleasant downs behind this latter, the *Primula denticulata*, the sundew (*Drosera muscipula*), *Viola cœspitosa*, and the pretty little eye-bright (*Euphrasia officinalis*), are all common, though less so than in the interior.

To the resident of Cawnpore or Ferozepoor, nothing can be more delicious than the freshness of the Fagoo woods in spring. The lofty stems of the pines are enveloped by the huge ivy and *Ampelopsis* climbers; and in the autumn, when the leaves of this last turn bright red and copper, the effect is very rich, and is said to resemble that produced in the North American woods by species of oak, maple, and sumach. All our oaks here are evergreens. The Tree-Rhododendron and *Andromæda*, which cover whole mountains of the outer ranges, become rare at Fagoo, and are seldom met with in the interior: so very limited in width is their favourite belt. They are however abundant on the Sutlej between Seran and Tiranda. The boiling point of water is 198° at Fagoo.

September 4th.—Detained for coolies; all those available being secured for Prince Waldemar and suite proceeding to Simla, and Colonel Fullarton and his party bound for the Roopin Pass.

September 5th.—To Puralee, ten miles, in four hours; the first seven miles, as far as Synj, are for the most part a steep and uninteresting descent to the Girree; the *Morina wallichiana*, which flowers in May and June, and the *Scutellaria angustifolia* are common. The glen of the Girree is so warm for most months of the year, that it is advisable, if practicable, to descend in the afternoon and merely pass the night in it; but fishermen will run all risks, and there is said to be good fishing ten miles lower down. Puralee is about two and a half miles up the valley from Synj on the same bank of the river, which, between these villages, forces its way through a deep rocky defile on the brink of which the road is carried for half a mile. There is a good breadth of arable land in this part of the valley, and the climate being very warm, the products are nearly those of the plains—barley, wheat, kodah

(*Eleusine coracana*), cheena (*Panicum miliaceum*), till (*Sesamum orientale*), and various species of *Phaseolus*. Puralee boasts a small bungalow of one room, which is cooler than a tent, but by no means so clean, being infested with almost all the insect plagues of Egypt.

September 6th.—To Kotkhaee, twelve miles, which we walked in five hours ten minutes. The road lies for three miles or so, up the right bank of the Girree, and then crosses by a good Sanga to the left bank, along which it continues for the rest of the route in a constant and rather wearisome series of ascents, descents, and sinuosities. Kotkhaee, “the Fort of the Fosse,” is a picturesque spot at the junction of several streams from the east and north, which first here give the Girree the character of a small reach, about the same size as the Hosilla in Kemaon, and like it rising short of the snowy range. The thermometer boils here at 202° , which gives about 6,000 feet elevation, about 500 more than is generally allowed to Kotkhaee. An excellent bungalow of two rooms had just been finished by Mr. Brskine, 150 or 200 feet above the left bank of the river. Across the stream, on a precipitous rock at the angle formed by the Girree, and a stream from Huttoo, is “the palace” of the Kotgooroo chief; it is an emblem of his own mind, being a ruin, which only shines under the brush of the painter. Consequent on the imbecility of the chief, the district has long been under British management. A clump of cypress (*Cupressus torulosa*) grows in the vicinity of the palace; the other trees are chiefly Kail pine (*Pinus excelsa*.) On the route to-day I noticed in the corn fields abundance of the pretty *Hibiscus trionum*, for which Dr. Royle goes as far as China. A species of *Vicia*, resembling *V. cracca*, is common amongst the thickets. Considerable quantities of iron are smelted at and around Kotkhaee, and conveyed on mules to Simla and the plains.

September 7th.—To Deorah or Dehrah, about twelve miles, in five and three-quarter hours. Three miles from Kotkhaee the road crosses to the right bank of the Girree, and then leaves the glen to ascend the Shunkun Ghatee, over the high neck joining the Koopur mountain on the SE., with Toombroo and Huttoo on the left. The Pass is probably from 9,000 to 9,500 feet above the sea, and on the ascent occur *Abies smithiana*, *Picea pindrow*, and in considerable numbers, *Populus ciliata*: this I find, the natives of the plains invariably mistake for the peepul. If the word *populus* comes from peepul, it would go to prove that the separation of

the Latin nations from the Hindoos took place after the establishment of the latter in India; the peepul not being known in the high countries to the north, whence the Hindoos are supposed to have emigrated. The converse may indeed be true, that the northern tree is the original peepul. On the grassy summit of the Pass, the *Morina longifolia*, the *Sibbaldia procumbens*, &c. are in abundance. From this point the source of the Girree may be seen to the right, at about 10,000 feet elevation on the Koopur mountain, below which the stream penetrates by a deep rocky and wooded chasm, a spur from Koopur which would otherwise turn it down by Deorah to the Pabur. The locality is well worth a visit, especially following the Chumba range from Bulsun and Puthernulla. A little beyond Koopur, and connected with it by the Puthernullah Pass of the map, is the still loftier three-peaked range in the Tiroch territory, called Kunchooa; the Urrukta ridge of Royle and Fraser, an appellation apparently taken from a fort now dismantled, and scarcely known to the present inhabitants. From the presence of birch, silver-fir, *Anagyris barbata*, &c. the Kunchooa summits are probably little under 12,000 feet elevation; there is a difficult route over them from Deorah to Choupahl *via* the Puthernullah Pass of the map. The view is fine from the Shunkun Pass, including the Jumnootree peaks to the east, the Choor, Shallee, Huttoo, Fagoo, &c. The Koopur mountain is composed of gneiss rock, like Huttoo; but the Shunkun Pass is of a decomposing micaceous shale, down which the road, some times steep and rocky, proceeds for four or five miles to Deorah, which is seen directly beneath. Deorah, often called simply Durbar, is the residence of the Rana of Joobul. The last Chief, Poorun Chund, was drugged to imbecility by his Wuzeers, in order to ensure the management of the country remaining in their own hands; this policy failed, as our Government assumed and still retains the management; but the legitimate claimant, an intelligent boy of eight or ten, is promised the restoration of the Raj when he attains his majority. His palace is an extensive and lofty square pile, surmounted by turrets, slated in the concave Chinese style, not uncommon in the Himalaya; it is picturesque and has often furnished a subject for the tourist's sketch book; the best view is from the Saree road. It stands from 6,000 to 6,400 feet above the sea, the thermometer boiling at $201\frac{1}{2}^{\circ}$, and being surrounded by high mountains, is rather a warm spot. But the traveller has the advantage

of a small bungalow, the last on the route to the snowy range. Here commences the rice cultivation so general in the valley of the Pabur. Bathoo (*Amaranthus anardana*), kodah, cheena, and tobacco, are also cultivated. The country is fertile and populous; the neighbouring mountains, especially to the south, where a long and lofty spur from Koopur extends to the Pabur—are beautifully diversified with fields, thriving villages, and pine forests, chiefly of Kail, the only species at Deorah.

September 8th.—To Rooroo Kothee in four and three-quarter hours, called fourteen miles in the route book, but perhaps not above twelve. Soon after leaving Deorah, the road enters the domain of the Ranee of Syree, leading down over gneiss rock, along the left bank of the Beeskool river, which rises from the Koopur mountain. Its banks are regularly fringed with elder trees (*Alnus obtusifolia*) here called *Koonch*, the *New* of Kunawur. Saree is about half-way to Rooroo, and is the lair of an old Ranee, once famed for her beauty, and now for litigation with her neighbours, and oppression of her people. The old lady visited Calcutta about 1822, where I saw her on a visit to the late Sir Robert Stevenson. From near Saree, which is a poor hamlet, the Pabur river is first seen, with the Beeskool flowing into it, through some flat alluvial ground by Goonsa village. Across the Pabur, on a nearly isolated hill perhaps 500 feet above it, stands the fort or castellated mansion of Raecengudh or Raecengurh, once a Ghoorka, then a British post, and since ceded to the Rana of Kyoonthul in exchange for Simla. Far above the fort, from amidst a group of minor mountains of very picturesque outline, spring the richly wooded peaks of Boorhun and Godar Deotah, to the height of nearly 9,000 feet above sea level, a branch of the Changsheel—or as it is here softened, Chaheel range. The road descends by easy gradations to the level of the Pabur, and crossing the Nye, Noye, Pursarar or Dogra, a tributary from Thana Keesahain, continues along or near its right bank to Rooroo, a few hundred yards short of which, it crosses by a Sanga, or wooden bridge, a rocky narrow chasm, ninety-nine feet deep, through which flows the Shikree Nuddee. The Pabur is here a fine, strong, and perfectly clear river, occasionally forming formidable rapids. A species of trout is abundant in it and in the Shikree, but is said to be prevented by the snow water from ascending more than ten or twelve miles higher up. The cliff

section of the Shikree exhibits strata of a micaceous sandstone, but Rooroo, Chergaon, and several other villages on the Pabur, stand on elevated plateau of gravel and boulders, from 100 to 150 feet above the present level of the river. These are chiefly devoted to rice cultivation, for which this valley, here and upwards, known as Chooara, is celebrated; the fields are abundantly, and to the traveller often inconveniently, irrigated by rills skilfully led along artificial cuts from the Pabur, originating at a sufficient distance above to admit of the highest levels being watered.

Rooroo Kothee is 5,200 feet above the sea, and is rather a hot place. The barley ripens in the latter half of May, the wheat in the first half of June; the heat is then excessive. It is not a very large village, and has a kind of square in the centre, which, were it a little cleaner, would remind one of a substantial farm-yard in England. The Muhunt or Chief Gooroo of Busehur resides here, and has large endowments in land. Owing to the neglect of the smooth-tongued Mookhees of Deorah, who promised everything and performed nothing, our baggage did not arrive till sunset, so that our breakfast and dinner merged into one, at $\frac{1}{2}$ past 7 P. M., thirteen hours after leaving Deorah; a place which economizes cash better than temper. During the day, a general assembly of the mountaineers took place under the Gooroo's auspices, for the purpose of dancing round the gods. These, however well-gilt, appear to be aired and ventilated but once a year, and were deposited in litters beneath the trysting tree in the village square, round which the people formed themselves, men and women apart, into seven squares, single rank of eight or ten each, holding each other's hands, extended behind their backs: then by a curious and by no means inelegant step, or set of steps, in excellent time, they gradually completed the circuit, the movement being combined with others to the front and rear, with repeated bowings in concert to the deities; this continued the best part of the day to the music of pipe and drum, the performers being occasionally relieved from the surrounding crowd, all seeming equally adepts. Considerable practice must have preceded so creditable an execution of this dance, and once or twice the gods even joined in the fun, which then grew more fast and furious than ever; and from the exceeding elasticity of the ash-poles on which they were carried, "their worships" got such a shaking as gods in the plains can never hope to enjoy.

The mountaineers of the Himalaya, like those of Gilead, invariably convert the letter *s* into *sh*; so that the Shibboleth test must be reversed to detect a Paharee; they have also retained in common use a great number of Hindooee words, which are seldom heard in the plains.

Rooroo Kothee is situated about 150 feet above the right bank of the Pabur, which, at this season is fordable here with difficulty. In common with similar valley sites in the mountains, the village is infested with a small species of fly, which, without giving any notice, inflicts a bite that is frequently attended with much irritation. The higher mountains have also in the spring, their pest, in the shape of a large gad-fly, a pitiless enemy of man and beast.

The low glen of the Pabur, while it boasts abundance of the *Rosa brunonis*, *Indigofera dosua*, *Hypericum cernuum*, *Deutzia staminea*, and other flowering shrubs, possesses few or none of the beautiful herbaceous plants of the Alpine rocks and pastures. The Marvel of Peru (*Mirabilis jalapa*) however, grows in the greatest abundance and luxuriance about Rooroo and several other villages, as well as about Kotkhæe on the Girree, and on the outer range about Barh and Kalka; the climate of the Himalaya between 4,000 and 7,000 feet elevation, brings it to such perfection that in all these places it is so completely naturalized as to appear wild. Another American plant, the *Martynia diandra*, is equally abundant near villages in the Turæe of Kemaon towards Bhumouree. The *Hypericum perforatum* is a common shrub in the cornfields of the Pabur and Girree vallies; and on the rocks near Rooroo and Deorah, I noticed the *Linaria incana*, resembling in habit the *L. cymbalaria* of Europe. *Desmodium tomentosum* is also a common shrub on the rocks in the Pabur valley hereabouts, and on the Sutluj above Wangtoo bridge, preferring the warmest exposures.

There is an interesting route of three marches, from Rooroo Kothee *vid* the Shikree Nudee, and over the Moraul ka Dunda, to Rampore on the Sutluj, halting at Samurkot and Neura (or Neheree.) The country is well peopled, and beautifully varied with forest and cultivation. In May and June nothing can exceed the beauty of the wild roses, (*R. Brunonis*) climbing up the dark pines and alders, and falling down in splendid festoons of the most fragrant blossoms. Snow will be found early in June on this route, when the heat at Rampore, immediately below is almost intolerable.

September 9th.—To Chergaon, an easy stage of ten miles up the right bank of the Pabur, which we walked in three and a half hours. The current of the river becomes more and more furious as we approach its source in the Boorhun Ghatee; and in several places, dashes along with the greatest noise and violence amongst the granitic and other boulders, which lie in its bed.

“Vexed Scylla and the sea that parts
Calabria from the hoarse Trinacrian shore,”

are smooth water compared with it even in poetry; for it must be acknowledged that in reality these classic rapids are wonderfully calm and gentle. After a few miles, the road passes under a high range of slaty mountains of a curious formation, presenting an appearance more like a series of gigantic pine-apples or cheeses, than any thing else I know of. This is owing to the inclination and interruption of the strata, which on one side present steep faces of shattered rock, while the reverse side of the hummocks, though steep, is covered with grass. There are no trees on these mountains, exposed as they are to the withering influence of the southern sun; the *Desmodium tomentosum* is, however, abundant, and the *Capparis nepalensis* creeps in patches along the face of the sunny cliffs. About eight miles from Rooroo, we passed the village of Mundlee, held in free gift by Brahmans, but also inhabited by a colony of Moosulmans, whose ancestors emigrated here from Jounpoor, three or four generations ago. They still possess the true faith and a supply of fowls and eggs. This is properly the first village of Chooara. The land is here almost wholly devoted to rice, which will be ripe in October: till, koolthee, mash, &c. are still sown, but not in any quantity; and in spring, the poppy is rather largely cultivated. Across the river on a spur from the mountains stands the romantic fort of Butolee, near a large village called Musoola; above these rise the densely wooded flanks of the Changsheel range, facing the north, and in full contrast to the mountains on the right bank, covered with forests of pine (*Pinus excelsa*, *Abies smithiana*,) &c. Should the traveller prefer it, he may, if bound from Simla to the Roopin Pass, strike up from the glen of the Pabur at Raecengurh, and follow the summit of the Changsheel range to Doodoo. This route is much cooler and more interesting than that by Rooroo; but there are no villages, and two or three days supplies, a good map, pocket compass, and guides from

Mandil village, are indispensable. A little above Butalee, the Pabur receives on the right bank the Mutretee river, from the Moral ke Dhar, consisting of lofty, broken, glacia-like ridges, the strata lying over towards the Sutluj, and probably rising to 13,000 feet. It is the continuation of the Shatool range, and divides Chooara from Dusao. By fording the Mutretee at a mill in the line of the Pabur, a considerable detour to the bridge up to its glen and a subsequent ascent of several hundred feet may be avoided; the short cut keeps close to the Pabur, but it requires a steady head to pass in safety some narrow ledges of rock, against which when the water is high, the current sets strongly, and none should then attempt it, who cannot depend on their nerves. On our return, the Pabur had fallen considerably, and we effected the passage without further inconvenience than what arose from the chilly waters of the Mutretee, which must be forded. About two miles on is Chergaon, a small and poor hamlet, about 6,000 feet above the sea, in the angle formed by the junction of the Undretee or Indravutee river with the Pabur. This impetuous torrent which is about equal in size to the Pabur, pours down south from the Shatool Pass; the bridge having been carried away, we were forced to cross its angry waters by a single tree, which my companion did unaided, while I was glad to accept the assistance of a neighbouring miller. Al-sirat itself could scarce be more narrow, or destruction more certain in the event of a slip. Chergaon is well supplied with apricot and other fruit trees, and the brink of the Pabur is shaded by alder, &c. The Toombroo peak, north of the Shunkun Ghatee, erroneously written Toongroo in the maps, is a conspicuous point from Chergaon down the glen of the Pabur.

September 10th.—To Moojwar village in Rol, twelve miles, a fatiguing march, during which we accompanied our coolies, who halted liberally to rest and smoke, so that we were eight hours on the road. For three miles the path lies through rice cultivation and brush-wood, up the left bank of the Undretee; then crosses and ascends about 500 feet to Dugol, a Brahman village of eight or ten families on the right bank, but in the map erroneously placed on the left. It is reckoned 6,800 feet above the sea, but the warm clothing of the inhabitants indicates a much colder climate than would be due to such an elevation nearer the plains. The holy fathers are small, well made, well clad men, but being afflicted with the itch, accompanied us to Rol for medi-

cine, of which, by the way, every traveller should carry a small supply to meet the demands, which will be almost daily made by patients suffering from liver, spleen, dysentery, and in short all the ills that flesh is heir to, save blue cholera; and if unflinching faith in the skill of the physician be conducive to a cure, the practitioner here should be successful indeed, for not *Æsculapius* himself was invested by the Greeks with more certain healing powers than is every European—however modest his pretensions in this department—by the mountaineers. From Dugol, the path again descends to the river, and for two or three miles keeps near its bank through beautiful English-like woods of elm, poplar, alder, cornel, (*Cornus macrophylla*) and birch (*Betula cylindrostachya*), with *Abies smithiana* on the heights. A little beyond Dugol, I found by a stream a species of *Eupatorium* in flower, much resembling *E. cannabinum*. We next recrossed to the left bank and followed it for several miles by a path often bad and rocky, and impracticable to ponies; the scenery is very wild and beautiful, the Undretee forming here, and indeed throughout the march, a series of foaming rapids: it is quite unfordable. We now once more recrossed to the right bank, and in a mile or two reached the junction of the two streams which form the Undretee—viz., the Byansoo from the left, the Sheear from the right, both flowing down from bare russet-coloured ridges, far above the region of forest, and evidently buried in snow for three-fourths of the year. The Byansoo, I believe, originates in the Jalsoo Pass, about 13,000 feet high, which affords a passage to Seran on the Sutluj. We finally gained the left bank of the Byansoo by a fallen spruce, and ascended the fork between the streams by a long and steep ascent to Cheechwar, one of the Rol group of villages, 8,600 feet above the sea, a pretty large and well-built place, one and a half or two miles above which, by an easy acclivity, we reached Moojwar. A blue aster, quite similar to the Swiss *A. alpina*; a large and handsome *Inula* by rivulets, (*I. royleana*?) the *Parochetus oxalidifolia*, the large-leaved elm (*Ulmus erosa*?) much like the Wych elm, here called Mored and Paboona, affording much fodder to the cattle, with the walnut, peach, and oak, (*Q. semicarpifolia*), are common in this district. Across the Sheear to the east, the mountains present a lofty precipitous front to the west, clothed with spruce and cedar. Across the Byansoo to the west are more bare, brown, and very rugged mountains. On the north, the Shatool is con-

cealed by rising land, but so far as one can see, the great range here is deficient in the magnificent cliffs and crags of the Roopin and other Passes to the eastward, but one is not yet high enough to judge fairly. Moojwar is about 9,000 feet above the sea; the houses large, of two stories, very substantially constructed of stone and timber. The cultivation is chiefly Bathoo (*Amaranthus anerdana*), and Phaphur or Buck-wheat, with a little tobacco. The climate is severe and capricious, and the people seem to consider the passage of the Shatool by no means a trifle, and, as we afterwards found, endeavoured to intimidate our people by the threat that not one of them would ever return; nor was a storm of rain and thunder in the afternoon, much calculated to encourage them. The villagers have, however, agreed to accompany us, and promised to have supplies for three days all ready in the morning. They are said to have been recently implicated in a foray on their neighbours beyond the next ridge whose sheep to the number of 1,500 they carried off after the manner of Rob Roy and his Caterans. There is *no king* in the land, and every man does that which is right in his own eyes.

September 11th.—To Kala Koondar, ten or eleven miles, which took us eight hours, being much delayed by the constant halts of the coolies, by my own rests and search for plants, and, after quitting the forest, by a very difficult path. The distances indeed are but approximations, and are perhaps exaggerated; experience has shown that to the direct map-distance about one-third must be added for the road-distance, instead of one-seventh as in the plains; but Kala Koondar, and the next two stages, being "*vox et præterea nihil*" are not inserted on the maps. Soon after leaving Moojwar, we passed the hamlet Jutwar, the last and highest (9,200 feet,) on the route. Brush-wood and meadows succeed, the first formed by *Rosa sericea* (a 4-petalled white species,) *Berberis brachybotrys* (with bright red fruit,) and abundance of the beautiful yellow *Potentilla dubia*; while the pastures abound with the sessile flowered *Iris kemaonensis*; all these plants are equally characteristic of the corresponding sites above Junglig and Jaka near the Boorun and Roopin Passes. The late Dr. Hoffmeister shewed me specimens of the above *Potentilla*, if they were not varieties of *P. atrosanguinea*, gathered at and above Chitkool on the Buspa, in which some of the petals were yellow and some carmine. On quitting the

meadows, the route enters and ascends steeply through a forest of *Abies smithiana*, *Pinus excelsa*, *Picea pindrow* and *P. webbiana*, *Quercus semicarpifolia*, *Taxus baccata*, *Ribes acuminatum* (red currant) the lemon-scented *Laurustinus* (*Viburnum nervosa*), *Rosa sericea*, &c., none of the trees remarkable for size. The *Picea pindrow* and *P. webbiana* are here and at Jaka, confounded under the name of Kulrai, perhaps the Chilrow of Royle, and these unconscious disciples of Lamarck insist, that the difference in the size and colour of their leaves is solely owing to the inclemency of the wind and weather, on the exposed sites where the Webbian species is found. We emerged from the forest at a spot called Bhoojkal, 11,700 feet above the sea, and about three miles from Moojwar; the rest of the day's journey lies along the east or SE. exposure of the mountains, destitute of trees, but covered with a new and rich series of Alpine plants. A little beyond Bhoojkal and on the same level, Reoonnee, sometimes used as a halting place but a very bad one, occurs; and hereabouts much ground is lost by several steep descents to torrents by rather dangerous paths. Above, to the left, the mountains exhibit bare, but not precipitous shelves of gneiss rock, inclined from the route; to the right are deep glens, woods, torrents, and a few beds of snow, all wild, lonely, and sublime. Kala Koondar is an open but steep spot in a grassy, flowery glen, facing south, about 300 feet above the forest, and 12,000 above the sea, on a level with the Choor summit, which is visible to SSW. We encamped amidst heavy rain and hail from the north, which rendered the grass very cold and wet for our people and ourselves too, having been compelled for want of hands, to leave our charpaees on the road to-day. In these difficult tracts a good tarpaulin under one's bedding is much more conveniently carried than a bed-stead, and excludes the damp almost equally well; where both are absent, a very excellent substitute is a thick layer of pine or yew branches.

The creeping juniper, here called Theloo but in Upper Kunawur Pama (*Juniperus squamosa*), commences from 800 to 1,000 feet below Kala Koondar. The open pastures are covered with a profusion of alpine flowers among which are the *Cyananthus lobata* (called Kheeree), the *Dolomicea macrocephala* (Dhoop or Googul), *Saxifraga parnassiaefolia* (or a species very like it, also found on the Choor), and (on rocks) *Saxifraga mucronulata*, *Sieversia elata*, *Swertia cœrulea* and several other species, (one, a large plant with pale blue blossoms is probably

Royle's *S. perfoliata*), the *Sphelia latifolia* of Don, *Polygonum molle* (or *polystachyum*), *brunonis*, and *vacciniifolium*, (the last on rocks, a beautiful species), *Lonicera obovata*, *Senecio nigricans*, *Achillea millifolia*, a yellow *Tanacetum*, *Oxyria elatior*, *Sibbaldia procumbens*, *Spiraea kamschatkika*, (very like meadow-sweet), several *Sedums*; *Morina longifolia*, *Caltha himalensis*, *Delphinium vestitum*, *Aconitum heterophyllum*, *Phlomis bracteosa*, *Corydalis govaniana*, *Geranium wallichianum*, *Picrorhiza kurroo*, and many more. *Rhododendron campanulatum*, is common in the region of birch, and is called Chumreesh, Simreesh, Simrat, Simbur, &c.; and above it is the much smaller *Rhododendron lepidotum* or *anthopogon* with aromatic leaves, smelling when bruised like those of walnut; it is called Talsur. The capsules are in dense terminal clusters, and the flowers are said to be red. *Gualtheria trichophylla* with its beautiful azure fleshy calyx abounds on the sunny banks. The above are so general in all the region above the forest on the Snowy range, that it will be needless to specify them on every occasion. The *Cyananthus lobata* covers extensive tracts with its blue (occasionally white) periwinkle-like flowers; at and above Nooroo Bassa on the north side of the Roopin Pass, I found the seed ripe on the 20th of September, while lower down, the plant was still in full bloom. In the same way, on the Changsheel Range, *Morina longifolia* was all ripe on the 25th September, while on the 30th, it was still in full flower on Huttoo. *Rhododendron arboreum* flowers in February and March at 7,000 feet, and is not ripe till Christmas; but *R. campanulatum* and *anthopogon* (Talsur) which flower in May, June, and July, at 12,000 feet, are ripe by the end of October. A strange alchymy of nature this, to ripen her products first in the colder sites, but perhaps necessary to the existence of plants in these elevated spots, where but for this provision, the early winter would prevent their ever coming to maturity. "Il est démontré (says the brilliant Frenchman,) que les choses ne peuvent être autrement: car, tout étant fait pour une fin, tout est nécessairement pour la meilleure fin. Remarquez bien que les nez ont été faits pour porter des lunettes, aussi avons nous des lunettes. Les jambes sont visiblement instituées pour être chaussées, et nous avons des chaussures. Les pierres ont été formées pour être taillées, et pour en faire des châteaux, aussi monseigneur a un très-beau château; et les cochons étant faits pour être mangés, nous mangeons du porc toute l'année."

The *Dolomicea macrocephala* is a very common plant in all the upper Himalaya : Royle's plate, perhaps for want of space, represents the leaves erect, which are naturally quite procumbent ; the root is highly valued as incense, and as such, is presented to gods and rajas. The *Picrorhiza kurrooa* grows abundantly on dry rubble from Kala Koondar to a great height on each side of the Shatool Pass, but I did not notice it elsewhere ; the root is excessively bitter, and is sold under the name of Kurrooa in the Simla Bazar ; it is the Kutkee of Kemaon.

September 12th.—To Doodach, eight or nine miles, which our coolies performed in four and a half hours. The route is much better and more easy than yesterday's, gradually rising over slopes, for the most part gentle, and crossing many rivulets from the left, some of them chalybeate. The banks of these exhibit in some places great walls of gneiss rock. The forest is now entirely lost sight of, and fuel must be brought in from Kala Koondar. Doodach is an open and level spot, well adapted for an encampment ; it must be fully 13,000 feet above the sea, and is probably identical with the Kuneejan, of Gerard. We had hard frost at night. The Undrete, a mere rivulet, rises in a bed of snow, a little higher up, and flows about 200 feet below us. Immediately above it, the opposite bank rises to a very great height, in a magnificent façade of bare gneiss cliffs, the ledges supporting deep beds of snow, and terminating to the north in a steep conical peak, called the Dhuneer ka Thood. From these crags several avalanches of rock fell down at night, with the noise of thunder. Between our camp and the base of the Pass (about a mile,) the rock is quartz, in immense *coulées* of shapeless masses, heaped together without order and very difficult to climb over. They have fallen from a huge and very curious rectangular mass, which forms the western side of the Pass. Several interesting plants abound here ; the *Saussurea* or *Aplo-taxis gossypina*, clothed in dense wool, raises its conical form every where on the rocky rubble to the top of the Pass, resembling a vegetable spectre. It is called Kusbul, Munna Kuswal, and Bhoot-pesh, and is offered to the gods, who have evinced their care and favour by clothing it so warmly, exactly as they have protected the yak and alpine goat with a thick *waistcoat* of *pushmeena*. Another *Aplo-taxis* is defended by a different contrivance ; the leaves are gradually converted into large yellowish transparent bracts, enclosing the colts-foot-like blossoms as

if in a head of cabbage. This plant is common amongst the large rocks from Doodach nearly to the summit of the Pass, and is also sacred. It is called "Birm (or Brem) Kounl (or Kouwul)," i. e. "Brahma's Lotus;" a similar species on the high mountains behind Cheenee, has a strong odour of musk.

Fraser found the "Birmah Counla" on the Bumsooroo Pass, between Sookhee and Jumnotree, and describes it thus—Stalk covered with large and long leaves, somewhat like those of a primrose, ending in a cup like that of a tulip, appearing merely the continuation of these leaves, closing and forming the petals of a very noble flower, in the centre of which the stamina and pistil are seen. Petals greenish towards the base, but the middle and higher parts are black and yellow, as is the centre of the cup, but more vivid. The latter part of the description appears derived from a *Fritillaria*, and very possibly from the same plant which, "Pilgrim" (pp. 66, 67) says is so beautiful at Kadarnath in April: and though growing on the hard ground and out of the melting snow, is called "Lotus." In Kemaon, the *Iris nepalensis* is known as the Neela Kumul, or blue Lotus; and is a favourite plant with fukeers, &c.

Amongst the other plants found at Doodach and on to-day's route were two species of *Aconitum*. One, which seems to be known as *A. dissectum* (*Hamiltonii* or *Speciosum*) abounds at this elevation, and has the leaves cut into five segments, with light blue blossoms. It is called here Doodhiya Moura, but in Kunawur, Tilia Kachung. The other species, *Aconitum ferox*, is called Moura-bikh, or simply "Mora" (from mri, to die,) and is reckoned extremely poisonous. It only occurred in one spot, a mile or two above Kala Koondar, growing in an extensive patch, the stems from four to six feet high, with long dense racemes of splendid deep blue flowers: the follicles three. The mountaineers were shocked when I told them that an equally deadly species was a favourite flower in our English cottage gardens, where they concluded it could only be planted in the view of occasionally getting rid of a superfluous boy or girl. The handsome *Ligularia arnicoides* (figured by Royle,) was in full bloom every where about and above Doodach, and in similar situations all over the Snowy and Changsheel ranges. On the south side of the Roopin Pass there is another species, with reniform leaves. By the rivulets on the route, and high upon the Pass, the *Primula stuartii* and *P. purpurea* are abundant, and now with ripe seed. They are both

called "Jy-be-Jy" or "Jyan," and are very ornamental in May, June, and July. With these occurs a very handsome species of *Dracocephalum* or *Lamium*, called Gurounta, with a strong camomile odour when bruised. On bare rocky ground from 12,800 feet upwards is found the *Centaurea* (*Aplotaxis*) *taraxicifolia*, the "Dhoopree," with heads of purple blossom and a delicious fragrance like that of the sweet colt's foot. The showy musk-scented *Delphinium* (*brunonianum*?) grows near the foot of the Pass, and is called "Soo-paloo," "Ruskur," "Ruskachung:" it is, I believe, the "Liokpo," of Upper Kunawur, and is a curious illustration of the association in these lofty regions of musk in the vegetable as well as the animal kingdom. The *Hymenolæna* *Govaniana*, and several similar *Umbelliferae*, with bracts greatly developed and beautifully fringed with white, are common, some of them attaining the crest of the Pass; among those lower down is one with decompound leaves, of a strong aromatic parsley-like fragrance, here called Nesir, and mentioned by Fraser as occurring near Jumnootree, under the name of Mahee. All this lofty region (from 12,000 to 13,000 feet) abounds with the Kanda, a species of prickly *Meconopsis*, probably *M. nepalensis*, in form like Royle's *M. aculeata* (which in his plate seems too deeply coloured,) except that the flowers are of the most lovely azure. Amongst the Doodach rocks grows the *Sedum himalensis*, very like the *Rhodiola rosea* of England, and amongst the rocks and snow at the source of the Undrettee I found the *Saxifraga granulata* of England, and a *Ranunculus* (*choorensis*?) much like the *R. glacialis* of Switzerland. Such are a few of the plants which "blush unseen" on these desolate wilds; a more leisurely examination would easily double the number. Nature, where she cannot be useful, seems determined to be ornamental, and converts these tracts where grain will not ripen, into pastures and flower gardens, where thousands of butterflies and insects enjoy their brief existence. The utility of nature must not indeed be limited to man, for there is scarcely one of these plants, the seeds of which do not support myriads of insects as well as many birds; and the highly successful experiment at Muhasoo is a sufficient proof that many of the forest tracts at least, and perhaps even the pasture lands above them might, by a moderate expenditure of industry and enterprise, be rendered available for the production of excellent potatoes, and thus enable the Himalaya to support

double or treble its actual population. Judging by the produce of the flocks and herds which now partly graze on these pastures, the soil and grass must be faultless; every traveller is struck with the quality of the milk—as rich as cream—at Rol, Jangleeg, and Jaka, placed at the lower limit of the belt where cultivation now ceases.

September 13th.—From Doodach over the Shatool Pass to Ateeng Wodar, twelve to fourteen miles, in somewhat under seven hours. An experienced native of Rol had earnestly advised us not to attempt the Pass unless the day were fine, and we were so far fortunate as to have a cloudless morning, and reached the summit, perhaps four miles, in three hours, mounting at a very easy pace; the ascent, indeed, is less fatiguing than that of the Choor from Seran; and on its completion we experienced none of those feelings of headache, giddiness, distress in breathing, &c., described by many travellers, and very sensibly felt by myself on a former occasion on the Roopin Pass. The route lies up over the frozen snow bed of the Undrete, and then up one steep continuous tract of broken, angular, masses of gneiss rock, of which there is a steep escarpment to the right, capped by a thick bed of the purest snow. The *col*, or semicircular summit of the Pass, is in its whole extent furnished with numerous piles of stones called Shoogars or Thooas—the “Ebenezers” of grateful and successful passengers; in number and height far exceeding those on the Roopin and Booran Ghatees; the pillars being apparently in a direct ratio to the piety and the fear of the passengers, and the difficulty and danger overcome. Our men had provided themselves with stores of flowers, chiefly the Kounl and Munna-kuswal saussurea, and the musk larkspur, which they tied in long garlands, and with which they decorated, first the pillars, and then, on the Hindoo principle of “Purmeshwur-hai,” ourselves. They clearly fancy their gods to be as fond of musk as they are. On so cold a site, a few faggots of wood would be a more rational offering; but as their evil genii and demons are lodged in eternal fire, it is quite logical to locate the gods in eternal cold and snow, and it is remarkable that he who was prophet at Medina, and impostor at Mecca, also patronized this notion, for he affirmed that, when touched by the hand of Allah, the sensation was that of intense cold. On our return by the Roopin Pass, the garland ceremony was dispensed with, each man merely tearing a small portion of his clothes, and suspending it on the pillars, a custom

universal in these mountains, where we observe a bush or tree on each more eminent pass, ornamented with votive rags of all colours, precisely similar to those about holy wells, &c., in Ireland. With respect to vegetation, the *Primula purpurea* and *Sibbaldia purpurea* grow very high upon the south side of the Pass; the two *Saussureas*, a large *Sedum* (probably *S. asiaticum*), a *Rumex*, and a pretty pink *Corydalis* (either *hamiltonii* or *meifolia*) reach the crest; and *above* that of the Roopin, I found patches of *Potentilla inglesii*; so far are these elevated ridges from being entirely forsaken by Flora!

The right or eastern portal of the Shatool Pass is formed by the pinnacle of rock, 1,500 feet high, and 17,000 above the sea, visible from Doodach; it is called Dhuneer ka Thooa (the Dunerko of Gerard,) from the Mookheea of Rol, who bribed a bold adventurer with a hundred rupees to scale it, and erect a pile of stones in honour of the Deotahs and himself. Moore tells us, that the schoolmen used to debate how many angels could dance on the point of a needle without jostling each other; and some of these Himalayan needles are so sharp, that the same question naturally suggests itself with respect to the thirty million of gods which the Hindoo Mythology has peopled them with. The Dhuneer ka Thooa sends down to the north a broken serrated spur, which falls to the west in a lofty and most superb escarpment of naked rock, which lay on our right as we descended. Looking down to the north, through the long vista of the glen, we had a glorious though somewhat limited view of the lofty peaks of the snowy range beyond the Sutluj, separating the Busehur district of Wangpo, north of the Wangtoo bridge, from the districts of Manes and Dunkur, in Speetee, and crossed by the Taree Pass, 16,400 feet above the sea. In some of our maps this range, or its outliers behind Kanum and Cheenee, is called the Damak Shoo, probably from the prevalence of the *Damak*, or various species of *Astragalus*, *Caragana*, &c. which grow there, and which our travellers in Upper Kunawur call Furze.

The Shatool Pass is 15,550 feet above the sea level, nearly 100 feet below the top of Mont Blanc; and was first crossed in June 1816 by General Hodgson. It is distinctly visible about E. 24° north from the top of Jaka at Simla, a degree or two to the left of Colonel Chadwick's house on the Muhasoo ridge, lying between two of those conspicuous inclined peaks of which the rocky planes slope down to the east and

ESE. at angles of from 10° to 20° , considerably to the right of the three-grouped and similarly inclined peaks, often but erroneously pointed out as the Boorun Pass. It is owing to this conformation of the strata that the routes up the vallies near this portion of the Snowy range invariably keep to their western and SW. sides; on the opposite ones, the strata "crop out" in inaccessible crags.

Beautiful are the "balancings of the clouds" at this and the past season in the Himalaya, and the endless variety of light and shade, which they cause on mountain, forest, field, rock, and meadow. No sooner has a shower fallen, and the sun shone out, than the process of evaporation commences in the heated vallies; the rising vapours are condensed at a given elevation into clouds, which, with a snail-like movement, creep up the mountain sides, and invest the summit or languidly tumble over the ridge into the next valley; "even in their very motion there is rest." Occasionally an entire valley or large tract of the mountain is covered with one fleecy mass, on which the spectator looks down as on a sea, a lofty peak here and there jutting up like an island. It must be confessed, however, that they are best at a distance and in poetry. Disagreeable at Simla, they are dangerous on the Shatool, where we had not been above half an hour, on the narrow crest, when from the south, clouds

"Rose curling fast beneath us, white and sulphury,
Like foam from the roused ocean of deep hell,
Whose every wave breaks on a living shore,
Heaped with the damned like pebbles!!!"

The wind also being very keen, and our only seat the snow, we effected a speedy retreat down the great northern snow-bed, of which we only reached the termination in an hour and three-quarters. The upper portion had been covered to the depth of two or three inches by a recent fall. To this succeeded a wearisome and, in many places, very steep and difficult *moraine* composed of enormous sharp, shapeless, fragments of gneiss piled on each other in wild confusion, the lowest ones resting on frozen snow. These would indeed prove "destruction's splinters" to the unfortunate, overtaken here by a snow storm, which would paralyse his hands and feet, and blind his eyes—all most essential accessories now; and accordingly this was the scene where Dr. Gerard in September 1820, had two of his people frozen to death at midday, and escaped

himself with great difficulty and the loss of all his baggage. In no month is the passage perfectly secure. It is effected with least difficulty early in spring, as the snow then covers all the rocks which so much impede one's progress; but I am not aware that the natives ever attempt the Shatool till the rains have set in; and even on the other Passes clear and perfectly *calm* weather is indispensable to safety.

The scenery on the northern declivity is wild and savage indeed: to the right are the magnificent black cliffs before mentioned, which, from the summit, slope back gently in great fields of snow, of the most dazzling whiteness; deep beds also lie at their base. To the left the mountains are more bluff and rounded but still greatly shivered. The Moraine ends to the north in a steep escarpment, and latterly our route over it, lay on the ridge of a very curious *band* of snow, rubble, and rocks, about sixty feet high, and very steep on both sides, and apparently artificial as any railway embankment. Except that frozen snow is substituted for ice, the whole scene greatly resembles the Mer de Glace, and other glaciers of Savoy and Switzerland. A turbid stream issues from the base of the great snow-bed, and is joined by several torrents from the left; the combined stream a little below flows placidly for a while over a nearly level dale. During the day time the powerful rays of the sun melt the whole surface of the snow beds, and these torrents become unfordable: but at night, when all is re-frozen, they are dwindled to mere rivulets, only supplied from the bottom of the snow-beds being melted by the heat of the earth, and hence they are easily crossed in the morning. Below the moraine, the mountains rise steeply on each side, covered, especially on the left, with grass and herbage, now of a rich raw-sienna tint forming a strong contrast with the great beds of white-quartz masses, which on this side extend down to the valley, reflecting a most intolerable glare. The path, a very narrow and bad one, finally keeps close to the left bank of the stream, and so continues to Ateeng Wodar, a summer station for shepherds, equivalent to the *chalets* of the Alps, except that the Himalayan mountaineer is generally content with the shelter of a cave in the rocks, sometimes a little improved by a rude wall in front. Ateeng is nearly in the latitude of Rampoor, a short distance above the birch forest, about 12,000 feet above the sea, and perhaps nine miles from the crest of the Pass. The valley is narrow, and destitute of the savage features it possesses above,

but across the torrent to the east, the mountains are still very steep, bold and lofty, with many deep ravines filled with snow.

The vegetation consists here of *Delphinium vestitum*, *Dolomicea macrocephala*, *Cyananthus lobata*, *Onosma bracteata*, aromatic rhododendron, and *Cassiope fastigiata* ("Talsiree") the "heather" of Fraser; with it grew a shrub with all the appearance of a *Vaccinium*, but with neither flowers nor *fraochans* to enable one to decide. Between Ateeng and the moraine, the *Salix lindleyana* creeps abundantly on the ground, and Royle's *Arenaria festucoides* is not uncommon; on the moraine itself was a plant very like his *Saxifraga imbricata*, abundance of *Ranunculus choorensis*, and one or two *Gentians*, in flower. These mountains no where exhibit the carpet of blue *Gentians* and *Campanulas* so lovely in the Alps. On the gravel beds and banks of the stream, the *Epilobium speciosum*, perhaps the finest species of the genus, grows in abundance.

The chief reasons for the Shatool Pass being so much dreaded are first—the intrinsic difficulty of the northern moraine, as well as the descent from Ateeng to Panwee, where the path is so narrow that even laden sheep pass with some risk: and secondly, the remoteness of supplies, fuel, and places of refuge. The Roopin and Boorun Ghatees have each a village within one stage of their southern base, and on the north, the valley of the Buspa is easily gained in one day by tolerable paths. Laden men cannot reach the Shatool from Rol in less than two days; and at Ateeng Woodar, on its north side, they are still distant a very hard day's journey, by an execrable path, from the valley of the Sutluj.

September 14th.—From Ateeng Wodar to Panwee, near the Sutluj above Wangtoo bridge, a distance which we estimated to be sixteen or seventeen miles, with a descent of 6,000 feet; a very fatiguing march, which we walked in eight hours, inclusive of several halts. In the contrary direction, it would indeed be a tremendous journey, and should be divided by all who travel for pleasure or profit. The route, by a bad pathway, gradually rises along the Alpine pastures, occasionally traversing a dense coppice of *Rhododendron campanulatum*, *R. anthopogon* (or *lepidotum*, the aromatic species) and mountain ash (*Pyrus foliolosa* or *ursina*), the latter in full fruit, the berries occasionally of a beautiful waxy white, a variety probably of the usual red-fruited species,

which I have also received from the Harung Pass above Sungla. It forms a favourite food of the bears which are numerous hereabouts. Mingled with and below the Rhododendron and mountain ash to the right, are extensive shaggy woods of large white-barked birch (*Betula Bhojpatra*,) recalling many a romantic spot in the Trosachs, Glengariff, and Capel Carrig. The bark consists of as many as twenty layers, and is much employed in Kunawur in the flat roofs of the houses, where it is laid under a stratum of clay. Supposing the Himalaya to have emerged gradually from the ocean, this "tree of knowledge" may be held the last best gift of heaven to man in the vegetable way, for it could not exist till the mountain had attained an elevation of 9,000 or 10,000 feet; the silver fir, (*Picea webbiana*) must be nearly of the same age, and thus we may form a comparative chronology of the dates at which the various trees were successively produced. Quitting the birch braes, we encountered a steep ascent under fine gneiss crags and pinnacles, with tremendous declivities on the right hand, which brought us to the crest of the Ootulmai Ghatee, (called Gonggrunch or Shaling by Alex. Gerard,) where the path turns to the left, and leaves the Shatool glen. Hence to Panwee is one almost unintermitted and generally extremely steep descent for a few hundred feet, over loose rugged rocks, covered with the large and now scarlet leaves of *Saxifraga ligulata*, and then through a superb forest of *Picea webbiana* and *Quercus semicarpifolia*, both streaming with long white lichens, also birch, and a dense underwood of mountain ash, *Rhododendron campanulatum*, *Rosa webbiana*, *Syringa emodi* (Lilac,) black and red currants, yew, &c. At the bottom of this glen, perhaps a mile down, we reached a small romantic dell, through which flows the Skooling or Shaling stream, and here the scenery is of a Titanic grandeur and wildness. On all sides, feathered with the dark silver fir, vast precipices spring up perpendicularly, and seem utterly to preclude further progress; it seems as if one had reached the gates of Hades. On the brink of the stream the Greek Valerian (*Polemonium cæruleum*,) and the lovely azure blue hound's tongue (*Cynoglossum uncinatum*,) were flowering in abundance. God might have made a more beautiful flower than this last, but he never *did*, as some one has justly observed of the strawberry as a fruit. Exit from this spot seems as impracticable as from the happy valley of Rasselas, and is only obtained by a short

sharp clamber, which introduces the wayfarer to the Panwee Dhunka, a distance of three miles, the most dangerous I ever traversed ; the path so called, being excessively narrow, and carried along vast ledges of rock, inclined at a high angle to a bottomless pit on the right, from which they rise at an equally steep angle on the opposite side. I cannot recollect such enormous shelves of rock elsewhere, nor, except the Via Mala on the Splügen road, and the gorge of Gondo on the Simplon Pass, an abyss more profound. Neither of these, however, can compare with the Panwee ka Dhunka in the extent and luxuriance of forest, which here clothes the mountains above and below, to the right and to the left. The Skooling falls in a fine cascade down to the right at such a depth, that one can scarce bear to glance at it, save from such "coigne of vantage" as a tree growing from the cliffs. "The least obliquity is fatal here," and no one should attempt the passage who is not well assured of his nerves, or weary of his life. Bossuet has a passage so eloquent, and so apt to such a situation, that my readers, if any, will be pleased at its insertion here.

"La vie humaine est semblable à un chemin dont l'issue est un précipice affreux. On nous en avertit dès le premier pas : mais la loi est portée, il faut avancer toujours. Je voudrais retourner en arrière : Marche ! marche ! un poids invincible, une force irrésistible nous entraînent ; il faut sans cesse avancer vers le précipice. Mille traverses, mille peines nous fatiguent et nous inquiètent dans la route. Encore si je pouvais éviter ce précipice affreux ! Non, non ; il faut marcher, il faut courir ; telle est la rapidité des années. On se console pourtant, parce que de temps en temps on rencontre des objets qui nous divertissent, des eaux courantes, des fleurs qui passent ! On voudrait s'arrêter : Marche ! marche ! Et cependant on voit tomber derrière soi tout ce qu'on avait passé : fracas effroyable ! inévitable ruine ! On se console, parce qu'on emporte quelques fleurs cueillies en passant, qu'on voit se faner entre ses mains du matin au soir, et quelques fruits, qu'on perd en les goûtant : enchantement ! illusion ! Toujours entraîné, tu approches du gouffre affreux : déjà tout commence à s'effacer, les jardins moins fleuris, les fleurs moins brillantes, leurs couleurs moins vives, les prairies moins riantes, les eaux moins claires ; tout se ternit, tout s'efface. L'ombre de la mort se présente ; on commence à sentir l'approche du gouffre fatal. Mais il faut aller sur le bord. Encore un pas : déjà

l'horreur trouble les sens, la tête tourne, les yeux s'égarerent. Il faut marcher : on voudrait retourner en arrière ; plus de moyens : tout est tombé, tout est évanoui, tout est échappé !" and it was our fate to escape these very literal precipices by an abrupt descent to Panwee, all through a dense and lofty forest, excepting the last 500 feet, which lead to the village through terraced cultivation. The forest trees occur in the following descending order—*Picea webbia*, first alone, and then mixed with *P. pindrow* and *Quercus semicarpifolia* ; then *Abies smithiana* and *Pinus excelsa*, many of the latter fully 150 feet high. Lastly, the cedar feathers all the bold crags about the village, which across the Skooling torrent to the east rise precipitously into a lofty peak, arguing no easy marches ahead.

We encamped by a temple where our people found excellent shelter from the brisk showers which fell in the afternoon. A thick bush of sacred juniper grows in the enclosure, and the vicinity is well shaded by horse chestnut (*Pavia indica*), elm, peach, apricot, walnut, and mulberry trees. Panwee is a middling-sized village, above the left bank of the Skooling river, two or three miles from Wangtoo bridge, and from 1,300 to 1,500 feet above it. From several points above the village, the Sutluj, with the road to Chegaon, is visible ; as well as the wild glen of the Wungur, which joins at the bridge in one succession of cataracts. By visiting Panwee, we have enjoyed some of the sublimest scenery in the world, at the expense of a stage on our way to Sungla, for the direct route follows the Shatool stream to Melum, but our guides were, or pretended to be, unacquainted with it, and on enquiry here, we found that it is really impracticable to men with loads ; and have every reason to believe it must be extremely difficult without that encumbrance.

September 15th.—To Melum or Ramné (the Melung of the map), about ten miles in seven hours, by a difficult route, the path being for the most part as rocky, and in some places as dangerous as any we have traversed. At one almost impassable ledge, one of our dogs fell and had a narrow escape. (By the bye, dogs should not be brought into these parts—being perpetually in the way, to the risk of their own and their master's necks.) In several places jutting crags are only passed by the aid of the ladders, scaffoldings, and steps, so familiar to the traveller in Kunawur. On leaving Panwee, there is a steep declivity to

the torrent, which here forms a pretty cascade, as does that under Melum, about a mile short of the village. The vegetation here consists of rank grass, reeds, &c. Hence there is a considerable ascent to a point affording an interesting view of the Sutluj, and its picturesque rocky gorge where spanned by the Wangtoo bridge. Our path then led us down to the left bank of that river, now rolling along an impetuous torrent of milky water. A long ascent succeeds, with the river from 300 to 1,500 feet right below; and above us to the right hand long craggy façades, bristling with cedar which abounds hereabout. The road to Cheenee lies down on the opposite bank of the river. From the brow of the last ascent our path turned to the right up the glen of Melum, and met the Shatool Pass torrent in about two miles, where it has deposited an immense accumulation of drift timber, the spoils of the forests above. The trees on its banks here are chiefly *Alnus obtusifolia*, *Rhus buckiamela*, and *Spiræa lindleyana*. A gentle ascent of about a mile and a half brought us to Melum, also called Ramné, a small but well built village, about 7,000 feet above the sea, standing on a plateau, closely backed by steep woody mountains. By avoiding the last steep ascent to-day, and keeping direct on to the mouth of the Melum river, we might perhaps have reached Keelba; but the gentlemen and ladies who carried our baggage assured us, we should repent if we tried the very bad ascent from that stream.

September 16th.—To Keelba, about nine miles, which from the excessive ruggedness and difficulty of the worst path in the world, and its manifold steep dips and rises, we only accomplished in five and a half hours. First we descended to, and crossed a torrent below Melum, and then mounted by Yana or Janee village, till we came abreast of Chegaon or Toling, and on a level with it, 7,225 feet above the sea. It consists of a group of villages, with several large temples and extensive cultivation. On the crags at this point, I noticed the *Incarvillea diffusa* of Royle, an elegant plant which is also found on the Wangtoo rocks. Hence the path falls to the Sutluj, and leaving Poonung above to the right, continues along its brink for a few miles over boulders, gravel, and sand, overrun by a shrubby, silvery, and very aromatic *Artemisia*; the river is fringed by the "Wee," a species of olive, probably *Olea ferruginea*. The toom or ash, *Fraxinus xanthoxylloides*, is common, but of no great size. It is frequently met with in the higher parts of

Kunawur, and is known about Rampoor, as the Gaha or Ungah. The very jaw-breaking specific name is very justly applied. The *Daphne mucronata* of Royle here becomes a common shrub, called jeekoo; and near Yana, I first met a species of *Celtis*, called koo, of which the drupe, now ripening, of the size of a small cherry, is sweet and edible. There are two species or varieties; one a large tree called Ro-koo, with black or dark purple fruit; the other, Cho-koo, smaller, has yellow or orange fruit. This, and not *Elæagnus*, as surmised by Royle, I take to be the "red and mawkishly sweet berry," produced on a shrub in Hungrung, as mentioned by Herbert (*Asiatic Researches*, XV. 392.): as his "yellow and acid berry about the size of a currant," is no doubt the fruit of the Soorch (*Hippophæ salicifolia*). The Koo is pretty common nearly up to Brooang, at Meeroo, &c. It has been mentioned to me by a friend as occurring under the name "Kaksi" near Jungée, where, however, a subsequent enquirer could hear nothing of it: in all likelihood because the first had been misinformed as to the name; "Kagshee" being the *Cornus macrophylla*, which has a *leaf* like the *Celtis*. Both the *Celtis* and the *Zizyphus* have been identified with the famous lotus of the Lotophagi; but assuredly one may devour any quantity of Koos or Bers, without risk of forgetting one's home and friends. A little below Panwee, and generally up the left banks of the Sutluj and Buspa to Brooang, at an average of 6,000 feet, there is abundance of a species of oak, which I have not met elsewhere, though it seems to be the *Quercus cassura*, of Don's *Prodromus*. The leaves are exceedingly waved and spinous, tomentose below (as are the cups of the acorns, which are produced by six to eight) or solitary, on spikes or peduncles of five or six inches. They are now nearly ripe. The tree is called "Bré," but this seems to denote the genus only. *Pinus gerardiana* is pretty common, but not very large on the crags, during this day's journey:—and in the coppice, *Abelia triflora* occurs abundantly, here called "Spung:" the "Takla" of Bulsun and Bhujee.

From the river-bank, the path now ascends for two miles or so, to a few hundred feet above its level: another rainy season will, to all appearance, render it impassable, and it is now as dangerous as can well be imagined, crossing a vast landslip with a most precarious footing on loose sand and rocks, highly inclined, where each step receives and requires more deliberation than an act of Parliament.

What has been done once may be done again, but no reasonable man would attempt this a second time. The reward consists in the view of the river, here not above ten yards over, "a hell of waters" rushing on, like Pyriphlegethon, in perfect cataract, boiling, foaming, and tossed up vertically in one continuous mass of spray in its ungovernable career, amidst immense boulders, and under the tremendous precipices of the right bank, which it seems bent on undermining. What an antithesis between its recent quiescent state and gentle fall as ice and snow, and this unruly turbulence, and then its almost stagnant course onward to the ocean, where it enters on its final probation as vapor, realizing the hell imagined by Shakespeare :—

" To reside
In thrilling regions of thick-ribbed ice;
To be imprisoned in the viewless winds,
And blown with restless violence about
The pendent world."

Above this, the river receives an affluent from Meeroo, and on an isolated rock, just above the junction, stands the Raja's Castle of Choling, the Chalgee of the map : still higher up, the Channel widens, and the river flows with a strong uniform current, bounded by a broad bed of shingle on its right bank. The Sutluj may here be said to effect its passage through the great range, and, generally, the traveller cannot fail to be surprised at the manner, almost resembling instinct, in which the river finds its way through such a labyrinth of mountains. It has here indeed followed the natural line of a vast echelon formed by the Shatool ranges to the south, and those of Speetee and Koolloo to the north : and from the Thibet frontier at Shipkee to Rampoor has an average fall of sixty feet per mile. The absence of lakes, and the existence of so general and efficient a system of natural drainage seems to argue the vast antiquity of the Himalaya, and may also serve to establish Lyell's theory of a gradual upheavement of mountain chains, which afforded time for the water to adjust their levels ; and to fill up the basins with those deep deposits of gravel and boulders, through which they are so often found to excavate their beds. The planes are indeed still far from uniformity ; and the roar of the torrent and the cascade, the sound of many waters, is rarely out of our ears as we approach the higher mountains.

From the rapids of the Sutluj an abrupt ascent of several hundred feet leads to the cultivation, chiefly buck wheat, and finally under vineyards, to the romantic village of Keelba, situated immediately above the river, surrounded by great numbers of fine peach, apricot, walnut and elm trees; while some superb weeping willows flourish by the beautifully clear rivulets which gush down on every hand from the lofty mountains to the south. These are densely wooded, and shew a front of splendid precipices to the north or north-west, ending in a high bluff of rock, which seems the "Yana Bul" of the map. Seen from near Meeroo across the river, the appearance is as if a great tract of ground had here subsided, having a high wall of rock on one side, reaching up to the Snowy range near the Boorun Ghatee. Meeroo itself is hidden from Keelba, but the neighbouring village and cultivated slopes of Oorinee, 400 to 500 feet above us, are visible to the north-west; and to the east, the snowy peaks of the Ruldung just come into view. The grapes here and at Brooang, &c. have totally failed this year, probably from the prevalence of unseasonable rain, which fell in drizzling showers to-day and yesterday, but cleared up this afternoon. At Melum, a good room was placed at our disposal, with a second for our people: and we have the same advantage at Keelba.

September 17th.—To Brooang, Booroo, or Brood, eight or nine miles. We marched at 20 minutes to 8 A. M. and descended to the Sutluj, which here flows in a broad and comparatively calm stream: the path generally bad, lying up and down the crags, which are finally wooded with ash, olive, and neoza pine (*P. gerardiana*.) At half past nine we reached the confluence of the Buspa, which flows into the Sutluj like a mill-race, and is equally muddy, marking its source in a granitic tract. "Pilgrim" attributes the turbid waters of the Neelung to its source amongst mountains of slate clay (p. 33.) but on inspection of the Ruldung cluster, which may be called the cradle of the Buspa, with its great scars and flaws of whitish granite, induces me to conclude that the discoloration is due to the decomposition of this rock: it is exactly the same with the Arveron at Chamouni. The bluff crags and cliffs, feathered with cedar, and the twisted neoza, are very grand where the rivers unite: the Sutluj comes down through a narrow rocky gorge, a little above the point of confluence; a good Sanga, 5,968 feet above the

sea, is thrown across the Buspa, for the Pooree and Cheena road; but our route lay up the rough, stony path on the left bank—the river a perfect torrent, in a very deep confined gully, where the channel is choked by huge boulders. At the fifth or sixth mile, we should have quitted the gorge, and ascended to Brooung: but we had loitered behind the coolies, and proceeding to the Brooung stream, were in full route to Sungla, when we fortunately met its Mookheea on his way to Ralee, who shewed us our mistake, and directed us back up a steep ascent of about 800 feet, where we lost our way again in a wilderness of fruit trees, and got at least 500 feet above the village, which, after two hours' wandering in complete uncertainty, we at length hit on quite accidentally. It is a poor scattered place, just above the left bank of the stream from the Boorun Ghatee, the snows and peaks of which are seen above: the inhabitants are a meagre, sickly race. It seems to be the place called Soorung, in the trigonometrical map—one of its manifold errors in typography. The elevation is generally given 7,411 feet, but in a German map, published at Berlin, it is stated to be 8,820 feet, (Paris) or 9,400 English, which is certainly too much.

On rivulets flowing into the Buspa, I noticed to-day a species of *Tussilago* (colts-foot) with the habit of *T. petasites*; it is said in May and June to produce fragrant yellowish flowers. With it grew the *Polygonum runcinatum* of Don's *Prodromus*.

September 18th.—From Brooung to Sungla, about twelve miles, in seven hours. For half this distance the path rises and falls along the left bank of the Buspa through beautiful scenery, the precipitous rocks feathered with the neoza pine, here generally called Shungtee and Ree. The course by the river then becomes impracticable; and a steep ascent of 2,000 feet succeeds nearly up to Chansoo, with a line of stupendous precipices to the right, the pents and ledges of which are clothed with splendid cedar and kail (*Pinus excelsa*), many of the latter not under 150 feet in height. To the left, the Buspa rages in a series of cataracts through a tremendous abyss, which succeeds its comparatively level course over the Sungla valley. Boisterous indeed is the career of this aquatic Richard: its average fall being 250 feet per mile. The brink and face of the steep on this side is fringed with many superb old tabular-headed cedars, their gigantic boughs thrown about in wild disorder, like Lear, with outstretched arms, appealing in vain to the unpitying heavens.

The tree constantly prefers the steepest acclivities, a peculiarity which must be respected by those now trying to naturalize it at home: it will infallibly perish if planted in any ground approaching a swamp, a condition unknown to the Himalaya. Near the foot of this ascent there is a *dogra* or hamlet, belonging to Chansoo, with orchards of apricot, walnut, and peach trees, of which last the very abundant fruit was sweet and juicy. The people and the bears divide the prize; the former securing their share by day, which is dried in the sun for winter consumption. The bears, who are said to be very numerous, devour their portion by night. Chansoo is 9,174 feet above the sea, and is a most lovely and picturesque spot; the continuation of the cliffs before mentioned, extending behind it in a lofty amphitheatre, the brow of which is clothed with birch, now falling into the sere and yellow leaf of winter. The fields of Chansoo are shaded by very large walnut and cedar trees: we measured an elm twenty-nine feet round, at five from the ground. From Chansoo there is a route via Soang or Sheong, (9,000 feet), over the Sheoo Ghatee, (13,350 feet), to Paneemor and the Boorun Ghatee. It is very interesting from its carrying the traveller amongst the most splendid cliff-scenery: and from the summit of the Sheoo Ghatee several shadowy ranges, covered with snow, are seen to occupy the horizon from north to north-east—the far away mountains of Ladakh and Thibet.

Our descent towards Sungla was amongst huge detached masses of gneiss, and at about one-third the height ascended, we again reached the Buspa, no longer roving like a maniac in a strait waistcoat, but flowing rapidly, and frequently in three or four streams, along the open valley of Sungla: Kumroo, the old capital of Busehur, is seen across the river, and elevated several hundred feet above it: it is about a mile from Sungla; the intervening tract being a high plateau, a forest of fruit trees. The rajas found themselves Tartar up here, and determining to become Hindoo, removed to Rampoor, as—*parvis componere magnis*—Peter the Great left Asia and Moscow for Europe and Petersburg. The banks of the Buspa are here fringed with the willow and “Soorch,” (*Hippophae salicifolia*); and in three or four miles from Chansoo, we crossed to the right bank by a good Sanga, immediately under the village of Sungla, close to which we encamped, by a temple adorned as usual in these parts, with many heads and horns of wild sheep, deer, &c. Some of them belonging to an animal called kin, skin, or sikeeng, are of

monstrous dimensions. The very general practice of decorating the temples (not of the men but) of the gods, with horns, which prevails even amongst the Mohammedans of the Hindoo Koosh, reminds us of the expression—"horns of the altar"—among the Jews, as well as of the altar of Apollo at Delos, which is reported to have been wholly formed of them. There is perhaps a reference to the rays of the sun, which are denoted in Hebrew by the word Kiran, which also expresses horns; hence, when it is said "Moses' face shone," the Vulgate chooses to render it—"was horned;" and the Italian painters have ever since represented the prophet with horns just as Alexander the Great ("Dhul," Karnein) wears them in right of his father Jupiter Ammon. The sun would naturally play a prominent rôle in the primeval worship of the Himalaya, and I remember once at Paikha, on the upper Pabur, when marking out a short vocabulary, having "Purmeshwur" given me as the name for the sun: a significant commentary on the Gayatri!

Sungla is rather a large village, built on a slope facing the south-east, about 150 feet above the Buspa, and 8,600 above the sea. There seems no medium in the looks of the inhabitants, who are either very handsome or very ugly. Of the extreme beauty of the valley there can be but one opinion: the river flows swiftly down the centre over gravel and stones; above this, on plateau of various levels, is an abundant terraced cultivation of cheena, bathoo, tobacco, kodah, and the beautiful buckwheat, diversified by occasional woods of cedar, poplar, and the usual fruit trees, irrigated *ad libitum* without labour; the difficulty in the hills being to level the ground, and in the plains to water it. To the south the base of the outer Himalaya is sloping and verdant, with woods of cedar and kôil firs: and immediately above the valley to the north-east, rise the enormous bare, grey, rocky scarps and pinnacles of the Ruldung group, with considerable snow beds wherever the slope allows, and still resisting the force of the southern sun. This magnificent group extends far up the Buspa towards and beyond Rukchum, above which a single pyramid of rock springs up nearly to the height of the loftiest peaks behind Sungla, 21,500 feet: but to see the valley and its setting in all its perfection of pinnacle, crag, and fields of the purest snow, one must mount to the highest hamlet towards the Roopin Pass. The scene strongly recalled Chamouni to my mind: the Buspa enacts the Arve well, and in each situation the mountains actually rise

about 13,000 feet right above the spectator. Seen laterally from Cheenee at only seven miles distance, the Ruldung presents the additional feature of dark and extensive forests, and the sharp needles are there mingled with long dome-shaped ridges, all invested in perpetual snow, from which, in June and July, is heard the frequent crash of the avalanche. "Ruldung" is the Kunawuree name for Muhadeo, who resides here, as Jove

‘ On the snowy top
Of cold Olympus ruled the middle air,
His highest heaven.’

The legend is, that Ruldung is a chip of the true Rylas near Mansorowur, brought here at the desire of an ancient king and penitent: and it is considered meritorious to perambulate the mountain, keeping it always to the right hand, exactly as the cairns, &c., are circled in Scotland and Ireland, and for the same reason, i. e. because the sun goes round the earth in this direction.* Amidst all this superstition, the sublimity and immaculate purity of the Ch’hota Kylas render it no mean emblem of "the high and holy one that inhabiteth eternity;" and we may quote with admiration, if we do not adopt with conviction, the lines of the poet, written under the inspiration of similar scenery—

‘ Mighty Mont Blanc! thou wert to me
That moment with thy brow in heaven,
As sure a sign of Deity
As ere to mortal gaze was given, &c.’

There does, indeed, appear to be both benevolence and design in the existence of these great mountain chains, and we may consider the Himalaya as nature's vast reservoir for the irrigation of empires; opened every spring by Phœbus Apollo, when like Amram's son, he ascends from the south and causes the waters to gush from the flinty rock. It is probable, that a portion of the Hindoo veneration for the range is owing to its containing the springs of so many of the rivers which fertilize their country.

When at Sungla, the traveller should not fail to ascend the Harung Ghatee, over a brown sterile spur of the Ruldung, on the route to Me-

* I have seen a Sikh soldier go through exactly the same ceremony at a shrine near Makhawal Anundpoor. From how much superstition would a knowledge of the solar system have rescued the world!

bur and Cheenee, for the view of the snowy range and Passes to the south. The scenery on the Buspa at Rukchum is said to be of the finest description : want of time prevented our seeing them. At Sungla is first met the petit shrine called *Chasian* by the Buddhists; in one of the four sides a small cylinder revolves on an axis, which the passenger puts in motion. Such a cylinder on a great scale may be seen in the temple at Soongnum, inscribed all over with 'om mane pudme hom,' which Klaproth interprets 'oh! the Jewel is in the lotus:' of which the esoteric meaning is very deep. The prayer is considered as good as said by each revolution; an idea which could never have originated but in the mechanical and material mind of the Mongolian race.

This day, the 18th, was cloudy, and snow fell on the Passes to the southward, but the afternoon was fine. We halted on the 19th.

September 20th.—From Sungla to Nooroo Bassa, about ten miles, in six hours, generally up an easy ascent by a path which is perfection, compared with any between this and the Shatool: traversing first some woods of cedar and koil, and then over the cultivated slopes of one or two small hamlets, where the wheat and barley were being cut, and sent down to Sungla. Above this, the path lies over grassy mountains, with wooded crags across the torrent to the left-hand; the whole somewhat tame after what we have seen, but for the Ruldung. The Chough abounds amidst the cliffs in all this and the upper portion of Kunawur. On the way to-day, we met a herd of the Yak, which supplies the *Chownree*. In Thibet, or the neighbouring districts of Toorkistan, we have the origin of the Pashas of one, two, three, or many tails, who once carried terror over Europe. About 1,000 feet below Nooroo, the path turns to the right, the glen of the Nulgoon Pass being straight ahead. About here large beds of *Ligularia arnicoides* were in seed fully ripe, while on the south side of the range, it is still in full blossom: 700 feet higher, the declivities are covered with *Anagyris barbata*; the seed nearly ripe, but much injured by grubs. The roots are much branched, and extend several feet under ground. The plant is here called *Bhaloo ka buroot*; it flowers in May and June, and resembles a lupine of the deepest purple. Nooroo Bassa is an extensive open piece of grassy land, 12,985 feet above the sea, and a few hundred feet above the highest birches, which afford abundance of fuel. A stream flows about 100 feet below to the south amongst beds of

snow; its right bank is rugged and craggy; the left sloping and covered with *Cyananthus*, &c., the general prospect limited and rather uninteresting. A bitterly cold storm of sleet came down from the Pass, just as our tents arrived, and we had hard frost all night, fully a month before it is thought of at Simla.

September 21st.—Over the Roopin Pass to Rasur or Raurung, called also Surra Peechoo, distance eleven or twelve miles. We left Nooroo at twenty minute past six A. M., and by an easy ascent reached the crest of the Pass at a quarter past nine, including, as elsewhere, several stoppages to collect seeds, &c. Heavy and suspicious masses of clouds accelerated our departure, but the sun soon dispelled them, and revealed the gigantic forms which surrounded us—the embodied frost—giants of the Edda, and very *unlike* the guardian angels seen by Gehazi to encompass the prophet. The northern declivity of the Pass is quite a trifle in comparison with that of the Shatool. On the 20th of September 1833, it was an unbroken and extensive sheet of snow, but to-day we only met two beds of it near the summit; nor is there any Moraine, so terrible at the Shatool from its chaos of sharp gneiss masses. Here the rock is chiefly flat micaceous slate, sometimes approaching to sandstone, and therefore of easy passage, though not macadamized. The grand cliffs of the Shatool are also wanting here, but on the left or east, there are some fine shivered pinnacles of rock, plentifully strewed with snow-beds and sufficiently high

‘To shew,
That earth may reach to heaven,
Yet leave vain man below.’

And nowhere does he appear vainer and more insignificant than here, if we regard only his physical strength and size; at the same time, the mind of a Shakspeare or a Newton is more truly wonderful and sublime than all the Ossas heaped on all the Pelions in the world. The glory of the Roopin Pass consists in the cascades on its south side, in its lovely valley, and in the views of the Buspa Dell and the Ruldung pinnacles, which from this point are seen from NE. to E. rising from great fields of the purest snow, untrodden by man, and probably by any living thing. On the 21st September 1833, the thermometer boiled on the summit of the Roopin at 186°; the elevation is reckoned to be 15,460 feet: and on that day about noon it stood in the shade at 49°.

and in the sun at 68°. It is the Pass marked Goonas in the map, which is another error, the Goonas being more to the west. "Pilgrim" refuses to all this range the honour of being the veritable Himalaya, and Captain Herbert considered, that the true continuation of this latter was in the Ruldung group, penetrated by the Sutluj near Murung : it is however merely a question of more or less ; and there is, at all events, no denying that from the Shatool Pass eastward, there is a snowy range, inasmuch as even on its south exposure, the snow never disappears ; nor can the fact of its gradually declining below the zone of perpetual snow in the Moral ka Kanda, between the Sutluj and the Pabur, detract from its claim ; though it must be allowed, that the mountains and Passes are inferior in altitude to those of Kemaon ; nor can the north-western mountains, any more than the whole world, furnish the prospect of overwhelming sublimity which the spectator enjoys from the Gagur, Binsur, and many more points near Almorah. Still the easternmost Pass into Kemaon from Thibet, the Byans, is under 16,000 feet elevation, and of so gentle ascent, that it is crossed on horse-back : and the Chinese invasion of Nepal proves that, still more to the east, the Passes can scarcely be so difficult as the Shatool.

Like Dean Swift, the mountains die at top first, and except a small white *Helichrysum* and the fragrant *Centaurea*, the vegetation on and near the Pass is now being rapidly burnt up by the frost : two or three *Gentians*, the *Aconitum dissectum*, and the *Delphinium vestitum*, seem alone to defy its power : but few flowers remain of *Saxifraga parnassiaefolia* (*orglandulosa* ?), *Sieversia elata*, *Ligularia arnicoides*, the yellow *Tanacetum*, common *Senecio*, and a *Polygonum* like the bistort of the Alps. On the crest of the Pass grow the *Aplotaxis gossypina*, *Potentilla inglesii*, *Hymenolæna govaniana*, *Corydalis meifolia*, and *Saxifraga imbricata*; the last two in flower.

We quitted the crest at quarter past 10 A. M., the wind being bitterly cold, and descended 800 feet or so, over loose stones and frozen snow, by a steep rocky *kloof* to a kind of oval basin, extending in length from NNW. to SSE. from six to eight miles, by two or three across, enclosed by a barrier of black broken crags, debris, and snow beds ; the surface covered with snow and mica slabs, thrown about in great confusion ; a scene of utter silence and desolation. Here and there, there is a pool of water, and a multitude of tiny rills trickled under the stones, the

sources of the Roopin river, of which the glen below this valley, is found, after a long and steep descent, to be completely blocked across by a precipitous wall of black rock, from 250 to 300 feet high. Over this the accumulated streams leap down by two falls, which, to the best of my memory, surpass in beauty the finest in Switzerland: the water perfectly clear, and reduced to white mist like the Staubbach, falls in the softest wreaths over successive tiers of ledges, and about a mile lower down, where the two falls are brought into one line, the effect is exceedingly fine. The path has hitherto kept on the right bank of the stream, but crosses between the falls, where in 1833, a deep snow-bed supplied a bridge; but this year, it is much melted here, though at the base of the lower fall, the river passes under an enormous mass of it. Here the path improves, following the narrow glen alongside the river, now flowing gently for a few miles as if to rest after its great leap. The mountain-cataract, which, having leaped from its more dazzling height,

‘ Even in the foaming strength of its abyss,
 (Which casts up misty columns that become
 Clouds raining from the re-ascended skies,)
 Lies low but mighty still.’

The lateral cliffs all down to Rasrung are continuous on each side of the valley, and so whitened with cascades, that the scene considerably resembles Lauterbrunnen, in the Canton Bern, and fully deserves that name—“ nothing but springs.” There is here indeed no wood, the whole being quite above the region of forest; but the grassy or rocky talus at the base of the crags, as well as the small levels by the water, are richly enamelled with flowers:—such as *Primula stuartii*, *purpurea*, and *glabra*: *Sieversia elata*, *Aconitum dissectum*, *Ligularia arnicoides* and another, *Polemonium cæruleum*, *Scrophularia urticæfolia*, the blue *Meconopsis*, and a host of *Compositæ* and *Labiatae*, especially near the falls; the Greek valerian is very common, and in full bloom, as is a very pretty species of Forget-me-not; these, and the *Lotus corniculatus* are amongst the many examples which in these mountains frequently replace us for a moment or two in our native land:

‘ And, as in forts to which beleaguers win
 Unhoped-for entrance through some friend within,
 One clear idea wakened in the breast,
 By Memory’s magic, lets in all the rest.’

Many of our Himalayan tourists, especially the earlier ones, have allowed their imaginations to run away with their judgments, and have dressed up their descriptions more in the style of Macpherson or of Harris than of sober prose: but it must be admitted in extenuation, that the reality of the scenery, and the champagne atmosphere, able to drive all sadness but despair, have an inevitable tendency to exalt the spirit to the etherial regions, which there, Chamæleon-like, naturally assumes the tint of their deep native *blue*. Even in the physical department of the man, a greatly diminished dose of alcohol will suffice to produce intoxication. The daily repetition, however, of the sublime and beautiful, is very apt to create a revulsion of feeling, till at length, to get rid of the perilous stuff which preys upon the heart, we take refuge in apathy, and perhaps fall so low as to adopt the Frenchman's panegyric, "*Grande, magnifique, superbe—pretty well!*" or at least to swear with Akenside—

'Mind, mind alone, bear witness heaven and earth,
The proper fountains in itself contains
Of beauteous and sublime.'

After many delays from seed and plant-collecting, and a heavy storm of rain and hail at the falls, we reached Rasrung at half-past 3 p. m.; a small sloping plot, covered with grass and flowers, just below the highest birches on the right bank of the Roopin, which is here crossed by a natural bridge of snow, still from twenty to twenty-five feet thick. The usual encampment is a little lower down and on the opposite (or left) side of the river, under a high cliff called Jeyral, where water boils at 194°, which gives an elevation of 10,800 feet. Rasrung is about 11,000. The sward here, and at Seetee, is much cut up by an animal like "a rat without a tail," which is figured in Royle's Illustrations, and is also found on the choor. It takes two hours to reach the upper water-fall from Jeyral, and four, the crest of the Pass. We had frost all night at Rasrung.

September 22nd.—To Jaka, ten miles, in six and a quarter hours. A cloudless morning, but we only reached our tents at 2 p. m. in time to escape a heavy rain, which fell in snow on the Passes. The climate up here is as "perfidious" as that of England: a sky without a speck at six a. m. is overcast by noon: at 2 or 3 p. m. we have a storm, and all is blue again: often however—and the phenomenon seems hitherto unex-

plained—no rain falls, but heavy clouds rest on all the mountains, which, notwithstanding the increase of cold, altogether disappear during the night. In Kemaon, when all else is perfectly serene, a fine thin wreath of cloud may be seen to issue from the summits of Nunda Devee (No. XIV. of the great map) and the Panch Choola (No. XIX.) which has led Europeans to the conclusion that a volcano exists there: while the natives solve the appearance by the supposition that culinary operations are going on amongst the immortals.

The route to-day was by a very rocky and often tree-encumbered path, but never difficult to a footman, following for some miles the right bank of the river, which is then crossed by a snow-bridge. It continues for a greater distance on the opposite bank, and finally returns to the right side by another snow bed, which must be permanent, being entered in the Trigonometrical Survey map, made about twenty-five years ago. For the first half or better, the glen, about 200 yards wide, is bounded on each side by noble-bastioned crags, in several places rising vertically from the river full 1,500 feet, and terminating in picturesque shattered pinnacles. The vegetation though luxuriant is still herbaceous, only consisting of *Aplotaxis aurita*, *Polygonum molle*, *Aconitum heterophyllum*, *Cynoglossum uncinatum*, *Sedum purpureum*, *Spirœa kamtchatkica* (Meadow-sweet), *Polemonium cœruleum*, *Geranium wallichianum*, *Potentilla atrosanguinea*, *Corydalis govaniana*, *Scabiosa candolleana*, *Achillea millefolia*, a straggling *Cerastium* with flowers like *Stellaria holosteum*, called Gundeeal, and used as a vegetable. But the birch soon clothes the cliffs, and then fine clumps of the dark silver fir (*Picea webbiana*) like so many gigantic cypresses, appear and become the predominant tree, with maple, and a rich underwood of lilac or "Shapree" (*Syringa Emodi*), the lemon-scented *Laurustinus*, "Tealain" or "Thelain" (*Viburnum nervosum* of Royle), *Rhododendron campanulatum*, *Lonicera obovata* and *bracteata*, *Rosa sericea*, *Ribes glaciale* and *acuminata*, several *Salices*, &c. Amongst the shady rocks here and on the eastern side of the Changsheel, &c. grows a large tall composite plant of the *Corymbiferae*, with a very strong smell of raw carrots; and on the cliffs of the right bank I found large tufts of a very elegant *Dianthus*, in full bloom, of a pink colour.

The levels on the river banks are delightfully wooded with birch, pine, maple, &c.: the scenery is so exquisitely beautiful, combined with

the grandeur of the rocks, that one is tempted to reverse the Persian proverb and ask what was the purpose of creating heaven while this valley existed? The Roopin, occasionally bridged and banked by snow-beds, and clear as crystal, dashes on from rock to rock, augmented every half mile by rivulets from the lateral cliffs and glens. These are generally constituted of mica-slate, but at the lowest snow-bed, the rock alters to quartzose strata, with a corresponding change in the scenery. Crossing to the right bank, the path ascends a steep of 800 to 1,000 feet, and the silver fir gives place to a dense and lofty forest of koil and pindrow pines, yew, hazel, *Rosa webbiana*, &c. The glen narrows to a gorge, the left bank presenting a wall of magnificent cliffs, perhaps 2,000 feet high, facing WSW., the brow splendidly wooded with pine. These cliffs soften down opposite Jaka into steep declivities, covered with forest and spacious grassy glades. The river raves below, and is no more approached in this stage. On leaving the forest, we reached Jaka by about a mile of more open country, interspersed with thickets of *Rosa sericea*, *Berberis brachybotrys*, &c. The pasture is covered with *Iris kemaonensis*, *Inula royleana*, the scarlet and orange varieties of *Potentilla atrosanguinea*, &c. Jaka is but a small village, overhanging some huge crags, and surrounded by great horse-chesnuts, walnuts, peaches, &c. under which we pitched, but found their shade much too chilly. Water boiled at 198, which gives under 8,000 feet: but the place is probably higher. We found the people very civil; a frank, rough, good-humoured set, the Mookheea especially, being a pattern of these excellent adjectives, and like Democritus, meeting every difficulty with a laugh or a loud whistle, the Lillibullero of the Himalaya. The people are of small stature and dark complexion, negroes almost compared with the fair faces of the vallies below Simla, which proves, if proof be wanted, that the colour is not entirely dependent on climate.

September 23rd.—To Kooar, nine miles, in four and a quarter hours, an easy stage in this direction. For about a mile and a half the path is execrably bad, rocky, and steep, descending about 1,500 feet to the river, and reaching its bed by a short but rather difficult ledge of rock, known as the Tunkoor Ghat, which reminded us in a small way of the Panwee ka Dhunka. The Roopin seems here to have several names, Sheelwanee, Gosung, Tous, &c. We soon quitted its bed, and re-ascend-

ed some 800 or 1,000 feet, through forests of pindrow, large hazel trees (*Corylus lacera*), *Grewia* (or *Celtis*), *Rhus buckiamela*, *Millingtonia dillenifolia*, *Staphylea emodi* (*nagdown*, the snake-subduer), *Symplocos paniculata*, *Betula cylindrostachya*, elm, and maple; the vegetation of Nagkunda. The opposite bank is one series of huge crags and cliffs, falling sheer down to the river, with a "boundless contiguity" of pine above. A large tributary here joins the Roopin from the wild shattered glen of the Nulgoon Pass. Open, grassy, and rather warm mountains succeeded, on which the path gradually declines to the river, where we reached the left bank by the sanga—called in the map, Wodar—from an impending rock, used as a sheep-fold. From this an easy ascent of two miles, shaded by elm, Horn-beam (*Carpinus viminea*), horse-chesnut, *Cornus macrophylla*, rhus, Alder birch, maple, and Mohroo oak—brought us to Poojalee, a very well-built village, one of the group of four or five collectively, called Kooar, situated on the sunny slope of the mountains, amidst a profusion of the usual fruit trees, and with a spacious tract of terraced cultivation, now one rich glow of the splendid carmine, orange, and yellow hues of the Bathoo, and the more delicate pink of the Phuphur or Buck-wheat. A fine stream rattles past the village from the mountains above, which extend from NE. to SE. covered with forest, and reaching the region of birch. They slope up easily, but from N. to NE. several bold peaks and bluff rocky promontories stand out in all the "wild pomp of mountain majesty."

Though now uncommonly low, the Roopin is here quite unfordable; its general temperature from Rasrung down to Kooar, is in the day-time from 46° to 50° at this season; from the clearness of its water and the beauty of its banks is most likely derived its name, which I think signifies "beautiful," as "Pabur" means "clear"—Tous (or Tamasa) "dark blue," &c. All the advantages indeed, of this valley, Paradise are counterbalanced by some serious drawbacks, one of which, the goitre, deforms rather than afflicts almost every inhabitant of Kooar; for while it shortens the breath, it does not, they say, shorten life or cause pain. In so far as it disables its subject from climbing the mountains, nature may seem to fail in adapting man's organization to his circumstances: but I could not learn that with his breath she takes away his mind too, as in those shocking samples of humanity, the cretins of the Valais, &c.

Water boils here at 198, which would give about 8,000 feet elevation. The villagers are of dark complexion. They keep numerous bee-hives, as usual located in the walls of the houses, which are very substantial, of stone and timber, roofed with thick slabs of mica-slate,

September 24th.—To Kala Panee, ten miles or perhaps more, in five hours and fifty minutes, of which the minutes were spent at Doodoo. The path falls in about 600 feet to the Roopin, passes it by a sanga, and continues for about a mile on the right bank through grass; then crosses a torrent from the Changsheel Pass, and finally quits the Roopin river and glen by an ascent of 1,200 feet up the steep grassy mountain to Doodoo or Doodrah, a considerable village, reckoned 8,732 feet above the sea, and the chief place of the district called Ruwain in NW. Gurhwal; the locality of which, Prinsep in his account of the Ghoorka war declared himself unable to assign. The *Iris nepalensis* is plentiful here on the damp shady ground, as *Iris decora* is on the sunny meadows below. The Mohroo oak (*Quercus dilatata*) grows at Doodoo in great beauty and perfection: one specimen by the wayside measured nineteen feet round at five from the ground, and possesses so superb and verdant a head, that it would have been deified in the time of the Druids. It does not appear that any superstition attaches in these mountains to the oak similar to those which made the Greeks people it with dryads and oracular demons, and the Celts to regard it as the habitation of Darnaway, their Jupiter Tonans, as apostrophized in masonic strains by one Vettius Valens Antiochenus;

‘ By the bright circle of the golden sun,
By the bright courses of the errant moon,
By the dread potency of every star,
In the mysterious Zodiac’s burning girth—
By each and all of these supernal signs,
We do adjure thee, with this trusty blade,
To guard yon central oak, whose holy stem
Involves the spirit of high Taranis :—
Be this thy charge.’

Our mountaineers are too much accustomed to lop oak branches and leaves for their cattle to believe there can be any thing very sacred about it.

At Doodoo, the path turns to the right, and after rising for a mile or more through an open cultivated country, enters the forest, in which it

continues generally ascending, for three miles more to Kala Panee, which is a very damp confined spot, so closely hemmed in by the trees as scarcely to afford space for a tent. This forest, covering the north side of a spur from the Changsheel, is very dense and chilly, consisting for the most part of tall pindrow firs, yew, maple, hazel, cherry (*Cerasus cornuta*), white-beam (*Pyrus lanata*), with a very rank undergrowth of *Nepeta govaniana* (a very aromatic plant), *Adenostemma*, and a tall shrubby species of *Strobilanthes*, which also abounds on Huttoo and Muhasoo, and which the hillmen fancifully assert to flower only on the year of the Muha-koomb at Hurdwar. The truth is, that the plant is greedily eaten by sheep, and that perhaps not one in a myriad escapes being browsed too low to admit its flowering, which this season occurred from August till October.

Water boils here at 197° , and the elevation is probably about 9,000 feet. There is no village nearer than Doodoo, from which supplies must be brought on. Heavy storms of rain, hail, and thunder all the afternoon from 2 P. M. made this uncomfortable spot doubly wretched.

September 25th.—Over the Changsheel Pass to Looloot or Lourrot, about eleven or twelve miles, which took us eight hours, including many stops and a long rest on the Pass: the march may be easily performed in six hours. The route continues up the forest, which abounds in streams; path rather rocky, and blocked up by fallen trees. The black bear is common and dangerous: we saw a man at Doodoo who had been terribly torn by one without any provocation; the white or yellow species is also said to abound, but frequents the crags on the heights above the forest. Emerging at length from its chilling shade, we reached an alpine glade, like all the higher parts of the Changsheel, a perfect carpet of flowers of all forms and colours; the Botanic Garden of Asia. Amongst them were conspicuous the *Anagyris barbata*, *Morina longifolia*, and *Codonopsis rotundifolia*; and now the *Picea webbiana*, *Rosa webbiana*, lilac, currant, &c., appear, followed, as we rose, by *Dolomiza macrocephala*, *Cassiope fastigiata*, *Ligularia arnicoides*, sweet *Centaurea*, *Polygonum vacciniifolium*, tansy, and other plants of the snowy range. On the western side, the *Caltha govaniana* (or *Himalensis*), the marsh marigold of England, the azure *Meconopsis*, and a large *Cynoglossum* (*grandiflorum*) resembling the common English hounds-tongue, are abundant, as the *Cyananthus lobata* is on both sides. The crest

of the Pass, 12,871 feet above the sea line, is attained after a considerable ascent in the region above the forest, with lofty grey crags and spires of gneiss and mica slate above on the right hand; and is considered high enough to be worthy of the stone cairns which mark the fear and the gratitude of the mountaineer. Being fortunate in a cloudless day, we rested a considerable time on the summit to inoculate our minds with the most extensive and magnificent panorama around us. The snowy range, that embodied eternity, "shining like truth" or rather considerably more brilliant, is seen to perfection, and not looking the worse for a good sprinkling of snow yesterday; the Changsheel itself is perceived in this direction emanating from the parent mass in a ridge of shattered crags and pinnacles, on which summer may be fancied to have been just impaled by the frost-giants; and the range from the Boorum to the Shatool Pass, with its lofty, shelving, and now russetting continuation towards Rampoor and Huttoo. It is interesting to observe how regularly the forest all round ceases at a regular level, or at best creeps beyond the line of demarcation a little in the ravines, to be succeeded by the zone of grass and flowers. Kooar is seen below to the east, and on the west the view reaches down the vale of the Pabur to Chergaon and Rooroo. To the SW. is a great reach of the Changsheel, the rounded and almost tabular summits rising considerably above the luxuriant forest which clothes their lower declivities, and presenting a gently sloping surface of the finest yellow autumnal tints; a most inviting though rather remote site for a settlement. The supply of wood for fuel and timber is inexhaustible; and the rice of Chooara would supply abundance of one important element of food:—at all events, it would furnish a most eligible spot for the head-quarters of a summer party from Simla. The circle of vision is completed on the south by a dreamy, mystic, "multitudinous sea," with the snowy range for the bounding surf, the swelling outlines melting into each other, and the whole seeming as if it reposed to all eternity after the enormous efforts by which it was upheaved. The Himalaya is seen to the best advantage, not at noon, but a little before sun-set, when, especially in the cold season, its whole extent is at once, and most gloriously lit up to a rose or copper colour, "one living sheet of burnished gold." Gradually the "sober livery of grey twilight" creeps up towards the loftiest peaks, extinguishes all their "bright lights" and replaces them with the deadly

pale hue of a corpse; the soul of the mountains has departed; and if the spectator be contemplating the ranges north of Simla, he says or sings its requiem with the pun—"Sic transit gloria *Mundi*!

The descent from the Changsheel Pass to Looloot is by the south side of a great spur of the mountain, and is so gradual and winding that the forest is not reached for above two miles; the first trees met are the birch, the horned cherry, the mountain ash, the Kurshoo oak, the silver fir, and most abundant coppice of *Rhododendron campanulatum* and *Rosa webbiana*. The oak and fir soon predominate; lower down the forest is almost exclusively pindrow, with koil, rai, cedar and the sweet *Viburnum*: and lastly, the usual thickets of *Rosa sericea*, *Berberis*, and *Indigofera*, lead to the arable tracts. Except in the pindrow forest, where it is steep and slippery, the path is generally very good this stage. Water boils here at 198°, indicating an elevation of from 8,000 to 8,500 feet: but the thermometer had not been verified, nor the water distilled, both very necessary to the accuracy of the process. Looloot is an insignificant place, and the inhabitants seem a poor, filthy and rather ill-looking race. They have had however, the spirit to introduce the cultivation of the potato, of which we obtained a small but welcome supply. This is the only site beyond Muhasoo where we observed any. A stream flows towards the Pabur below Looloot; the opposite side of the glen, to the SW., is thickly peopled, and beautifully cultivated, the Bathoo as usual in the greatest proportion. With all its brilliancy, the bread made from its flour seems bitter and unwholesome.

September 26th.—To Chergaon, eight or nine miles, in three hours: the first part of the route is a descent of from 1,500 to 2,000 feet down grassy mountains to the Pabur, which we crossed by a sanga of two spars opposite Tikree. The path then keeps the right bank to Chergaon, and is good, except in one place where it passes for a few hundred yards on a narrow rocky ledge, about 200 feet above the river. Here, in 1833, a friend of mine lost his ghoot by the fall of a small bridge, and in general, it is not advisable to take ponies beyond Chergaon. In May and June, when the glen of the Pabur is excessively warm, the traveller to the Shatool and Boorun Passes may avoid it by keeping the heights above the right bank by a route from Huttoo, given by Captain Hutton, in one of the volumes of the Journal of the Asiatic Society of Bengal. Even at this season we found the temperature

disagreeably warm, till the sunny forenoon was succeeded by a cool cloudy day. On the 27th we walked to Rooroo Kothee in two and a half hours.

September 28th.—To Thana Kushain, ten and a half miles, in four hours and forty minutes: the road is good, chiefly through cultivation; quits the valley of the Pabur about three miles below Rooroo, and in two more, by an ascent of 1,000 feet, reaches Krassa, an exceedingly well-built and comfortable looking village; the Kunaits, or descendants of the Rajpoots and aborigines occupying one department, and the Kholees, or Helots, a separate one. These poor outcasts are held in great contempt, and are never allowed to mix in society with their liege lords, the Kunaits. In a pine-wood here, the downward traveller should breakfast and pass the heat of the day. Hence the road undulates up the left bank of the alder-fringed Pursrar or Dogra Nuddee, formed by two branches which unite below Kuskain. We ascended the fork for 600 or 800 feet, and encamped a little above the village in a very airy spot, shaded by some fine cedars, with the twin-village Thana a little below to the west. The elevation is probably 7,000 or 7,200 feet, which ensures a delicious climate after Rooroo. About 500 feet higher, and a mile distant on the ridge above to NW., is the small but rather inaccessible fort of Tikhur, formed by two square-roofed bastions, connected by curtains, all of good masonry, and held by a garrison of one man, who refused to surrender till my companion climbed over the wall and opened the gate. The walls command an interesting view of spacious and well-cultured mountain slopes, with several large villages, above which the koil pine abounds, crowned by the lofty Chumba ridge and Suraroo Pass. This is the Nawur District, rich in iron ore, which is found disseminated in grains like iron-filings in a grey, friable micaceous sandstone, which is quarried from mines a little below the village, pulverized, and then washed in running water, which carries off the earthy matter; the ore is then smelted, and as much as a thousand maunds are said to be made in favourable years: most of which is carried on mules to Simla and the plains. The shafts or mines dip at all angles, and are very like the dens of wild beasts; they are more or less inundated during the rains, and the work can consequently only be carried on during the cold and dry seasons. Some of the ore is sent to Shyl to be smelted, probably to economize wood. The usual

rock here is a silvery grey mica slate, containing a very large proportion of quartz. There is also a blue clayslate, with which the houses are roofed in the concave style.

September 29th.—To Shyl or Hurrela, ten miles, in six hours ; we had considerable difficulty in getting coolies ; Kushain brought up its quota punctually, but on applying to Thana, we found that the Mookheea, having forgotten or disregarded, if he had ever heard, the precept of the Temperance Societies—

“There's not a joy this world can give like that it takes away,
When the glow of slight excitement yields to drunkenness the sway,”

lay gloriously or hopelessly drunk—‘o’er all the ills of life victorious ;’—so that we were compelled to assume his official functions, and use a little gentle coercion. The route lies up the mountain a little to the left of Tikhur, and on reaching the crest of the Chumbee range, continues along it to the right, gradually ascending. The mountain, hitherto smooth and grassy, with a mica slate basis here changes to gneiss, which occurs in a labyrinth of great blocks and crags, with a coppice of Kurshoo oak, *Viburnum nervosum*, cotoneaster, &c. The more common plants are *Nepeta govaniana*, *Impatiens (glandulosa?)*, *Potentilla atrosanguinea*, *Polygonum molle*, *Delphinium vestitum*, several *umbelliferæ*, and the *Anemone discolor*, “Kukra,” which in May covers the mountains with its white and blue. The acrid leaves are used by the mountaineers to raise blisters ; but they are said to produce bad sores, leaving a permanent scar. The “Chitra” or *Drosera muscipula*—“Sundew”—a curious little plant which abounds between Kotgurh and Simla is applied in the same way. The elevation of the Suraroo Pass is 9,875 feet, commanding a glorious and extensive view, which includes the Koopur and Kunchooa ranges, the Moral and Changsheel up to the snows, with a long segment of the great range itself, in which the positions of the Shatool and Boorun Passes are well fixed by their pyramids. On the other side the huge wooded and grassy range of Huttoo is the most prominent object, its base watered by the Chugountee Nuddee, the opposite or western bank of which presents one of the most beautiful and extensive sheets of cultivation in these mountains. Chumba, Chumbee, or Chamee is a term very generally used in the Himalaya to express a mountain range. The road to the summit of this Chumbee is good, and we reached it in three hours very quiet walking ; but the descent to Shyl is the

very reverse, the path being very steep, bad, and rocky, over a most dazzling decomposing micaceous shale near the top, and with some awkward steps near the bottom, where several streams are passed—the head waters of the Chugountee, one of the main feeders of the Girree. Shyl is a considerable village, or rather group of villages between two of these, and possesses a good share of arable land. It belongs to Busehur, and is about 8,000 feet above the sea. Passing the villages we descended by a rough flight of stone steps to a stream, and then re-ascended the opposite or Huttoo side, till about 100 feet above Shyl, where we pitched our tents by a Bowlee amidst woods of young cedar. Supplies are got with difficulty from Rutnaree, a village about one mile south, which shares alternately with Shyl, the charge of hospitality, and which would apparently transfer to it willingly the whole honor and merit of entertaining strangers, perhaps from having hitherto been so unlucky as to chance on few or no angels amongst them.

September 30th.—To Nagkunda, eight or nine miles, over Huttoo mountain, of which we reached the summit, 10,670 feet, (water boiling at 190°) in 1 h. 50 m. by the Pugdundee route, which keeps to the left of and below the made road, and, which from precipitous rocks, is impracticable for ponies. The made road passes under a ruined fort called Kurena, and then over the north shoulder of Huttoo, within 400 feet of the summit, on which we passed some hours. Huttoo or Whartoo, may be called the Righi of the Himalaya; but it must be confessed, that we are here totally deficient in three main constituents to the attractions of the Alps: first, their exquisite lakes; second, their equally exquisite hotels and markets; and third, their historical or legendary associations, such as those of William Tell, and the confederates of Grütli. In Hindooism the gods interpose so constantly, that man is nothing. But so far as natural scenery is concerned, I do not know a more delightful walk than that along the rounded swelling knolls of the Huttoo range, with its edging of “castled crags” of gneiss rock to the north-west, its alternate coppices of Kurshoo oak, and meadows enamelled with flowers, and its spacious views. Those of the snowy range are inferior to few, extending from (probably) the Peer Punjal of Kashmeer by the Chumba, Koollloo, and Shatool ranges, to and beyond Jumnootree, which rises over the high slopes of the Changsheel like a double-poled tent. Choor, Koopur, Kunchooa, Moral, are all conspicuous features; Huttoo itself being protract-

ed towards the last in the darkly wooded summit of Kot, below which to the right is Nowagurh, once a garrison of the Ghoorkas, who had also several posts, now dilapidated, on Huttoo, and who indeed, Kenite-like, made their nests on the rocks of every commanding height in these provinces. Half way between the Choor and Kunchooa range in Tiroch (the Ootroj of the map,) appears an isolated summit, probably Deobun, on the Mussooree road, between the Tons and the Jumna. On the W. and SW. are the Shallee and Muhasoo mountains, and on a clear day the houses of Simla may be discovered on the distant and hummock-like Jaka, which, after the grander features of the interior, looks small indeed. All around is the same ocean of summits and ranges which render the Himalaya rather one vast mountain of 1,500 or 2,000 miles in length, than a series of mountains; for no where do we find the comparatively broad vallies of other systems, and this character may be best expressed by a different reading of one of Campbell's lines, "its peaks are a thousand, their bases are one." In the absence of lakes it is apparently parallel to the Andes. Including the charming walk from the summit of Huttoo down to Kotgurh, and the ascent thence to Nagkunda, the botanist will enjoy a rich treat on Huttoo and its great buttresses. The summit pastures are alive with *Fritillaria verticillata*, *Morina longifolia*, *Aster alpina*, *Anemone discolor*, *Corydalis govaniana*, *Potentilla atrosanguinea*, *Viola reniformis*, *Hemiphragma heterophylla*, *Veronica*, &c. &c.; and the crags with *Lloydia Himalensis*, *Saxifraga ligulata* and *parnassifolia*, the shrubby *Potentilla rigida* or *arbuscula*, *Anemone villosa* (which is very common on the rocky banks of rivulets above the forest belt of the great range), two species of *Lonicera*, one of which greatly resembles *L. alpigena*, *Ribes acuminata*, *Pyrus foliolosa* and *lanata*, and a few very stunted specimens of *Rhododendron lepidotum*. The *Roscoea alpina* is found up to 9,500 feet. The declivities of the mountain are clothed by a magnificent forest of *Abies smithiana*, *Picea pin-drow*, *Quercus semicarpifolia*, maple, yew, and towards Nagkunda, sweet scented *Viburnum* (Thelain), *Kadsura grandiflora*, *Deutzia corymbosa*, *Philadelphus tomentosa*, *Symplocos paniculata* (Lodh, Loj—a sheet of white bloom in May), the scanitent *Hydrangea*, (*H. altissima*), *Rhus buckiamela*, *Jasminum revolutum*, and many species of *Desmodium*, *Indigofera*, *Berberis*, *Clematis*, &c. form a dense brushwood or coppice; while the mossy rocks and shady banks are covered with *Wulfenia am-*

herstiana, *Primula denticulata*, *Pedicularis megalantha*, *Gypsophila ceras-tioides*, "Bhatlee," several beautiful species of *Impatiens*; and in the deepest recesses of the woods *Actæa acuminata*, *Aconitum palmatum*, *Angelica glauca*, *Adenostemma*, *Strobilanthes*, *Lilium giganteum*, called "Book," and *Arum speciosum*, "Gangsh or Jungoosh," a curious plant, the spathe of which beautifully striated with green, and ending in a long thread, bears an alarming resemblance to the hood of the cobra di capello. In autumn the bushes towards Kotgurh are matted with the leafless and sweet-scented Dodder (*Cuscuta grandiflora*), which, having no root, the natives may safely promise boundless wealth to the lucky man who finds it. The Akash-bel, or heavenly twiner of the plains, *Cuscuta reflexa*, may be considered the Mistletoe of the Brahmans.

Huttoo only requires a deep lake and a slide of Alpnach to be a mine of wealth in its timber; at present it lives, dies, and rots uselessly. In several places large tracts of pine have been killed, perhaps by lightning, and remind us of Milton:—

"As when heaven's fire
Hath scathed the forest oaks or mountain pines,
With singed top, their stately growth, though bare,
Stands on the blasted heath."

The Berbery at Nagkunda, &c. is a distinct species, which is now covered with the most profuse crop of fruit, of a fine blue, with a bloom of a pink or lilac colour. It makes excellent jam, and I have had the pleasure of seeing young plants raised in Dublin from seeds which had undergone that fiery ordeal unscathed.

The descent to Nagkunda occupied us one hour and twenty-five minutes; there is a good bungalow, and two or three buneas. As is frequently the case in this direction, the waters flow on one side to the Bay of Bengal, and on the other to the Arabian sea. The elevation of the bungalow is 9,000 feet. In one of the shady glens to the north, and about 1,000 feet below, there is a most copious chalybeate spring, known as the Lal-panees.

The *Polygonum molle* or *polystachyum* is very luxuriant about Nagkunda.

October 1st.—From Nagkunda to Muteeana, by the Pugdundee route, over the back of the Kumuloree or Sheerkot mountain, about ten miles, which we walked in three and three-quarter hours. The path rises

through brushwood immediately behind the bungalow for about 4,000 feet, or 10,000 above the sea, and in about two miles enters the forest of pindrow, yew, maple, white-beam, *Cerasus cornuta*, *Cotoneaster affinis* (Rous) and *acuminata*, with occasional glades covered with the richest beds of flowers, *Potentilla atrosanguinea*, *Anemone discolor*, *Geranium wallichianum*, *Aplotaxis aurita*, *Spiræa kamtchatkica*, *Campanula latifolia*, *Ranunculus*, &c. In the forest we find *Erysimum alliaria*, *Strobilanthes wallichii*, *Nepeta govaniana*, *Aconitum palmatum*, *Callimeris flexuosa*, and a species of *Diplopappus* resembling it, *Senecio canescens*, and a very elegant species, perhaps *asplenifolius*, also common on the north side of Huttoo: on the rocks, *Mulgedium macrorhiza*, *Saxifraga ligulata*, *mucronulata*, and another: and under the shadiest crags, the may-apple of N. America, *Podophyllum emodi*, and the enchanter's night-shade, *Circæa intermedia*, whose only connection with the black art seems to be the fact of its loving the absence of the sun. The views of the Chumba and Koolloo snowy ranges are magnificent, seen over and through the primeval forest, with the great range of Mundee to the right or north, the base covered with villages and cultivation, and the crest reaching up to about 11,000 feet, reported to afford cedar of the first dimensions. Huttoo lies on the left hand, and, latterly, Shallee, Muhasoo, and Simla, in front. At an abrupt turn, a path strikes down to the right towards the Sutluj and Koolloo, which must be carefully avoided, as well as another a little further on to the left, which will equally, though not so fatally, mislead the wayfarer, and beguile him of his summum-bonum, which, under present circumstances, is probably his breakfast. A convenient and most romantic spot for this is on some crags about half way, where there is a small spring just below the path to the north. So far the difficulties of this route have consisted mainly in the fallen trees; but beyond this, both in and out of the forest, it becomes so rocky in several places, as to be totally inaccessible to ponies, and very difficult to jumpans. On leaving the forest, there is a rapid descent of about 600 feet to some crags, under which a multitude of sheep are tended, and on which will be found a very pretty white *Sedum* or *Sempervivum*, and the shrubby *Polygonum graminifolium*: after this four miles of pleasant walking along and down the southern and grassy face of the mountains, latterly through cultivation, lead to Muteeana bungalow, 7,900 feet, which

having neither doors nor window-frames, offers but a cold welcome, with a roof, too, resembling the sieve of the Danaides : they manage these things better in the plains and in Kemaon ; but a decree has I believe gone forth for the erection of a new bungalow in a more convenient site than the present, which is more suited to the herald Mercury than to the mortal, weary, and thirsty traveller. It was the full intention of the late Major Broadfoot, C. B., to open the Pugdundee route, so greatly superior in scenery and shade to the made road, which, besides being nearly two miles longer, dips deeply into the hot glen below Muteeana, and is uninteresting till within a few miles of Nagkunda. It will always, nevertheless, be necessary as the winter medium of communication with Kotgurh, when the northern exposure of the mountain is buried in snow. In this warm glen, and in that of the Girree, grows the shirsha, a species of *Acacia*, perhaps *A. smithiana*, with flowers in May of the size of *A. speciosa* or *Lebekh*, the *Siris* of the plains, except that its long tassels of stamens are rose-coloured, and that it has not the delightful lemon fragrance of the latter. The shirsha greatly resembles *A. julibrissia* (i. e. *gul-i-reshm* or silk-flower), a Persian species, which is naturalized about Como. In the same glen will be found the pretty little *Parochetus oxalidifolia* or *communis*, the *Cedrela serrata*, *Populus ciliata* ; and in the cornfields on the way side, the Nepal wall-flower (*Erysimum robustum*), *Silene inflata*, *Carduus nutans* (the fine purple thistle), &c.

October 2nd.—To Fagoo, fifteen miles in five hours : the road rises to the Punta Ghatee, 8,500 feet, 100 feet above which to the right, stands a ruined post of the Ghoorkalees, who near this inflicted a decisive defeat on the mountaineers. Hence it descends and makes a great circuit to, and up the Kunag Ghatee, 8,400 feet, with the Teeba, 300 feet higher to the right ; it then passes a little under Theog, and reaches Fagoo by a long but gentle ascent. Except some koil and oak woods below Theog, and the forest of Mohroo oak on the Kunag mountain, there is but little wood in this stage ; the Mohroo oak (*Quercus dilatata*) considerably resembles the beautiful evergreen oak of Nynce Tal, and the Binsur and Gagur ranges in Kemaon, where it is known as the Tilonj, Kilonj, or Timsha : it is the *Quercus kamroopii* of Don's prodromus : this botanist was afterwards inclined to identify the two trees, but they differ considerably in several particulars. A few specimens

of *Quercus kamroopii* may be seen on a south aspect at Simla on the lower bazar road, near Lord Combermere's bridge: and far down in the vallies grows the "Banee," (the Funiyat of Kemaon), or *Quercus annulata*, which Don calls *Quercus phullata*. The handsome globe-thistle, the *Echinops cornigera*, is very abundant on the sunny rocks of the Punta and Kunag ghats, and *Morina longifolia* flourishes on the Kunag Teeba: neither of these plants occurs nearer Simla, though Muhasoo would at first sight promise them: but the neighbourhood of the plains seems inimical to many Himalayan plants: just as thyme is plentiful at Almorah, but unknown at Nynee Tal and the Gagur, with a much more favourable elevation. The *Iris decora* is common on the grassy slopes of the Kunag mountain, and towards Fagoo, the *Spiræa cuneifolia*, "Takoo," in May and June, whitens as the roadside-like hawthorn. The red *Potentilla* (*P. nepalensis*) and the deep-blue *Cynoglossum furcatura* abound at Theog, and tufts of the delicate little *Androsace sarmentosa* hung, as at Simla, from the sunny rocks.

This stage is generally decried as the most uninteresting near Simla, and it is assuredly rather bare: yet the views are fine; the bold bare precipitous peak and ridge of Shallee, like a lion couchant, are now where seen to such advantage, and are novel features in the more usual scenery of Simla. On the left hand are the snowy range, Jum-mootree, and the Choor; and latterly in the same direction the great northern spur of this last "cloud compeller" with its seamed and scarped flanks, pleasant meadows, and beautiful woods, reminds the traveller towards Mussooree, of one of the most picturesque excursions short of the snows; and the botanist, of *Trillium govanianum*, *Actæa acuminata*, *Paris polyphyllum*, *Podophyllum emodi*, and several *Polygonatums* and *Smilacinas*, which Fraser, by a pardonable deviation from botanical orthodoxy, calls the lily of the valley. The mountaineers commonly distinguish the Choor as the "Choor-chandnee" or "crest of silver," the original having no reference to any abstraction of silver spoons, as some, impelled thereto by Indian experience, have supposed. The summit exhibits the only granite hitherto discovered amongst the outer ranges of the NW. mountains, and is apparently a continuation of the line of granitic out-breaks traced by Mr. Batten in Kemaon, inside of the Gagur, which, in all likelihood, owes its superior altitude to the vicinity of this great natural lever. The granite of the Choor is,

however, somewhat different from that of Kemaon and the snowy range; and it is a remarkable fact, that this last (I speak from specimens of the vast precipices of Sookhee, near Gungootree) is identical in its abundance of felspar and black schorl crystals, with the granite of the Ajmeer hills; where, by the way, is an example never yet, I think, published, fully as conclusive on the igneous origin of this rock as the more celebrated Glentilt in Perthshire. The exact locality is three or four miles west of Nusseerabad, on the way to Rajgurh, where the granite is seen penetrating the stratified rocks in a complete and very extensive network of veins, and in several places imbedding large masses of them, in a manner that must satisfy the most sceptical, it was once in a state of fusion. The Choor also, which like another Briareus, with a hundred arms, domineers over the outer Himalaya, is the nearest point to Simla, where we meet with the silver fir; and separated as it is by comparatively low ridges from the great ranges which form the natural habitat of the tree, the fact necessarily gives rise to speculations on its origin, and as in the similar case of the Alpaca and Llama of the isolated Cordilleras of the Andes, and its own *Lagomys* or tailless rat, induces the question whether nature does not necessarily and independently give birth "automate" to like forms of organization under similar circumstances. Every traveller in the colder tracts of the Himalaya must remark the resemblance of the genera to those of Europe: while, with very few exceptions, the species are different; so much so, that as Mr. Batten observes, though our oaks have acorns all right, the absence of the sinuous leaf of the English tree is enough almost to excommunicate our spinous brethren. The only exception to the above rule appears to be in New Holland, as compared with a like soil and climate in South Africa, where her productions, animal and vegetable, are so dissimilar in plan from those of all the world besides.

The homeward route from Muteeana to Simla may be agreeably varied by a diversion to the Shallee mountain. From Muteeana to Bhogra, 1,500 to 2,000 feet below its summit, is a walk of six or seven hours by a path scarcely practicable for ponies. Back to Fagoo, via Kiarree, is about the same distance, including a long and tiresome ascent from the Nawul Khud: or one may return to Simla direct by Deotee in the Kotar state. Bhogra is the most southern of the cluster of five villages visible from Fagoo, on the east face of Shallee, the property of

the Thakoor of Kiaree Mudhan. Though very steep and rocky, there is no difficulty in the ascent to the summit, (9,623 feet above sea level,) where Bheema Kalee or Devee 'towers in her pride of place', in a small octagonal temple, and as nature personified, enjoys, when she pleases to look out, an exceedingly extensive and impressive view of her own works and votaries. Her character and attributes seem as severe as those of the Taurian Diana; and the mountaineers, who scarcely acknowledge any other god or goddess, hold her in such awe, that I have known one of them positively refuse to approach nearer than 300 or 400 yards to her fane, though it was our only shelter from a cutting blast. Hence, no doubt, she is said in Hindoo mythology to be the daughter of Himalaya. The entire northern face of Shallee is covered with dense forest, amongst which the *Cupressus torulosa* is found in considerable quantity, being the only site in these Provinces where it appears to be truly indigenous. The day-lily, *Hemerocallis disticha*, is common by the water-courses, as is the *Abelia triflora* on the warmer exposures. On the summit grow *Ephedra saxatilis*—"syr"—and a silvery *Artemisia*, very like the *A. rupestris* of the Rhine.

"All things are full of error" said one of the ancients; and it is at best but a quixotic procedure to wander out of one's way to refute it, at the imminent risk of encountering controversial wind-mills, Biscayans, or Crowderos; and truth when found, may, like Mademoiselle Cunégonde, prove less attractive than had been anticipated. All that can be done discreetly is to knock an error on the head when met privately; and it may be accomplished with the less scruple on this occasion, as the present is, so far as I know, the only one into which the late Captain Herbert has fallen. I allude to his Geological Map of our Himalayan Provinces, where Shallee is included in the micaceous slate district; whereas it is in fact, one great mass of very compact, splintery, light-blue limestone, apparently very pure, with the exception of a small proportion of magnesia. Several plants will be found, which are, I think, peculiar to limestone, as *Cytisus flaccidus*. The mountain is very deficient in springs, and in the warm season is dependent for water on the pits called "Jors," which is of so vile a quality, that all Hudor-men-aristons men should carry up a supply from the Nawul stream.

October 3rd.—To Simla. The distant view of the hospitable homes of our countrymen identifies our feelings with those of the Mesopo-

tamian soothsayer, and we adopt afar off his exclamation—'How goodly are thy tents, O Jacob, &c.' but the nearer and beatific vision of the bazaar and its brimful stores, exalts our enthusiasm to the pitch of the wizard of the north, and we end our pilgrimage by a gastronomic application of his famous lines.—'Breathes there the man, &c.' Those heaps of flour and Shajehanpoor sugar are worth more than the purest cones of snow in the frosty Caucasus; those gram-fed fleeces than its shaggiest woods; those cases of aqua-vitæ, more soul-satisfying than its loudest water-falls. Rapt into future dinners, the Deotahs of the unfriendly rocks and snows of Emaus descend to insipid nonentities in comparison of Messrs. Barrett and Company, who are confessed the true dispensers of the good things of this life to all who can pay for them and to some who cannot.

Rough Notes on the Zoology of Candahar and the neighbouring Districts.

By Captain THOMAS HUTTON, of the Invalids, Mussoori; with Notes by ED. BLYTH, Curator of the Asiatic Society's Museum.

(Continued from Vol. XIV, p. 354.)

No. 20. The Wild Hog. These are plentiful among the high rushes at the lower extremity of the Bolan Pass, where they conceal themselves during the day, but issuing forth at night, they proceed to ravage the cultivation around Dadur. They are also numerous in similar covers on the Helmund and in Seistan around the lake.

They are hunted but not eaten. They do not appear to differ from the common wild hog of the Upper Provinces of India.²²

22. In Mr. Gray's catalogue of the specimens of mammalia in the British Museum, the "Indian wild boar" is styled *Sus indicus*: and Mr. Elliot had previously pointed out the following differences between it and the European one. "The Indian wild hog," remarks the latter naturalist, "differs considerably from the German. The head of the former is longer and more pointed, and the plane of the forehead straight, while it is concave in the European. The ears of the former are small and pointed, in the latter large, and not so erect. The Indian is altogether a more active-looking animal; the German has a stronger heavier appearance. The same differences are perceptible in the domesticated individuals of the two countries." (*Madr. Journ.* No. XXV, 219.) Vide Cuvier's 'Ossemens Fossiles', pl. lxi, for figures of the skull of the European boar, but which would seem to have been taken from a domestic individual.

In the Society's Museum are two very different forms of Indian wild boar skulls, especially characterized apart by the contour of the vertex and occiput. In a particu-

I heard of an animal, however, which had been killed near Washer, on the frontier towards Herat, and at the death of which my informant was present, which leads me to suppose (if the story be true,) that the "Babaroussa" (*Sus babaroussa*, Linn.), or some allied species, is an inhabitant of those parts. My informant was one of the party who accompanied the Candahar Sirdars as far as Washer, on their disastrous expedition against Herat in the years 1838-9. He described the animal as like a hog, with tusks and *two horns on the nose*; now the Babaroussa, according to Fred. Cuvier, has four tusks, two of which, by piercing through the skin of the muzzle, give the animal the appearance described by my informant. He declared, that it charged the party of hunters and overthrew a horse, but was shot and speared before it could do further injury. I have seen no spoils of the animal, and merely give the story as I heard it, from one who, by the way, was found in other respects, like most of his countrymen, to be an unblushing fabulist.²³

Wild hogs are plentiful in Scindh, and especially around Shikarpore.

No. 21. *Hystrix cristata*. Common Porcupine.

This animal is very abundant around Candahar and in the neighbouring districts; it hides in the deep fissures and caves which abound in the limestone ranges that divide the valleys, and issuing forth at night-fall, they commit sad havoc in the grain-fields and gardens. They are entrapped in pit-falls, and likewise shot. I once asked an Afghan if he would eat one, and he replied with a start of astonishment—"toḥḥ,

larly fine specimen, from Cuttack, measuring fourteen inches and a half above, along the mesial line to tip of nasal, and the lower tusks of which (withdrawn from their sockets) measure seven inches and a half long following their curvature, the vertex narrows posteriorly to an inch and three-eighths; whereas, in another skull of the same length, or a trifle longer, with lower tusks measuring six inches and a quarter, the vertex is two and a quarter across where narrowest, and the whole vertical aspect of the cranium is broader and more convex. Where the latter specimen was obtained I cannot learn; but I have seen others like it from Bengal and Arracan.

Wild hogs are very generally diffused throughout India, and they occur in the Himalaya at all altitudes. Mr. Hodgson informs us that there are not any in Thibet; but in the country of the Usbeks they would appear to be very numerous. Thus, Lieut. Wood, in his 'Journey to the Source of the Oxus,' mentions that—"Descending the eastern side of Junas Durrah, our march was rendered less fatiguing by following hog-tracks in the snow. So numerous are these animals, that they had trodden down the snow as if a large flock of sheep had been driven over it." They are also common in Persia, and in the countries eastward of the Bay of Bengal.—*Cur. As. Soc.*

23. Possibly a species of *Phacochoeres*.—*Cur. As. Soc.*

teba, look at the animal's feet; do you not perceive the similitude to your own?" And he then proceeded seriously to inform me, that once upon a time, there lived a race of men so exceedingly wicked, that God at length laid his curse upon them and changed their forms to that of the porcupine, obliterating all trace of the human form divine, except the feet, which were left to mark the accursed and fallen race, and to serve as a warning to other evil doers. The hollow quills which form a tuft on the tail, are said, by the marvel-loving vulgar, to be used for the purpose of carrying a supply of water, but how the animal is to make use of the same is not stated; their true use, however, appears to be to give warning of approaching danger, and to alarm an assailant, as they emit a loud rattling noise when shaken.—"Sahee" of India.²⁴

No. 22. [*Alactaga acontium*, (Pallas): *A. indica*,²⁵ Gray, *An. and Mag. Nat. Hist.* Vol. X, 262]. The Jerboa. This beautiful little animal is abundant over all the stony plains throughout the country, burrowing deeply, and when unearthed, bounding away with most surprising agility after the manner of the Kangaroo. It was known throughout the army by the name of the Kangaroo-rat. They are easily tamed, and live happily enough in confinement if furnished with plenty of room to leap about. They sleep all day, and so soundly, that they may be taken from their cage and examined without awaking them, or at most they will half-open one eye in a drowsy manner for an instant, and immediately close it again in sleep. The Afghans call it "*Khanee*." It retires to its burrow about the end of October, and remains dormant till the following April when it throws off its lethargy and again comes forth. It is doubtless the "*desert rat*," mentioned by my friend the late Captain Arthur Conolly, in his *Overland Journey to India*, (page 54, Vol. 1.)

No. 23. *Gerbillus Indicus*. The Indian Gerbil.²⁶

24. The species of *Hystrix*, as the genus is now limited, are greatly in need of elucidation; I am of opinion, that several are at present confounded under *H. cristata* and *H. leucura*, and I have been endeavouring for some time past to collect more extensive data for determining those of India. The Afghanistan species, as figured by Burnes, has a black crest, and a much longer tail than the true *cristata*, or than either of the Indian species with which I am at present acquainted, which latter are at least two, if not three, in number.—*Cur. As. Soc.*

25. It certainly does not occur in "India."—*Cur. As. Soc.*

26. Two species of Indian Gerbils have been indicated, but their distinctions are by no means satisfactorily made out. Mr. Waterhouse, in *Proc. Zool. Soc.* 1838, p. 56, has endeavoured to characterise a *G. Cuvieri*, with tarse an inch and three-quarters long, though smaller than a specimen of *G. indicus*, in which the tarse measured but one

These beautiful field rats abound at Neemuch and about Muttra; as likewise in the sandy tracts north of the city of Bhawulpore; where the country is absolutely riddled with their burrows. I think I have somewhere read that they live singly, i. e. that each pair is found separately and widely scattered over the plains; but this is incorrect, for they form large colonies like rabbits, and live in regular warrens wherever they are located; these colonies are usually situated in the neighbourhood of cultivation, which suffers much injury from their depredations. It has also been said that they do not venture out in the day-

and a half. He remarks, also, that "in the specimen of *G. indicus*, and that of *G. Cuvieri*, belonging to the Zoological Society's Museum, there is a considerable difference in the colouring, the latter being paler, and of a much brighter hue than the former; but whether this difference is constant," he adds, "I am not aware."

Mr. J. E. Gray, in his 'Catalogue of the Mammalia in the British Museum,' identifies Mr. Elliot's *G. indicus* of S. India (*Madr. Journ.* No. XXV, p. 211), with the *G. indicus* of Waterhouse, but applies to it the name *Hardwickii*; reserving the appellation *indicus* for some Bengal specimens presented by the late Major Gen. Hardwicke, while he makes no allusion to *G. Cuvieri* of Waterhouse, as if regarding this as a third Indian species, not in the British Museum collection. Specimens from S. India, however, presented to this Society by Mr. Walter Elliot, of the Madras C. S., (who also supplied the British Museum,) differ in not the slightest respect from at least one Gerbil of Lower Bengal. Of two specimens of the latter, from the vicinity of Berhampore, (for which the Society is indebted to the obliging exertions of my friends Capt. Thomas, 39th N. I., and Dr. Young,) and which accord in their general dimensions, one has the tarse to end of claws fully an inch and three-quarters, the other but an inch and five-eighths; though the former is the more usual admeasurement in the full grown animal.

It would seem, however, that we have a second species in Lower Bengal, which I take to be *G. Cuvieri* of Waterhouse, and the skull of which corresponds exactly with that of Capt. Hutton's species, No. 24: having the auditory *bullæ* considerably more voluminous than in *G. indicus*, and the incisive tusks larger and longer, and fronted with much paler enamel. Long ago, as mentioned in *Jour. As. Soc.* XI. 890, I found the remains of one of these animals in a paddy-field, half devoured by some carnivore: of this I preserved the skull, and what I could of the skin, with the tail and limbs; but I unluckily gave the fragment afterwards to some *shikarree* who was to have endeavoured to procure others, but of whom I never heard again. At that time I had no suspicion of the existence of a second species of Bengal Gerbil, and it is only very recently that I have succeeded in procuring Bengal specimens of the other.

Captain Hutton's species, No. 24, agrees so very nearly with the common Indian Gerbil, that I can perceive no very satisfactory external distinctions. The tarse, however, to end of claws, of an adult male, barely exceeds an inch and a half long; the general colour is also much paler, both of young and adults; and the fur generally is longer, especially that growing on the tail: the anterior limbs are either white, or have but a faint tinge of colour; whereas the hue of the back is, I think, always tolerably deep on the fore-limbs of *G. indicus*. The surface hue of the upper parts is of that light arenaceous, so very prevalent among the animals of Scinde and Afghanistan, as among those of Egypt and other sandy and stony countries.—*Cwr. As. Soc.*

time, but this too is incorrect, for they may be seen the whole day through, popping out of their holes, nibbling the long grasses, and bounding off from hole to hole. This is the desert rat of Elphinstone's Cabul. (See Introduction.)

No. 24. *Gerbillus* [*Cuvieri* (?), Waterhouse.]²⁷ This species is plentifully scattered over the arid and stony plains of Afghanistan, but they do not form colonies like the last named. The Afghans call it "Juwee." A full grown male specimen measured nine inches, and the tail seven inches and a half, equal to sixteen inches and a half over all. This, like the last, although perhaps strictly speaking nocturnal, is nevertheless active during the day, popping occasionally out of its hole to feed. They form no colony, but are numerous scattered in pairs over the plains.

No. 25. *Gerbillus* [*erythrourea*, Gray, *An. and Mag. Nat. Hist.* Vol. X. 266]. This likewise is abundant over the same tracts as the last, and goes by the same name; it is more abundant around Quettah, while the former affects the tracts around Candahar. All burrow in the ground, and are seen during the day at times. The nails of the feet in this last are black, but in the former (No. 24) they are white or colourless in living specimens.

N. B.—You will see one specimen of *Gerbillus* distinguished by a X on the enveloping papers, No. 25½. It is, I consider, the same as No. 25, the black colour of the nails being, however, the consequence of death, for in the living specimen they were colourless. Found in wide stony plains with the habit of the last.²⁸

No. 26. *Arvicola* [*Mus Huttoni*, Blyth.]²⁹ I am doubtful whether

27. Vide preceding note, No. 26.—*Cur. As. Soc.*

28. I do not think that it differs from No. 25.—*Cur. As. Soc.*

29. This belongs to a particular and very separable division of *Mus*, having much the appearance and also the habits of *Arvicola*. Among Indian species, it comprises the *M. giganteus* of Hardwicke, or great Bandicoot-rat, and the presumed *M. indicus*, Geoff. (*v. Arvicola indica*, Hardw., *M. kok* of Gray, and *M. (Neotoma) providens* of Mr. Elliot's catalogue.) The latter naturalist having expressed to me his intention of applying a particular name to this group, I shall not forestall him in so doing; but I entirely agree with him in the propriety of the separation. Mr. Gray (in *M. N. H.* 1837, p. 585,) regards it as the typical form of *Mus*.

In size and proportions the present species bears a near resemblance to *M. indicus* (*v. kok*), but the tail is shorter, and the general colour much lighter, resembling that of the Gerbils. On comparison of the skulls, the zygomatic arch is seen to be conspicuously broader anteriorly; and the palate is much narrower, and contracts to the front: but the most obvious distinction consists in all the teeth, both incisive tusks and grinders, being considerably broader and stronger. In other respects the skulls of

this is *A. indica* of Hardwicke or not. It occurs south of Bhawalpore, and is abundant in Afghanistan from Quettah to Girishk, throwing up the mould after the manner of the mole. It feeds on herbs and seed, and burrows in the ground beneath hedge-rows and bushes, as well as along the banks of ditches. Its nest is deep-seated, and it constructs so many false galleries immediately below the surface, that it is difficult to find the true passage to its retreat, which dips down suddenly from about the middle of the labyrinth above. In the gardens and along the sides of water-courses in the fields at Candahar, their earth-heaps are abundant.

No. 27. *Mus [bactrianus, Blyth, n. s.]*³⁰ This is the common house mouse of Candahar, but the house rat is I believe unknown there; at least so all my informants agreed in stating, and I certainly never saw one, although for two years I was in charge of extensive grain godowns, which would naturally have attracted them had any existed.

No. 28. *Lagomys [rufescens, Gray, An. and Mag. Nat. Hist. X. 266.]*³¹

these two species bear a very close resemblance. Length, minus the tail, about six inches: the tail (vertebræ) four: tarsus, with toes and claws, an inch and three-eighths: ears posteriorly half an inch; to antæal base three-quarters of an inch. Fur soft and fine, blackish for the larger basal half of the piles, the surface pale rufescent-brown, deepest along the crown and back, pale below, and whitish on the throat: whiskers small and fine, and chiefly black: tail naked: feet light brown: incisive tusks buff-coloured, the enamel of this has partially worn away on those of the upper jaw.—*Cur. As. Soc.*

30. This little animal presents a very close approximation to *M. musculus* in size, proportions, and structure, inclusive of the conformation of the skull; but the fur is much denser and longer, and its colouring absolutely resembles that of a pale specimen of *Gerbillus indicus*, except that there is no whitish about the eyes, nor is the crown of a deeper hue, and the tail is thinly clad with short pale hairs to the end. Comparison of recent specimens would probably elicit some further distinctions from *M. musculus*, especially in the larger eye, and somewhat more produced muzzle; but I cannot venture upon describing such differences from a single skin. The entire under-parts and feet are white; and the upper parts light isabelline, with dusky extreme tips to the hairs, and their basal two-thirds deep ashy.—*Cur. As. Soc.*

31. Length about six inches: tarsus to end of claws an inch and three-eighths. The skull exhibits good specific differences from that of *L. Hodgsoni*, nobis, *J. A. S. X.*, 816; being in particular much narrower between the orbits. Mr. Gray, in his 'Catalogue of Mammalia in the British Museum,' refers *L. Hodgsoni* to *L. Roylei* with a mark of doubt; and afterwards seems to identify it with *L. nipalensis*, Hodgson—a very different species; but the plates to accompany the descriptions of *L. Hodgsoni* and *L. nipalensis* were unfortunately transposed. *L. rufescens* exhibits the same sandy colouring so prevalent among the animals of Scinde and Afghanistan, and also those of Egypt.—*Cur. As. Soc.*

This species inhabits the rocks of Afghanistan from the Bolan Pass, where they were first seen, to Girishk and elsewhere northerly. They shelter beneath ledges of rock, and make their nests in the fissures, where it is next to impossible to get at them; and although I paid high for all specimens, and kept two men purposely to bring me the productions of the country, I only succeeded in procuring two examples of this animal, one of which escaped during the night; the other I send for inspection. It is probably the "Coney" of Scripture.³²

No. 29. [*Myospalas fuscocapillus*; *Georychus fuscocapillus*, Blyth, J. A. S. XI, 887.]³³ The Quettah Mole, as it was commonly called, is I think, a species of *Aspalas*; it burrows like the mole, throwing out heaps of earth. It is difficult to dig out, and is said to make long horizontal galleries, with earth-heaps thrown up at intervals. It probably feeds upon bulbous roots with which the plains around Quettah abound, such as red and yellow tulips, &c. I never saw or heard of the animal except around Quettah in the valley of Shawl, about 5,500 feet above the sea level, and I am indebted to the kindness of Lieutenant Holroyd, 43rd Light Infantry, for the specimens which are sent for inspection.

No. 30. *Lepus*———? Hares are common all over the plains, and I kept several tame ones at Candahar. I have, however, unfortunately lost my notes, and have preserved no specimen. It is said by several who have written upon Afghanistan, that there are two species, a large and a small one, the latter somewhat like a rabbit. I cannot positively deny the correctness of this assertion, although I have strong doubts on the subject; the small hares that I saw both at Quettah and Candahar, being nothing more than immature specimens or leverets of the same species, and I suspect that observers have mistaken the *Lagomys* for a small hare, an error by no means of infrequent occurrence. They are said to be remarkably strong and swift in some parts of the country, and the dog that can catch one single-handed, is reckoned a good one. Having neither notes nor specimens to refer to, I cannot pronounce upon the species, though it appears from memory to correspond with the

32. The "Coney" of our English version is, beyond doubt, the *Hyrax syriacus*, Schreber.—*Cur. As. Soc.*

33. This type differs from *Myodes*, or the Lemming genus, in the much greater size and strength of the feet, in the elongation and protrusion of its upper incisive tusks, &c. I will describe it more particularly with some other new rodents.—*Cur. As. Soc.*

common hare of the Deyra Dhoon. [*L. ruficaudatus*, Is. Geoff.] This, however, is conjecture. "Khur-gosh," i. e. *Ass-cared*.³⁴

No. 31.—*Bos bubalus*.—The Buffalo is scarce and does not occur wild; the few that are kept are evidently from the east of the Indus, and are precisely the same as the domestic buffalo of the Bhawalpore country, where they occur in immense herds along the banks of the Garra. There they are kept for the sake of the milk and ghee, and during the heat of the day they forsake the jungles and repair to the river, where they immerse themselves in the water, leaving only the head on the surface. I know not if it be the same as the Mysore buffalo, but it differs greatly in its horns from those commonly met with in our Provinces. They are of large size, chiefly black, sometimes with a white forehead and white tip to the tail, which reaches to the fetlock, hairy on the neck and shoulders; withers not raised above the rump. Some are dun-coloured, and among these, also, the white forehead is occasionally seen. Irides often white; forehead prominent; the horns in all curving up strongly and closely from the base, and forming a curl at the side of the head instead of lying back along the neck, as in those of the Provinces. The only domestic buffaloes that I saw in Afghanistan were a few kept at Candahar, for the sake of the milk and ghee.³⁵

34. From the skull of an immature specimen of the Afghan Hare in Capt. Hutton's collection, it is easy to perceive that the species differs from the northern Indian one: as is especially shewn by the greatly diminished horizontal elongation of the descending angle of the lower jaw, by the difference of the condyle, &c. It is only within a comparatively recent period that the common hare of Bengal and of the Upper Provinces has been recognised as a peculiar species by Zoologists. According to the observation of Mr. Vigne, it is remarkable that there are no hares in Kashmir. "One of the most singular facts connected with the natural history of the valley," writes that gentleman, "is that of there being no hares there. As a sportsman, I could not have believed it to be the case, as I have nowhere seen more likely ground. I am assured that they do not exist there, and I have never seen one myself, although I have traversed every quarter of the valley. It is probably too cold for the Indian hare; and that of the valleys of Thibet is an Alpine hare [*L. oistolus*, Hodgson, v. *tibetanus*, Waterhouse,] that has its dwelling amongst rocks, sand, and Tartarian furze. I should think that the European hare would thrive very well there."—*Curr. As. Soc.*

35. The above description applies better to the tame buffaloes of Italy and Hungary, than to those ordinarily met with in India; the former having besides a longer tail, and they are very commonly more or less marked and splashed with white. A skull of this race is figured in the '*Ossements Fossiles*.' An Egyptian cow-buffalo which I saw in London approached more to the degenerate tame Indian breed, and had small, but elongated horns, similarly directed; and the late Mr. John Stanislaus Bell, (of 'Vixen' celebrity,) who favoured me with some interesting particulars respecting

No. 32. *B. taurus*.—The Cow is a handsome animal, and generally a good milcher; this is doubtless owing in a great measure to the rich artificial pastures on which they feed; the hump is generally reduced to an almost imperceptible rise at the withers, and in many it is not at all present. They are short-legged, and have good barrels, being altogether a far more European-looking breed than any native cattle on this side of the Indus. They do not appear to give the same quantity of milk in India, unless well fed.

No. 33. *B. pöephagus*.—The Yäk is seen to occur wild in the Huzara ranges, but for this I cannot vouch;³⁶ it has been said, by more than one traveller, also to occur wild in the higher parts of Kunawur and Tartary, and Lieut. Smith is quoted by Mr. Ogilby as having seen them wild on the confines of Bhootan; but these herds, I suspect, were nothing more than the tame yäks turned adrift, according to the custom during the summer, and left to roam at large until the winter sets in, when they are reclaimed and housed. The same custom may probably prevail among the Huzarrahs, and so have given rise to the tale of wild herds.³⁷ (Perhaps this is the "*Gow-cohi*"

many of the animals of Circassia, informed me, that the Circassian buffaloes "agree with the Italian in their bombed forehead, massive and ponderous conformation, and also in the abundance of excellent milk afforded by the female, often for two years; but the horns, especially those of the female, are very large, inclined backwards, much curved, annulated and serrated. The common attitude is that of the Indian buffalo, with the head horizontally held out; and the tail, with its terminal tuft, does not reach much more than half way to the ground. The young are of a dusky-brown colour; but the full grown are almost invariably black, without a spot of white. Their stature exceeds considerably that of the largest British cattle.

It should have been premised, that I furnished Mr. Bell with sketches from life of the Italian and common domestic Indian buffaloes, the principal distinctions of which races I pointed out to him, and this drew his attention to the minutiae which he has particularized. Certainly, the Italian tame buffalo is a very different looking animal from that of Bengal, and the buffalo of Afghanistan is evidently the same; but the Circassian would seem identical with the ordinary (and wild) Indian race.—*Cur. As. Soc.*

36. My friend the late Sir A. Burnes replied to my inquiries on this subject. "The Yak is, I hear, wild in Pamir, or some animal very like it."—T. H.

37. Various authors have mentioned wild Yaks, though some at least of them have been doubtless misled by the circumstance mentioned by Captain Hutton, of the tame herds being turned loose in summer upon the mountains. According to Lieut. Irwin, "Yaks are found in a wild state on the Pamir, and on the upper parts of Budukhsun." Mr. Vigne also informs us, that there are wild Yaks on the northern slope of the mountains towards Yarkund; and Timkowski mentions, that this species "is found, both wild and tame, in the western frontiers of China, in all Tangout and Thibet." So Captain Broome assured me, that he heard of wild Yaks being seen about Kodok, said to be in herds, and exceedingly savage and dangerous to travellers in the passes.

of the Persian physicians, also *Gowzen*; vide Cuvier's 'Synopsis Mammalium.')

No. 34. To the Horses I paid no attention, but believe there is no good breed proper to Afghanistan, or at least not in the neighbourhood of Candahar; all coming from other countries, as Herat, Toorkistan, &c.

No. 35. *Asses* are as common at Candahar as elsewhere, and do not differ from their brethren of other more civilised countries; they are used as beasts of burthen, and have no more mercy shown to them than elsewhere.

Of the many notices I have seen of the habits of this animal, one of the most interesting is that given by Lieut. Wood. "The Yak," he remarks, "is to the inhabitants of Thibet, and Pamir, what the Rein-deer is to the Laplander of Northern Europe. Like the Elephant, he possesses a wonderful knowledge of what will bear his weight. If travellers are at fault, one of these animals is driven before them, and it is said, that he avoids the hidden depths and chasms with admirable sagacity. His footing is sure. Should a fall of snow close a mountain pass to man and horse, a score of yaks driven ahead answer the purpose of pioneers, and make, as my informant expressed it, a 'king's highway.' In this case, however, the snow must have recently fallen, for when its surface is frozen over and its depth considerable, no animal can force its way through it. Other cattle require the provident care of man to subside them through the winter; but the *Kash-gow* is left entirely to itself. He frequents the mountain slopes and their level summits. Wherever the mercury does not rise above zero, is a climate for the yak. If the snow on the elevated flats lies too deep for him to cross the herbage, he rolls himself down the slopes, and eats his way up again. When arrived at the top he performs a second somerset, and completes his meal as he displays another groove of snow in his second ascent. The heat of summer sends this animal to what is termed the old ice, that is to the regions of eternal snow; the calf being retained below as a pledge for the mother returning, in which she never fails.* * * The *Kash-gows* are gregarious, and set the wolves, which here abound, at defiance. Their hair is clipped once a year in the spring. The tail is the well known *chowry* of Hindoostan; but in this country, its strong, wiry, and pliant hair, is made into ropes, which, for strength, do not yield to those manufactured from hemp. The hair of the body is woven into mats, and also into a strong fabric, which makes excellent riding trowsers. The milk of the yak is richer than that of the common cow, though the quantity it yields is less."

It is a very prevalent opinion, that the Yak has never yet been taken alive to Europe. But Captain Turner long ago stated,—"I had the satisfaction to send two of this species to Mr. Warren Hastings, after he left India, and to hear that one reached England alive. This, which was a bull, remained for some time after he landed in a torpid and languid state, till his constitution had in some degree assimilated to the climate, [or had got over the effects of the long voyage,] when he recovered at once, both in health and vigour: he afterwards became the sire of many calves, which all died without reproducing, except one,—a cow, which bore a calf by an Indian bull. Though naturally not intractable in temper, yet soured by the impatient and injudicious treatment of his attendants, during a long voyage, it soon became dangerous to suffer this bull to range at liberty abroad, for which reason, after destroying a valuable horse, he was finally secured alone."—*Cur. As. Soc.*

Dozens of these animals are driven into Candahar every morning during the fruit season, each carrying a pair of panniers loaded with grapes, figs, pears, peaches, apricots, nectarines, plums, cherries, green-gages, and melons. Latterly, also, from the difficulty and expense of procuring camels for commissariat purposes, we used to hire asses, and found them to be quick travellers, under loads of two puckah maunds each, (160lbs). The Bokhara breed is very large and often white. These animals are subject to swellings or tumours in the throat, from which secretions of lime are extracted, often as large as a pigeon's egg, and formed similar to the gravel stones in the human bladder. I send one for analysis.³⁸

No. 36. Mules are good, and often high-priced, especially riding mules, which sometimes sell from 250 to 300 Co's. Rs. each. I do not think any are bred in Afghanistan, but suspect they come from Mooltan and the Punjab.

No. 37. *Equus hemionus*. The Gorkhur, or wild Ass, I never saw, but it occurs in the southern deserts, and in Gurmsail; also in the neighbourhood of Herat and in Persia. It is difficult to capture alive. They occur also in Cutchee and in Guzerat. I heard a Bombay Engineer Officer state *as a fact*, which he backed moreover by the authority of Capt. Harris, of the same Presidency, (Author of 'African wild Sports') that *stallions* of the wild ass were very seldom met with, and the reason assigned was, that *as soon as the young one was born, the old stallion immediately castrated it with his teeth!!* This very marvellous story was evidently believed by the gentleman from whom I heard it, but I strongly suspect that if it really originated with Captain Harris, that Officer must have been quizzing. One very simple reason against the

38. Of this, Mr. Laidlay has favoured me with the following report:—

"The calculus submitted for examination weighed 237 grains, and had a specific gravity of 1.81. Exactly in its centre was found what appears to be the husk of some grain, (paddy?) which served as a nucleus around which the chalky deposit accreted in concentric layers. Its composition is

Carbonate of lime,	89.0
Carbonate of magnesia,	1.9
Phosphate of lime,	1.6
Animal matter (mucus and albumen,)	7.5
	<hr/> 100.0

Corresponding with the ordinary composition of salivary concretions."—*Cwr. As. Soc.*

truth of the story arises from the fact, that in newly born animals, the testicles are not apparent, nor do they drop for some time after their birth; nor is it at all likely that the stallion is in attendance as accoucheur, for the female knowing the propensity of the male to attack her offspring, would assuredly take the necessary precaution to prevent it. Besides, if this be the rule, the continuance of the race of wild asses, must be altogether fortuitous! The story speaks for itself; but I mention it as illustrative of what people, and clever people too, will swallow from the mouth of one supposed to be an oracle.³⁹ "*Ghorkhur*," quere from "*Ghora*," a horse, and "*Khur*," an ass, literally "*Equus Asinus*."

No. 38. *Cervide*. Of the true Deer there are none in the lower tracts of Afghanistan around Candahar, nor is there any cover for animals of this tribe, the whole country being a succession of bare hills and arid stony plains, with scarce a shrub of any kind larger than the camel-thorn. I was once informed, that the *Fallow deer* occurred near Herat, but acting on the hint and making every enquiry from competent authorities, I failed to get the least confirmation of the report, and believe my informant had never seen the fallow deer even in Europe.⁴⁰

It may not be amiss to say a word here regarding the *Hippelaphus* of Aristotle, which Mr. Ogilby has applied to the Nylghau (*Portas picta*). I should not have ventured on the subject had not that gentleman pointed to the modern Punjab, as *Arachosis*, which Aristotle gives as the habitat of *Hippelaphus*. Finding no other animal in the Punjab, to which the description will apply, Mr. Ogilby decided that the Nylghau

39. Aristotle, as quoted by Colonel Hamilton Smith, remarks of the common Ass, that the more powerful males thus attack the weaker, "*Tandiu illum persequuntur donec assecuti ore intus posteriora crura inserto testiculos ejus eveliant.*" And for this reason, observes Colonel Smith, it is held dangerous to allow a male ass to pasture in the same field where there is a stallion. With the Ghorkhur, as with the Ass, the males fight with the teeth rather than with their hoofs; nor are they the only animals which evince a propensity for gelding their antagonist. Dr. Bachman relates the same of certain of the American Squirrels; and I have observed it in Shrews. There is an interesting notice somewhere in the "*Asiatic Review*," of a number of Ghorkhurs taken in pit-falls in Scinde or Guzerat; among which, I think it is remarked that not a single entire male occurred. In a note to Vol. XI, p. 286, I expressed doubt respecting the alleged identity of the "*Kyang*" of Tibet with the *Ghorkhur*; but the Society has recently received (from G. T. Lushington, Esq., of Almorah,) a nearly perfect skin of a *Kyang*, which completely settles the question in the affirmative.—*Cur. As. Soc.*

40. There is a magnificent true Elaphoid stag in Persia, known as the *Maral*, of which a pair were taken to England by Sir John McNeill, and deposited in the Zoological Gardens.—*Cur. As. Soc.*

must be the species alluded to. To this view of the case, I have to offer the following objections and suggestions :

1st.—As regards the country called "*Arachosia*," it would appear from various sources, and among others from Professor Lassen,⁴¹ that *Arachosia* was part of the country called "*Ariana*," and situated in that part of Afghanistan of which Candahar is the capital. Such being the case, it is at once evident, that the animal alluded to by Aristotle under the name of *Hippelaphus*, could not have been the Nylghau, inasmuch as that animal does not anywhere occur within the limits of Afghanistan, and in all probability it does not even cross the Indus. The same remark will equally apply to the Saumer deer of India, and indeed to all the deer tribe, as none of them, as far as I could learn after two years' inquiry, are found in that part of the country.⁴² It would seem proved, therefore, that neither the Saumer nor the Nylghau can be the *Hippelaphus* of Aristotle. Mr. Ogilby says, the name *Hippelaphus* is now applied to the Saumer, but in the English '*Régne Animal*,' the specific title of "*Aristotetis*" is given to that animal. It is as yet undetermined, I believe, whether the *Saumer* and *Jurrow* are the same species or not, and until such is proved, the name of "*Aristotetis*" must apply to the latter deer.⁴³

41. Journal As. Soc. Bengal, Nos. 86 and 101 *passim*.

42. The '*Arachosian Ox*' of Aristotle is, beyond doubt, the Buffalo.—*Cur. As. Soc.*

43. Vide *Journ. As. Soc.* XI, 449, for some remarks on this subject, which further observation has confirmed, as regards the distinctness of the '*Jurrow*' (*C. Aristotetis*), the '*Saumer*' (*C. hippelaphus*, Cuv.), and the Malayan Rusa (*C. equinus*, Cuv.) The *Jurrow* is peculiar to the Himalaya, and its antlers are always much larger, and more divergent than in the others; and the prongs composing their terminal fork are generally about equal in length; sometimes the inner and sometimes the outer, being the longer. In the *Saumer*, which inhabits Bengal, Arracan, and the hill forests of Peninsular India (it being doubtless also the Cingalese species), the antlers very rarely, if ever, exceed two feet and a half in length, and are much less massive than those of the *Jurrow*; of the prongs of their terminal fork, the outer is usually the longer. In the Malayan Rusa, inhabiting the Malay Peninsula and Java, the contrary obtains; the inner prong being usually much the longer, and the reverse of this is observable in a still greater degree in the common Axis or spotted deer. In addition to series of each of the above in the Society's museum, are three pairs of antlers of a Rusa, now common in the Mauritius, and which nearly resemble those of the Malayan *C. equinus*, but are remarkable for a strong sigmoid flexuosity of the beam. There are also two frontlets from Assam, which seem to be referrible to the *Saumer*, having the antlers unusually robust but short, and (as in ordinary *Saumer*) much less divergent than those of the *Jurrow*.—*Cur. As. Soc.*

2nd.—From Aristotle's description of the animal, and the habit furnished by him, as well as from Mr. Ogilby's remarks thereon, I would beg to suggest, that the *Hippelaphus* is nothing more than the "*Capra ægagrus*."

I found this opinion on the following facts, namely:—

1st.—*Hippelaphus* inhabits the country of Arachosia, in which the *C. ægagrus* abounds, but where neither the Nylghau nor the Saumer occurs.

2nd.—"The *Hippelaphus*," says the Greek philosopher, "has a mane (like a horse) above the shoulders, but from this to the head, along the top of the neck, it is very thin; it has likewise a beard on the larynx; it is about the size of a stag—the female has no horns—those of the male resemble the horns of the *Dorcas* (*Gazella dorcas*):—it inhabits Arachosia." (Royle's Him. Bot., Mamm., p. 74.) Now a reference to the figure of *C. ægagrus* given in the 'Calcutta Journal of Natural History,' No. 8, will show the mane and beard alluded to by Aristotle; in the figure, however, the hair on the shoulders or withers is not represented long enough, nor so thick as in the living animal. This animal therefore possesses precisely such a mane as Aristotle describes, it being longest on the shoulder and growing thinner and shorter towards the head: it has likewise a long and bushy beard depending from the throat.

Mr. Ogilby, after declaring that it can be easily proved, that the *Dorcas* is the Gazelle of Egypt, goes on to say that—"Theodore Gaza, himself a Greek, and the first translator of Aristotle, very properly renders the word by *Capra*." Here then is a corroboration of my opinion, for according to Aristotle and his first translator, the *Hippelaphus* inhabited Arachosia, i. e. Candahar; it had a mane and beard; so has *C. ægagrus*: it has horns like the *Dorcas* or goat; *C. ægagrus* is a horned goat. The only dissimilitude is in the female having no horns, whereas all the specimens I have seen of the female *ægagrus* were horned. Even this, however, is in a measure nullified by the statement in the English *Régne Animal*, that the female has "short or no horns." If, therefore, the horns are sometimes wanting, it may have been from a hornless specimen that Aristotle's description was drawn up.

The *Capra ægagrus* will consequently be found in every respect to answer the description of *Hippelaphus*, both as to its appearance and habitat; while in the latter respect at least, neither the *Portax picta* nor

any of the *Rusa* tribe, can possibly agree, for none of them occur across the Indus or in Arachosia. The only wild ruminants that I could hear of in the country, were *C. agagrus*, *C. megaceros* (nobis), *Ovis Vignei* (Blyth), *Gazella subgutturosa*, and in Cutchee and Upper Scindh, west of the Indus, the *Cervus porcinus*, *Gasella Bennettii*, and *G. Christii*. To none of these, with the exception of the first, can the description above quoted apply; and if it be rejected, then there remains no animal in Arachosia to which we can refer that notice. In the 'Penny Cyclopædia,' art. Ariana, we are informed that "Ariana was the general appellation given by ancient authors, subsequent to the age of Alexander the Great, to the eastern portion of those countries which form the highland of Persia. According to Eratosthenes, Ariana was bounded on the north by the Paroparmisus mountains, and their western continuation as far as the Caspiæ Pylæ; on the south by the great sea (the Indian Ocean); on the east by the river Indus; and on the west by the chain of hills which separate Parthyene from Media, and Karmania from Paraitakene and Persis. Its shape is by Strabo compared to that of a parallelogram, the dimensions of which, reckoned from the mouths of the Indus to the Paroparmisus, he estimates at 12,000 or 13,000 stadia; and in a straight line from the upper Indus to the Caspiæ Pylæ, on the authority of Eratosthenes, at 14,000 stadia; the length of the southern sea coast from the mouths of the Indus to the entrance of the Persian Gulf is stated at 12,900 stadia. The countries properly belonging to Ariana are, according to Strabo, in the east, the Paroparmisadæ, the *Arachoti*, and *Gedroseni*, along the Indus proceeding from north to south; the *Drangæ* towards the west of the *Arachoti* and *Gedroseni*; the *Arii* towards the west of the Paroparmisadæ, but extending considerably to the west and south, so as nearly to encompass the *Drangæ*, the Parthyæi west of the *Arii*, towards the Caspiæ Pylæ; and Karmania to the south of the Parthyæi."

From this it becomes abundantly evident, that Mr. Ogilby is altogether wrong in placing the modern Punjab within the ancient Arachosia, and consequently that his views with regard to the identity of *Hippelaphus* and *Portas picta* or Nylghau, are wholly inadmissible.

If therefore we reject the *Capra agagrus* as Aristotle's *Hippelaphus*, the matter is left in more doubt than ever, for there is now no other

ruminant inhabiting Arachosia to which his description can possibly apply.

No. 39. *Cervus porcinus*. Hog deer—Parah. This species occurs abundantly in the preserves at Shikarpore, and is also found in the jungles of the Bhawulpore territory. While returning to Ferozepore by water from Sukkur, I saw a hog deer some miles below Oosh, suddenly spring off the bank into the river, and strike out for the opposite shore; shortly afterwards, the reason for this was apparent, as a common village dog took the water at the same place in pursuit of the deer. The river was here very broad, and must have been close upon two miles across as the animals were steering; the deer made good way, and kept well up against the current, which was running strong; the dog seemed tired and was carried far down the stream, and while he was still struggling in the middle of the river, the deer had gained the shore and galloped off to the jungle. I did not see whether the dog got across or not, as a turn in the river shut him out from view.

This animal does not occur in Afghanistan.

No. 40. The Nylghau—*Portax picta*. This is said to be found in the northern portion of the Bhawulpore country. It is not found in Afghanistan.

No. 41. *Antelope cervicapra*—Sarsinee, or Indian Antelope. It is said to occur in the northern portion of the Bhawulpore country, but does not appear to cross the Indus, and none are found in Afghanistan. It is common in the Upper Provinces of India and also at Neemuch. I do not think that this species is an inhabitant of the countries west of the Indus, and in Cutchee it appears to be replaced by the *Gazella Bennettii* and *G. Christii*, while again these two do not cross the mountain barrier into Afghanistan, but are there represented by *G. subgutturosa*, which extends into Persia. If this conjecture be true, it is probable that *A. cora* and *arabica* are distinct from *A. Bennettii*? This is hazarded however as a mere surmise.

No. 42. *Gazella Bennettii*—Ravine deer. Goat-antelope of Europeans; "Chikara" of Neemuch; Kalseepes of Mahrattas. *Gazella Cora*? *Antelope Arabica*?

This species is abundant at Neemuch, where it roams over the wide and sterile plains in small groups of five and six. The natives there call

it "Chikara" or "Shikara," a name which is elsewhere applied to the Four-horned Antelope. The female has horns, but these are very short and slender, and invariably crooked in growth; they are blackish and smooth, with slight indications of wrinkles at the base. The same species likewise occurs in Cutchee, but does not pass the mountains into Afghanistan.

No. 43. *Gazella Christii*, Gray.—This species approaches very nearly to the last named, and occurs in Cutchee also, but not in Afghanistan. A fine specimen was brought to me at Dadur, and the skull was carefully preserved and brought to this country with my other collections; but since my arrival at Mussoorie it has most unaccountably disappeared.⁴⁴

No. 44. *Gazella subgutturosa*.—The Ahu. (N. B. The word "ahu," though applied to this species by the Afghans, is used only as a generic term; the specific name I cannot now remember, and my note is mislaid.)

Although I have referred the Afghan Gazelle to *G. subgutturosa*, still I do so with diffidence, on account of the remarkable difference between the horns of my specimens and the figure of a skull given in the English 'Régne animal.' In that work the horns bend *outwards* at the tip, and it is said in the text that such is their direction in the Persian *Antilope subgutturosa*. I am strongly inclined to think, that the horns on the skull figured in the 'Régne animal' have been transposed, namely, the right horn on the left core, for if they were again changed they would exactly represent the horns of the Afghan species. In my largest specimen the horns are fourteen inches long measured over the curve; they have twenty annulations, and are seven inches and a quarter apart at the tips, which turn inwards and almost form a hook; indeed, with the exception of the above difference in the direction of the horns, the two animals precisely correspond.⁴⁵ The Ahu of the Afghans is found from Quettah to Candahar and Girishk, and it probably extends thence *viâ* Herat into Persia; they are found in small flocks of six or seven, and roam over the wide and sterile plains of Afghanistan, occasionally committing great havoc in the grain-fields.

I do not know whether it extends upwards to Cabool, though such is probably the case, as I heard of its occurrence near Ghuznee. In the

44. For some notice of this species, vide XI, 452.—*Cur. As. Soc.*

45. The horns are those of a typical *Gazella*, rather stout, and abruptly hooked in at the tip.—*Cur. As. Soc.*

winter time they travel further south, and skirt the sandy desert which stretches along from the Sooliman ranges into Persia.⁴⁶

In the young males, the horns nearly touch at the apex in consequence of their inward turn, but they afterwards separate and diverge as the animal advances to maturity.

As regards the female, however, if mine be in reality the Persian Gazelle, there is still greater difference between the Afghan species and the published description in the English edition of Cuvier's '*Régne Animal*;' for it is there stated, that "the females have smaller horns, and are destitute of lachrymary sinus and of tufts on the knees;" In the Afghan Gazelle, on the contrary, the female is *hornless*; she *has a lachrymary sinus* as well as the male, and she has tufts at the knee, although they are perhaps smaller than in the male. In all other respects of marking, colour, &c. the description of Cuvier corresponds with my specimens, which I can regard as none other than *G. subgutturosa*, and I conclude that some mistake must have led to the erroneous account in the English '*Régne Animal*.' I am the more inclined to believe this, since I find an equally glaring error regarding the "*Goral*" (*Kemas goral*), it being stated that the female is *hornless* and possessed of only *two mammae*, whereas she *has horns* (generally), and *four mammae*!

The Afghans have a mode of catching or destroying these animals when they repair to a river to drink; a net is erected along the bank of the stream, and a single opening is left for the antelope to enter at; after satisfying their thirst the animals proceed to wander along the stream, and the ambushed hunters springing up and securing the opening or door way of the net, capture or kill the whole batch. The carcase was often brought into the market at Candahar and sold.

No. 45. *Ovis Vignei*. "Koh-i-doomba" of the Afghans—*O. cycloceros*, Hutton.

When I named this species, I was not aware that it had passed through abler hands, but of course my trivial name must give place to yours. I have nothing to add to my former account in the '*Calcutta*

46. M. Menetries remarks, that this animal "is very common in winter on the vast Steppes which border the Caspian sea, from Bakou to Koo; living in small troops, which once a hundred and fifty paces from the hunter, remain tranquil and fearless. It is easily tamed, so that it may be suffered to run at large without danger of losing it."—*Cuv. As. Soc.*

Journal of Nat. Hist.' The animal is abundant throughout the higher mountains of Afghanistan and is said to extend into Persia.⁴⁷

No. 46. *Ovis steatopyga*—Var.—“Doomba,” or broad-tailed sheep.

The domestic sheep of the Afghans are all *Doombas* or “broad-tails,” but the development of this singular feature is dependent apparently upon climate and perhaps pasture, although certainly not to such an extent as some have supposed: for instance, Pallas ascribes it to the prevalence of wormwood in the pastures, but if such be the cause the feature should become larger or smaller according as such pasture abounded or decreased; why then have the sheep around Shawl and among the tribes which frequent the mountains of the Soolemaun range a *less* development of fat than those sheep which are found around Candahar, for wormwood and saline soils abound there? why again have the sheep of the Khyber Pass and Peshawur the broad tail, for wormwood I am told *does not occur there*? why have not the sheep of Upper Kunawur and Hungrung in the Himalaya, the broad tail, for wormwood *abounds* there, and forms one of the chief plants in the pasture of those elevated tracts?

The “Broad-tailed Sheep,” which is but a variety of the “Fat-rumped” species, or “*Ovis steatopyga*,” occurs throughout hill and vale, extending into Bokhara, Persia and Palestine; it occurs also with some modification in Africa and elsewhere. If the prevalence of wormwood and saline pastures had the effect of producing the broad fat tail of this breed, so ought they to have enlarged the tail of the wild race (*Ovis Vignei*), and the Camels and other cattle which feed upon the same pastures; yet such is not the case.⁴⁸ Again, if the fat is engendered by such causes, it should disappear gradually when the exciting cause had ceased to operate, and by removing the *O. steatopyga* to pastures where neither wormwood nor saline plants prevail, the singular enlarge-

47. There is a brief notice and very passable figure of this species, taken from an animal killed in the vicinity of Persepolis, in Lieut. Alexander's ‘Travels from India to England,’ &c., p. 136 (1827): and I may take the present opportunity to remark, that the Society is indebted to the obliging exertions of G. T. Lushington Esq., of Almorah, for a noble specimen of the true *Ovis ammon* of Pallas, which is quite distinct from *O. montana* of N. America, and to which must be referred my *O. Hodgsoni*, founded on Mr. Hodgson's figure and description of the head and horns of a young ram, since called by him *O. ammonoides*.—*Cur. As. Soc.*

48. The fighting rams of India seem to me to be of a race descended from *O. Vignei*, of which they preserve the crescent-horns and short tail.—*Cur. As. Soc.*

ment of its tail should disappear and become as in other breeds. This however is also not the case, for the doomba has long been tended in different parts of India and other countries without a reduction in the size of the tail, which still continues enlarged as in the original stock. This fact, therefore, goes directly to establish the *O. steatopyga* as a *distinct* and *original species*, which has descended from none of the living stock, whether domesticated or in a state of nature.⁴⁹ Let us examine the grounds on which this opinion can be maintained. First, we find that sheep taken to the pastures of the broad-tails, do not gain an accession of fat on the rump and tail, but remain precisely as they have always been. Secondly, the broad-tails, when removed from their own pastures, do not lose the singular feature from which they take their name. Pasture, therefore, is clearly not *the cause* of this enlargement. Thirdly, proofs may be given that the *O. steatopyga* is the original breed confided to the care of men even from the dawning of his abode on earth. It is however contended, that all our domestic stock has sprung from some one of the existing wild races, and as regards the Sheep, the Musmon (*O. musimon*) is supposed to be the origin of our flocks.⁵⁰—Now, if we are to attend strictly to the *generic characters* assigned by naturalists to the Musmon and our Sheep, we shall at once perceive the absurdity of assigning such an origin to the latter species,—for while all accounts agree that the true Sheep possess “*no lachrymal sinus*,” and that they have *an interdigital hole or sac* ;” the Musmon has actually been removed from the genus and ranked as a *Goat* by no less authority than C. L. Bonaparte, the present prince of Canino, because that animal *does possess a lachrymal opening*,⁵¹ and because it possesses *no interdigital hole* !

If the absence of a lachrymary sinus in the domestic sheep *were true*, which it is not, the want of it would prove that none of the wild

49. Certainly not an aboriginal race, but one highly altered by domestication.—*Cur. As. Soc.*

50. 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.—*Cur. As. Soc.*

51. The presence of a lachrymary opening proves, however, that it is not a Goat, because that genus does not possess it. T. H.—If I mistake not, (writing from memory,) the Prince of Canino states, that the *lachrymary sinus* is wanting in the Moufflon, as it is certainly in *O. tragelaphus* and *O. nahoor* ; whereas I believe all sheep possess the interdigital sinus (an easy mode, by the way, of distinguishing a leg of goat-mutton from one of mouton proprement dit).—*Cur. As. Soc.*

sheep known to us could have furnished the original stock, for all of them possess that character;—the assertion, however, that the genus *Ovis* does not possess the lachrymal sinus is erroneous, for both the broad-tails and every other domestic variety that I have seen, decidedly possess it; it varies in size in different breeds, but I will venture to assert that it will always be present. Still, notwithstanding the occurrence of a sinus both in the musmon and domestic sheep, the latter must nevertheless be a distinct species, because it possesses a character common to all sheep, but which in the musmon is wanting, namely, the interdigital opening sac.

Having given proof therefore that our domestic flocks have not been derived from the musmon, I shall now endeavour to establish my third position, by proving that the *Ovis steatopyga* is a remnant of the original breed confided to man in the infancy of the world. I have already said, that I am inclined to think the *Ovis steatopyga*, with its varieties, as altogether distinct from the races now living in a state of freedom, and in this opinion I shall now attempt to trace back its origin from the earliest to the present time, leaving it to others to form their own conclusions from the facts here brought to their notice.

The earliest mention made of man's possessing flocks is in the 4th Chapter of the Book of Genesis, where, at the 4th verse we are informed, that Abel "brought of the firstlings of his flock," as an offering to the Lord.

Since then, at this early period, a sufficient number of animals were domesticated to enable man to offer up the daily sacrifices which it appears was then the custom, and since, moreover, we know that the animals were created especially for man's use and comfort, it is evident that some of the more useful races must have been placed from beginning under his controul as domestic stock, for it is clearly impossible that he could, by any exertions of his own, have captured and subdued a sufficient number of the wild mountain breeds, at the period alluded to, to enable him to offer up such sacrifices.

In this case, such cattle would necessarily have descended from generation to generation, even to the period when God commanded Noah to build the Ark, and they consequently formed part of the stock preserved alive with him, and became the foundation of his domestic flocks after the flood, and were diffused again with his descendants from the coun-

try where the Ark rested. They were therefore part of the stock which Abraham and Lot possessed, and which, after them, Jacob tended while serving Laban for his daughter Rachel. This opinion seems moreover to be well supported by the fact, that the general colour of the breed is the same now as in that early period; for we read that Jacob's hire was to consist of all the ring-straked, speckled, and spotted among the goats, and of all *the brown among the sheep*; and it is easy therefore, without the aid of a miracle, to see how his flocks increased while those of Laban diminished; since to this day, there are few domestic goats without some speck or spot of white, and since the prevailing colour of the Tymunnee broad-tailed sheep is brown of various shades!

It was indeed an arrangement well calculated then, as it would be still, to enrich the one party and impoverish the other, and if we only allow that Jacob was an observing shepherd, and had learned by experience that "*like breed like*," the secret of his great success is at once made manifest.

With Jacob therefore and his sons, they were taken up into Egypt in the time of the famine under Pharaoh's reign, when the land of Goshen was allotted for a residence to the Israelites; and of course, from thence they accompanied that people throughout their wanderings into the promised land, after the Exodus from Egypt, and from thence again they became diffused through all the neighbouring states and kingdoms: unless, indeed, as is most probably the case, they occurred there already, as the nations which were then in the land had equally with the Israelites descended from the Ark.⁵²

Now, that the sheep known to the Jews was the *Ovis montanus*, would seem to be amply proved from the 29th Chap. of Exodus, where, at the 22d verse, in describing the manner of a certain sacrifice to be offered up, it is written, "thou shall take of the ram *the fat and the rump*, and the fat *that covereth the inwards*, and *the caul above the liver*, and *the two kidneys*, and *the fat that is upon them*, and the right shoulder; for it is a ram of consecration."

Here there is evidently a marked difference made between the fat of the tail and the fat of the inwards and kidneys, for the words "the fat

52. So, Captain Hutton might also argue, are the aborigines of both Americas, of Australia, Polynesia, and the countries generally to the E. and SE. of the Bay of Bengal, in which latter Sheep have only recently been introduced, and are as yet possessed wholly by the European residents.—*Cwr. As. Soc.*

and the rump," clearly show that they were distinct parts of the animal, otherwise it would have been written, "*the fat of the rump.*"

It is likewise held distinct from the fat of the other parts, as "the fat of the inwards" and "the fat of the kidneys." Now it is a notorious fact, that the fat here mentioned is literally all that the animal possesses, unless kept up and fed with grain, which Asiatics never do; so that the passage reads "the fat *tail* and the rump," &c. We have consequently a true description given us of the "*Ovis steatopyga*," in which there is "a solid mass of fat on the rump, which falls over in the place of a tail, divided into two hemispheres, which take the form of hips with a little button of a tail in the middle."⁵³

Again, all doubt upon the subject appears to be removed by a passage in the 3d Chap. of Leviticus, where, at the 7th and following verses, in explaining the method to be adopted in "offering up a sacrifice for a peace offering," it is written—"If he offer a lamb for his offering then shall he offer it before the Lord. And he shall offer of the peace offering an offering made by fire unto the Lord; the fat thereof *and* the whole rump, it shall he take off hard by the backbone; and the fat that covereth the inwards, and all the fat that is upon the inwards, and the two kidneys, and the fat that is upon them, which is by the flanks, and the caul above the liver, with the kidneys, it shall he take away."

Here then it will be observed, that not only is the distinction between the fat of the hinder parts, and of the inwards again repeated, but we are instructed more particularly that the tail was the part alluded to, since "the fat thereof *and* the whole rump," were to be taken "*off hard by the backbone*," thus clearly pointing out the part where the fat alluded to was situated, namely, in the rump and tail, which takes its origin from, or is a continuation of, the end of the backbone.

It must farther be remarked, that the word "*and*," written in italics in the Bible, does not occur in the original Hebrew, but has been added in the English translation in order to show the connection of the words "*the fat thereof*," with those of "*the whole rump.*" Therefore, in the original, the passage would stand thus—"the fat thereof, the whole rump, it shall he take off hard by the backbone;" and that the fat rump of the sheep is the part alluded to is clearly proved by the word

"it;" otherwise if "*the fat thereof*," and "*the whole rump*," had been separate parts, they would not have been specified in the singular number, by "*it shall he take off*," but by "*them shall he take off*." We thus at once perceive, that the allusion is made to the peculiar formation of the hinder parts of the "*Ovis steatopyga*," in which the fat of the rump actually descends in two lobes on either side of the tail, which it so completely envelopes as to leave only the tip of it apparent, and thus while it contributes to form the broad tail which characterises the species, it still remains likewise a part of the rump, commencing at the end of, or '*hard by the backbone*,' as correctly alluded to in the above passage of Leviticus.

Further evidence, if such were necessary, may be probably gathered from other passages, such as that of the 15th Chapter of Samuel, where the prophet in reproving Saul, declares to him, "behold, to obey is better than sacrifice, and to hearken than the *fat of rams*." Now, since the Asiatic sheep are notoriously devoid of fat, unless kept up and fed, the repeated mention in the Scriptures of the fat of rams, would seem to point most particularly and plainly to the species under consideration, which thus becomes doubly interesting, as being not only an Antediluvian species, but a descendant from the original stock bestowed upon mankind by the Almighty in the earliest ages of man's existence upon the earth, and as being moreover the animal which was used in the ancient sacrifices of the Jewish people.

Thus we perceive, that so far from this animal having sprung from any living wild breed, it is in all probability the most ancient of all our sheep, and the stock from which the numberless domestic varieties which now contribute to the comfort of mankind, have themselves descended.⁵⁴

In the same manner it might be urged, that as from the earliest periods after the flood, we read in Scripture of camels, asses, oxen, sheep, goats, pigeons and doves, being in a state of domestication, a strong probability would seem to rise that all these species had been reserved to himself by man from the period of the descent from the

54. Capt. Hutton has, at least, here shewn satisfactorily, the great historical antiquity of the Doomba race of domestic sheep, by proving it to be the variety (and it would seem the only variety, as to this day in Afghanistan,) tended by the Hebrew Patriarchs, and familiarly referred to in the Mosaic writings.—*Curr. As. Soc.*

Ark, and therefore that none of them have now, in a state of freedom, the original stock from which they sprung.

It should also be remembered, that if the animals at present distributed over the earth, *are all to be considered as having descended from the Ark*, (which I deny,) we ought rather to seek among our domestic breeds for the original stock from whence they have become diffused, than that the converse should be the case; for it can scarcely be supposed with any show of reason, that man, who had once held every species in captivity under his immediate controul, would have suffered them to escape and roam over various quarters of the earth, until they had become wild and difficult of approach, and that then he should have turned his attention to the means of recapturing and reducing them again to subjection.—If, therefore, any of the existing wild breeds of oxen, sheep, or goats are identical with our domestic species, (which is not proved,) it should rather be supposed that the *former* had descended from the *latter*, and that they gained their freedom after the flood, when the then existing families of men had selected from among them a sufficient number to serve as the foundation of their domestic flocks and herds.⁵⁵ But as the Scriptures declare, that only *seven pairs* of each of these animals were preserved alive, and as we read that some of each kind were sacrificed by Noah on his descent from the Ark, it becomes very improbable that any of them regained their freedom, and consequently the domestic breeds of camels, goats, asses, oxen, sheep, and some others have descended from stock which lived before the flood, either wild or in a state of domestication. Therefore, we perceive that neither can our domestic breeds be traced to any of the wild stock of the present day, nor can the latter be traced from them; and the wild races are consequently distinct as species, and have been created since the flood;—of this however more will be said elsewhere.

The treatment of the flocks in Afghanistan appears in many respects very similar to European methods. One ram is reckoned sufficient for a flock of a hundred ewes. At the rutting season the ewes are kept in an enclosure and passed to the rams until all are served, the shepherd assisting in the operation by holding up the tail, without which it

55. The writer of the article 'Sheep,' in the 'Penny Cyclopædia,' alludes only to the Moufflon and Argali (*O. musimon* and *O. ammon*,) among wild races; absolutely stating of them, that "They are descendants of those which have escaped from the dominion of man, and are retreating from desert to desert in proportion as the population of the country increases." !!!—*Cur. As. Soc.*

is asserted the animals cannot consummate. When all have been passed to the male in succession, the rams are turned in with them, and should any ewe have been passed over or not served, the ram detects her by the scent. The rams selected to serve are fed up with barley and melon-rinds, and in the autumn, which is the rutting season, they are rendered furious with lust. Another mode of treating them is, to turn the rams out with the flocks in the autumn time, when those ewes which are ready for the male will leave their food and follow him about, upon observing which, the shepherd separates them and puts them to the serving ram.

In the spring months, the young are yeanned at the very season when the grass is again springing up. Some females come in heat after yeanning, but they are never served then, because the young would be dropped at the end of the year when the grass is fading: when the lambs are born, the mother is milked to prevent the lamb from tasting the first milk, which the Afghans reckon to be injurious;⁵⁶ after this the lambs are allowed to suck sparingly in the morning and evening, and after the third day, they are all flocked together during the day, and only allowed access to the mothers at sucking-time; the surplus milk is manufactured into *croot* and *ghee*, as cows' milk is not much esteemed by the Afghans. If the rains of winter have been plentiful and the spring grass is in consequence abundant and rich, the lambs are allowed to suck for four months, as the milk is good; but if the contrary has been the case, the lambs are taken up at three months old, in order that they may not weaken the mother.

I was informed by a person who possessed large flocks, and who had no reason to deceive me, that sometimes the tail of the Tynansee doombas increased to such a size, that a cart or small truck on wheels was necessary to support the weight, and that without it the animal could not wander about; he also declared that he had produced tails in his flock which weighed twelve Tabreez-i-munds or forty-eight seers puckah, equal to about 96 lbs. It has been remarked by Fred. Cuvier, that the fat of these tails, when melted, does not return on cooling to the state of fat, and this assertion is a fact well known to the Afghans, who sell and use it mixed with the ghee formed from milk. Some objections were on this account offered to the ghee by our sepahees, but their scruples soon vanished.

56. The reverse is the opinion in Europe.—T. H.

For particulars regarding the wool of these sheep, I must refer the reader to a former paper, published in the Journal of the Asiatic Society of Bengal, No. 99, and likewise to some very pertinent remarks by Dr. Griffith, in the 120th No. of the same Journal.⁵⁷

No. 47. *Capra megaceros*, (mihi. For remarks on this species, see McClelland's 'Journal Nat. Hist.'). This I consider to be a true wild species, and not an accidental race as you suppose. It is the "*Markhore*," or snake-killer of the Afghans.⁵⁸

No. 48. *Capra egagrus*: "*Boos*," of the Afghans: Ibex, of writers on Afghanistan.

I have nothing to add to my former notice of this animal in McClelland's 'Journal Nat. Hist.:' the experiments, however, which I was making on the cross between it and the domestic goat, have all failed hitherto, in so far as the production of offspring, *inter se*, is concerned. I brought from Candahar a half-bred female, the produce of a wild female by a domestic male; this female was again crossed by a tame goat, and brought forth two fine male animals, by one of which she subsequently had kids which lived and grew up; none of her offspring however, have as yet bred *inter se*, and most of them, together with the half-bred mother, are now dead; I have still a few of the young ones left, and shall notice any produce that may occur from them. As yet, however, we have gained nothing in regard to the opinion that the *egagrus* is the original stock from which our domestic breeds have

57. They are sometimes four or five-horned, but this is only an exception, not a general rule, as some accounts would have us believe.—T. H.

58. In my description of the spiral horns of this animal, *Proc. Zool. Soc.* 1840, p. 80, I made a grand mistake in stating the spirature to be inwardly directed, as in all spiral-horned domestic goats; the fact being, that in the *Markhore*, as in every other species I know of, which has spiral horns in its natural wild state, (*e. g.* the Indian Antelope, the Addax, Koodoo, and Caffrarian Impoof,) the twirl is in the opposite direction. Capt. Hutton mistook my meaning in his remarks, (*Cal. Journ. N. H.* II, 541,) upon the "*inward tendency*, at least at the tips," which I mentioned as being almost invariably observable in the endlessly diversified races of domestic goats; supposing that I intended the convergence generally observable towards the tips of the long arched horns of the majority of wild *Capræ*,—a character of very trifling importance, even if constant, which it is not. And I may here also remark on the subject of the Himalayan Ibex (*Capra saken*, nobis), of which my notice was briefly commented upon by Capt. Hutton, that, in addition to the differences which I indicated as distinguishing its horns from those of the Swiss Ibex, the existence of a well developed beard (four inches long, in the head of a young male in the Society's Museum,) affords a conspicuous differential feature; for the beard of the Swiss Ibex is constantly reduced to the merest rudimentary tuft, such as would remain unnoticed if not specially looked for.—*Cur. As. Soc.*

sprung, but as far as experiments have been carried, strong doubts arise in my mind as to the correctness of such a doctrine.⁵⁹

No. 49. Domestic goats. The domestic Goats of the Afghans are chiefly long-haired, with an under-coat of fine soft down. They very much resemble the Goats of the lower Himalaya and Kooloo, and appear to be a degenerate breed or perhaps variety of the true Shawl Goat. The prevailing colour is black, or parti-coloured.

No. 50. *Camelus dromedarius*. The Dromedary or Arabian Camel. "Shootur," of Persians, &c.⁶⁰

59. *Capra aegagrus* is stated by Menetries to be "not uncommon on the Caucasian Alps, seldom if ever descending below an elevation of 1000 feet, and then not in consequence of severe weather." It appears to be generally diffused over the mountains of Persia and Asia Minor, and the adjoining regions of Western Tartary. The London Zoological Society possess a fine specimen of it from the vicinity of Erzeroum. The finest pair of horns of this species which I have seen, is in the British Museum. They measure four feet and a quarter over the curvature, and diverge to sixteen inches apart where widest, not very far from the extremity, the tips returning to fourteen inches of each other: basal circumference nine inches; and depth inside three and three-quarters: they number ten years of growth. It is not usual, however, for this species to exceed three feet and a half in the length of its horns, though these are not unfrequently four inches, or even more, deep at the base.—*Cur. As. Soc.*

60. The two species of Camel are better denominated the one-humped and the two-humped Camels, and the name 'Dromedary' (from *δρομας*) should be restricted to the swift-running breeds which occur of both of them. Hitherto, the Camel and Dromedary have been continually spoken of as distinct animals, sometimes the one, and sometimes the other, bearing either name. Thus Burkhardt refers to the two-humped species by the name dromedary, when he affirms that "the Armenian or Caramanian camel is produced by a he-dromedary and a she Arab camel. The people of Anatolia," he adds, "keep their male dromedaries to breed with the females of the smaller Arab race, which the Turkomans yearly bring to market. If left to breed among themselves, the Caramanian camels produce a puny race, of little value." ('Travels in Nubia,' p. 232.) By the French writers more particularly, the one-humped species (having indeed been termed *C. Dromedarius* by Linnæus,) is commonly styled the Dromedary, as Capt. Hutton also designates it. The mixed race was long ago described by Oleareus, as "a hybrid between the male two-humped and female one-humped camels. They are the most esteemed of all, so much so, that some sell (in Turkey) at 1,000 crowns a piece. They carry 900 or 1,000 weight, and are in a manner indefatigable. They are muzzled. The camels which come of these degenerate very much, and are heavy and slow, being not worth more than 80 or 140 crowns." At Aleppo, the usual price of one of these hybrids is double that of an Arab camel: they are extensively employed in Turkey and Persia; and Sonnini observed a few in Egypt, where they are still rare. These hybrids are, I believe, always of the dark colour of the male, or two-humped parent. The common Indian race, which is diffused hence westward to Senegambia, appears to be constantly of a pale colour in this country; and it is perhaps only the *Dromedary*, or fleet race of it, which is occasionally variable in hue. Thus, in Arabia, we are informed that a lady of Nadja considers it a degradation to mount any other than a black camel, while an Ozanian beauty prefers one that is grey or white. In the continuation of Clapperton's Journey by Lander, we are told of the arrival of 500

The Camel with one hump is in use throughout Afghanistan, but is of a much more robust and compact form than our Indian variety, and well suited to the hilly regions it often has to traverse.

Nothing can be more erroneous, however, than the common belief that the Camel is a hardy animal; so opposed to this is the Afghan opinion, that they used to exclaim with astonishment at the indifference generally shown by us to the comfort of this useful creature. They were often heard to say, "you take immense trouble, and incur great expense in pampering *your men and horses*, but the camel is altogether neglected, although if you wish him to thrive and do his work, you must both feed him well, and clothe and house him too, in winter and in wet weather." In every case where practicable, they acted up to this advice themselves, and no sooner does an Afghan *cafilah* come to its ground after a march, than *the camels are seated round a heap of leaves, straw or grain*. With us, on the contrary, our poor brutes after wandering along from four o'clock in the morning till two or three o'clock in the afternoon, with heavy loads badly fixed upon their backs, no sooner arrived in camp than they were turned out to pick up a morsel around the tents over stoney plains, which produced scarcely any plants of sufficient size to furnish a bite even for sheep, and after a couple of hours passed in an ineffectual search for food, the starving brutes were driven back to camp, and tethered for the night, in most instances without a particle of grain or other food. What wonder then that dozens could not rise beneath a load on the following morning, and were left to be the prey of ravens or the prize of the almost as ravenous Afghan! Let those who prized their cattle, and made some efforts to clothe and feed

camels laden with salt from the borders of the great desert, which "were preceded by a party of Tuarick merchants, whose appearance was grand and imposing. They entered all full trot, riding on handsome camels, some of them red and white, and others black and white," ('Clapperton's' 2nd 'Expedition,' p. 266.) These parti-coloured individuals remind us of the Peruvian Alpaca. In Arabia, and in all northern Africa, much attention is bestowed upon regulating the propagation of the best sort of camels, but especially of the lighter kinds or dromedaries,—termed *Asharry* and *Mahairy*, in Barbary. "Those of Oman," writes the late Lieut. Wellsted, "enjoy a deserved celebrity for strength and swiftness. Nejd is equally the nursery of the camel as of the horse; but the Omary, in all ages, is celebrated in the songs of the Arabs as producing the fleetest; their legs are more slender and straight; their eyes more prominent and sparkling; and their whole appearance denotes them to be of higher lineage than the ordinary breed of the animal." ('Travels in Arabia,' II, 291.) The smallness of the head is a conspicuous and characteristic feature of a true dromedary.—*Cur. As. Soc.*

them on the march, speak as to the benefit they derived from their humanity; camels thus cared for, were brought in safety and in health from India, and again returned to it after marching through the country, and passing through the first campaign.

Numbers of camels that were abandoned on the line of march every morning, from their inability to carry a load, were afterwards hawked about for sale by the country people who had housed, fed, and recovered them. This I know to be a fact, for being in the Shah's commissariat at Candahar, I purchased several of them. That the animal is patient under privations, and will endure to the death, is quite true; but his constitution is tender, and his power of endurance, unless well fed and cared for, is not equal to that of the horse. Rest, food, and warmth, in a word—*comfort*, is more necessary to the camel than to his cruel lord and master.

The Dromedary of Central Asia differs much in its external characters from the animal domesticated in India. In the former we perceive a shortness and a strength of limb, and bulk of carcase, which form a marked contrast to the tall and stately "desert sheep" of India; the one is a short, thick-set, powerfully-made animal, well clothed with a thick close curly hair, to protect it against the cold of winter; the fore-arm often enormously thick and muscular; the hump rounded and compact, and *on a level with which the crown of the head is almost invariably carried*.

The other is a tall, long-limbed, long-necked animal, which placed beside its congener of Korassan, reduces the latter to a mere athletic dwarf;—the thick coat of hair is wanting or considerably reduced, and the head is carried high *above the hump*. Yet notwithstanding the marked dissimilarity in their general configuration, the two animals can only be regarded as varieties of the same species, the differences observable being, I think, solely attributable to climate, domestication, and the different circumstances under which both individuals are placed. I am aware, that in advocating the agency of climate and food, as the great causes which have served to modify the species, I am in a measure reviving an exploded doctrine, yet I am not sure that absolute rejection of the doctrine is altogether warranted or wise; for Cuvier himself declares, "that the wild herbivorous animals feel the influence of climate somewhat more extensively (than the *carnivora*), because there is added to it in their case, the influence of the food, which may happen to differ both

as to quantity and quality. Thus, the Elephants of one forest are often larger than those of another; and their tusks are somewhat longer in places where their food may happen to be more favourable for the production of ivory."⁶¹

Now, precisely the same remarks will apply to the camel, and while, in a country deficient in woody productions, the animal is of small stature, the very reverse is found to be the case in India, where the camel browses entirely on leaves and woody branches favourable to his growth. Every consideration tends to point out to us, that the Indian dromedary is not in its original country, and that adapted as it is by nature for existence in the dry and sandy plains of an arid region like Arabia, its occurrence at all within the influence of the monsoons, is entirely to be attributed to the agency of man, who has brought it with him in a state of domestication from the Postdiluvian focus of diffusion, across mountains and broad rapid rivers, which in its natural state of freedom would have formed insuperable barriers to its further progress eastward, than the long range of mountains extending downwards from the great northern chain through Beloochistan even to the sea, forming a well-worked natural boundary between India and the states of Central Asia. The camel of Korassan is formed for grazing in a country where its food is gathered from the ground, and where it has to perform long journeys through mountain passes and defiles; its shortness and strength of limb are therefore well adapted to its mode of life, and the severity of its climate; while on the other hand, the Indian variety having a range of long and almost interminable level country to travel over, where its chief food consists of the leaves and tender branches of trees, has become modified by domestication to meet the circumstances of its present condition, and thus its limbs are less powerfully built, its body less clothed with hair, and its proportions adapted to reach the food by which the change has been effected, and in which it delights.

Much has been said regarding the existence or non-existence of this animal in a state of freedom, and as yet all tends to prove that neither the camel nor the dromedary have been known wild since the present historical era commenced. It can scarcely be thought possible, that animals of such magnitude as these, can be still living wild in herds upon any country of the known earth, and yet that they should have eluded the researches of naturalists; for although it has been stated by

some of the older writers, that in their times the camel was found in the regions of Tartary, yet as their accounts have been corroborated by no later travellers, and as I feel assured, from information carefully collected during a two years' residence at Candahar, from traders to Bokhara and other neighbouring states, that none are found wild in our days, it is most probable that the herds described as once existing in a state of freedom within the modern era, were either as Cuvier has suggested, individuals let loose from religious motives by the Calmucks, or that they were troops of young or even fold animals, turned out to graze together in the breeding districts, as is the custom where pasture is plentiful and the animal not required for immediate labour. This conjecture would more particularly apply to the two-humped or Bactrian camel, which, from its constitution being suited more especially to the cold regions of the northern Steppes, is unable to perform long journeys southward during the heats of summer, and they may therefore be left at that season to roam and feed in herds upon the plains of the Khuzzak country to the north of Bokhara, which appears to be the proper habitat of the species, until the winter setting in again enables them to travel with *kafilahs* of merchandise, into Russia and other states. It is very certain, however, that if the camel seen by the old authors, or even by Mr. Trebeck, in his tour to Ludak,⁶² was on the Steppes of Tartary, it could have been no other than the Bactrian species, for the Arabian camel would be wholly unable to endure the rigours of the climate in those northern latitudes. Balkh and Bokhara, appearing by all accounts to be the most northern limit in which it can live, and even there it requires the greatest care and the comfort of warm clothing and shelter, to enable it to survive the cold of the winter months. Thus, after all, even if the Bactrian camel could be proved to have been wild within the historical era, we should still require proof that the dromedary had been so found, and as all the arguments hitherto have had reference to this last species, we are still authorised in believing that it at least has never been known to man in a state of natural freedom since the present order of things commenced.

From strict and careful inquiries instituted during a two years' residence in Afghanistan, through traders of all classes who were in the constant habit of travelling into the Tartar countries, as well as through some Khuzzak camel drivers, I am unhesitatingly inclined to adopt the

62. Vide Editor's Note.—*Journal As. Soc.*, No. F.

belief, that neither the one nor the other camel exists wild at present, or has done so since the flood of Noah. The late Sir A. Burnes, with whom I corresponded on such subjects, replied to one of my last letters as follows : "Caubul, 25th May, 1841. I have never seen or heard of the camel being wild, nor do I credit the report if from Moorcroft ; but that the animal, at some time or other, must have been, like all other animals, in a state of nature is clear, though certainly not in the historical era : the natives all say the same." This was written in answer to repeated inquiries from me regarding the existence of wild camels in the northern Steppes ; and Sir A. Burnes, after a careful examination of all who were likely to throw any light upon the subject, came to the only conclusion that any one can arrive at, namely, that neither species has been known to *Postdiluvian man*, in a state of freedom.

This species (*C. dromedarius*) is not only useful as a beast of burthen to travel with merchandise, but yields a soft and durable wool, which is converted into cloth. In the valley of Pisheen, I have likewise seen them yoked together in the plough, and compelled to till the ground.

No. 51. *Camelus bactrianus*.—Two-humped camel. "Bagdad-i," of Afghans.

This animal is too impatient of heat to undergo even the climate of Candahar for more than a year or two. His true habitat is in the Khuzzak country ; he is found in caravans which journey to the south, but is not kept in Afghanistan. While this two-humped species cannot undergo the heats of the south, the dromedary on the other hand cannot endure the rigours of the north. To obviate the inconvenience which might arise from this circumstance, the Afghans, or rather the tribes of the northern Steppes, have produced a crossed breed between the two animals, which is enormously powerful and of large stature. Its general appearance varies according as the dam has been a camel or a dromedary, and it is asserted, that if the hybrid animal is *born* in the northern Steppes its constitution unfits it for a continued residence in a hot country, while on the other hand, if born in a warm climate, it cannot endure a great degree of cold. This circumstance is worth attending to, since I heard of several persons, who were anxious to introduce the hybrid into India, in order to strengthen our dromedaries. The cross however, should be obtained from the camel and female dromedary, and the produce be born in our own provinces, if the assertion of the Afghans is to be relied on. I do not think, however, that any good

would result from crossing our breed, which is admirably adapted to the Indian climate and the work it has to perform, and we may perhaps in this case, follow with advantage, the old adage of "Let well alone."

The species said to exist among the Kirguise, and supposed to be distinct from the two forementioned species, is, in all probability, nothing more than the hybrid obtained from the camel and dromedary. I heard of no instance of the hybrids breeding *inter se*, but at the same time I do not consider the point decided, or even of consequence, either one way or the other; as the fact of hybrids breeding *inter se* cannot prove identity of species in the original parent stock, since I have more than once obtained and reared offspring from hybrid birds, which offspring moreover again bred *inter se*. Yet, notwithstanding this, the original species were distinct, being the one a female canary, and the other a common linnet. Such being the case, it must be evident that if the offspring of the domestic goat and the wild *ægagrus* were proved capable of breeding *inter se*, it would not show that the wild and domestic breeds were identical!

In respect to the stock from which the camels originally descended, I hold the same opinions as those set forth in regard to the domestic sheep and goats, namely, that they never had, during the historical era, any wild representatives, the whole having been retained by man after the exit from the Ark. The camels, therefore, like most others of our domestic cattle, I hold to be species whose original stock perished in the waters of the Noarchian deluge. These opinions will elsewhere lead me to remark upon the habitats of the modern camels, with a view to ascertain whether both could have spread from the focus of Postdiluvian diffusion, or whether the country of Armenia be in reality the true resting place of the Ark, a point on which I am inclined to be sceptical.

No. 52. *Sciurus palmarum*.—The Palm Squirrel.

This little animal is found in the Bhawalpore country, and extends into the jungles of Cutchee as far as the borders of the "Putt," or desert between Poojaun and Burashore. It does not appear to cross that desert, and is not found in Afghanistan.

P. S.—I think I may venture to say, that very few wild mammalia occur below Ghuznee, which have not been here noticed, and those will probably be small species.

In the northerly mountains of Cabul, &c. doubtless many are found, but as my personal observations were confined to the neighbourhood of

Candahar and the route to that city, I shall not venture further on the subject. I do not think, however, that any large ruminants will be found even there.

I will send you a notice of the birds collected also.

These notes are not arranged in order, but that you can easily rectify. I have been obliged to write them for you as I could lay my hands on my old memoranda, which have become confused. You are at liberty to describe, and name any species that may appear new.

THOMAS HUTTON.

Additions and corrections to former Notes, Vol. XIV, p. 340 et seq.

NOTE 2, p. 341.—With reference to the range of the Tiger on the Himalaya, I should have quoted the Rev. R. Everest's paper 'On the power of enduring cold in the mammalia of hot countries,' published in *An. and Mag. Nat. Hist.*, VIII, 325. "The Tiger," remarks that gentleman, "is very scarce in the Himalaya, even in summer time, being too large and unwieldy an animal to follow the caprine races over the precipitous ground. I, however, met with their tracks on the snow near my house; and while shooting in the oak-forest, from 5,000 to 6,000 feet above the sea, had one of my people carried away by one. They can go wherever the [Jerrow (*Cervus Aristotelis*.)] can obtain a footing, and remain on a mountain north of Mussoorie, (Nagtiba, near 10,000 feet in height,) all the year round. They live principally on stags and also bears."

NOTE 6, p. 342.—Prof. Behn, of Kiel University, and now with the Danish expedition on board the *Galathea*, pronounces this to be distinct from the European *Felis sylvestris*. The state of the skin does not permit of a satisfactory description being taken from it; but it may be briefly characterized as of a light fulvous colour, mottled or varied with blackish on the back, which colour forms somewhat large, transverse, ill-defined stripes on the sides and limbs, and more distant spots on the under-parts: the tail tapering, with five or six rings of black, and a black tip; and the fur moderately long and dense. Length about two feet, the tail a foot more. If new, *F. Huttoni*, nobis.

NOTE 8, p. 343.—"The Afghan pointer," remarks the late Major Brown, "has been long known, having occasionally been brought down for sale by the fruit-merchants; but they have never been considered equal to the English dog. In Afghanistan they are called *Boders*, and are used for shooting pretty generally throughout that country, including Cashmere. They have rather a coarse heavy appearance, and the one now described resembles a Beagle a good deal; otherwise it has much the appearance of an India-bred English pointer. The hair is smooth, of a red and white colour: it stands short on the legs, with a large double dew-claw on each hind-leg, which has a very ugly appearance. Its ears are well hung but short; the breadth at the forehead is great, but the muzzle small, and it has great natural courage. Apparently it has never been broken in, and some large scars about the head testify that it has fought some hard battles in its day." 'Gunga,' in *Bengal Sporting Magazine*.

NOTE 15, p. 346. *Mangusta pallipes*. Since the note referred to was written, the Society has received specimens of *M. Edwardsii* (apud Ogilby) from Agra, which render it extremely doubtful whether the Afghan species can be considered more than a variety of the same: upon comparison of the skulls, however, the first false molar of both jaws is much smaller in Afghan than in Bengal specimens. The last appear

always to be of a much darker and browner colour, resembling those from Nepal—*M. auropunctata* of Hodgson, which name will, I believe, stand.

NOTES 19 and 20, p. 352 *et seq.* Hedgehogs. The Indian species of this genus are still much in need of investigation. Four have received names, as follow :—

1. *E. collaris*, Gray: founded upon Gen. Hardwicke's figure of a specimen obtained in the 'Dooab.' This is represented to have uniformly blackish spines, rather large ears, which are greatly emarginated posteriorly, a blackish face, more rufous chest, and a narrow band of pure white on the throat, commencing from the ear. In Mr. Gray's recent catalogue of the mammalia in the British Museum, three specimens referred to this animal are enumerated, one of them from Madras, presented by Walter Elliot, Esq.

2. *E. spatangus*, Bennet, *Proc. Zool. Soc.* 1832, p. 123.

3. *E. Grayi*, Bennet, *ibid.* p. 124. Both from the Himalaya, and referred "to that extra European form of the genus *Erinaceus*, which is distinguished by the possession of large ears."

4. *E. mentalis*, Gray; "Black-chinned Hedgehog," from the Himalaya.—Seemingly undescribed, being merely enumerated with the preceding three in Mr. Gray's catalogue of the British Museum mammalia.

Capt. Hutton's No. 19, from Afghanistan, to which I gave the provisional name *megalogotis*, would seem to approximate the *E. spatangus*; but the difference of size is too great to admit of the probability of their being young and adult of the same, the advanced dentition of Mr. Bennet's specimen leading him to suppose it "probably not fully adult, there being only two false molars on each side of the upper jaw." The head and body of *E. spatangus* are given as but three inches and a quarter, tail a quarter of an inch, ears three inches and a quarter, and tarse to end of claws an inch. Capt. Hutton's recent Afghan specimen is described as about a foot in length, minus the tail, the latter measuring an inch and a half. (?) The example of it sent, is about the size of a moderately large European Hedgehog, with great ovate ears, an inch and a quarter long, and seven-eighths in extreme breadth: tarse to end of claws an inch and a half, tail but five-eighths; entire length of skull, with projecting upper incisors, two inches and a quarter.

Of Capt. Hutton's No. 18, the first and second specimens mentioned by him are, I suspect, rightly referred to *E. collaris*: but his third specimen seems, from the description, identical with one in the Society's museum, the locality of which is unknown, and also with others from S. India, obligingly sent me on loan by Mr. Elliot, and to which I suspect that Mr. Gray's 'Madras' specimen (presented by Mr. Elliot), and probably the two others referred by him to *E. collaris*, likewise appertain. The crania and dentition of an adult sent by Mr. Elliot, and that of the Society's specimen, correspond exactly: but Capt. Hutton's skull of the Bhawalpore Hedgehog presents some differences; the general form is rather shorter and broader, it is more constricted between the orbits, and the zygomæ are considerably more projecting; the small upper pre-molar anterior to the scissor-tooth is less minute; and in the lower jaw, the second lateral pair of incisors from the front are much smaller, as indeed are also the next or last pair of the true incisors. If new, I propose to call this species *E. micropus*.

Another Asiatic hedgehog, additional also to *E. auritus* of Siberia, and nearly allied to the European species, is *E. concolor*, Martin. *P. Z. S.* 1837, p. 103, described from a specimen received from Trebizond.—*Cuv. As. Soc.*

JOURNAL

OF THE

ASIATIC SOCIETY.

CATALOGUE OF MAMMALIA.

Inhabiting the MALAYAN PENINSULA AND ISLANDS.

*Collected or observed by THEODORE CANTOR, M. D., Bengal
Medical Service.*

☞ Localities printed in *Italics* signify those from whence the animals of the Catalogue were obtained; in ordinary type those previously given by authors.

QUADRUMANA.

SIMIADÆ.

GEN.—PITHECUS, *Geoffroy.*

PITHECUS SATYRUS, *Geoffroy.*

SYN.—*Simia Satyrus*, Linné.

Simia Agrias, Schreber.

Singe de Wurmb, Audebert.

Papio Wurmbii, Latreille.

Pithecus Satyrus, Desmarest.

Simia Wurmbii, Kuhl.

Orang Pandak, Raffles.

Simia Satyrus,
Simia Abelii,
Simia Wurmbii, } *apud Fisher.*

No. 171. No. 87, NEW SERIES.

2 A

Simia Satyrus, apud Ogilby.

Satyrus rufus, Lesson.

Pithecus Satyrus, apud Martin.

Simia Satyrus, apud Schinz.

"O'rang U'tan" of the Malays.

HAB.—*Borneo, Sumatra.*

The physiognomy and the colour of the face exhibit a marked difference in living individuals from the two localities.*

GEN.—*HYLOBATES*, Illiger.

HYLOBATES LAR, Ogilby.

SYN.—Grand Gibbon, Buffon.

Homo Lar, Linné, Mantiss.

Simia longimana, Schreber.

Simia longimana, Grand, et Petit Gibbon, Erxleb.

Simia Lar, Linné Syst.

Le Gibbon, Audebert.

Pithecus Lar, Desmarest.

Simia albimana, Vigors and Horsfield.

Simia Lar, apud Fischer.

Hylobates Lar, Lesson, apud Martin.

Hylobates albimanus, apud Schinz.

"Ungka étam" of the Malays of the Peninsula.

HAB.—*Malayan Peninsula.*

Siam, Burmah, Tenasserim.

LIGHT-COLOURED VAR.

SYN.—Petit Gibbon, Buffon.

Simia Lar, β . Linné.

Pithecus variegatus, Geoff.

Pithecus variegatus, apud Kuhl.

Pithecus variegatus, apud Desmarest.

Hylobates variegatus, Ogilby.

Hylobates leuciscus, apud Cantor. Ann. and Mag. of Nat. Hist.

"Ungka puti" and "Wow-wow" of the Malays of the Peninsula.

* An excellent likeness of a young male Bornean Orang Utan, living in my possession upwards of two years, has lately been taken by Mr. Thornam, one of the artists of the scientific expedition on His Danish Majesty's Ship 'Galathea.'

The colour varies from blackish-brown to light-brown, yellowish or dirty-white, sometimes uniform, sometimes mottled. The index and middle toes, of both or of one foot, are in some individuals, of whatever sex or shade of colour, united by a broad web throughout the whole of the first phalanx; in some partially so, and in others not. The ribs vary from twelve (7+5) to thirteen pairs (7+6,) as observed by Mr. Blyth, (Journal Asiatic Society 1841, Vol. X. p. 839.)

HYLOBATES AGILIS, F. Cuvier.

VAR. UNGKA ETAM, Martin.

SYN.—Ungka etam, Raffles.

Oungka, Hylobates Lar, F. Cuv.

Simia Lar, Vigors and Horsfield.

Hylobates Rafflesii, Geoff. apud Ogilby.

Hylobates variegatus, Müller apud Schinz*.

“Ungka etam” of the Malays of the Peninsula.

HAB.—*Malayan Peninsula*, (*Malacca, Purús, Kéddah, Púngah.*)
Sumatra.

The first phalanges of the index and middle toe are in some individuals of either sex, partially or entirely united by a web. Sometimes the first phalanx of the middle toe is partially united to the fourth.

An adult male examined, had thirteen pair of ribs (6+7), an adult female fourteen, (7+7), a young male on the left side thirteen (7+6), on the right twelve (7+5). In these three individuals the stomach was constricted at the fundus and the pyloric part, which characters, when compared with specimens of *Hylobates agilis* from Sumatra, will go far to decide the identity of that species and *H. Rafflesii*. On the Malayan Peninsula, the latter appears to be less numerous than *H. Lar*. The light-coloured Var. of *H. agilis* I have not seen.

HYLOBATES LEUCISCUS, Kuhl.

SYN.—“Wou-wou,” Camper.

Simia leucisca, Schreber.

Simia moloch, Audebert.

Pithecus cinereus, Latreille.

Pithecus leuciscus, Geoffroy.

Pithecus leuciscus, apud Desmarest.

* Schinz gives as a synonyme: *Pithecus variegatus*, Geoff. which, however, is *Hylobates Lar*, Var.

Simia leucisca, apud Fisher.

Hylobates leuciscus, apud Ogilby.

Hylobates leuciscus, apud Schinz.*

HAB.—*Borneo*, ?

Java.

GEN.—*SEMNOPIITHECUS*, F. Cuv.

SEMNOPIITHECUS *OBSCURUS*, Reid.

SYN.—*Simia maura* ? Lin. Lotong, apud Raffles.†

Semnopithecus leucomystax, Temm. in MSS.

Semnopithecus obscurus, apud Martin.

Presbytes obscura, Gray, List of Mamm. B. M.

Semnopithecus sumatranus, Müller, apud Schinz.‡

Semnopithecus halonifer, Cantor, Proceed. Linn. Soc.

"Lótong" or "Lótong étam," of the Malays of the Peninsula.

HAB.—*Malayan Peninsula*, *Pinang*, *Singapore*.

District adjacent to Singapore, in the Malayan Peninsula.

SEMNOPIITHECUS *ALBOCINEREUS*, Schinz.

SYN.—*Cercopithecus albocinereus*, Desmarest.

Simia albocinerea, Fisher.

Semnopithecus dorsatus, (young) Waterhouse MSS.§ apud

Presbytes cinerea, Gray, List.

[Martin.

Semnopithecus albimanus, Is. Geoff. ?

"Ka-ka" of the Malays of the Peninsula.

HAB.—*Malayan Peninsula*.

* Among the Syn. occurs *Ungka puti*, Raffles, which is *Hylobates agilis*.

† The Hab. Pinang and Singapore, in neither of which islands *Semnopithecus femoralis* appears to occur, tends to prove, that Sir S. Raffles did not, as it has been supposed, refer to that species. His short description indicates *S. obscurus* (Lotong,) the most common species in both islands. Sir S. Raffles evidently did not describe the living animal, or he would not have omitted one of the most striking characters, viz. the white marks of the face, which, in preserved specimens, become obliterated, so that the face appears uniformly black. The omission of this character by Sir S. Raffles, and subsequently by later describers of this species, has given rise to confusion.

‡ Schinz repeats *S. femoralis*, Martin, as a Syn. for *S. sumatranus*, and says in a note, that Müller in his monograph of *Semnopithecus* refers that species to his *S. sumatranus* (Schinz Syn. Mam. I. p. 39, note.) Were even the two identical, the species should not have been renamed, as *S. femoralis*, Horsfield, not Martin, would take precedence, being the denomination under which Dr. Horsfield described it in the *Appendix to the Life of Sir T. Stamford Raffles*, 1830.

§ Martin, p. 481, refers the young *S. dorsatus* to *S. femoralis*, but the description is that of the young of the present species.

The young of this species, described by Martin, p. 481, is from the peculiar distribution of the colours, as easily distinguished from the young of *S. obscurus*, as it is difficult to distinguish the adults of these two species. Both attain to the same size, have in common the shape of the body, the white marks of the face, and the general distribution of colours. In the adult of the present species the prevailing colours are clear ashy-grey above, and white below. On either parietal bone, the hairs form a whorl, and the anterior are directed forward, projecting beyond the eyebrows. The two whorls are distinct in the young, though the hairs of the head are too short to mingle with the long, erect, divergent, black hairs of the eyebrows. Just below the spot where the two whorls come in contact, the skull is naked, thus forming a rather broad, triangular forehead. The general colour of *S. obscurus*, both in the young and adult state, is considerably darker. On the upper parts a blackish, or brownish ash colour prevails, lighter below, which acquires in some individuals a whitish appearance, from the white skin of the stomach, which is but scantily covered with hairs. Of parietal whorls there is no trace; the hairs of the head, directed backwards, originate in a peak as far down as the glabella, and are smoothed down on the top of the head from the occipital crest backward.

SEMNOPIHECUS CRISTATUS, Horsfield.

SYN.—*Simia cristata*, Chingkau, Raffles.

Semnopithecus pruinosus, Desmarest.

Semnopithecus pruinosus, apud Lesson.

Semnopithecus cristatus, apud Martin.

Presbytes cristata, Gray:* List.

Semnopithecus cristatus, apud Schinz.*

HAB.—*Pinang, Malayan Peninsula.*

Sumatra, Borneo, Banka.

The whitish colour round the eyes and the mouth is present, though less distinct in this than in the preceding two species.

SEMNOPIHECUS FEMORALIS, Horsfield.

SYN.—*Semnopithecus chrysomelas*, Muller, apud Martin and Schinz.

* Gray quotes *S. maurus*, Horsfield, and Schinz *S. femoralis*, Martin, as synonyms, both of which are species, in physiognomy, colours, and, as far as *S. maurus* is concerned, in habits distinctly different from the present one.

HAB.—*Purli's* (on the Malayan Peninsula.)

Borneo, Java (?), Sumatra (?).

In a young male of this, apparently everywhere difficultly procurable species, the face during life was intense black, except the white-haired lips and the chin, which were of a milk-white colour. In the preserved specimen, the latter soon changed into the dull brownish-black of the rest of the face. The interdigital membrane, often loosely connecting the first phalanges of the four fingers and toes in *S. obscurus*, *albocinereus*, *cristatus* and other Malayan monkeys, was also present in this individual, in which even the first and second phalanges of the index and middle toe were thus connected. In preserved specimens, the interdigital web becomes shrivelled and indistinct, and therefore, being at all times a very questionable, if not altogether inadmissible, specific character, ought in such state to be least relied upon. On its arrival at Pinang, the animal was in too sickly a state to allow of its natural habits being observed.

GEN.—*CERCOPITHECUS*, apud *Ogilby*.

CERCOPITHECUS CYNOMOLGUS, *Ogilby*.

SYN.—*Simia cynomolgus*, Linné.

Simia aygula, Linné.

Simia attys, Schreber.

Macacus cynomolgus, Desmarest.

Simia fascicularis, Raffles.

Cercocebus aygula, Geoff. apud Horsfield.

Macacus cynomolgus, apud Gray : List.

Macacus cynomolgus, apud Schinz.

"Kra" of the Malays of the Peninsula.

HAB.—*Pinang*, *Malayan Peninsula*.

Sumatra, Java, Banka, Borneo, Celebes, Timor, Tenasserim, Nicobar Islands.

The first phalanges of the four fingers and toes, and in some individuals also the second phalanges of the toes, are united by a membrane.

GEN.—*PAPIO*, apud *Ogilby*.

PAPIO NEMESTRINUS, *Ogilby*.

SYN.—*Simia nemestrinus*, Linné.

Simia platypygus, Schreber.

Simia fusca, Shaw.

Macacus nemestrinus, Desmarest.

Simia carpolegus, Raffles.

Macacus nemestrinus, apud Gray, List.

Macacus nemestrinus, apud Schinz.

"Broh" of the Malays of the Peninsula.

HAB.—*Pinang, Malayan Peninsula.*

Sumatra, Borneo.

The interdigital membrane of the first phalanges of the four fingers and index, and middle toe, occurs also in this species.

LEMURIDÆ.

GEN.—*NYCTICEBUS*, Geoffroy.

NYCTICEBUS TARDIGRADUS, Waterhouse, Cat. Zool. Soc.

SYN.—*Lemur tardigradus*, Linné apud Raffles.

Nycticebus bengalensis, Geoff.

Nycticebus javanicus, Geoff.

Loris tardigradus, Geoff.

Stenops javanicus, Van der Hoeven.

Stenops tardigradus, Wagner, apud Schinz.

"Kúkang" of the Malays of the Peninsula.

HAB.—*Pinang, Malayan Peninsula.*

Java, Siam, Tenasserim, Arracan, Sylhet, Assam.

The sublingual appendage is cartilaginous, of a white colour; the apex divided in a number of fine points. The new-born is of the same colour as the adult, but paler, and has the dense, soft fur, mixed with a number of long hairs, grey at the base, white at the point. In a male, measuring from the apex of the nose to the root of the tail one foot two and a half inches, the tail five-eighths of an inch, the dimensions of the intestinal canal, were:

Small Intestines,	3 feet $\frac{1}{2}$ inches.
Large ditto,	2 „ $3\frac{1}{2}$ „
Cæcum,	0 „ $3\frac{1}{2}$ „

GEN.—*GALEOPITHECUS*, Pallas.

GALEOPITHECUS TEMMINCKII, Waterhouse.

SYN.—*Lemur volans*, Linn. apud Marsden and Raffles.

"Kúbong" or "Kúrbong" of the Malays of the Peninsula.

HAB.—*Singapore, Pinang, and other Islands in the Straits of Malacca, Lancavy Islands, Malayan Peninsula.*

Java, Sumatra, Borneo, Pelew Islands, Siam.

Two individuals are never of precisely the same design and ground-colour, which latter varies from clear ashy-grey to greyish-brown or chesnut. The white spots on the back of the anterior extremities, appear to be constant in every age. Though there are four mammae, situated in pairs one above the other, close to the axilla, of a number of females with young, none had more than one offspring, which was carried wrapped in the wide mantle-like membrane. In several shot on the hills at Pinang, the stomach contained vegetable matter, but no remains of insects. In confinement, plantains constitute the favourite food, but deprived of liberty the animal soon pines and dies. The anterior margin of the broad smooth tongue has a fringed appearance, produced by a number of rounded papillae. In a male, measuring from the apex of the nose to the root of the tail one foot four inches, the tail nine inches, the intestinal canal was of the following dimensions :

Small Intestines, 4 feet 4 inches.

Large ditto, 7 „ 7 „

Cæcum, 0 „ 11 „

Costæ veræ seven pairs, spuriae six pairs.

CARNIVORA.

CHEIROPTERA.

INSECTIVORA.

GEN.—RHINOPOMA, *Geoffroy.*

RHINOPOMA, HARDWICKII, Gray.

SYN.—*Vespertilio* (Rhinopoma) Hardwickii, Elliot.

HAB.—*Malayan Peninsula.*

Southern Mahratta country, Calcutta, Allahabad,* Agra,†
Mirzapore.

A single male, in no way differing from Bengal individuals, was obtained by Captain Congalton, H. C. Steamer 'Diana,' in a cave on an island in Girbee river, in Latitude 8° 0', on the Malayan Peninsula.

This species is provided with a true cæcum, the existence of which in all Cheiroptera has erroneously been denied, or restricted to the car-

* Numbers inhabit the subterraneous Hindoo place of worship within the Fort at Allahabad.

† In the Taj-Mahal.

diac cæcum observed in the genera *Vampyrus* and *Pteropus*. The present species, and *Megaderma spasma*, also possessing a true cæcum, thus present a higher organisation than has hitherto been attributed to Cheiroptera.

Length of the small Intestine,		$7\frac{3}{8}$	inches.
„ „ large ditto,		1	„
„ „ cæcum,		$0\frac{3}{16}$	„

GEN.—MEGADERMA, Geoffroy.

MEGADERMA SPASMA, Geoffroy.

SYN.—Vespertilio spasma, Schreber.

Megaderma trifolium, Geoffroy.

Megaderma spasma, apud Fisher.

Megaderma spasma, apud Schinz.

HAB.—Pinang, Malayan Peninsula.

Singapore, Java, Ternate.

Incis. $\frac{0}{4}$ Canin. $\frac{1-1}{1-1}$ Molar, $\frac{4.4}{5.5}$

Length of the head and body $3\frac{2}{8}$ inches.

„ „ „ inter-femoral membrane, 1 inch.

Extent of the flying membrane, .. 14 inches.

The five caudal vertebræ project one quarter of an inch beyond the pelvis, but are completely enveloped in the inter-femoral membrane, and therefore not apparent. The inguinal warts are, as in the *Rhinolophi*, most developed in the adult female. A true cæcum, though smaller than in *Rhinopoma Hardwickii*, is present in this species.

Length of the small Intestines,		7	inches.
„ „ large ditto,		$1\frac{1}{16}$	inches.
„ „ cæcum,		$0\frac{1}{16}$	inches.

GEN.—NYCTINOMUS, Geoffroy.

NYCTINOMUS TENUIS, Horsfield.

SYN.—Nyctinomus tenuis, apud Fisher.

Molosse grêle, Temminck.

Dysopes tenuis, Schinz.

HAB.—Malayan Peninsula.

Java, Sumatra, Borneo.

Two individuals had the back of a velvety snuff colour, becoming a shade lighter on the under-parts. Entire length of the larger four and four-eighth inches, of which the tail one and two-fourth inches. Extent of the flying membrane ten and four-eighth inches. In the size of the ears some difference exists in the two.

GEN.—TAPHOZOUS, *Geoffroy*.

TAPHOZOUS MELANOPOGON, Temminck.

SYN.—Taphozous melanopogon, apud Schinz.

HAB.—*Pulo-Tikus, Pulo-Lancávy, Malayan Peninsula.*

Java, Caves of Kanneria.

Temminck's description, as quoted by Schinz, is taken from the adult male, the Malayan individuals of which differ in having the black beard surrounded by a broad light-brown band, covering, like a pelerine, the chest and shoulders. The rest of the lower parts are either white or brownish-white. The flying membrane in the adult male is whitish; in the females and young males it is blackish or brownish between the legs, along the sides of the body and the arms. The colour of the female and young male is on the back of a more or less brownish mouse-grey, becoming much lighter or whitish beneath, but both are destitute of the black beard, which, out of a number of between forty and fifty from different Malayan localities, occurred but in seven males, although some of the beardless males in size and extent of flying membrane equalled, or even slightly exceeded, the bearded. The entire length of the largest male was four inches, of which the tail measured one inch.

Extent of flying membrane fifteen and four-eighth inches.

Dentition : Incis. $\frac{0}{4}$ Canin. $\frac{1-1}{1-1}$ Molar, $\frac{4.4}{5.5}$

TAPHOZOUS SACCOLAIMUS, Temminck.

SYN.—Taphozous pulcher, Elliot MSS. apud Blyth.

HAB.—*Pinang.*

Java, Sumatra, Borneo, Celebes, Southern India.

In two males captured at Pinang in houses in the valley, the colours somewhat differ from Temminck's description, quoted by Schinz. In the larger, the head and back are of a sooty black, with a few white dashes, the lower parts of a pure white. The flying membrane is black

between the legs, along the sides of the body and the arms, and between the index, second and third fingers; the rest being dull semi-transparent white. The length from the apex of the nose to the posterior margin of the inter-femoral margin, is four and seven-eighth inches, of which the tail measures one inch. The extent of the flying membrane eighteen inches. Dentition as in *T. melanopogen*. The smaller differs in having the chest of a pale brownish-white, the abdomen and the pubes light rust-coloured, leaving the sides pure white. Mr. Blyth quotes *Taphosous pulcher*, Elliot, from Southern India, as being "black-brown above with white pencillings, and pure white below," (Journal As. Soc. XIII. 1844. p. 492,) from which, as well as from Mr. Elliot's specimen, at present in the Museum of the Asiatic Society, it appears that the Indian more resemble the Malayan individuals than those of the Indian Archipelago, described by Temminck. The internal surface of the gular sac secretes, an odorous oily fluid, of a light brown colour.

GEN.—RHINOLOPHUS, *Geoffroy*.

RHINOLOPHUS, *Gray*.

RHINOLOPHUS AFFINIS, *Horsfield*.

HAB.—*Pinang*.

Java.

Of two individuals, the male is reddish-brown above, light greyish-brown beneath; the female is above golden fulvous, which becomes lighter on the lower parts.

Entire length of the male, .. $2\frac{4}{8}$ inches—female, $2\frac{7}{8}$ inches.

Tail, $\frac{4}{8}$.. female, $\frac{5}{8}$..

Extent of flying membrane, .. $11\frac{2}{8}$.. female, $12\frac{4}{8}$..

Incis. $\frac{2}{4}$ Canin. $\frac{1-2}{1-1}$ Molar, $\frac{5.5}{5.5}$

The inguinal warts are highly developed in the female.

HIPPOSIDEROS, *Gray*.

A. Adult male with a frontal pore, with a tuft of rigid hairs.

HIPPOSIDEROS DIADEMA, *Gray*?

SYN.—Rhinolophus Diadema, *Geoffroy*?

HAB.—*Pinang, Malayan Peninsula*.

Timor.

The Malayan individuals are, according to age and sex, of a more or less intense reddish or greyish-brown above, under certain lights assum-

ing a golden lustre, owing to the whitish points of the hairs; beneath, they are of a lighter greyish-brown. Individuals occur of a light golden-brown, in colours resembling *Rhinolophus larvatus*, Horsfield. In the adult male, the livid flesh-coloured nasal appendage is larger, more complicated, and somewhat different from the figure given by Geoffroy St. Hilaire, (Ann. du Muséum XX, Pl. 5 and 6), which resembles the female in the simpler appendage and in the absence of the frontal pore. The latter organ, in the adult male, is large, secreting a yellowish brown oily fluid, the odour of which resembles that of *Arctictis Bintarong*, Fisher. A female, during lactation, presented a great inequality in the development of the inguinal warts, of which the right measured one-quarter of an inch in length. At the time of her capture, it was reported that a young one had been "sucking" the right wart. Not having myself observed the young clinging to that organ, I cannot vouch for the correctness of a statement which, if authentic, would tend to explain the use, being to afford support to the young, when not sucking. The size of the Malayan individuals appears to exceed those from Timor, the entire length of the former being five and six-eighths inches, of which the tail measures two inches. Extent of the flying membrane twenty-one and a half to twenty-two inches. The extremity of the 2nd phalanx of the fourth and fifth fingers is bifid, or terminating with two minute diverging joints, a structure also existing in the Malayan individuals of the following species.

$$\text{Incis. } \frac{2}{4} \quad \text{Canin. } \frac{1-1}{1-1} \quad \text{Molar, } \frac{5.5}{5.5}$$

HIPPOSIDEROS NOBILIS, Gray.

SYN.—*Rhinolophus nobilis*, Horsfield.

Rhinolophus nobilis, apud Fisher.

Rhinolophe fameux, Temminck.

Rhinolophus nobilis, apud Schinz.

HAB.—*Pinang, Malayan Peninsula.*

Java, Sumatra, Timor, Amboyna.

The frontal pore is less developed than in the former species, as compared with which the present is of a more slender form, though of a size little less inferior. Entire length five and four-eighths inches, of which the tail measures two and one-eighth inches. Extent of flying membrane twenty-one and four eighths inches. Dentition similar to that

of *H. Diadema*. In the valley of Pinang single individuals of both species are at night abroad at all seasons, but during the rains they are particularly numerous.

HIPPOSIDEROS VULGARIS, Gray.

SYN.—*Rhinolophus vulgaris*, Horsfield.

Rhinolophus insignis, Var. apud Temminck.

Rhinolophus insignis, Horsf. apud Schinz.

Rhinolophus vulgaris, Horsf. *female of insignis*, apud Schinz.*

HAB.—*Pinang*.

Java.

Entire length four inches, of which the tail measures one and three-eighth; extent of flying membrane fourteen inches.

Incis. $\frac{2}{4}$ Canin. $\frac{1-1}{1-1}$ Molar, $\frac{4.4}{5.5}$

HIPPOSIDEROS MURINUS, Gray.

SYN.—*Rhinolophus murinus*, Elliot.

HAB.—*Pinang*.

Southern Mahratta Country, Nicobar Islands.

Entire length two and four-eighth inches, of which the tail measures one inch. Extent of flying membrane nine and four-eighth inches. Dentition similar to that of the last species.

B. Forehead simple.

HIPPOSIDEROS GALERITUS, N. S.

H. prosthematicis simplicis membranâ transversâ latâ, altè erectâ, aurículas tangente; auricularum, latè pyriformium, apicibus laciniâ exsertis, besse postico lobuloque basali villosis; vellere longo, denso, molli, bicolore; suprâ saturatè, subtus pallidius-fusco-rufescenti.

Latet fœmina.

HAB.—*Pinang*.

Entire length three inches, of which the tail measures one inch. Extent of the flying membrane ten and four-eighth inches.

Incis. $\frac{2}{4}$ Canin. $\frac{1-1}{1-1}$ Mol. $\frac{4.4}{5.5}$

The livid flesh-coloured nasal appendage is simple but large, occupying the whole upper part of the face and the forehead; the horse-shoe or

* The only individual of *Rhinolophus vulgaris*, Horsfield, observed at Pinang, happened to be a male.

nasal disk covers the short, rounded, hairy muzzle, which has two leaves on either side; the transversal membrane is concave, as broad and long as the horizontal horse-shoe, which it joins under a right angle, while its sides are almost in contact with the ears. The latter are sub-erect, broader than long, their breadth equalling the length of the head; the shape is broad, pyriform, narrowing towards the apex, which appears like a small artificially rounded flap, scarcely elevated above the level of the fur covering the vertex. More than two-thirds of the back of the ear is covered with fur, leaving a narrow naked line along the external margin, which, as well as the singular shape of the ear itself, affords a distinguishing character. The hairs are buff or whitish at the base, the other half of their length brown. The general colour of the upper parts is deep-brown, with a slight reddish hue, becoming a shade lighter beneath.

This species somewhat resembles *Hipposideros apiculatus*, Gray (*Vespertilio speoris*, Schneider, apud Schreber; *Rhinolophus speoris*, Geoffroy,) from which it however differs in the absence of the frontal pore, in the shape of the ears, and in colours. A solitary male was captured in the valley of Pinang.

GEN.—*VESPERTILIO*, Linné.

VESPERTILIO, Gray.

VESPERTILIO ADVERSUS, Horsfield?

SYN.—*Vespertilio adversus*, Fisher?

Vespertilio adversus, Temminck?

Vespertilio cineraceus, Blyth MSS.

HAB.—*Pinang*.

Java, Calcutta.

This bat having the characteristic distinction of the upper incisor, described by Horsfield, is above greyish-brown, beneath light-greyish, measuring in length three and two-eighth inches, of which the tail is one and four-eighth inch. Extent of flying membrane ten and four-eighth inches. It differs from *V. adversus* in having on each side five molars, of which but two are spurious, which character also obtains in *V. cineraceus*, Blyth MSS. and specimen in the Museum Asiatic Society, which (as observed by Mr. Blyth,) as well as the present, may prove varieties of *V. adversus*, Horsfield.

KIRIVOULA, Gray.

KIRIVOULA PICTA, Gray.

SYN.—*Vespertilio ternatanus*, Seba?

Vespertilio pictus, Pallas, apud Horsfield.

Vespertilio kerivoula, Boddaert.

Vespertilio kerivoula, apud Geoffroy.

HAB.—*Pinang*.

Java, Sumatra, Borneo, Ceylon.

KIRIVOULA TENUIS, Gray.

SYN.—*Vespertilio tenuis*, Temminck, apud Schinz.

HAB.—*Pinang*.

Java, Sumatra, Borneo.

A single male, in colours slightly differing from Temminck's, being above of a dark greyish-brown, many of the hairs with white points; beneath of a lighter shade. Entire length three and two-fourth inches, of which the tail one and four-eighth inch. Extent of flying membrane ten inches.

Incis. $\frac{2-2}{6}$ Canin. $\frac{1-1}{1-1}$ Mol. $\frac{5.5}{5.5}$

Trilatitus, Gray.

TRILATITUS HORSFIELDII, Gray.

SYN.—*Vespertilio tralatitius*, Horsfield.

Vespertilio Gärtneri, Kuhl, apud Schinz.

HAB.—*Pinang*.

Java, Sumatra.

Scotophilus, Leach, apud Gray.

SCOTOPHILUS TEMMINCKII, Gray.

SYN.—*Vespertilio Temminckii*, Horsfield.

Vespertilio Belangerii, Isid. Geoff.

Vespertilio noctulinus, Isid. Geoff.

Scotophilus castaneus, Gray.

Nycticeius Temminckii, Schinz.

Nycticeius Belangerii, Temminck, apud Schinz.

Nycticeius noctulinus, Temminck, apud Schinz.

"Klâwah" of the Malays of the Peninsula.

HAB.—*Singapore, Pinang, Malayan Peninsula and Islands.*

Java, Sumatra, Borneo, Timor, Pondicherry, Calcutta.

As observed by Schinz, this species is very variable in its colours according to age, all of which variations occur in individuals inhabiting Pinang and the Malayan Peninsula. The following are the specific names attributed to different individuals of this species :—

1. *Vespertilio Temminckii*, as originally described and figured in *Zoological Researches in Java*. Back dark-brown; greyish-brown underneath. Entire length four inches six lin., of which the tail one five-eighth of an inch; Extent of flying membrane twelve inches.

2. *Scotophilus castaneus*, Gray.

3. *Nycticeius Belangeri*, Temminck, apud Schinz. Hairs of the back brown at the base, chestnut or olive-chestnut at the apex; beneath light yellowish-brown, isabella or whitish. Entire length $3\frac{1}{2}$ " of which the tail $1\frac{1}{2}$ " Extent of flying membrane $13\frac{1}{2}$ ".

Incis. $\frac{1-1}{6}$ Canin. $\frac{1-1}{1-1}$ Mol. $\frac{4.4}{5.5}$

4. *Nycticeius noctulinus*, Temminck, apud Schinz, is the very young. Above more or less intense brown or rust-coloured; beneath isabella or light greyish-brown. Entire length three to three two-eighth inches, of which the tail seven-eighth to one two-eighth of an inch. Extent of flying membrane eight six-eighth to nine inches. In this state it has frequently been observed clinging to the mother.

Incis. $\frac{2-2}{6}$ Canin. $\frac{1-1}{1-1}$ Mol. $\frac{4.4}{5.5}$

This species is exceedingly numerous, forming large congregations in sheltered situations on the Malayan Peninsula, and in the caves on the numerous islands of limestone which stud the shores from Maulmein to Java, and in such localities large deposits of Guano occur. The latter, ("Ty Klawah" of the Malays, i. e. bats' manure,) has been tried by agriculturists at Pinang, but has been found much less efficacious than the Guano obtained from the swift (*Collocalia*), producing the edible nests.

FRUGIVORA.

GEN.—*PTEROPUS*, *Brisson*.

PTEROPUS EDULIS, *Geoffroy*.

SYN.—*Pteropus javanicus*, *Desm.* apud *Horsfield*.

Pteropus Edwardsii, *Geoffroy*.

“Kalong” of the Javanese.

“Klúang” of the Malays of the Peninsula.

HAB.—*Pinang, Singapore, Malayan Peninsula and Islands.*

Java, Sumatra, Banda, Bengal, Assam.

GEN.—*CYNOPTERUS, Fred. Cuvier.*

CYNOPTERUS MARGINATUS, F. Cuv.

SYN.—*Vespertilio marginatus, Buchanan Hamilton, MSS.*

Pteropus marginatus, Geoffroy.

Pteropus titthæcheilus, Temm.

Pachysoma titthæcheilus, Temm.

Pachysoma brevicaudatum, Is. Geoff.

Pteropus brevicaudatus, Schinz.

Pachysoma Diardii, Isid. Geoff.

Pteropus Diardii, Schinz.

Pachysoma Duvaucellii, Is. Geoff.

Pteropus pyrivorus, Hodgson, apud Gray.

HAB.—*Singapore, Pinang, Malayan Peninsula and Islands.*

Java, Sumatra, Southern Mahratta Country, Bengal, Nipal.

The colour is very variable, not only individually, but according to age and sex, which has given rise to several supposed distinct species. But they all resemble each other in habits and dentition, they occupy one common place of rest, and their new-born, or very young, are of a uniform colour. The ears of the adult are, in all, more or less distinctly margined with white.

1. *Cynopterus marginatus.* Back reddish, or brownish-grey; lighter underneath.

2. *Pachysoma titthæcheilus.* 3. *Pteropus brevicaudatus.* Male: back reddish or olive-brown; a tuft of hair on the sides of the neck, the chest, and the sides of the greyish abdomen rusty, or orange-coloured. Female: above yellowish, or greyish-brown; beneath lighter. In some individuals from Malacca, the flying membrane is of a light reddish-brown.

4. *Pachysoma Diardii:* Back greyish-brown; abdomen greyish, brown on the sides.

5. *Pachysoma Duvaucellii*: pale greyish-brown.

The following is a description of a new-born. The upper part of the head, the nape of the neck, the back and the posterior surface of the humerus and femur, were covered with dense, soft, short hairs, of a dark greyish-brown; all the rest of the body was naked, of a greyish-black colour. The eyelids were not yet separated. The joints of the bones of the extremities were cartilaginous. The nails of the thumb and index were developed, but the feet and nails of the toes had already attained the size of the adult. The tongue was considerably extensile. The teeth present were:

$$\text{Incis. } \frac{4}{4} \quad \text{Canin. } \frac{1-1}{1-1} \quad \text{Mol. } \frac{2.2}{2.2}$$

Entire length, one and four-eighth of an inch, of which the slightly projecting tail two-eighth inch. Extent of the flying membrane, six and four-eighth inches.

In an individual measuring two and four-eighth inches in length, with an extent of the membrane of nine inches, the face and the lower parts, excepting the throat, had become scantily covered with light brownish-grey, short hairs. The eyelids were separated. The shoulder, elbow, hip, and knee-joints, had become ossified, the other joints still remaining cartilaginous.

INSECTIVORA.

GEN.—*TUPAIA*, *Raffles*.*TUPAIA FERRUGINEA*, *Raffles*.

SYN.—“Tupai Press,” *Raffles* and *Horsfield*.

Cladobates ferrugineus, F. Cuv. apud *Schinz*.

Sorex Glis, *Diard* and *Duvaucel*.

Glisorex ferruginea, *Desmarest*.

Hylogale ferruginea, *Temminck*.

Herpestes, *Calcutta Journ. Nat. Hist.**

* Vol. II, p. 458, PL. XIII $\frac{1}{4}$. The explanation accompanying this figure is as follows: “Searching for Col. Farquhar’s drawing of *Rhisomys Sumatrensis* already referred to, I found in the Society a drawing of a bushy-tailed *Herpestes*, differing merely from Mr. Hodgson’s *Gulo Urva*, in having the tail of one uniform colour with the body, without the yellow tip. There is no name or letter on the drawing to shew

"Tupai tana" of the Malays of Pinang.

HAB.—Pinang, Singapore, Malayan Peninsula.

Sumatra, Java, Borneo.

The young of this very numerous species in hilly jungle, is easily tamed, and becomes familiar with its feeder, though towards strangers it retains its original mistrust, which in mature age is scarcely reclaimable. In a state of nature it lives singly or in pairs, fiercely attacking intruders of its own species. When several are confined together, they fight each other, or jointly attack and destroy the weakest. The natural food is mixed insectivorous and frugivorous. In confinement, individuals may be fed exclusively on either, though preference is evinced for insects; and eggs, fish, and earth-worms, are equally relished. A short peculiar tremulous whistling sound, often heard by calls and answers, in the Malayan jungle, marks their pleasurable emotions, as for instance, on the appearance of food, while the contrary is expressed by shrill protracted cries. Their disposition is very restless, and their great agility enables them to perform the most extraordinary bounds in all directions, in which exercise they spend the day, till night sends them to sleep in their rudely constructed lairs in the highest branches of trees. At times they will sit on their haunches, holding their food between the fore-legs, and after feeding, they smooth the head and face with both fore-paws, and lick the lips and palma. They are also fond of water, both to drink and to bathe in. The female usually produces one young; she has four mammae, the anterior pair of which is situated on the lower lateral part of the chest, the posterior on the side of the abdomen. On the lower surface of the tongue, the frenum is continued to within a short distance of the apex in a raised line, on either side of which the skin is thickened, fringed at the edges, and thus presenting a rudimentary sublingual appendage, somewhat similar

from whence it came, and to prevent its following the fate of Colonel Farquhar's *Rhizomys*, we here afford a copy of it." Pl. XIII $\frac{1}{2}$ represents no *Herpestes*: the elongated muzzle, the proximity of the large eye to the ear, which is exposed, and not hidden by the hairs of the cheek, are characters foreign to every known species of *Herpestes*. The draughtsman has very correctly represented a *Tupaia*, and the drawing, reappearing as a *Herpestes* in the *Calcutta Journal of Natural History*, has, by Mr. Blyth, been traced to be the original of Pl. IX, *Asiatic Researches*, Vol. XIV, where it properly accompanies the description of *Sorex Glis*, (i. e. *Tupaia ferruginea*) of MM. Diard and Duvaucel.

to that observed in *Nycticebus tardigradus*; though in *Tupaia ferruginea* the fringes of the margin only are free, the rest being attached to the tongue, but easily detached by a knife. The lateral raised lines of the palms and soles, the posterior part of the first phalanges, and the third phalanx (second of the thumbs,) which is widened into a small soft disk, in fact all the points which rest upon the ground, are studded with little transversely curved ridges or duplicatures, similar to those observed under the toes, of some of the *Geckotidæ*, which fully account for the precision, the 'applomb,' with which these animals perform the astounding leaps from below, barely touching with the soles the point d'appui above. In a cage, the Tupai will continue for hours vaulting from below, back downwards, poise itself for an instant, continuing back downwards under the horizontal roof, and regain the point of starting, and thus describe a circle—the diameter of which may be three to four times the length of the animal,—in far shorter time than is required for the description. In a young male, measuring from the nose to the root of the tail seven and three-fourth inches, the tail six and a half inches, the dimensions of the intestinal canal were:

Small Intestines, 3 feet $4\frac{1}{4}$ inch.; diameter $\frac{1}{8}$ inch.

Large ditto, 0 „ $3\frac{1}{4}$ „ „ $\frac{1}{5}$ „

Cæcum, 0 „ $0\frac{1}{4}$ „ „ $\frac{1}{16}$ „

Costæ veræ: 8 pairs; spuræ: 5 pairs = 13 pairs.

This species* is infested with a Tick of the following description: *Ixodes Tupaia*. Body suboval, shining dark-green olive; scaly plate, palpi casing the pointed sucker, and the legs: pale reddish-brown. Length, when swollen, three-eighth inch.

GEN.—GYMNURA, *Raffles*.

GYMNURA RAFFLESII, Vigors and Horsfield.

SYN.—*Viverra gymnura*, *Raffles*.

"Tikus ámbang búlan," *Raffles*.

HAB.—*Malacca*.

Sumatra, Singapore,

In a district not distant from Malacca, the animal is said to be numerous, though not to be seen in other localities.

* Single light coloured individuals occur with the back, limbs and abdomen greyish, whitish, or isabella.

GEN.—*Sorex*, Linné.

Sorex murinus, Linné.*

SYN.—*Sorex myosurus*, Pallas, apud Schinz.

Sorex caeruleus, Var, Raffles ?

“Chinchorot” of the Malays of the Peninsula.

HAB.—*Pinang*.

Java.

Dark brownish-grey above ; beneath light brownish-grey. Feet and tail flesh-coloured in the living animal, changing to cinereous after death. In the young the colour is more of a bluish-grey, slightly mixed with brown on the back. Length of the head and body five and half inches ; tail three inches.

Incis. $\frac{2}{2}$ Canin. $\frac{0}{0}$ Molar, $\frac{8.8}{5.5}$

The present differs from the ‘Musk Shrew’ of Bengal (“Choochundr,”) in its proportionally broader, more developed, and from the head more diverging ear, which characters also distinguish it from *Sorex nigrescens*, Gray, which it somewhat resembles in its colours. The smell of musk, emitted by the adult animal, and which in the young is barely perceptible, is much less intense than that of the Bengal Musk Shrew.

CARNIVORA.

GEN.—*Ursus*, Linné

Helarctos, Horsfield.

Helarctos Malayanus, Horsfield.

SYN.—*Ursus Malayanus*, Raffles and Horsfield.

“Brúang” of the Malays.

HAB.—*Malayan Peninsula*.

Sumatra, Tenasserim Provinces, Assam, Nipal.

Colour of the young : snout and lips pale ferrugineous. Head, back, and outside of the limbs black, mixed with pale rust colour, in consequence of many of the black hairs having the point, or a part next to the

* The following Syn. are given in Gray's *List of Mam. in British Museum* : *Sorex myosurus*, Pallas. Geoff. Ann. Mus. XVII. *S. Sonneratii*, and *S. giganteus*, I. Geoff. Mem. XV. *S. indicus*, Geoff. Mem. Mus. I. *S. capensis*, Geoff. Ann. Mus. XVII. *S. Pilorides*, Shaw, Mus. Lever. *S. caeruleus*, Shaw, Zool. *S. crassicaudatus*, Licht. Säligeth. *S. nepalensis*, Hodgson. *S. moschatus*, Robinson, Assam. Olivier, Voy. Buffon. H. N. Suppl. VII.

point, of the latter colour. Ears, tail, paws, and inner side of the extremities shining black. The somewhat woolly hairs of the abdomen are faintly marked with ferrugineous, and are mixed with longer stiff black hairs. As observed by Schinz, the mark on the breast is very variable in its form. It may be compared to a crescent, assuming according to the smaller or greater breadth of the limbs, the shape of the letter U, of a horse-shoe, or a heart. In the living animal it is of a pale rust, or orange colour, in some individuals with a few small blackish spots, fading after death to a yellowish-white. A very old male presented the following dentition :

$$\text{Incis. } \frac{6}{6} \quad \text{Canin. } \frac{1-1}{1-1} \quad \text{Molar, } \frac{4. 4 (2+2)}{6. 6 (3+3)}$$

In a young female, three feet in length, the intestinal canal measured fifteen feet. It had neither cæcum nor valve to mark the transition. She had ten grinders in either jaw, of which four were spurious, six true.

GEN.—ARCTICTIS, Temminck.

ARCTICTIS BINTURONG, Fischer.

SYN.—Viverra? Binturong, Raffles.

Paradoxurus albifrons, F. Cuvier.

Ictides ater, F. Cuvier.

Arctictis penicillata, Temminck.

Ictides ater, Blainv. Calcutta Journ. of Nat. Hist.*

"Unturong" of the Malays of the Peninsula.

HAB.—Malayan Peninsula.

Tenasserim, Arracan, Assam, Bhotan, Nipal.

Java and Sumatra are quoted by M. Schinz, but neither Dr. Horsfield, Sir S. Raffles, nor M. Temminck, (*Discours Preliminaire, Faune Japonica*,) mention the *Binturong* as inhabiting either of the two islands.

* In the 3rd Vol. of *Calcutta Journ. of Nat. Hist.* p. 410, occurs the following passage : "The *Binturong* was first discovered in Java, but the first notice of its existence on the continent of India will be found in the second volume of this Journal, p. 457," (sic!) "&c." Sir Stamford Raffles, who published the first account of this animal, distinctly states, that it was discovered at Malacca, (not Java, as erroneously stated,) by Major Farquhar, and Malacca is situated on the continent of India as well as Tenasserim. The fact of its inhabiting *Bhotan*, was according to Cuvier (*Règne Animal*,) first made known by Duvaucel, and the author of the article "*Ictides*" in the *Penny Cyclopædia*, 1838, gives Mr. Hodgson's authority of the *Binturong's* inhabiting Nipal, (Kachar, though they occasionally occur in the central region of Nipal.)

The general colour of either sex is black, sprinkled on the body and extremities with pale ferrugineous, produced by some of the hairs having a part next to the point of that colour. In both sexes nearly all the hairs of the head, face and throat are thus marked, which communicates to these parts a whitish or greyish appearance. In the young of either sex there is a faint trace of a white spot over the eyes. The long ear-tufts are always black, the margin of the auricle being either white, or pale rust-coloured. The tail is black, but the hairs of the anterior or basal half, are whitish at the root, or in some uniformly of that colour. The pupil is vertically contracted by the influence of light; the iris is of a beautiful Van Dyke brown. In its habits the *Binturong* is both arboreal and terrestrial, and nocturnal, sleeping till the sun is below the horizon, when it displays great agility in searching for smaller quadrupeds, birds, fishes, earth-worms, insects and fruit. The howl is loud, resembling that of some of the Malayan *Paradosuri*. The young are easily tamed, but the old animal retains its natural fierceness. Between the anus and penis is situated a large pyriform gland, exceeding two inches in length, partially divided by a deep naked fossa, commencing from the latter organ. The gland secretes a light-brown oily fluid, of a peculiar intense, but not fetid or sickening odour. In a young male, measuring from the nose to the root of the tail, two feet three and five-eighth inches, the tail two feet two and a half inches, the intestines were of the following dimensions:

Small Intestines,	..	..	7 feet 11 inches.
Large ditto,	..	..	1 foot 10 inches.
Cæcum,	..	..	0 $\frac{1}{2}$ inch.

The circumference of the small intestines about seven-eighth inches; of the large but little more, but the rectum was thickened two inches in circumference.

The short cæcum is crescent-shaped, or lengthened pyriform. The stomach is remarkably lengthened cylindrical, the parietes much thickened towards pylorus. Oesophagus enters close to fundus ventriculi, in consequence of which there is but a slight difference between the curvatures.

Length along the greater curvature,	..	1 foot 2 inches.
„ „ „ smaller „	..	1 „ 1 „

The circumference from cardia round fundus ventriculi measured five and a half inches; round pylorus two six-eighth inches. Both the gall-bladder and the spleen presented a remarkably elongated shape. The former organ, lengthened pyriform, measured in length two inches; ductus cysticus two and a half inches. The spleen, tapering to a narrow point, was half an inch broad, and eight and a half inches in length. Costæ veræ, nine pairs; spurizæ, five pairs = fourteen pairs.

GEN.—*MUSTELA*, Linné.

PUTORIUS, Cuvier.

PUTORIUS NUDIPES, Fred. Cuvier.

SYN.—*Mustela nudipes*, Desmar. apud Schinz.

“Pulásan” of the Malays of the Peninsula.

HAB.—*Malayan Peninsula*.

Sumatra, Borneo.

The muzzle and the soles of the feet are pale flesh-coloured. The animal is said to inhabit the densest jungle, and is most difficult to obtain.

MUSTELA, Cuvier.

MUSTELA FLAVIGULA, Boddaert.

SYN.—*Viverra quadricolor*, Shaw.

Marte à gorge dorée, Desmarest.

Mustela Hardwickii, Horsfield.

Martes flavigula, Hodgson, apud Gray.

“Anga Prao” of the Malays of the Peninsula.

HAB.—*Malayan Peninsula*.

Java, Sumatra, Nipal.

The Malayan individuals differ from those from Northern India, originally described, in having the fur shorter and less dense, the head pale-brown, the neck and back pale yellowish-brown, becoming darker towards the tail, which, as well as the posterior extremities, is black. The anterior extremities are greyish-brown; the feet and the streak behind the ear deep brown; the lips whitish; the throat and chest yellowish-white or ochreous; the scanty hairs of the abdomen pale brownish.

GEN.—*LUTRA*, Storr.

LUTRA NAIR, Fred. Cuvier.

SYN.—*Lutra indica*, Gray.

“Anjing Ayer” of the Malays of the Peninsula.

HAB.—*Malayan Peninsula*.

China, Bombay, South Mahratta Country.

LUTRA BARANG, Raffles.

SYN.—“Barang Barang” or “Ambrang,” Raffles.

Lutra leptonyx, Wagner, apud Schinz.*Lutra Simung*, Schinz ?*

“Mumrang” or “Amrang” of the Malays of the Peninsula.

HAB.—*Malayan Peninsula*.

Sumatra, Borneo.

The young are very playful, and soon become sufficiently domesticated to roam about the house, and to appear when called. Its voice is a short shrill whistling, not unlike the sound of the cricket, but stronger. Its food is not confined to fishes and crustacea; birds and insects are equally relished. The muzzle is hairy, but in the old animal the hairs become rubbed off. The Malayan individuals appear to attain to a greater size than the Sumatran, described by Raffles. An old male measured from the apex of the nose to the root of the tail two feet eight and a half inches; the tail one foot eight inches. In a young male two feet and two inches, and the tail one foot two-eighth of an inch in length, the simple intestinal canal measured nine feet and one inch, with a circumference throughout of about two and two-eighth inches. No cæcum. Each of the kidneys consisted of ten loosely connected glands.

AONYX, Lesson.

AONYX LEPTONYX, Gray: List.

SYN.—*Lutra leptonyx*, Horsfield.*Lutra cinerea*, Illiger.

* In Schinz's diagnosis of *Lutra Simung* is said “ungvibus robustis falcularibus,” (“die Nägel an den Zehen sind stark und gekrümmt”) which if the passage refers to *Lutra leptonyx*, Horsfield, must be a mistake, as the original diagnosis expressly states “ungvibus brevibus sublamnaribus.” As Schinz describes *Lutra Barang* “ungvibus minutissimis obtusis” *Lutra leptonyx* is probably meant, and thus the one species is mistaken for the other.

Lutra perspicillata, Is. Geoff.

Mustela Lutra, Marsden.

Aonyx Horsfieldii, Gray.

Lutra Barang, apud Schinz?

"Anjing Ayer" of the Malays of the Peninsula.

HAB.—*Malayan Peninsula*.

Java, Sumatra, Singapore, Nipal.

This, as well as the two preceding species, inhabits numerously the banks of the Malayan rivers, and all are at times used by the Malays in river fishing.

GEN.—*CANIS*, Linné.

CUON, Hodgson.

CUON PRIMÆVUS, Hodgson.

SYN.—*Canis primævus*, Hodgson.*

Chrysæus primævus, Hamilton Smith.

Chrysæus soccatus, Cantor.

"Anjing útan" of the Malays of the Peninsula.

HAB.—*Malayan Peninsula*.

Bengal, Nipal.

Some slight differences occur in the Malayan individuals. The inferior surface, the inside of the ears and limbs, the lips and throat, are of the same colour as the back, but much paler. A black carpal spot, like that of the wolf, is very distinct in the male, less so in the female. The young animal of either sex has a faint white spot with a few blackish bristles, situated nearly midway between the angle of the mouth and the ears. Of the wavy wool of the Buansu, the Malayan wild dog, inhabiting a tropical climate, has but a little on the inner side of, and immediately behind the ear; the posterior part of the abdomen is almost naked. The short bristles of the lips, cheeks, throat, and above the eyes, are all black. In habits, so fully described by Mr. Hodgson, and in size, the Malayan agrees with the Nipalese. In a young male, from

* Mr. Ogilby considers *Canis Dukhunensis*, Sykes, and *Canis primævus*, Hodgson, to be identical, and apparently not different from *C. sumatrensis*, Hardwicke, (*Mem. on the Mammalogy of the Himalayaks*, apud Royle.) Colonel Sykes, on the contrary, describes *C. Dukhunensis* as being "essentially distinct from *Canis Quao*, or *Sumatrensis*, Hardwicke."

the nose to the root of the tail two feet eight and a half inches in length ; the tail one foot, the intestinal canal was of the following dimensions :

Small Intestines,	..	..	..	6 feet	2 inches.
Large, ditto, ..	..	..	..	0	„ 10½ „
Cæcum,	..	..	..	0	„ 4 „

The latter intestine is spiral, much widened at the origin.

Costæ veræ 8 pairs, spuris 5 pairs = 13 pairs.

The Malays mention another, black wild dog ("Anjing útan étam,") as also inhabiting the densest jungle. A Hyena is also reported to occur on the Peninsula.

Mongrel curs, "pariah dogs," of every description, infest every village, but apparently not uninhabited places, nor localities far distant from the dwellings of man. As they all may be said to be in a state of half domestication, and are of forms very different from the wild dog, which shuns the human presence, their origin cannot with certainty be traced to the Malayan Peninsula.

GEN.—VIVERRA, Linné.

VIVERRA ZIBETHA, Linné.

SYN.—Viverra undulata, Gray.

Viverra melanurus, Hodgson	} Apud Gray : List.
Viverra orientalis, Hodgson	
Viverra civettoides, Hodgson	
Undescribed Civet, McClelland	

"Tanggallong" of the Malays of the Peninsula.

HAB.—Pinang, Singapore, Malayan Peninsula.

Southern China, Siam, Bengal, Khasyah Hills, Nipal.

Judging by the comparatively few individuals observed in the Straits of Malacca, this species would appear to be far less numerous, than the following. Of several, the largest, which was a female, measured from the apex of the nose to the root of the tail two feet and eight inches ; the tail one foot eight and a half inches.

VIVERRA TANGALUNGA, Gray.

SYN.—Viverra Zibetha, Lin. apud Raffles.

"Tangalung," Raffles.

Viverra Zibetha, Lin. apud Horsfield.

Viverra Zibetha, apud Fred. Cuvier.

Viverra Zibetha, Lin. apud Schinz.*

"Músang jebát" of the Malays of the Peninsula.

HAB.—*Pinang, Singapore, Malayan Peninsula.*

Sumatra, Borneo, Celebes, Amboyna, Philippines.

This species is readily distinguished from *V. Zibetha* by a continuous longitudinal black band occupying the upper surface of the tail, the numerous irregular rings being separated only on its inferior half. (Gray: Proceed. Zool. Society, 1832, p. 63.) The number and distance of the half rings on the lower surface of the tail, vary in different individuals, some of which have either the entire tail, or the anterior half or third of the tail, thus marked, the rest being black. The very young animal is generally of a much darker ground colour than the adult, and the black marks are therefore less conspicuous. Under certain lights the colour appears uniformly black. *Viverra Tangalunga* and *Zibetha*, however similar in habits and general colours, neither live nor breed together. Placed side by side, the living animals present a marked dissimilarity of countenance, which although obvious to the eye, would be most difficult, if possible at all, to convey in words. The female has three pairs of Mammaræ, and produces from one to three young. The Malays of the Peninsula distinguish by different names the *Zibetha* and the *Tangalunga*, but as they suppose the civet of the former species to be of better quality, perhaps because it is scarcer, they will frequently offer for sale individuals of the latter, exceedingly numerous species, imposing upon it the name of *V. Zibetha*: "Tanggalong" of the Peninsula. The largest individual of the present species observed, measured in length from the apex of the nose to the root of the tail three feet and one inch; the tail one foot five and a half inches. In a younger, a female, three feet five and a half inches in length, of which the tail one foot and one inch, the intestinal canal was of the following dimensions:

Small Intestines,	..	..	..	7 feet 5 inches.
Large ditto,	..	..	..	0 ,, 9 ,,
Cæcum,	..	..	..	0 ,, 1 ,,

Costæ veræ, seven pairs; spurisæ, six pairs = thirteen pairs.

* The true *Viverra Zibetha*, Linné, is quoted by Schinz under the denominations of *V. bengalensis*, Hardwicke (?), and *V. melanura*, Hodgson.

VIVERRICULA, Hodgson.

VIVERRICULA MALACCENSIS.

SYN.—*Viverra malaccensis*, Gmelin.

Viverra Rasse, Horsfield.

Viverra Gunda, Buchanan Hamilton MSS.

Viverra indica, Geoffroy.

Viverra bengalensis, Gray : Illustr.

Viverra pallida, Gray : Illustr.

Genetta Manillensis, Eydoux.

HAB.—*Malayan Peninsula*.

China, Philippine Islands, Java, Singapore, Cochin-China, Tenasserim Provinces, Bengal, Nipal, Hindoostan, Dukhun, Bombay.

On the Malayan Peninsula this species appears to be more numerous than *V. Zibetha*; less so than *V. Tungalunga*, and in size inferior to either. The largest observed was three feet four inches in length, of which the tail one foot three and a half inches. In a male, measuring from the apex of the nose to the root of the tail, two feet and three-fourth of an inch, the tail one foot one inch, the dimensions of the intestinal canal were :

Small Intestines, 4 feet 0 inch.

Large ditto, 0 „ 8 „

Cæcum, 0 „ 0 $\frac{1}{4}$ „

The three preceding species have the following characters in common—The pupil is vertical, oblong; the iris of a rich brown. They are arboreal as well as terrestrial, preying upon the smaller quadrupeds, birds, fish, crustacea, insects and fruit. Naturally very fierce, they are scarcely reclaimable except in youth, but with age the original disposition returns. Their voice is peculiar, hoarse and hissing.

GEN.—PRIONODON, Horsfield.

PRIONODON GRACILIS, Horsfield.

SYN.—*Viverra*? Linsang, Hardwicke.

Felis gracilis, Horsfield.

Viverra Hardwicke, Lesson.

Viverra gracilis, Deamarest, apud Schinz.

Linsang gracilis, Müller, apud Gray : List, and Schinz.

HAB.—*Malayan Peninsula.*

Java, Sumatra, Borneo, Siam.

The ground colour is buff, and the dark marks are of a deep snuff colour, inclining to black with purple reflection. Length from the apex of the nose to the root of the tail: one foot six inches, the tail one foot three six-eighth inches.

Mr. Rappa, for many years a dealer in objects of natural history at Malacca, who previously had been supplied with a figure and description of *Prionodon gracilis*, reported in a memorandum accompanying the specimen, that it had been captured in the jungle at some distance from Malacca. It was unknown to himself and to the natives. At first the animal was fierce and impatient of confinement, but by degrees it became very gentle and playful, and when subsequently suffered to leave the cage, it went in search of sparrows and other small birds, displaying great dexterity and unerring aim in stealthily leaping upon them. Fruit of every description it refused. Another younger individual was captured about the same time, but contrived to make its escape.

GEN.—*PARADOXURUS*, *Fred. Cuvier.*

PAGUMA, Gray.

PAGUMA LEUCOMYSTAX, Gray: List?

SYN.—*Paradoxurus leucomystax*, Gray?*Amblyodon auratus*, Jourdan?

“Músang búlan” of the Malays of the Peninsula.

HAB.—*Malayan Peninsula.*

Singapore, Sumatra.

In a single individual observed, the hairs of the body, limbs and anterior third of the tail, are greyish-yellow at the base, next bright rust-coloured, with the apex shining black, which produces a mixture of ferruginous and black, the latter prevailing on the nape of the neck, middle line of the back, and the anterior third of the tail. The hairs of the vertex and the ridge of the nose are dark at the base, with yellowish points. The large oblique whitish spot in front of the ear, produced by uniformly whitish hairs, is on either side blended with the whitish vertex and ridge of the nose, and is continued down the sides of the neck, forming a large broad arrow-shaped mark. The orbits are dark brown, the face, lips and throat pale brown. The long rigid white

whiskers are mixed with a few shorter black bristles. The feet are dark brown, the posterior two-thirds of the tail uniformly black. The lower surface and the inner side of the extremities are pale ferruginous. From the apex of the nose to the root of the tail: two feet three inches, the tail one foot eight inches.

PAGUMA TRIVIRGATA, Gray: List.

SYN.—*Viverra trivirgata*, Reinwardt, Mus. Leyd.

Paradoxurus trivirgatus, Gray.

"Músang ákar" of the Malays of the Peninsula.

HAB.—*Malayan Peninsula*.

Singapore, Tenasserim.

The ground colour varies from yellowish, or brownish, to blackish-grey. Fur short, peculiarly soft, silky. The dorsal streaks are either continued, undulated, (the central nearly always,) or composed of separate black spots. Some individuals have a short white streak on the ridge of the nose. The largest male measured from the apex of the nose to the root of the tail, two feet two and a half inches; the tail two feet three inches.

PARDOXURUS MUSANGA, Gray.

SYN.—*Viverra hermaphrodita*, Pallas, apud Schinz.

Viverra fasciata, Gmelin?

Viverra Musanga, Marsden, Raffles.

Musang bulan, Raffles.

Viverra Musanga, Var. *javanica*, Horsfield.

Ichneumon prehensilis, Buchanan Halmilton MSS.

Platyschieta hermaphrodita, Otto

Paradoxurus Pallasii, Gray

Paradoxurus Crossii, Gray

Paradoxurus dubius, Gray

Paradoxurus Musangöides, Gray.

Paradoxurus typus, apud Schlegel.

Paradoxurus felinus, Wagner, apud Schinz.

"Músang" or "Músang Pándan," (when the tail is with white point: "Músang Búngkwang,") of the Malays of the Peninsula.

HAB.—*Pinang, Singapore, Malayan Peninsula*.

Java, Sumatra, Borneo, Timor.

The ground colour and dorsal marks of this exceedingly numerous species are liable to considerable variations, the principal of which are noted by Schinz: individuals occur (probably of every species) with the apex of the tail white, with elongated white spots on the abdomen, with the tail spirally twisted. In most the dorsal marks become indistinct, or invisible in certain lights. The female has from one to three young, of colours similar to the adult, but less distinct, their fur is softer, somewhat woolly, mixed with longer stiff black hairs. The young is tamed without difficulty, and is sometimes kept in houses to destroy rats and mice. The *Paradoxuri* are in habits like the *Civets*. They have an elliptical pupil, vertically contracted by the influence of light. Their glandular secretion is of a peculiar, not civet or musk-like odour. The largest specimen of a great number, measured from the apex of the nose to the root of the tail two feet and half an inch; the tail one foot four and a half inches. In a male, measuring three feet one and a half inch in length, of which the tail one foot four and a half inches, the intestinal canal were of the following dimensions:—

Small Intestines,	..	..	..	5 feet 8 inches.
Large ditto, ..	..	..	..	0 „ 5 „
Cæcum, ..	..	..	..	0 „ 1½ „
Costæ veræ, seven pairs; spurisæ, six pairs = 13 pairs.				

PARADOXURUS (?) *DERBYANUS*, Gray.

SYN.—*Paradoxurus*? *Zebra*, Gray.

Hemigalea Zebra, Jourdan.

Viverra Boiei, Müller.

“Musang Bâtu” or “Sângah Prao” of the Malays of the Peninsula.

HAB.—*Malayan Peninsula*.

Borneo.

The ground colour varies from pale ochreous to buff, and the dark marks in shape and number scarcely alike in any two individuals, from snuff colour to black. The species is apparently not numerous, and is celebrated among the Malays for its great agility. It is said chiefly to feed upon the larger birds, such as the *Argus* pheasant, which it will hunt down, following its prey till the strength of the latter is exhausted, when it falls an easy victim to the indefatigable pursuer. The slender vermiform make, the countenance and distribution of

colours ; the serrated, flattened false molars ; the soles, hairy between and under the toes, and slightly in the centre ; the somewhat removed thumb, are characters by which this animal differs from *Paradoxurus*, and forms a link between that genus and *Prionodon* in the same manner that *Viverricula* connects *Viverra* to *Prionodon*. The largest male observed measured from the apex of the nose to the root of the tail two feet ; the tail one foot and four inches.

GEN.—CYNOGALE, Gray.

CYNOGALE BENNETTII, Gray.

SYN.—*Viverra* (Limictis) *carcharias*, Blainville.

Potamophilus barbatus, Kuhl.

Cynogale barbata, Schinz.

HAB.—*Malayan Peninsula*.

Sumatra, Borneo.

The very young, of which two individuals, a male and a female, were found with the mother, differ from the adult in having a very soft, silky, dense fur, mixed with longer hairs, which are black, except on the chest and abdomen, where the apex is silvery. Over the tarsus and on the upper surface of the feet some of the hairs have a subterminal white band, close to the black apex. The posterior margin of the ear is hairy and of a silvery colour. This animal appears to be of rare occurrence on the Malayan Peninsula, and the natives are consequently not acquainted with it. The largest male examined measured from the apex of the nose to the root of the tail two feet three inches ; the tail eight inches.

(To be continued.)

Notes, chiefly Geological, on the Coast of Coromandel, from the Pennaur to Pondicherry. By Captain NEWBOLD.

The coast from the mouth of the Pennaur to Madras, is a sandy plain, covered with reddish sandy loam which occasionally passes into clay, and generally rests upon the bluish-black marine clay of the Coromandel. It has been already said, that the breadth of the latter stratum varies, and is interstratified with layers of sand and reddish clays;—the whole resting usually on granitic or hypogene rocks: nodules and masses of a concretionary sandstone are found imbedded in the sands close to high-water mark, often perforated by lithodomi. Magnetic iron sand is found in many situations mingled with the sea sand, derived probably from the hornblende and basaltic greenstone rocks. This iron sand occasionally, I suspect, contains potassium, and strongly resembles iserine in external character.

Farther inland, between the base of the ghauts and the sea, extend thin beds of laterite, and sandstone closely allied to laterite, passing into puddingstones and soft shells of various colours.

The puddingstones usually imbed rounded pebbles of white quartz, and of the older sandstone which crests the eastern ghauts near Nagghery, Udegghery, &c.

The beds of this sandstone rarely exceeds three or four feet in thickness, and may be seen near Sri Permatoor, on the great western road, (vide Notes from Mangalore to Madras), and, according to native information, in the vicinity of Parmaulnaigpet, about six and a half miles to the E. by S. of Tripassore, a little north of the road to Madras. Their continuity, and that of the laterite beds, with which they are probably contemporaneous, has been much interrupted by aqueous denudation, which probably took place while the Coromandel Coast was emerging from the bed of the sea.

It is also probable that these sandstone strata were once continuous with those imbedding silicified wood at Pondicherry and Verdachellum in south Arcot.

These remarks are merely thrown out to elicit farther investigation and research into the age, and extent on the coast, of these interesting littoral deposits, by which we may be enabled, probably, to mark out the ancient lines of coast formed, as the land gradually rose.

From its flatness the plain of Goromandel has been usually neglected by geologists as of little promise, but I trust, these remarks will prevent observers from running over it in the dark.

The sandstones and slate clays should be diligently examined for organic remains, as after all, it is possible, they may be freshwater deposits.

Of the sea and its inroads upon the land, from the Pennaur to the mouth of the Cauvery, the natives preserve many wild traditions, which I have little doubt originated in a sinking of this part of the coast.

In a Mahratta MS. of the Mackenzie collection,* there is a legend of the origin of the town of Sri-hari-cota, on the south boundary of Telinghana, close to the west shore of the Pulicat lake, which states the submersion of another town; the ruins of which, according to the MS. are still to be seen underneath the water. Trisancu, a king of the Solar race, is said to have been founder of it.

The miracle of the sea shell passing by a subterranean passage to the Pandurangha temple, might have originated from the circumstance of subterranean beds of marine shells being found, as at Madras, &c. inland.

The Pulicat lake is a lagoon running down the coast from Deraz-patnam on the north, to Pulicat on the south, nearly forty miles long, and varying in breadth from a few yards to twelve miles. A spot of sand from a quarter of a mile to five miles broad, running parallel with the coast, separates it, excepting four narrow openings, from the Bay of Bengal. Three of these openings are at its northern and southern extremities, and the other between the hamlets of Ryadooroo and Day-ullum.

The lake is studded with numerous ialets: its inland or western shore is low and sandy, furrowed by numerous rills which run down during the monsoon from the sides of the eastern ghauts, (here having the local name of the Pulicat hills), about eleven miles to the westward.

The lake is in general shallow, and its formation is attributed to the sea bursting through the sand-bank in front on the low ground inland, now its bed. I am not aware of any other tradition which refers its origin to the historic period, except that just alluded to.

* Madras Journal, No. 30, p. 86.

Madras.—Granite and the hypogene schists, have been before stated as the rocks basing the more recent deposits covering the level plain of Madras. In the bed of the river (Adyar) near Marmalong bridge, and on its right bank at the quarries for the old breakwater, in the park of Guindy, around the race course, it usually contains but little mica, being composed of grains of a greyish quartz, with white felspar usually weathered and earthy on the exposed bosses and blocks in which the rock makes its appearance. Much of the granite near the Little Mount I found to be pigmatitic, that is, a binary granite of felspar and quartz, without mica.

Laterite is seen overlying the granite at the breakwater quarries before mentioned, and I am informed by Capt. Worster, that beds of this rock occur about a mile north of Nabob's Choultry on the Poonamalee road;—also near Tremungalum, about two miles NE. of Santivellore; near Vungada, about two miles SE. from Sri Permatoor; at Cotrubaucum, half a mile north of Raja's Choultry, and about two miles north of Balchitty Choultry; besides the beds at the Red hills, about eight miles NW. from Madras, so ably described by Mr. Cole, and which occupying an area of about fifty miles, cover an undulating tract, elevated usually forty or fifty feet above the general level of the country. Those near Sri Permatoor tank, I have already noticed (vide notes from Mangalore to Madras.)

At the bases of St. Thomas' Mount and the Palaveram Hill, granite is seen outcropping, and it also forms some of the smaller hills in the vicinity of Palaveram.

Both the Palaveram Hill and that of St. Thomas' Mount, are composed for the most part of a massive variety of hornblende rock, in which stratification is indistinct.

This rock, though often entirely composed of black brilliant hornblende, at Palaveram is usually a dull olive-green colour, translucent at the edges, and appears to be a mixture of hornblende and felspar, with a small proportion of quartz, in an almost homogeneous mixture. This rock occasionally imbeds garnets, crystallized schorl, hornblende, and a little dark mica. A little to the SSE. of the Mount, near the tank, is a lateritic bed.

The height of the Palaveram Hill, on which the bungalow built by Col. Coombes stands, Lieut. Ludlow informs me, is nearly $345\frac{1}{2}$ feet above the plain at its base.

Chingleput.—This is the judicial head-quarters and capital of the Jaghire of the same name; it is situated about thirty-six miles to the SSW. of Madras, at the base of a small cluster of hills; the loftiest not being higher than the Flagstaff hill at Palaveram, and composed of a precisely similar variety of hornblende rock (garnetiferous), and associated with binary granite, or pigmatite.

The hornblende rock passes into light shades of green. It has been largely used as a building stone in the construction of the fort, which is extensive, and said to be nearly two miles in circumference. It, as well as the town, lies on a stream, which falls into the Palaur, about half a mile to the west, almost surrounded by this hilly cluster. A wet ditch surrounds the outer walls which enclose a citadel,—the remains of the ancient palace of the native princes, government offices, and barracks, &c. Near the outer gate is a weaving establishment: and on a neighbouring eminence stands the European burial ground. The native town is populous; the houses are, for the most part, built of mud, thatched, or tiled.

Chingleput was early a place of importance, and for some time the residence of the Hindu princes of the Bijanugger dynasty.

During the early wars, when the French and English were struggling for empire in the East, the occupation of Chingleput, which lies on the great southern road to Madras from Pondicherry, was a point of much consequence. It was captured by the French in 1761, but retaken the following year by Capt. Clive. It was here the English army under Sir Hector Munro retreated (11th September, 1780) from Conjeveram, after the fatal massacre of Baillie's detachment near Perambaucum.

The soil in the vicinity is sandy, but in some places overlies a stiff clay used for bricks and tiles. The cultivation is principally of rice, irrigated by a tank which lies to the east of the Madras road.

Carangooly.—The sandy bed, sometimes occupied by a muddy torrent of the Palaur, is crossed about two and a half miles SW. from Chingleput. It is about three-quarters of a mile from bank to bank. This river, which takes its rise in the table lands of Mysore in the elevated tracts, (their water sheds) between Colar and Nundi-droog, pursues a SE. course by Baitmungalum and Watlaconda-droog, to the Pullur gap in the eastern ghauts, whence it descends to the vale of Amboor. Here, following the north-easterly direction and slope of the valley which it

fertilizes, it washes the feet of the eastern ghauts, receiving many mountain tributaries to the base of Amboor-droog; whence, turning the northern flank of the Rajahpollum and Javadie hills, which bound the right of the valley, it escapes easterly by Paliconda to Vellore. Thence it crosses the Carnatic increased by the Poni; by Arcot, Wallajahbad, Conjeveram, and Chingleput to the Bay of Bengal, into which it flows about three and a half miles, south of Sadras, in latitude $12^{\circ} 28' N.$ after a course of about 220 miles, marked during its progress through the Carnatic by a narrow, verdant, winding zone of rich vegetation.

The road from Chingleput to Carangooly lies at no great distance, for the first and greater part of its course, from the right bank of the river, over the plain on which the town and fort of Carangooly stand, to the eastward of the large tank, and about thirteen miles SSW. from Chingleput. A few low hills in the vicinity mark the prolongation of the bed of hornblende rock observed at St. Thomas' Mount, Palave-ram, and Chingleput. The prevailing soil is a sandy loam.

Carangooly, like Chingleput, during our early wars with the French, was a military post of great importance, though now reduced to insignificance. The gates of the fort were blown open, and the place stormed by Capt. Davis (January 24th, 1781): Hyder's garrison was 700 strong.

The fort was dismantled by General Stuart, in February 1783.

Permacoil.—The route to Permacoil lies over a plain less cultivated and more jungly than hitherto; varied at Acherowauk by a range of hills running for two or three miles in a SW. direction, flanking the right of the road. At Permacoil the granitic rocks rise above the surface in clusters varying from 100 to 300 feet high. The chief mass is composed of felspar, quartz, mica, and hornblende, in some places veined by a porphyritic granite with large plates of mica. The mica is sometimes entirely replaced by hornblende in the same mass, and would be termed a syenite by many geologists. I picked up a few crystals of adularia in the gravelly detritus of a weathering vein, and some fine specimens of an iridescent felspar. The felspar, which prevails in the substance of the rocks, is reddish, and the mica dark coloured, but it sometimes occurs in rich gold coloured scales and plates.

The soil is a greyish, friable loam, passing into reddish and sandy, and usually rests on a bed of kunker; below which, in a bed of sand and gravel, water is found at depths of from eight to fourteen feet from the

surface. The surrounding country is generally rocky and jungly. Rice, raggi, kovaloo, and bajra are the staple articles of cultivation.

With the exception of two or three families of Palicars and Brahmins, speaking Telinghi, the inhabitants are chiefly of the Pallaywar caste, and speak Tamul: there are still a few Mussulmen left here. The town is situated a little south of the tank bund, at the western base of the rocks, and is said to contain about 600 houses.

The remains of the fort stand on a steep rock, overlooking the town, about 300 feet high, and not commanded by any of the surrounding heights. Like Carangooly and Chingleput, it became of importance as a military post during hostilities with the French. In 1760 it was taken after a severe assault by Sir Eyre Coote, who was wounded here; besieged by Hyder in 1781 but not taken, and again in combination with the French in 1782, to whom it was compelled to capitulate on the 6th May.

It was subsequently blown up and dismantled: but in the succeeding war with Tippoo, it was held as a post of observation by a company under an officer, which was cut off by Tippoo in 1791.

Murandi Choultry.—This place is situated on the celebrated Red hills which run to the rear of Pondicherry, from which it is about four and a half miles NNE. These beds of sandstone, which extend probably farther to the NE. will be described more fully when speaking of Pondicherry. They overlies the Neocomian limestone beds, which are seen outcropping nearer the sea to the NE. in the vicinity of Conjimere, about ten miles north from Pondicherry, on the Madras along shore road, &c. which passes by Sadras and the seven Pagodas—the ruins of Mahabalipuram, or Mavellipuram, as it is called by natives. These ruins lie among a cluster of low rocks which project from a sandy spit running down the coast from Covelong to Hedoor, a distance of about sixteen miles in breadth. It varies from half a mile to one and a quarter of a mile. In front, dashes the everlasting surf; in rear lies a salt marsh of upwards of a mile broad in some parts, and communicating with the sea on the south and north extremities of the sand bank in its front, by two narrow openings. The principal sculptured rocks lie about two and three-quarter miles from the south extremity of the bank, almost abreast, but a little south of, the Chingleput hills already described. In the monsoon they are insulated from the main-land by the inundation of the salt marsh in their rear.

A series of bare granite rocks, naturally of fantastic contour, nearly a mile long and 120 feet high, has afforded the Hindu artist ample scope for the exercise of his chisel, which must have been wrought of the finest tempered steel, for which India, since the dawn of history, has been justly celebrated. The bronze tools of the Egyptians might answer well enough in the limestone quarries around old Cairo, in working the blocks which constitute the great bulk of the pyramid, but would be of little avail in the quarries of Syene, a type of whose granite we find in the redder felspar. Quaternary granites compose the great monolith *raths* of the seven pagodas—a mixture of red and white felspar, white quartz, dark mica, and hornblende. It is more than probable that Indian steel found its way into Egypt during the early traffic that is known to have subsisted between India, Judæa, Yemen, and Egypt. It is absurd to suppose, that the sharply cut and deeply engraved hieroglyphics which cover the granite obelisks of Egypt, were done with chisels of bronze, even armed with corundum dust.

Quintus Curtius informs us, that Porus presented Alexander with a quantity of steel as one of the most acceptable and valuable gifts India could offer.

The granite blocks here, as elsewhere in India, are subject to spontaneous concentric exfoliation and splitting. The globular mass apparently about sixty feet in circumference, which we see nicely poised on a convex mass of granite—the pat of butter petrified by the god of milkmaids, Krishna—is ascribable to the first process; and the rents in the sculptured rocks—one of which cleaving the monolith pagodas, was ascribed by Mr. Chambers to a violent earthquake—have doubtless been caused by the latter process of spontaneous splitting.

With regard to the Brahmanical history of the seas overwhelming the ancient city and rolling over its ruins at the fiat of the God of the Heavens, Indra, who, it is said, loosed the chains of the ocean and overwhelmed its wicked ruler Malecheren, there are few facts that can be relied on—except that pieces of pottery, Roman and Chinese coins, are occasionally washed ashore in storms, and the remains of ruins and sculptured rocks are at a little distance in the sea.

From a multitude of enquiries which I have made regarding the encroachment of the sea on various parts of the Coromandel Coast, I am led to think, that the shore has been subject, like that of the Baltic, to

undulations, causing the sea to enroach and recede in different parts. Marks on the rocks, as on those of the Baltic and Caspian, would serve to determine the question.

From the inscriptions hitherto deciphered, nothing decisive has been obtained as to the date of the sculptures. In the 3rd report, by Taylor, on the Mackenzie MSS. section 9, we find it stated that in the Cali Yuga, Singhama Nayadu, a zemindar of the Vellugotivara race, ruled at Mallapur, (Mavellipoor). In that time during a famine many artificers resorted hither, and wrought on the mountain a variety of works during two or three years. Ignorant people term these things the work of Visvacarma; but, (says the writer) the marks of the chisel remaining disprove that opinion. Besides Singhama Nayadu built a palace on the hill, of which a few fragments now only remain. "In another MS. we find a Singhama Nayadu mentioned as son of Vennama Nayadu, and who became head of his race, and whose brother made successful incursion against Canchi and the Pandya kings, and beat the Musulmans."

There must be always some doubt until the identification of this Singhama of the Cali Yug and the Singhama who lived at the time of the Mohomedan invasion, a period not more remote than the 7th century of the Christian era.

Mr. Walter Elliott, with the aid of inscriptions he has lately brought to light at Idian Padal, two miles north of Mavellipoor, in old Tamil characters, one of which bears the name of Tribhuvana Vira Deva, a Chola king—and other collateral evidence—infers that its rulers were in a state of independence during the 6th and beginning of the 7th centuries.*

None of these inscriptions bear the special number of the year, but Mr. Elliott mentions one, in the neighbouring hamlet of Parajaakaran Choultry—in the same character as those of Idian Padal, and Varaha Swami—as bearing the name of the reigning sovereign Vikrama Deva, and the date of 1157 of the Salivahana era. The other names of sovereigns that occur, are Kama Raja and Ati Rana Chanda Pahava.

These inscriptions referred merely to grants and sales. The time in which Tribhuvana Vira Deva ruled remains to be fixed. But even when this is accomplished, we shall be still in the dark as to the exact date of

* Madras Journal, No. 30, for June 1844.

these singular sculptures which resemble,* as Mr. Fergusson justly observes, in plan and design the Hindu series at Ellora, though many of their details are only to be found at Ajunta and Salsette. It is evident, however, that the rocks were executed under the direction of priests of Siva and Vishnu, as no traces of Buddhism or of the Jains are seen.

From the inscriptions hitherto brought to light, I coincide with Mr. Elliott in supposing that the character in which some of them are written, (Grantham and Nagri) are not older than the 6th century. The freshness of the chisel-marks on the granite on which Mr. Taylor and some other antiquarians found, in part, their suppositions of a still more modern origin, (viz. from 300 to 500 years) cannot be relied on, as the marks in the quarries of Syene, and in the defile leading from Thebes to Cossier testify.

One general remarkable feature in these sculptures remains to be noticed, viz. that they have been left apparently in haste, being all unfinished. Mr. Goldingham mentions a tradition of the workmen, who had emigrated from the north, having suddenly been recalled by their prince before they had completed them. This tradition, and the similarity of the sculptures to those of the Deccan, are in favour of the theory that they are not the work of the inhabitants of the country, yet the inscriptions in the old Tamul character must have been executed probably at a later period than the others, under the directions of the Tamul or Chola princes, or priests.

I am not aware whether the inscriptions on the monolith *Raths* have as yet been fully deciphered. It is probable they may throw light on the era of the Ati Rana Chanda, the lord of kings, who is declared by the inscription on granite, (north of the pagoda, two miles north of the place) to have built it; and of the Kama Rajah who founded the temple to Siva, according to the Sanscrit inscription in the temple of Ganesa. The antiquity of these inscriptions beyond a certain era may be negatively inferred from the absence of the date either Vikramaditya or Salivahana.

The Revd. Mr. Taylor, who has catalogued the Mackenzie inscriptions, states, that he has not met with inscriptions with a defined year higher

* Journal Royal As. Soc. Part. I, No. XV, p. 88.

up than the 10th century*. I have only met with one of the 9th century on stone, but copper grants have been found with earlier dates extending to the 5th century.

Pondicherry.—From Murtandi to Pondicherry, the loose sandstone of the Red hills extends on the right, and a sand-covered beach on the left. The nature of the substrata at Pondicherry has already been described in the notes from Pondicherry to Beypoor.

A Canal Act of the Emperor Akbar, with some notes and remarks on the History of the Western Jumna Canals. By Lieut. YULE, Engineers, First Assist. W. J. C.

For the following translation of a Decree of the Emperor Akbar, forming an interesting Appendix to the History of the Canals, given by Colonel Colvin in the 2nd volume of the Journal of the A. S., I am indebted to the kindness of Capt. S. A. Abbott, in charge of the Kythal district, who obtained the Persian copy from the parties named below, residents of Dhátrat, a town on the southern boundary of Kythal, just at the point where the Hansi branch of the Western Jumna canals enters the Chitang Nálá, in the old channel of which, deepened and widened, the canal waters flow to their termination at Bahádera, in the Bikaner territory.

Translation of a Sanad of Akbar Sháh Bádscháh, dated month of Shawál, A. H. 978, [A. D. 1568] at Firozpúr, in the Province of Lahaur. Obtained from Abdul Samad and Abdul Mustakím, Pirzádahs at Dhátrat, being four leaves abstracted from a book which bears the appearance of considerable antiquity.

“My Government is a tree, the roots of which are firm in the earth, and being watered by the waters of God’s grace, its branches reach to Heaven. In acknowledgment of God’s mercy in establishing this great empire, my desire, purer than water, is to supply the wants of the poor;

* Madras Journal, No. 30, p. 41.

and the water of life in my heart is larger than the sea, with the wish to dispense benefits, and to leave permanent marks of the greatness of my Empire, by digging canals, and founding cities, by which too the revenues of the Empire will be increased.

"God says, sow a grain, and reap sevenfold(a). My desire is to reap one-hundredfold, that my crown may become wealthy, and that the zamindars may obtain double returns.

"The seeds sown in this world, are reaped in the next.

"The Omnipotent God gives power to whom he pleases.

"The following is the best purpose to which my wealth can be applied, viz.—

"The Chitang Naddí, by which Fíroz Sháh Bádsháh, two hundred and ten years ago, brought water from the nálás and drains in the vicinity of Sádhaura(b), at the foot of the hills, to Hánsí and Hissár, and by which for four or five months in the year water was then available, has, in the course of time, and from numerous obstacles, become so choked, that for the last hundred years, the waters have not flowed past the boundary of Kythal, and thence to Hissár, the bed has become so choked, that it is scarcely discernible; since which time, the inhabitants of those parts have become parched with thirst(c), and their gardens dried up.

"Now that I have given the district (Sarkár) of Hissár to the great, the fortunate, the obedient, the pearl of the sea of my kingdom, the star of my government, the praised of the inhabitants of the sea and land, the apple of my kingdom's eye, my son Sultán Muhamad Salím Bahádúr(d), (may God grant him long life and greatness); my wisdom wishes that the hopes, like the fields of those thirsty people, may, by the showers of liberality and kindness, be made green and flourishing,

(a) "The similitude of those who lay out their substance, for advancing the religion of God, is as a grain of corn which produceth seven ears, and in each ear a hundred grains."—*Sale's Korán, Ch. II.*

(b) Sádhaura, a town of the Ambálá district, about twenty miles west of the Jumna. The river flowing past Sádhaura is the Markanda, but the sources of the Chitang are only seven or eight miles distant.

(c) In Hariáná the springs have been raised, since the canal was re-opened, in some instances as much as sixty feet.—Capt. Baker's Report on the Sutlej and Jumna Canal.

(d) Afterwards the Emperor Jahángír, who was at this time under two years of age. "The Sirkár of Hissár Fírozeh, ever since the conquest of Hindoostan by the Moguls, has constituted the personal estate of the heir apparent of the empire"—*Revel.*

and that the canal may, in my time, be renewed, and that by conducting other waters into it, it may endure for ages.

“ For God has said, from water all things were made. I consequently ordain, that this jungle, in which subsistence is obtained with thirst, be converted into a place of comfort, free from that evil.

“ Consequently, in the year of the Hijra 977, my Farmán, bright as the sun, and obeyed by all the world, went forth; that the waters of the nálás and streams at the foot of the hills at Khizrábád(e), which are collected in the Sonb river and flow into the Jumna, be brought by a canal, deep and wide, by the help of bunds, &c. into the Chitang Naddí, which is distant from that place about one hundred kos(f), and that the canal be excavated deeper and wider than formerly, so that all the waters may be available at the above mentioned cities, (Hansi and Hissár) by the year 978.

“ Behold the power of God, how he brings to life land that was dead(g).

“ Truly a canal is opened, and from the source to the mouth, although the zamindars and cultivators take by cuts abundance for their crops, it is still sufficient to meet the demand.

“ Because this canal was renewed for the sake of my beloved son, in compliment to him, whom, in his childhood, I call *Shekko*, and because in Hindustani a canal is called *Nai*, I have called this canal the *Shaikh Nai(h)*.

“ And whereas Muhamad Khán Tarkhán was superintendent of this work from first to last, I have conferred upon him the office and title of Mír-áb.

[Here follows a flourish of the writer of the Sanad.]

“ The following verses have arisen from the ocean of my heart to the shores of my lips :

“ Muhamad Akbar Ghazí Jaláluddín.

“ He is the king of this age, and equal to king Jamshaid.

(e) Khizrábád, a Sikh town near the debouchement of the Jumna from the Hills, and the present Delhi Canal head.

(f) Dhátrat, where the present canal joins the Chitang, is by the line of the banks about 130 miles (pretty exactly 100 kos of the country) from Khizrábád.

(g) God sendeth down water from Heaven, and causeth the Earth to revive, after it hath been dead.—*Sale's Korán, Ch. XVI.*

(h) This title appears to have been very short lived. I am not aware that the word *Nai* is now applied in this sense in any of our canal districts, but I learn that it is the Panjábt corruption of *Naddí*, and is commonly applied by the Sikhs to a river or water-course. The valley of the Ghagar is called *Najít*.

" His throne is the throne of Farídún and Kai.

" He is like unto Khizr, and from the waters of his generosity every thing has life.

" He is such a king, that from the canal of his liberality, the garden of the world is green all the year round.

" A canal by his orders was carried to Hissár ;

" For the sake of the Prince Salím of blessed steps.

" A canal like milk, and that milk full of fish ;

" Its waters like honey, and pleasanter than wine.

" The king in his great kindness gave Muhamad Salím the title of Shekho, because his Pír (spiritual patron) was a Shaikh(i).

" He consequently called this canal Shaikh Nai.

" May the Bádsháh and Prince live for ever.

" The date of excavating this canal is to be found in the following words :—

(ج) اباديحي في

" Tarkhán obtained the title of Mír-áb for his labours, because he carried the waters of the canal in every direction.

" As long as the new moon, like a boat, sails in the waters of the blue heavens, so long may the waters of this king's generosity irrigate the garden of the world.

" Whereas I have ordered that the waters be collected in this canal, and that it be made so wide and deep to Hissár, that boats may ply upon it in every part ; it is my will that the superintendent build bridges and bunds wherever necessary(k), that at the season of cultivation a sufficient supply of water be given to all who aided in excavating the canal, and they obtain water all the year round.

(i) It is said that Akbar having had no child who survived infancy, made a pilgrimage to offer his prayers for posterity at the shrine of Mugnuddin Chishtfat, Ajmir. He was there directed to seek the intercession of the Shaikh Salfm Chishtfa Sifrf; and shortly afterwards the favourite Sultana was delivered of a son, who in honour of the saint was called *Shekho Salim*. A village on the canal near Hissár bears the name of Salfma Shekhopoor.

ا ب د ش ي خ ن ي (ج)

(k) The only old bridges now existing between the canal head and Hansi are, that called the Gharaunda bridge, near Karnal, and one at Safidan ; both massive structures with pointed arches.

"Also, that on both sides of the canal down to Hissár, trees of every description, both for shade and blossom, be planted(*l*), so as to make it like the canal under the tree in Paradise, and that the sweet flavour of the rare fruits may reach the mouth of every one, and that from these luxuries a voice may go forth to travellers, calling them to rest in the cities where their every want will be supplied, and I trust that, from the blessing attending this charity, the garden of goodness may remain ever green, that the benefits of the blessing may be incalculable, and that from it, I may obtain eternal reward.

"Thanks be to God who has enabled me to do this, which, without his instruction, I should not have performed.

"It is necessary that every one acknowledge the person appointed to this work, and recognize no partner with him.

"Should it be necessary to construct a bund, or any other work on the canal, all Shikkdars(*m*), Chaudrís, Mukaddams, and Rayats, whether of the Khalsa or of other Parganahs, will give the necessary assistance in labourers, &c. and delay not.

"Every Parganah will be satisfied with the number of cuts made by the Mír-áb, and take no more, and on every occasion abide by his directions. He has the power to punish as he sees fit every one who takes water out of season; whoever disobeys his orders will, after investigation, be punished as an example to others.

"The superintendent is particularly cautioned to see that the cuts in every Parganah are equally and justly distributed, and in this matter to consider every one on an equality; not to permit the strong to oppress the weak, and so to act as to please both God and man.

"The inhabitants of both sides of the canal will abide by these orders, and obey all the high, enlightened, concise, &c. &c. farmans of the king."

This document will be regarded as a very curious one by all who take interest in the past history, as well as in the present and prospective utility of the canals of Hindustan, suggesting as it does a fact which history appears to have forgotten, and which we have not ascertained

(*l*) Excepting a few of the different kinds of *Ficus*, scarcely any old trees now exist on the canal banks.

(*m*) *Shikkdár*, a revenue officer.

without some degree of pleasure, namely, that the Jumna canals, as a perennial source of supply to a thirsty land, owe their origin to the greatest of Indian princes.

The question, however, is a difficult one on account of the universal prevalence of the belief that Fīroz Shāh drew a canal *from the Jumna* to Hissār, and from the obscurity of the accounts of the various channels excavated by that king. The only books bearing on the subject to which I have access, are Dow's *Firishta*, and Rennel's *Memoir on the Map of India*.

The words of *Firishta* are as follows :—" In the year 757, between the hills of Mendoulī and Sirmoor, he (Fīroz) cut a channel from the Jumna, which he divided into seven streams ; one of which he brought to Hansi, and from thence to Raeesen, where he built a strong castle, calling it by his own name. He drew, soon after, a canal from the Cagar, passing by the walls of Sirsutti, and joined it to the rivulet of Kera, upon which he built a city, named after him Fīrozeabad. This city he watered by another canal from the Jumna." (a)

The seven streams I cannot explain. " Raeesen, (though this name is not now recognizable) where he built a strong castle, calling it by his own name," is doubtless Hissar Fīrozah, or " the castle of Fīroz." The remainder of the sentence seems almost inextricable from its obscurity, and probably, as Major Rennel suggests (o), contains a jumble, arising from the multitude of excavations made by King Fīroz, and the number of cities to which he gave his name. There appears, however, no reason to believe, according to Rennel's hypothesis, that a canal was ever brought to Delhi before the time of Shāh Jāhān.

The *city of Sirsutti*, which Major Rennel is a little puzzled to fix, would seem to be *Sirsa*, for the following reasons—It was (Rennel

(a) Dow's *Firishta*, I. 305. A more exact translation than Dow's of the passages relating to the excavations of Fīroz, from a copy of *Firishta* in the palace library at Delhi, is given by Mr. Seton, Resident at Delhi, in a letter to Government, on the subject of restoring the canals, dated September 11th, 1807. But, in the words quoted, there is no material difference, except in the names of Hansi and Raeesen, which Dow writes *Hassi and Beraisen*. But the system of water carriage on the canals which Dow attributes to Fīroz in the following sentence, appears to be a mere embellishment.

(o) " It may probably be a jumble of two sentences, which relate to different cities together. The *river Kera*, and *Firozeabad* may relate to the city of Fīrozepoor, at the conflux of the Sutlege and Beyah, and the canal from the Jumna to Fīrozeabad, a city founded by Fīroz in the vicinity of old Delhi. * * * * Capt. Kirkpatrick notices an obscurity in the text of *Firishta* in this place.—*Rennel*, page 74.

p. 76) at the end of Timur's third march from Bhatner to Samána, and four marches distant from the latter place. Now *Sirsa* lies directly in the road from Bhatner to Samána; it is upwards of forty miles distant from the former and about eighty-five from the latter. This is easily reconcilable with the number of marches given, especially as two of these seven are stated to have amounted to 32 kos; which, if we take somewhat under 60 miles, the remaining five marches would average 14 miles each, and three such marches would just give the distance from Bhatner to Sirsa. Firishta also states that Timur having taken and pillaged the town of Battenize (Bhatner), and after that *Surusti*, advanced to Futtehabad(*p*). This seems to fix the identity of Sirsutti with Sirsa. But again, Ibn Batuta relates, that on his journey from Multán to Dehli, after travelling four days from Ajúdahan, he arrived at the city of Sirsutti, a large place abounding in rice, which was carried thence to Dehli. And from Sirsutti he proceeded to Hansi(*q*). Now Sirsa is about 100 miles distant from Ajodin, (or Pák Patan) on the Gharra, in the direct line towards Hansi. And the rich valley of the Ghagar might well supply the abundant rice crops.

The canal then which Fíroz drew from the Ghagar under the walls of Sirsutti, is in all probability the Choya nála, which issues from the Ghagar near Múnak, passes close to Sirsa, and bears evident traces of having been partially, at least, an excavated channel(*r*). The mention of its junction with "the rivulet of Kera" is indeed unintelligible. The nála in fact joins the Ghagar again, not far from Sirsa, and a short distance below their union, the Revenue map shows a village called Fírozabad. I should be curious to know if at this village exist any remains of greatness, from which we might suppose it to be the city alluded to by Firishta.

The remainder of the sentences we must leave alone. Hissár Fírozah might indeed have been watered by a canal from the Ghagar as well as from the Jumna(*s*), but certainly not by a canal from the Ghagar passing under the walls of Sirsutti or Sirsa.

(*p*) Dow II. p. 4.

(*q*) Ibn Batuta, p. 110.

(*r*) See Capt. Baker's printed report on the Ghagar.

(*s*) And probably was. For the late Major Brown traced an old channel from the vicinity of the Ghagar, in the direction of Hissár. This, however, the natives called an old bed of the Sirsutti river. But the Sirsutti has a gift of ubiquity!

Major Rennel's words with regard to the Hissár canals are as follows : " It appears that previous to the building of Hissár, Fíroz had made a canal from the Jumna, near the northern hills, to Safidún a royal hunting place ; for the purpose of supplying it with water. This canal was in length 30 royal cosses or full 60 G. miles ; and it passed by Karnál and Toghlukpoor. After the foundations of Hissár were laid, he drew two principal canals to it ; one of which was a prolongation of the canal of Safidún, the whole extent of which was then 80 (common) cosses, or about 114 G. miles. The other principal canal was drawn from the Sutlege river to Hissár Fírozabad. The outlet and course of this canal is not so clearly defined as the other : Capt. Kirkpatrick, to whom I am indebted for the information concerning Hissár and its canals, had it from a history of Fíroze written by *Shumse Seraje*, soon after the death of that great monarch which happened in 1388."

With regard to this Sutlege canal to Hissár Fírozah having ever been successfully executed, we may feel sceptical. The only line within possibility would be from the neighbourhood of Rupar to the Sirhind nála, and thence crossing the Ghagar into the Hissár district, according to the general line sketched by Capt. Baker in 1841. But leaving this and turning to the Safidún canal, we remark that in Hodgson and Herbert's map, a branch of the Chitang is represented as quitting the main channel and passing within a short distance of Safidún(*t*). And this, guided by the *Sanad* before us, we might suppose to be the original canal of Fíroz, were not the statement so distinct that his canal was drawn from the Jumna. Toghlukpúr I have no knowledge of, but the mention of Karnál points to the existing line of canal, as the Chitang is ten miles distant from that city. It is difficult to doubt this evidence, and yet it is almost equally difficult to throw overboard the clear statement of Akbar's *Sanad*. It is indeed possible that Fíroz may have connected the Chitang at a much higher point of its course with the Jumna, by a cut which could only convey a supply of water into the nála when the river was at high levels ; or that a canal from the Jumna was by Fíroz Sháh attempted unsuccessfully, upon which recourse was had to the

(*t*) " Of this branch all I am aware of is, that in seasons heavy of rain great floods pour into the canal near Barod, said to be consequent on the destruction of the earthen dams of the Chitang.—*Col. Colvin in J. A. S. II. 106.*

temporary supply derivable from the Chitang, and as the latter flows for sixty miles almost parallel to the Jumna and at no great distance from it, a misrepresentation thus arose. Otherwise we can only suppose that Akbar, in self-glorification, falsely represented his own renewal and repair of his predecessor's work, as an original enterprize of his own.

Singularly enough the *Sanad* itself does not speak of the new canal having been fed from the Jumna, but "from the nálás and streams at the foot of hills which are collected in the Sonb river and flow into the Jumna." But the Emperor speaks of his canal as capable of supplying water all the year round, and the Jumna is the only accessible source of such a supply. Doubtless then as now, the supply of water *crossed* the Sonb, that is, flowed *into* it and again *out* of it, so that the canal might with truth be said, to be drawn from nálás collected in the Sonb.

It is certainly somewhat singular that Firishta, who flourished in the latter part of Akbar's reign, and has made prominent mention of the ancient excavations of Fíroz, should not have alluded to this work. But the historian residing in the Deccan had probably no personal knowledge of the work, whilst contemporary documents would be less accessible than those relating to past times. It is true also that the Hansi canal is still known universally as the Canal of Fíroz, and the name fondly bestowed by Akbar in honour of his infant heir has been utterly forgotten(u). But new names always adhere loosely among the many: *Dekli* and *Agra* are likely to outlive the remembrance of *Sháhjáhanábád* and *Akbarábád*, and though the canals have had as many names as a Parisian *place* during the Revolution(v), yet Nahr Fírozah, the first name known to the people, keeps its place in their mouths.

There seems no good reason to doubt the genuineness of the *Sanad*. It is dated in the month of Shawál A. H. 978, from Fírozpúr in the Súbah of Lahaur. Now it appears from Firishta, that Akbar, on the

(u) Akbar appears to have been particularly fond of this kind of nomenclature. He called the new Súbah of Kandish *Dándish*, after his son Daniel.—(*Rennet*.)

(v) Some of these names are—

Nahr Fírozah.
Shaikh Nai.
Nahr Bihisht.
Fyz Nahr.
Sháh Nahr.

birth of his son Murád, in the first month of 978, went on a pilgrimage to the shrine of Muyínuddín at Ajmír, thence by way of Nagor and Ajodín on the Sutluj to Lahaur, which he quitted for Ajmír and Agra in the second month of 979. So that he might well have been at Fírozpúr on the date given.

It is easy to conceive how the canals fell into decay. In the decline of the imperial power, when the irrigated country was a seat of constant war, and the lands along the banks were alienated among various chiefs, any system of conservancy became impossible, and the works must rapidly have been ruined. The Hansi canal was the first to suffer, as early as 1707, we are told^(w), the Sikhs taking advantage of the weakness of government during the contentions of Aurang Zeb's sons for the empire, converted the whole of the canal waters to their own use. And this at once reducing the country around Hissár to its original sterility, forced almost the whole of the inhabitants to seek a more favourable soil. A hundred years afterwards, in 1807 (as we are told by an officer on Survey in the Sikh States at that time), there was not a single inhabitant in the extensive city of Hissár^(x). The Dehli canal, or Ali Mardán Khan's branch, continued to flow to a much later period. The officer just referred to learned, from aged zamindars, that the country had been deprived of the advantages of this canal since the accession of Alamgír II. in 1758. The same authority informed him that for purposes of canal police, and the ready repair of accidents, a Darogha was stationed at every three or four koss, with peons and beldárs under him. The water rent appears to have been regulated by the time that the outlets remained open. 1000 armed peons and 500 horse, as Mr. Seton was informed by the son of one of the last native superintendents^(y) were maintained on the establishment. According to a proverbial expression current at Dehli, the net revenue from the canals was reckoned equal to the maintenance of 12,000 horse^(z).

As Colonel Colvin's paper on the history of the canals contains few dates, it may be worth while to add the following :—

(w) Letter dated May 1807, from Lieut. F. White, Surveyor to the Resident at Dehli. In the Office of the G. G. A. N. W. F.

(x) Ditto ditto.

(y) Letter from Mr. Seton to Govt. 11th September, 1807.

(z) Ditto ditto.

Chronology of the Western Jumna Canals.

A. D. 1351.—Fīroz Shāh brought a stream down the channel of the Chitang to Hansi and Hissār.

About 1468.—The waters of the above named channel ceased to flow further than the lands of Kythal.

A. D. 1568.—Akbar re-excavated the work of Fīroz and brought a supply from the Jumna and Sonb, by the present line, into the Chitang.

About 1626.—From the last named line, Ali Mardān Khān drew a canal to Dehli; first by way of Gohānā, and afterwards, on that failing, by the present channel, passing near Paniput and Soneput.

A. D. 1707.—The water ceased to reach Hariāna.

„ 1740.—Ceased to flow at Safidūn.

„ 1753
to } The Dehli branch ceased to flow.
„ 1760 }

„ 1817.—Capt. Blane appointed to restore the Dehli Canal.

„ 1820.—The water again entered Dehli.

„ 1823.—Restoration of Fīroz's, or the Hansi branch commenced.

„ 1825.—The water turned down.

Simla : November 1st, 1845.

P. S.—Capt. Abbott having, since the above was written, furnished me with a copy of the original Persian of the Sanad, it is enclosed. I have also since ascertained that the Ayin Akberi makes no mention of Akbar's having engaged in this work, which is singular.

Notes, chiefly Geological, on the Western Coast of South India.

By Capt. NEWBOLD.

I have not yet had an opportunity of examining the Western Coast from Cape Comorin to Beypoor, but by specimens received thence, and by information from General Cullen, laterite is doubtless the prevalent surface rock. General Cullen writes me that he has found a bed of lignite, in the laterite at Karkully, about fifteen miles south of Quilon, in a stratum of dark shales and clays. At Cape Comorin itself are beds of sandstone, and shell limestone, of which a good account is a desideratum.

Calicut.—At Calicut, the ancient capital of the Zamorin, (a corruption by the Portuguese for Raja Samudri) and the landing place of Albuquerque on the shores of India, laterite is also the prevalent rock.

The modern town exhibits few traces of this once famous city. Of the old fort scarcely a vestige remains beyond a ruined doorway, the traces of a fosse and counterscarp, some mounds marking the southern gateway, and the site of a few bastions.

Another fort, it is said, was built by Tippoo; but this too has been destroyed; and the present shoal of Calicut was pointed out to me by an old native as the site of a still older fort overwhelmed by the sea. Tradition states that the place where the Syrians landed near Quilon is also engulfed.*

The modern town is a large assemblage of garden houses, on a low sandy sea coast, under a grove of cocoanut and jack trees, and extending a considerable distance inland. A broad street runs down to the sea through the midst of this scattered town. The houses flanking it are usually contiguous, built of laterite, or brick and chunam, whitewashed.

The streets, that branch off from it to the right and left, are narrow, winding, and dirty, like those in the oldest parts of Lisbon. Here dwell the Moplay and other native merchants.

On the beach facing the sea runs a row of warehouses for timber, coir rope, split bamboos and other marine stores. The rope is manufactured on the spot.

* Madras Journal, No. 30, p. 146.

In the roadstead I observed native craft only. The boats used for communication with the shore, though composed of planks sewn together with coir, like the Massoolah boats at Madras, differ from them in being lighter, lower, and flat-bottomed, and are extremely pointed at the stem and stern. As the surf here is much less powerful than on the Coromandel Coast, a boat of a heavier description is not required.

The laterite continues, by Mahé and Tellicherry, to Cannanore, a little north of which it overlies some carbonaceous looking clay, and slate clay. Lateritic iron ore is found at Augadipur, Satimangalum, and many other places throughout Malabar; iron sand (magnetic) in most of the ghaut streams. Gold dust is also found in similar localities, especially in Wynaad and Ernaad, and other places elsewhere specified.

Payengady.—Payengady is about sixteen miles NNW. from Cannanore, and stands on the sea coast near a back water. A *coup d'œil* from the rising ground near the village presents a low flat, stretching between an inland ridge and the sea; and which has all the appearance of having been covered by the sea up to the base of the laterite cliffs. This flat is for the most part covered by marine sand, and thinly scattered with houses shaded by cocoanuts. A few marine shells were found at the base of the cliffs about a mile inland. Whether drifted by the wind or conveyed here by the sea under former conditions is uncertain.

The hills in the back ground stretch out like promontories, terminating abruptly at the inland edge of the flat.

The laterite overlies granitic and hypogene rocks. Between Covai and Caututcherry the Nelisir back water is crossed from Malabar to Circar Canara, or from Malayala to Tuluva, where Canarese is spoken and Malayalum ceases.

Cassergode.—The laterite continues the surface rock by Hosdroog, Bekul, and Chundergherry, to Cassergode. It rests as usual on granitic and hypogene rocks; which, near Bekul, are veined with quartz, and imbed garnets and amethystine quartz, fragments of which are numerous in the sand on the shore. There is also a black magnetic iron sand derived probably from the dark and beautifully crystalline hornblende schists. The strike of strata is westerly: the dip is confused, often vertical. The fort stands on laterite, capping basaltic greenstone.

The soil on the rice flats is a rich mould, deposited in part by the rivers in their passage to the sea from the ghauts. These bring down a considerable portion of the decayed vegetable matter of the dense jungles on their banks, mingled with the detritus of granitic hypogene rocks, and of the laterite. When lateritic detritus is in excess, vegetable matter is added by the natives as a manure. Inland, to the NE., the granitic masses of Jumalabad, Murbiddry, and Carulla rise above the surface, the former to a great height, almost inaccessible from the steepness of its sides.

Mangalore.—Laterite is still the surface rock as before observed. The numerous back waters or marine lagoons, which lie along the Malabar Coast, are formed at the mouths of rivers by sand bars thrown up by the antagonizing forces of the mountain torrents and the tidal wave. These sand bars are liable to be broken through, and alter their position by the force of extraordinary storms. Their beds afford instructive examples of the manner in which both fresh water and marine exuviae may be mingled and embedded in the same stratum. Numerous sand dunes also occur at the embouchures of rivers near back waters. These tranquil marine lagoons greatly facilitate native commerce along the coast.

Kundapur.—About a mile inland from the present embouchure of the Kundapur river, stands the town of Barcelore, the supposed Barace of Ptolemy: a place of great traffic in former times with Arabia and Egypt, and which is supposed to have stood upon the old embouchure of the river before the land gained upon the sea.

Vicramaditya, or his dynasty, is said to have ruled 2,000 years at Barcoor (Barcelore), and, after him Salivahana, to whom succeeded Buddha Penta Raja and the Bijanugger dynasty. A human sacrifice, offered up to increase its commerce, is alluded to in the Mackenzie MSS.

I observed near the old Pagoda at Kundapur, an inscription on stone, which opportunity did not permit me to copy. Barcelore is still a place of great native trade.

The present bar at the river's mouth does not admit vessels of more than fifty or sixty corges, which find secure anchorage under the lee of the north bank. Its entrance was protected by a battery built by Hyder, and an old fort now in ruins.

Honawer (Onore) and Sedashegur.—The geology of Honawer, or Onore, has already been touched upon. Suffice it to say, that laterite is the prevalent rock.

Sedashegur is about 168½ miles, northerly from Mangalore, about three miles south of the southern frontier of the Portuguese territory of Goa. The western ghauts here advance boldly to the ocean and afford some points of view, which truly approach the magnificent. The back ground of the picture is filled with the wild mountain scenery of the ghauts, from whose forests issues the Kali, or Black River, to the Indian Sea in the fore ground, expanding into a broad and beautiful lake near its embouchure, and stretching between two bold promontories, the northernmost of which is crowned by the picturesque ruins of the old fort which once guarded the entrance.

Across the mouth of the river runs a sand bar, over which at high water there is a draught of about two and three-quarter fathoms. Vessels of about forty cargoes find a snug anchorage within the bar; and boats of from twenty to twenty-five cargoes pass up the river eighteen miles to Mallapur, where there is a salt depôt. They carry up salt-fish and salt from Gokurn, and bring back rice and firewood, chiefly for the Goa and Bombay markets. Mr. Oakes attempted to make this a depôt for the cotton shipped from the interior to Bombay, &c., as being a much more convenient harbour, and nearer Bombay than that of Kompta. But the project failed in consequence of the opposition of the Gujerati merchants of Kompta, who were averse to quitting their Mamool village.

The formation of the ghauts near Sedashegur to the south, is chiefly granite with gneiss and hornblende schist, penetrated often by large dykes of basaltic greenstone, which at their base are covered partially by laterite. Their summits, I had no opportunity of examining.

A little south of Sedashegur, between Ancola and Chendaya, the beach of a small and pretty indentation of the sea is strewed with nodules of a stiff black clay, resembling in colour that of the lignite deposit at Beypoor: the situs cannot be very far distant. Iron is said to be smelted at Gopchatta.

The soil is usually a sandy loam. The staple articles of cultivation are rice, cocoanuts, sugarcane and raggi. The latter and hill-rice

occupy the dry lands and cleared sides of the mountains (like the wheat on the high *sierras* of Spain,) while the irrigated flats of the valleys smile with abundant crops of paddy and sugar-cane. Yearly the mountains blaze with the fires of the clearers, who are obliged, like the Malays, to shift from one spot to another as the soil of the clearing becomes exhausted.

The fort, it is said, was built by the Sodaj Rajas of Sircy, from whom the Portuguese wrested it. It next fell with Ancola and Gokurn into the hands of Hyder, and eventually into those of the English.

I observed about thirty-two guns, apparently of Portuguese manufacture, lying about.

At present (1840), Sedashegur (Siveswargur) contains about 600 houses, inhabited principally by Concanni Mahrattas engaged in cultivation, by Christians from Goa, Comarapaiks, and Mussulmans. Three miles north commences the *Konkana* region, where that of *Tuluva* terminates. Near the junction, the two languages, viz. Canarese and Mahratta, are mixed. The old inscriptions on stone at Gokurn and other places south of this, are mostly in the old Canarese language and character. Some of the earlier ones belonging to the ninth century of the Salivahana era, show that this part of the country was under the sway of the kings of the Cadumba dynasty of Bunwassi; and those of the fifteenth century show the extension of the Bijanugger empire to the western coast.

Gokurn, about thirty miles south of Sedashegur, is one of the sacred places of Hindu pilgrimage, ranking with Tripati, Ramisseram, Juggernath, Sondur and Sri Sailam or Perwut.

It is the reputed scene of Parasuram's exploits, who raised the whole of the western coast from the ocean's bed to the base of the ghauts, and divided the new born territory among the Brahmans. Many subdivisions of this tract, and other changes, are known to have taken place at various historical epochs; for instance, the tract from Honawer to Gokurn was called *Haiga*; but it is probable the three provinces as they now exist, viz. the Concan, (or *Konkana*); Canara (or *Tuluva*); Malabar or Travancore (or *Kerala*), distinguished by the Mahratta, Canarese, and Malayalum languages, were the original geographical and political divisions of the western coast of India. After descending the ghauts,

with the physical aspect of the country, the vegetable, animal, and social systems undergo a striking change. A new language strikes the ear, and the eye is astonished at the sight of the wives and daughters of the upper classes, walking abroad naked from the waist upwards. The houses of towns and villages, instead of being huddled together as in the Carnatic, are widely separated in gardens or *desams* like the Malay Campong, and the generality of inhabitants struck me as resembling Malays in their habits and customs. The singular right of inheritance enjoyed by the sister's son is precisely similar to that of the Menangabowe Malays. Sheep are no longer seen, and instead of the fine oxen of Coimbatore, one sees a miserable breed of black cattle, hardly larger than donkies. The peculiar manners and customs of the various castes are too various for detail here.

Goa and Malwan.—Laterite covering granite and the hypogene rocks, continues from Sedashegur to Goa, and probably from Goa by Vengorla to the north of Malwan.

At Malwan gneiss occurs, and a bright magnetic iron ore, resembling that of Salem, disseminated in grains and nests, or in alternate layers with quartz. The rocks off the coast, washed by the breakers from their white colour and shape have the appearance of a boat under sail.

Mr. Fraser describes the overlying trap as coming down to Malwan, but I did not meet with it on the coast till I reached the village of Sarki.

Sarki.—I had no opportunity of examining the rocks at Ratnagherry, which lies between Malwan and Sarki : but the contour of the ghauts here is apparently trappean. At Sarki the trap hills descend towards the coast in long, flat-topped, wall-like promontories, becoming higher and wilder around Severndroog.

Bancoot or Fort Victoria.—The trap rises from the sea beach in a high steep rock, on the western extremity of which stands the fort commanding the entrance of the river. The citadel and flag-staff are conspicuous objects at sea. The town extends, at the base of the rock, towards the sea, and is well studded by cocoanut trees.

The rocks in the little bay of Shiwurdin are dark basalt and amygdaloid, imbedding zeolites, geodes and veins of chalcedony and quartz. At the water's edge the basalt is much honeycombed.

The outline of the ghauts in the back ground is bold and picturesque. A little to the north, the mountains of overlying trap attain their maximum elevation, which never approaches that of the peaks of granite and hypogene schist farther south, although they sometimes attain 4,500 feet of altitude above the sea's level.

They usually rise from the low maritime tracts of the Concan in bold escarpments, broken by steps or terraces, to the table land of the Deccan.

The Concan.—The foregoing observations from Goa were made as I was sailing up the coast from Sedashegur in a native pattamar, with a foul wind to Bombay. After leaving Fort Victoria the wind became fair, and consequently I had no longer any opportunity of going ashore and examining the Concan between Bombay and Bencoot. The ghauts in this region, we know, are of trap from the observations of Colonel Sykes. Their long horizontal outline, varied occasionally by truncated conoidal peaks, are characters in which their nature is plainly written.

The rock composing the Concan is chiefly trap. My lamented friend Malcolmson found beds of sandstone at Atchera, dipping at a considerable angle to the NW.

As the existence of fossiliferous deposits is by no means improbable on this low maritime tract, through the rocky fissures of which many hot springs find vent, and which have not yet been fully examined, I should strongly recommend its minute geological exploration.

Bombay.—The geology of this and the neighbouring beautiful islets of Elephanta, Salsette, &c. has been so well and minutely described by Dr. Thomson, that I shall content myself with observing that they are all of the overlying trap formation, and the rocks composing them embrace every variety from dark basalt to light coloured amygdaloids and wackes, from compact to crystalline and porphyritic.

I must not however omit to mention a curious variety termed *white basalt*, of which the base of Sir John Malcolm's statue at Bombay, if I recollect right, is composed. Externally it often resembles a soft felspathic granular sandstone, white, with a slight shade of yellow, but it is clearly seen passing into a true, rough, crystalline trachyte.

It is dug at the quarries of Salsette, and composes a large part of the island; some of the granular varieties are extremely hard, and

take a fine polish. Crystals of glassy felspar occur imbedded when the rock passes into trachyte porphyry ; but I have never seen it with scales of mica, assimilating granite, like the trachytes of Smyrna and Mitylene. In some places it has the appearance of a stratified sandstone, and in others there can be no doubt of its volcanic origin. In one place it is felspathic ; in the other imbedding rock crystal, and *globules* of quartz.

As this curious rock is without parallel in India, a detailed description of its relations with the contiguous trap, and a series of specimens exhibiting the different mineral alterations the rock undergoes in various parts of its mass from the line of contact to its most distant point from the trap, would be highly interesting and instructive. It is probable that the molten mass of trap and trachyte may have here invaded the sandy bed of a lake or sea, and thus become blended.

The amygdaloid of Bombay, among other beautiful specimens of the zeolite family, contains that rather rare mineral (in Europe), apophyllite. Chalcedony in most of its varieties, and beautiful agates, are common.

The temperature of sea water in the harbour of Bombay in April was 87° Fahr. a foot below the surface. The temperature of air in the shade was 85° the time of observation 3 p. m.

The temperature of water in a well at Bombay, 20 feet deep, was 82° ; (which approaches the mean temperature of the place) : the temperature of air in the shade was 86° ; time, noon ; month, April. The temperature of the cave of Elephanta—same month—time, noon—was 85° ; the temperature of the water of a well in Elephanta was 75° . 5'—temperature of air in the shade at the moment was 85° ; time of observation, noon.

*The Coins of Arakan :—The Historical Coins, by Capt. A. P. PHAYRE,
Principal Asst. Commr. Arakan.*

The art of coining appears to have been introduced among the Arakanese only at a very late period. Their oldest legendary coins were suggested to them by the coined money of the Mahumudan sovereigns of Bengal. I say their *legendary* coins, since it is probable that a medal similar to that described, and so happily explained by Lieut. Latter (in the Jour. As. Soc. Vol. XIII. p. 571) was struck in Arakan at a period much earlier than were the coins now to be noticed. It is indeed certain, that to coin money is a but lately known art among the Burmese race. The term in their language for coin,—*ding-ga*,—seems not to be a native word, but adopted from the Hindooee, *tu-ka*. In the dominions of Ava, coined money is still unknown ; payments are made by silver ingots weighed out as required.

The Arakanese sovereigns no doubt wished to follow the kingly practice existing in Bengal, of coins being struck in the name of the reigning monarch. We learn from their annals that about the middle of the fifteenth century of the Christian era, they conquered Bengal as far as Chittagong, of which they kept possession for about a century. It was then, that they first struck legendary coins. On the obverse of the earliest of these, we find the date and the king's names written in the Burmese character, together with barbarous attempts at Mahumudan names and titles ; these they assumed as being successors of Mussulman kings, or as being anxious to imitate the prevailing fashion of India. Indeed, there is some reason to believe that *Ba-tsau-phyú*, a Búddhist king like the rest, who ascended the throne A. D. 1459, obtained among his own subjects the epithet *kalamashá*, (the son of the *Kalama*) from having issued a coin with the Mahumudan *kulima* inscribed upon it. The reverse of most of the earlier coins, contains unintelligible Persian and Nagri inscriptions. The Arakanese kings were frequently known to their subjects by names and titles different from those which appear on their coins. This circumstance will explain a discrepancy observable between the coin-names of kings given here, and the sovereigns of the same period found in the list of Arakanese kings, published in the Society's Jour. Vol. XIII. page 50. The coin-date generally coincides with the year of the king's

accession to the throne ; but in some instances it does not : more than one coinage having occasionally been issued in the same reign.

Old coins are frequently discovered buried in the ground in various parts of Arakan. Several valuable ones thus found have been kindly sent me by Major David Williams, Principal Assistant Commissioner (then) of Ramree. Many have also been met with, hung as charms or ornaments round children's necks, which have been retained in families for several generations. At present I have the means of describing only a few of those I once possessed ; the greater portion having been lost when the Society's cabinet was robbed some months ago. All those now described are of silver, for though a few of mixed metal are to be met with, their legends do not differ from these.

The oldest Arakanese coin I now possess is that marked No. 1. The obverse is as follows :—

၆၆၃ သင်္ကြံ သခင် နရာမိဗ္ဗတိဘောဓိဝံသျှာ

TRANSLATION.

963. *Lord of the White Elephant, Nará-dib-ba-di Tshau-lim Shyá.*

Here 963 in the Arakanese era is equivalent to A. D. 1601. *Nará-dib-ba-di* is a Pali title signifying I believe "Ruler of men ;" while *Tshaulim Shyá*, is nothing more than a barbarous attempt at the Mahumudan title *Zalim Shah* ! The reverse of this coin bears some unintelligible compound of Persian and Nagri letters. The above king stands No. 17 in the list of Arakanese sovereigns of the *Myouk-ú* dynasty, in the Jour. As. Soc. 1844, p. 50, under the name of *Meng-Rá-dzá-gyi*. I long considered the date of this coin to be 863, the first figure on that I possess being imperfect, and the date 863 corresponding with the accession of a king styled *Meng Rá-dzá* in the above mentioned list No. 8. However, on seeing a duplicate of this coin in the possession of Lieutenant Fytche, I was struck with the resemblance of the first figure to a 9 and looking into the *Rá-dzá-weng* or Arakanese history, I found *Meng-Rá-dzá-gyi* mentioned with the Pali and Mahumudan titles (the latter differing slightly in the spelling) as inscribed on the coin. The coin must have been struck in the eighth year of his reign.

No. 2. The next coin is that of the son and successor of the preceding king; the obverse bears the following date and inscription:—

၇၇၄ ဆင်ဖြူ သခင် ဝရမ္မရာဇာ ဥဿျာဏ်သျှာ

TRANSLATION.

974. *Lord of the White Elephant, Wa-ra-dham-ma Rá-dzá Oo-shyoung-shya.*

This date is equivalent to A. D. 1612. *Wa-ra-dham-ma Rá-dzá* is a Pali title said to signify "Excellent-law-observing king;" while in *Oo-shyoung-shya* we have another instance of the barbarous adoption of a Mahumudan name, it appearing to stand for Hoosein Shah! This king was commonly known to his subjects by the name *Meng khamoung*.* The reverse of this coin bears like the preceding one an illegible inscription in Persian and Nagree.

No. 3. The obverse of this coin has the following date and inscription:—

၇၈၄ ဆင်ဖြူ သခင် ဆင်နီ သခင် သီရိသုဓမ္မရာဇာ

TRANSLATION.

984. *Lord of the White Elephant, Lord of the Red Elephant, Thi-ri-thu-dham-ma Rá-dzá.*

This date is equivalent to A. D. 1622. There is no Mahumudan name on this coin. The Pali title is translated "Excellent righteous king." On the reverse is an illegible Persian and Nagree inscription.

No. 4. This coin, and all those posterior to it, have the same inscription on the obverse and reverse. On this one the date and inscription are as follows:—

၁၀၀၀ ဆင်ဖြူ သခင် ဆင်နီ သခင် နရပတိကြိ

TRANSLATION.

1000. *Lord of the White Elephant, Lord of the Red Elephant, Na-ra-ba-di-gyi.*

This date answers to A. D. 1638, the very year in which the History of Bengal informs us that the "Mugh Chief who held Chittagong on the

* *Khamoung*, in Burmese writings signifies, the "canopy of state"—being part of the regalia of their Kings. It is probable that this title *Meng Khamoung*—was a translation of some Mahumudan epithet, which this King took to himself. It may be rendered, "The Canopy of Kings."—T. L.

part of the Raja of Arakan," delivered it up to the Mogul Viceroy, Islam Khan. This circumstance accounts for the Persian inscription being wanting on this coin. This chief is called in the Bengalee History, Makut Ray, a corruption of his title *Meng-ré*, i. e. "War Chief."

No. 5. The date and inscription of this coin are as follows :—

၁၀၀၇ ဆင်နီ သခင် ဆင်ဖြူ သခင် သာဝိုဏ် မင်းတရား

TRANSLATION.

1007. *Lord of the Red Elephant, Lord of the White Elephant Tha-dó the monarch.**

This king does not appear to have been known by any other name than that here mentioned. The date is equivalent to A. D. 1645.

No. 6. Date and inscription are thus :—

၁၀၁၄ ရွှေနီ သခင် ဝန္ဓသုဓမ္မရာဇာ

TRANSLATION.

1014. *Lord of the golden Palace, Tsan-da Thoo-dham-ma Rá-dzá.*

The date answers to A. D. 1652. The style of the king is here altered; he is no longer Lord of the White Elephant, but of the "golden Palace." This style was retained until the fall of the kingdom in A. D. 1784. The Pali title signifies "The moon-like righteous king."

No. 7. The obverse and reverse run thus :—

၁၀၄၇ ရွှေနီ သခင် ဝရဓမ္မရာဇာ

TRANSLATION.

1047. *Lord of the golden Palace, Wa-ra-dham-ma Rá-dzá.*

This date is equivalent to A. D. 1685. In the list of Arakanese kings before referred to, the date of this monarch's accession is erroneously given as 1054.

No. 8. The date and inscription are as follows :—

၁၀၇၂ ရွှေနီ သခင် ဝန္ဓဝိဇယာ

TRANSLATION.

1072. *Lord of the golden Palace, Tsan-da Wi-dza-yá.*

This date answers to A. D. 1710.

* The words *meng tará* might perhaps be interpreted "Lord of justice." Whilst *dhamma* generally refers in the Burmese Language to the "sacred law," *tará* alludes to the "law of the land."—T. L.

No. 9. Date and inscription.

၁၀၉၃ ၏နိ သခင် စန္ဒသူရိယာရာဇာ

TRANSLATION.

1093. *Lord of the golden Palace, Tsan-da Thu-ri-ya Rd-dzá.*

This date answers to A. D. 1731.

No. 10. Date and inscription.

၁၀၉၉ ၏နိ သခင် မဒရိယာရာဇာ

TRANSLATION.

1099. *Lord of the golden Palace, Ma-da-rit Rd-dzá.*

No. 11. Date and inscription.

၁၁၀၄ ၏နိ သခင် နာရာအာယာရာဇာ

TRANSLATION.

1104. *Lord of the golden Palace, Na-ra-a-pa-ya Rd-dzá.*

No. 12. Date and inscription.

၁၁၂၃ ၏နိ သခင် စန္ဒပရမရာဇာ

TRANSLATION.

1123. *Lord of the golden Palace, Tsan-da Pa-ra-ma Rd-dzá.*

No. 13. Date and inscription.

၁၁၂၆ ၏နိ သခင် အာယာမတာရာဇာ

TRANSLATION.

1126. *Lord of the golden Palace, A-pa-ya Ma-há Rd-dzá.*

No. 14. Date and inscription.

၁၁၃၅ ၏နိ သခင် စန္ဒသူမနရာဇာ

TRANSLATION.

1135. *Lord of the golden Palace, Tsan-da Thu-ma-na Rd-dzá.*

For this coin I am indebted to the kindness of Lieutenant A. Fytche,
Junior Assistant to the Commissioner of Arakan.

No. 15. Date and inscription.

၁၁၃၉ ဣန့် သခင် စန္ဒသဒိသရာဇာ

TRANSLATION.

1139. *Lord of the golden Palace, Tsan-da-tha-di-tha Rá-dzá.*

No. 16. Date and inscription.

၁၁၄၀ ဣပြည် သခင် ဓမ္မရာဇ်ရာဇာ

TRANSLATION.

1140. *Lord of the golden Land, Dham-ma-rit Rá-dzá.*

No. 17. Date and inscription.

၁၁၄၄ ဣန့် သခင် မဟာသမတရာဇာ

TRANSLATION.

1144. *Lord of the golden Palace, Ma-há Tha-ma-da Rá-dzá.*

This was the last native sovereign of Arakan. In the second year of his reign being 1146 or A. D. 1784, the Burmese conquered the country. They immediately issued the next coin.

No. 18. Date and inscription.

၁၁၄၆ အမရပူရ ဆင်ဖြူရှင်နိုင်ငံ

TRANSLATION.

1146. *Conquered country of the Amarapura, many-white-Elephant-Lord.*

This coin was also placed at my disposal by Lieutenant A. Fytche. During the forty years the Burmese held Arakan, they did not, I believe, issue a coin with any other date stamp upon it.

There is another coin which has been lent to me by Lieutenant Latter, and which should have come immediately after No. 9. I now mark it.

No. 19. Date and inscription.

၁၀၉၇ ဣန့် သခင် နရပဝရာဇာ

TRANSLATION.

1097. *Lord of the golden Palace, Na-ra-pa-wa-ra Rá-dzá.*

The date is equivalent to A. D. 1735.

✓ *The Coins of Arakan—The Symbolical Coins.* By Lieut. THOS. LATTER.

The coins of which the accompanying facsimiles are given, are interesting, in that they represent whatever ideas they were intended to convey, by means of pure symbolism alone; and afford no clue by which to connect them with any particular prince. They are all, I believe, of a type peculiar to Trans-Gangetic India. No. 1, was found in the city of Haleng, in the Empire of Burmah, and has been already described at some length in a former number of the Society's Journal. It is placed here for the purpose of shewing how the same type of symbol runs through the whole. The remainder are peculiar to Arakan, the last being somewhat common. Knowing these coins to be Buddhistical from their being found only in localities—where no other than that faith has obtained, and having, as I have already said, no clue to justify our connecting them with any particular monarch; it is only by viewing them as representing by means of symbols certain dogmas, or tenets, (whether religious, or philosophical) of the Buddhist faith, that we can hope in any way to resolve their meaning.

In the description of No. 1, I speculated that the side (b) might be intended to convey a symbolical representation of the cosmology of Buddhism. The twenty-eight circular figures in the outer ring representing the twenty-eight Buddhas characteristic of a *Mahāgabbha*, or grand period of nature; and the five drop-shaped figures within the circle representing a *Buddhagabbha*, or lesser period of nature, the present period being characterized by the presence of five Buddhas; which are therefore made to preside over a curious emblem composed of certain triangles representing this world in particular. Although I could not at the time account for the reason why this singular combination should be able to convey such an idea; yet in a subsequent paper, (on the Buddhism of the emblems of architecture), I ventured to suppose (taking the triangles with their points downwards to represent "water;" and those with their apices upwards to typify "fire;" that their being made to meet in a circle, (the universe) with a point in it, (this earth) meant to convey the belief in the reiterated destruction of the world by fire and water, whence its Pali name *laṅga*, from *law*, "to be again and again" renovated and destroyed. It is singular that in the two coins, Nos. 2 and 3, my interpretation is indirectly corroborated, for in them

this emblem of "renovation and destruction," is conformably represented by the Bull *Nandi*, the peculiar cognizance of Shiva, the God of "destruction and renovation."

The two last coins are Shivite, but probably appertain to a time when the emblems of the worship of Shiva, and those of Buddhism had something in common. Struck perhaps by this similarity as well as by their novelty, they seem to have been adopted by some of the Princes of Arakan. The fact of the characters on them being Pali does not in any way militate against this supposition, as the Burman Alphabet is but a modification of the Pali, and the similarity of the two increases in proportion to the earliness of the date. We see on these coins the Buddhist triglyph represented by the trident of Shiva. On each side is a scroll; and beneath are certain round dots. These dots are curious, for they here occupy the same position in reference to the triglyph of Shiva, that the guttæ do to the triglyph of architecture. In three coins in my own possession, evidently of two different dies, their number is "five." In another from the collection of Capt. Phayre, figured No. 3, their number is "nine;" this last, however, is a peculiarly expressive and powerful number in Buddhism. The legend over the Bull varies in three coins, they are given separately, (*a. b. c.* No. 5.). (*c*) presents the characteristics of the old Pali alphabet, with the exception of the first letter; I read it "*Shrī Vrieghaw*, the last member of the symbol of the last vowel being effaced; so that it appears to the eye *Vrieghé*. The other two may be determined by those better versed in the old Nagri character. (*b*) is of a more ancient type than (*a*); which last is of the same class as the characters composing the inscription on the temple of Shiva in the village of Harahi, described in the Society's Journal, No. 43, July, 1835.

The popular tradition connected with these coins is the following: There was a king who set off to China to find the skull which he owned in a former state of existence when he was in the body of a dog; his astrologers having told him that this skull being wedged into the cleft of a tree was the reason why he was troubled with such incurable headaches, and that on removing it he would be cured. On his departure he left with his wife a ring, and told her that in case he should not come back in seven years, she was to raise to the throne, and marry

that one of her subjects whom it would fit. On his way back the daughter of the Ocean king who was in love with him, begged her father to raise a storm to drown his fleet, and thus procure her lover. This being done, the prime minister who escaped informed the queen of the death of her husband; she immediately gave out throughout her kingdom that he should be her husband whom this ring would fit. Though numbers tried, it was not till an herdsman from the hills with his brother and nephew came down, that it was found to fit any one. It fitted them all three, the queen married the eldest brother, who thus became king, and he, in commemoration of his origin, put an ox upon his coins, as also the goad (the trident), the implement of his craft.

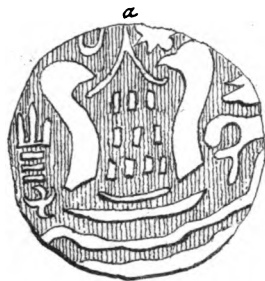
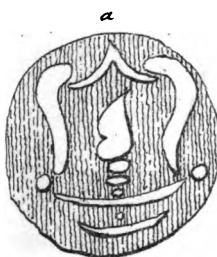
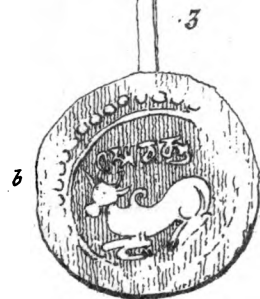
The coin No. 4, is much more modern in appearance than any of the others. It would be impossible to determine its age, its appearance would not give it more than 100 years. It is evidently the handywork of an artist who has concocted together a quantity of symbols that most struck his fancy from coins of a more ancient date. On the side (*a*) we see the parasol roof; being a part of the *tsédya* emblems. On each side are figures appearing to guard it. Below is that flame-shaped symbol, mistaken by Marsden, if I remember right, for the conch of Vishnu. On the obverse (*b*) is the symbol of combined triangles, over which are three "Z" shaped figures.

No. 6. The coin No. 6, though not belonging to the country, is represented here, having been found on the sea shore of the Island of Ramree with several others. It is of gold, and thin. The central portion represents an animal like a pig, with the representation of the Bo-tree above, and a monographic character 𑀓 beneath. Around are certain characters which an intelligent Buddhist priest declares to be old Cingalese, and to compose the words, "*Pawaraganran thoorada*," commencing from the letter marked (*a*). The first letter appears to have been mistaken by him; the first half composing it, being indistinct, appears to have escaped his attention. The name he gives is that of one of the old kings of Ceylon.

Historical Coins of Arakan.



Symbolical Coins of Arakan.



০৯৪৬

a

৬৭৮৬

b

৬৭৮৬

6



JOURNAL
OF THE
ASIATIC SOCIETY.

CATALOGUE OF MAMMALIA

Inhabiting the MALAYAN PENINSULA AND ISLANDS,

*Collected or observed by THEODORE CANTOR, M. D.,
Bengal Medical Service.*

Localities printed in *Italics* signify those from whence the animals of the Catalogue were obtained : localities in ordinary type those previously given by authors.

[Continued from p. 203.]

GEN.—HERPESTES, *Illiger.*

HERPESTES JAVANICUS, Desmarest.

SYN.—*Ichneumon javanicus*, Geoffroy.

Mangusta javanica, Horsfield.

"*Garangan*," Horsfield.

HAB.—*Pinang, Malayan Peninsula.*

Java.

The species is numerous. The largest male measured from the apex of the nose to the root of the tail one foot four and a half inches ; the tail one foot one and a half inch.

No. 172. No. 88, NEW SERIES.

2 K

HERPESTES AUROPUNCTATUS, Hodgson.

SYN.—*Mangusta auropunctata*, Hodgson.

Herpestes nepalensis, Gray.

Herpestes Edwardsii, apud Ogilby (?)

Herpestes javanica, Hodgson, apud Gray: List.

HAB.—*Malayan Peninsula*.

Bengal, Nipal, Scinde, Afghanistan.

This species somewhat resembles *H. javanicus*, but the ground colour is lighter, and the lower surface uniformly pale yellowish-grey; whereas in the former species it is similar to the back, or a shade paler. A single female observed, measured from the apex of the nose to the root of the tail one foot one inch; the tail nine inches.

HERPESTES GRISEUS, Desmarest.

SYN.—*Ichneumon griseus*, Geoffroy.

Mangouste de Malacca, F. Cuvier,

Mangusta malaccensis, Fischer,

Mangusta grisea, Fischer,

Herpestes Edwardsii, Fischer,

Mangusta Nyula, Hodgson,

Herpestes griseus, Nyool, apud Ogilby.

Herpestes pallidus, Schinz.

Forsan *H. nipalensis*, Gray, Var. apud Schinz.

HAB.—*Malayan Peninsula*.

Bengal, Hindoostan, Scinde, Nipal.

The present differs from the other species not only by its grey colour, but by its broader head, particularly between the prominent eyes, and by its shorter, blunter nose, which places the eyes comparatively nearer to the muzzle. In a single female, measuring from the apex of the nose to the root of the tail one foot two and a half inches, the tail nine and a half inches; the intestinal canal was of the following dimensions:

Small Intestines,	..	..	..	3 feet 1½ inch.
Large ditto,	..	..	..	0 „ 5½ „
Cæcum,...	..	..	..	0 „ 1 „

By a contraction in the middle of the greater curvature, the stomach is distinctly separated into a cardiac and pyloric cavity.

HERPESTES BRACHYURUS, Gray.

SYN.—“Musang Túrón” of the Malays of the Peninsula.

HAB.—*Malayan Peninsula*.

The largest male measured from the apex of the nose to the root of the tail one foot six and a half inches, the tail nine inches. It is distinguished from the other species, not only by its colours and comparatively short tail, but by its larger size and much more robust make.

GEN.—FELIS, Linné.

FELIS TIGRIS, Linné.

SYN.—Tigris regalis, Gray : List.

“Harímau” or “Rímau” of the Malays.

HAB.—*Malayan Peninsula*.

India.

Lieut. Colonel James Low has communicated the following denominations, by which the Malays of the Peninsula distinguish different varieties :

“Rímau Sípai,” reddish coated, striped.

“Rímau Bállu,” darker coloured.

“Daun Pinang,” reddish coated, without stripes.

“Tuppu Kassau,” darkish, without stripes, but with longer hairs than the others.

“Puntong Prun,” very dark, striped.

FELIS LEOPARDUS, Schreber.

SYN.—Felis Pardus, Linné, ?

Felis varia, Schreber,

Felis Panthera, Erxleben,

Felis chalybeata, Hermann,

Felis antiquorum, Fischer,

Felis fusca, Meyer,

Felis Nimr, Ehrenberg,

Leopardus varius, Gray : List.

Felis Leopardus, apud Schinz.

“Rímau Bintang” of the Malays of the Peninsula.

HAB.—*Malayan Peninsula*.

India.

} Apud Gray : List.

DARK VAR.

SYN.—*Felis melas*, Péron, apud Gray : List.

“Rimau Kúmbang,”* of the Malays of the Peninsula.

The ground colour is a shining beetle-brown, mixed with white hairs, not however sufficiently to impart a grey appearance. The black spots become distinctly visible in certain lights only. The skin of a male killed at Malacca, measured from the nose to the root of the tail four feet four and a half inches, the tail two feet ten and a half inches.

The Leopards of the Malayan Peninsula appear to attain to a larger size, and to be more ferocious than is generally the case in India. Instances of their having killed and carried off Malays are on record.

FELIS MARMORATA, Martin.

SYN.—*Felis Diardii*, Fischer, apud Schinz.

Felis Diardii, apud Jardine. Tab. 21 and 22.

Leopardus marmoratus, Gray : List.

“Rimau dahan” of the Malays of the Peninsula.

HAB.—*Malayan Peninsula*.

The ground colour varies from rusty-grey, or fulvous to grey, and the black markings are scarcely quite alike in any two individuals, nor is the extremity of the tail constantly black. The adult exceeds the size given in the original description ; a female measured from the apex of the nose to the root of the tail two feet half an inch ; the tail one foot nine inches. The species is numerous.

FELIS JAVANENSIS, Desmarest.

SYN.—*Felis javanensis*, Desmarest, apud Horsfield.

“Kuwuk,” Horsfield.

<i>Felis minuta</i> , Temminck, <i>Felis servalin</i> , Temminck, <i>Felis sumatrana</i> , Horsfield, <i>Felis undata</i> , Desmarest,	}	Apud Schinz.
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* “Kúmbang” signifies a beetle ; applied *par excellence* to a species of *Oryctes*, resembling *Scarabeus nasicornis*, Linné, which is very destructive to cocoanut plantations. “Rimau Kúmbang,” Raffles, is by Schinz referred to *Felis Pardus*, Temminck, Var. *nigra*, Muller ; *Felis melas*, F. Cuvier, the habitat of which is said to be Java and Sumatra.

Felis Diardii, Griffith,
Leopardus javanensis, } Apud Gray : List.

"Rímau ákar" of the Malays of the Peninsula.

HAB.—*Pinaag, Malayan Peninsula.*

Java, Sumatra ?

The ground colour in the Malayan individuals varies from pure grey to greyish brown or ferruginous. The largest adult male measured from the apex of the nose to the root of the tail one foot eleven and a half inches, the tail ten inches ; another of equal dimensions of the body had the tail eight inches in length. The intestinal canal was of the following dimensions :

Small Intestines,	..	..	..	3 feet 8 inches.
Large,	..	..	..	0 .. 9½ ..
Cæcum,	..	..	..	0 .. 1½ ..

In the scansorial habits of this very numerous species originates its local denomination "ákar," signifying a climber as well as a root.

FELIS PLANICEPS, Vigors and Horsfield.

SYN.—*Chaus* (?) *planiceps*, Gray : List.

"Kúching-útan," or "jáláng" of the Malays of the Peninsula.

HAB.—*Malayan Peninsula.*

Sumatra, Borneo.

The Malayan individuals of this apparently not numerous species differ from the Sumatran, originally described, in having the whitish throat, chest and abdomen, and the inner side of the limbs undulated with brown, transversal, interrupted bands. In none of the Malayan wild cats is the length of the tail more variable. In a male, measuring from the apex of the nose to the root of the tail two feet one and a half inch, the tail, consisting of twelve gradually diminishing caudal vertebræ, measured five and a half inches ; in another, one foot ten and three-fourth inch in length from the nose to the root of the tail, the latter organ measured two inches, consisting of four slightly decreasing vertebræ, the last one of which was broad, flattened, and rounded at the posterior extremity. It is of most ferocious habits, and untameable. In the smaller individual the intestinal canal was of the following dimensions :

Small Intestines,	..	..	3 feet 6½ inches.
Large,	..	..	0 .. 5½ ..
Cæcum,	..	..	0 .. 0½ ..

FELIS DOMESTICA, Auct.

“Kúching” of the Malays.

The Malays, like most Muhamedans, are as partial to cats as they are the reverse to dogs. As observed by Sir S. Raffles, some of the Malayan, like the Madagascar domesticated cats, have a short twisted or knobbed tail, others are tailless. Among those of an uniform colour, a light ashy and a bluish (or slaty-grey) variety, with single longer black hairs on the back and tail, are conspicuous. They frequently relapse from a state of domestication, resort to the jungle, and shun the presence of man.

RODENTIA.

SCIURIDÆ,

GEN.—SCIURUS, Linné.

SCIURUS BICOLOR, Sparrmann.

SYN.—Das javanische Eichhorn, Schreb.* apud Horsf.

Sciurus giganteus, McClelland MSS. } Apud Horsfield, Proc.
Sciurus bicolor, Sparrmann, } Zool. Soc.

Sciurus madagascariensis, }
Sciurus macruroides, Hodgson, } Apud Gray : List.

“Chingkráwah étam” of the Malays of the Peninsula.

HAB.—Pinang, Malayan Peninsula.

Java, Sumatra, Borneo, Siam, Tenasserim, Assam, Nipal.

The original diagnosis will prevent misunderstanding as to the species under consideration. “Sciurus supra niger, infra fulvus, auriculis acutis imberbibus, palmarum ungue pollicari magno rotundato.” (Sparrmann, apud Horsfield.) The colour of the head, back, tail, outside of the extremities, and the feet, is intense shining black, the single hairs being blackish-grey at the root, those of the tail blackish-brown at the root. In some individuals the black hairs generally, in others those of the tail, or some part of the back only, have a broad subterminal band of bright cinnamon, or Indian red, which imparts a reddish tint to the general black colour. The mustachios, whiskers and the superciliary bristles are black; those of the throat and forearm are black in some,

* *Sciurus javensis*, Schreber, and *bicolor*, Sparrmann, apud Gray : List, is *Sciurus Leschenaultii*, Desmar. apud Horsfield. Syn. *S. hypoleucus*, Horsfield.

ferruginous, or with the apex of that colour, in others. The under-parts vary from a deep golden fulvous to isabella colour. Whatever be the prevailing shade, it is always most distinct on the lateral line, which, commencing from the cheeks, passes along the sides of the body. The fur of the lower parts of the body, and of the inside of the extremities, is much shorter, softer, and less dense, than that of the back. The single hairs are greyish, or blackish at the root, with the apex of the shade of yellow prevailing in the individual. Single long bristles, either uniformly, or partially black, or fulvous, appear on the chest and abdomen. The species, under the present garb, is very numerous in the Malayan forests and hills.

VAR. β , Horsfield.

"*Sciurus supra fuscus, varians a fusco-nigricante ad sordide fulvum, pilis velleris fulvis et canescentibus intermixtis, subtus fulvus vel pallide flavescens.*"—Horsfield.

SYN.—*Sciurus auriventer*, Is. Geoff. apud Schinz.

Sciurus aureiventer, Is. Geoff. apud Gray: List.

"Chingkrawah" or "Chingkrawah puteh" of the Malays of the Peninsula.

Single individuals, resembling the Javanese one figured in '*Zoological Researches in Java*,' occur at Pinang, but there, as in Java, tawny of different shades, with a greyish cast, is more frequent. In some the head is of a darker colour, in others large spots of dark appear on the back, or the tail is above barred with dark. The upper part of the nose, a ring encircling the eyes, and the ears appear in all individuals to be of a darker brownish colour, and all have a more or less distinct large white spot on the anterior and upper part of the thigh. The back of the feet is either dark brown or fulvous. The palms, soles, mammae and genital organs, are black in all. The single hairs of the back are greyish-brown at the root, darker than the apex, which imparts the general colour to the back. With the hairs of the tail the reverse is the case, the basal half being isabella or white; the apical darker. On the lower surface of the distichous tail, the roots of the hairs form a white line on either side of the vertebræ, which are covered with short, dark-brownish, or fulvous hairs. The under-parts of the body are of the same colours as those of the black-coated animal, but their roots are yellowish-white. The mustachios, whiskers, and other bristles, are

in all of a blackish-brown; but the single bristles of the abdomen are sometimes fulvous.

The black-coated individuals stand in a similar relation to the light-coloured varieties, as that in which the black-coloured *Hylobates Lar* stands to the light-coloured. Such differences of colour, wide no doubt, are of no uncommon occurrence among the Malayan Mammalia, and ought to be well considered by Zoologists, who have not the opportunity of studying the living animals.

This, as well as the rest of the Malayan squirrels, is capable of being tamed to a certain extent, and evinces attachment to those who feed them, but the appearance of a strange person, animal, or even an unusual sound, startles them, and recalls their natural shyness. The largest of a great number, measured from the apex of the nose to the root of the tail one foot six inches; the tail one foot nine and a half inches. The intestinal canal was of the following dimensions:

Small Intestines,	..	..	..	9 feet 6 inches.
Large ditto,	..	..	..	4 „ 9 „
Cæcum,	..	..	..	1 „ 2 „

SCIURUS RAFFLESII, Vigors and Horsfield.

SYN.—*Sciurus rufogularis*, Gray.

Sciurus rufoniger, Gray.

Sciurus Prevostii, Desmar. apud Schinz.

“Túpai baláng” of the Malays of the Peninsula.

HAB.—*Malayan Peninsula*.

Java, Borneo, China* (Canton.)

* China is the habitat assigned to *Sciurus rufogularis*, Gray. Without doubting the authenticity, it is perhaps as well to observe, that skins of the more showy animals and birds of India, Malacca, and the Indian Archipelago, are offered for sale as indigenous productions in the shops of Canton and Macao. Skins of *Halcyon Smyrnenis* for instance, and other birds from different parts of India, are bought up by the Chinese merchants of our colonies in the Straits of Malacca, who annually, on Chinese Junks, ship quantities of considerable value to China, where they are manufactured into fans and artificial flowers. In a list of birds, contained in a collection of Chinese productions, exhibited in London in 1842, Mr. H. E. Strickland observes in his communication to the Zoological Society, that some of them appear to have been imported from Malacca. Skins and other parts of a host of animals, from the most distant parts of Asia, form items in the Chinese Pharmacopoeia. On my visits to Chinese Dispensaries in China and in our Malayan Colonies, I have been shewn horns of rhinoceroses and deer, tusks of the Duyong, heads of Bucer, tortoise-shells, and well preserved skins of *Trigonocephalus Blomhoffii*, from Japan; Ammonites and other fossils, *cum multis aliis*, all supposed to possess specific virtues, and accordingly prescribed by Chinese Medical practitioners.

This species, numerous in the Malayan countries, occurs with the following individual variations of colour—

Cheeks and throat iron-grey, shoulders uniformly, or mixed with red. (*Sciurus rufogularis*, Gray. *Mag. Nat. Hist.* 1842, p. 263.)

The cheeks are sometimes dark-brown, or ferruginous.

In some the white lateral line commences from the side of the nose, passing over the cheeks, the side of the neck, and over the shoulder. The lateral line is either pure white, more or less distinct, or mixed with single longer hairs with black apex.

Some have a short black line immediately below the white; in others there is above the latter a grizzled line, sometimes continued over the outside of the thigh. The tail is seldom uniformly black, frequently partially black, reddish or grizzled, owing to the apex of the hairs being white. The tuft is frequently reddish or rust-coloured.

The feet are sometimes white or pale ferruginous.

The Museum of the Asiatic Society possesses a specimen from Java, differing from *Sciurus rufoniger*, Gray, in having the tail grizzled instead of black. *Sciurus redimitus*, Van der Boon, is probably another variety of *S. Rafflesii*.

A young male, about a fortnight in confinement, after having finished his usual meal of cocoanut, seized and devoured an *Iora typhia*, which had just been shot, and happened to be placed within reach. Sparrows and other smaller birds were subsequently eaten, and apparently relished.

The largest male measured from the apex of the nose to the root of the tail eleven and a half inches; the tail one foot two inches.

SCIURUS HIPFURUS, Is. Geoffroy.

SYN.—*Sciurus erythræus*, Pallas (?)
Sciurus caudatus, McClelland ? } Apud Gray : List.
Sciurus anomalus, Kuhl.

Sciurus rufogaster, Gray.

Sciurus castaneoventris, Gray.

“Túpai Jinjang,” “Ummu,” or “Jau” of the Malays of the Peninsula.

HAB.—*Malayan Peninsula*.

Java, Sumatra, Assam, China (Canton).

The ground colour of the Malayan individuals differs but slightly, according to the more red or yellow rust colour of the bands of the hairs. The anterior part of the tail above is of the same colour as the back, the rest is either uniformly black, reddish, or with transverse bands, or has the tuft of that colour. The colour of the ears is brownish in some, but generally of the leaden grey, grizzled colour of the head, cheeks, chin and outside of the limbs. The feet are black or slightly grizzled.

The largest individuals of this numerous species measure from the apex of the nose to the root of the tail one foot; the tail one foot and half inch.

SCIURUS VITTATUS, Raffles.

SYN.—Túpai, Raffles.

Sciurus bivittatus, Raffles, Desmar. } Apud Horsfield.
Ecureuil Toupai, F. Cuvier,

Macroxus Toupai, Lesson, apud Gray: List.

Sciurus flavimanus, Is. Geoffroy, apud Schinz.

"Túpai" of the Malays of the Peninsula.

HAB.—*Singapore, Pinang, Malayan Peninsula.*

Sumatra, Borneo, Canton.

This is the most numerous species in the Straits of Malacca, the largest individuals measuring from the apex of the nose to the root of the tail eleven inches; the tail eleven inches.

SCIURUS NIGROVITTATUS, Horsfield.

SYN.—*Sciurus griseiventer*, Is. Geoffroy, apud Schinz.

HAB.—*Malayan Peninsula.*

Java, Sumatra, Borneo, Canton.

Not numerous; the largest individual observed, a female, measured from the apex of the nose to the root of the tail nine inches; the tail eight and half inches.

SCIURUS TENUIS, Horsfield.

SYN.—*Sciurus modestus*, S. Müller?

HAB.—*Singapore, Malayan Peninsula.*

Java, Sumatra, Borneo, Canton.

Of two individuals observed, the larger, a male, measured from the apex of the nose to the root of the tail six inches; the tail seven inches.

SCIURUS LATICAUDATUS, Diard, Var.

SYN.—*Sciurus laticaudatus*, Diard, apud S. Müller ?*

HAB.—*Malayan Peninsula*.

The present squirrel differs from the diagnosis of *Sciurus laticaudatus* from the west coast of Borneo, (communicated in *Natuur en Geneeskundig Archief, &c.* II Jaarg. I Afl. p. 87,) in having neither the first nor the fifth molar of the upper jaw very large. Both are of nearly equal size, and much smaller than the rest. The following is a description of the Malayan animal.

The shape of the head is depressed, elongated, conical, gradually attenuated towards the laterally compressed nose. The whole outline, the slender form, and general colours, render the animal strikingly similar to *Tupaia ferruginea*. The eyes are large, brilliant, dark; the ears large, oval, with smooth short hairs; the mouth is small, the upper incisors are very minute, the lower slender, flattened, and almost straight; the black mustachios, whiskers, superciliary and gular bristles, and the few white ones of the forearm, are all shorter than the head; the muzzle hairy, leaving the margins of the small, and at the apex laterally pierced nostrils, naked. The limbs and feet slender; the nailless tubercle of the thumb rudimentary, barely perceptible in the living animal. The claws are small, sharp, compressed, whitish.

The colour of the head, back, outside of the limbs and feet, is a rich rusty-red, mixed with shining black, particularly on the occiput, the back and the feet, less on the sides, where the ferruginous prevails; the throat, chest, abdomen and inner side of the limbs, whitish; in some individuals pale-yellowish. The fur is soft and delicate. The separate hairs are leaden-grey at the base, shining black, or with a broad subterminal ferruginous band. The tail is shorter than the body, distichous, broadest in the middle, attenuated at the root, terminating in a thin tuft. It may be compared to a feather, black on each side of the quill, successively ferruginous, again black, margined with buff.

* In the *List of Mammalia in the British Museum* occurs a genus: *Rhinosciurus*, Gray, and a species *R. tupaoides*, Gray, Syn. *Sciurus laticaudatus*, Müller ?? Generic or specific characters being neither given nor referred to, it is impossible in India to decide whether the specimen in the British Museum thus labelled, is identical with the animal here characterised.

Such is the succession of the bands on the separate hairs. This organ is less full and ornamental than in the generality of squirrels. The species is apparently not numerous; the largest out of five examined, a female, was of the following dimensions—

Length from the apex of the nose to the root of the tail,	$10 \frac{6}{8}$	inch.
„ of the tail,	$6 \frac{4}{8}$	„
„ of the head,	$2 \frac{3}{8}$	„
„ from the apex of the nose to the anterior angle of the eye,	$1 \frac{2}{8}$	„
„ from the posterior angle of the eye to the ear,	$0 \frac{3}{8}$	„
Breadth above the apex of the nose,	$0 \frac{1}{8}$	„
„ between the anterior angles of the eyes,	$0 \frac{7}{8}$	„
„ between the ears,	$0 \frac{6}{8}$	„
Diameter of the head at vertex,	1	„

Its habits in confinement presented nothing remarkable.

GEN.—*PTEROMYS*, Cuvier.

PTEROMYS *NITIDUS*, Geoffroy.

SYN.—*Sciurus petaurista*, Lin. apud Cuvier?

Sciurus petaurista, Chin Krawa, Raffles?

Pteromys albiventer, Gray Illustr.

“Túpai Térbang” or “Kúbin” of the Malays of the Peninsula.

HAB.—*Singapore, Pinang, Malayan Peninsula.*

Java, Sumatra, Borneo.

The part of the head anterior to the ears, the cheeks, the chest, and the abdomen, are white in some individuals of either sex, one of which is figured in Hardwicke's *Illustrations of Indian Zoology*, under the denomination of *Pteromys albiventer*, Gray.

The black, or dark-brown eyelids, nose, chin, feet and tip of the tail, appear to be constant characters. The shade, and intensity of the red colour is liable to considerable variations.* In the very young, there is a short black stripe behind the ears; and the posterior part of the back and anterior half of the tail are shining black, from each separate hair having the apex of that colour. Traces of these characters occur in some adult individuals. This species is very numerous in the Malayan countries. It is not strictly nocturnal, for it is frequently seen abroad

* In an individual from Malacca, the back was very dark Indian-red, with a few dashes of pure white. The identity of the species is, however, doubtful.

during the day. It is particularly fond of the Durian, the fruit of *Durio Zibethinus*, Linné. The flying squirrel has this partiality, in common with various other animals, as monkeys, Pteropi and Paradoxuri; nay, the Malays assert, that they have to watch this, their favourite fruit, against tigers.

In a female, measuring from the extremity of the nose to the root of the tail, one foot six and half inches; the tail one foot nine inches: the intestinal canal was of the following dimensions—

Small Intestines,	..	..	..	7 feet 4½ inches.
Large, ..	..	..	..	5 „ 2 „
Cæcum,..	..	..	..	2 „ 4 „

SCIUROPTERUS, Fred. Cuvier.

SCIUROPTERUS HORSFIELDII, Waterhouse,

SYN.—*Pteromys aurantiacus*, Wagner, apud Gray: List.

HAB.—*Malayan Peninsula*.

Java? Sumatra?

A single skin, brought from Kéddah, measured from the apex of the nose to the root of the tail eight and three-eighth inches; the tail eleven inches.

SCIUROPTERUS GENIBARBIS.

SYN.—*Pteromys genibarb*is, Horsfield.

“Kechubu” Horsfield.

HAB.—*Malayan Peninsula*.

Java.

Of two, the larger, a male, measured from the apex of the nose to the root of the tail seven and half inches; the tail seven inches.

MURIDÆ.

GEN.—*MUS*, Linné.

MUS BANDICOTA, Bechstein.

SYN.—*Mus giganteus*, Hardwicke,
Mus malabaricus, Shaw,
Mus perchal, Shaw,
Mus Icria, Buchan. Ham. MS.
Mus nemorivagus, Hodgson,

} Apud Gray: List.

Tikus besár of the Malays of the Peninsula.

HAB.—*Pinang, Malayan Peninsula*.

Southern Mahratta Country, Bengal, Nipal.