

XXXIV.—*Notice on the Remains of a Fossil Monkey from the Tertiary Strata of the Sewalik Hills in the North of Hindoostan.*

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THE most highly organized mammifers hitherto described in a fossil state, so far as our information extends, belonged to the *Cheiroptera*; and the instances of these on record are very few*. That quadrumanous remains should be wanting is by no means surprising, without the necessity of supposing that they did not exist. The countries of which the ancient races have been most completely investigated, had a climate unsuited to be the habitat of the tribe, as we now know it, when the more recent or superficial deposits were in progress of formation. If we refer to the remote epochs when the climate was suitable, and when genera now associated with the Monkeys were abundant, it is easy to conceive that the latter might have existed in numbers, without their remains being entombed. It requires in all instances many unconnected circumstances for the preservation of organic bodies, and their subsequent disclosure. Amongst the most important of these are the habits and organization of the animals themselves. As in the case of birds, it might be predicated, that this lucky concurrence of circumstances would be rare with quadrumanous remains. The very perfection in the organization of the Monkey entails, as a consequence, that his solid frame should seldom continue to indicate the previous existence of the individual. His admirable agility and social habits protect him against most aggressions. A flood might suffocate in their dens, over a large tract of country, the burrowing tribes; and might sweep from under the feet of the monkey hundreds of its herbivorous and predaceous fellow-tenants of the forest, and bury them in the near shingle or far-distant estuary, or drown and deposit them in the stagnant swamp—while he would remain secure. The tree on which he was perched might totter, and yield to the undermining cur-

* Brewster's *Edinburgh Journal of Science*.

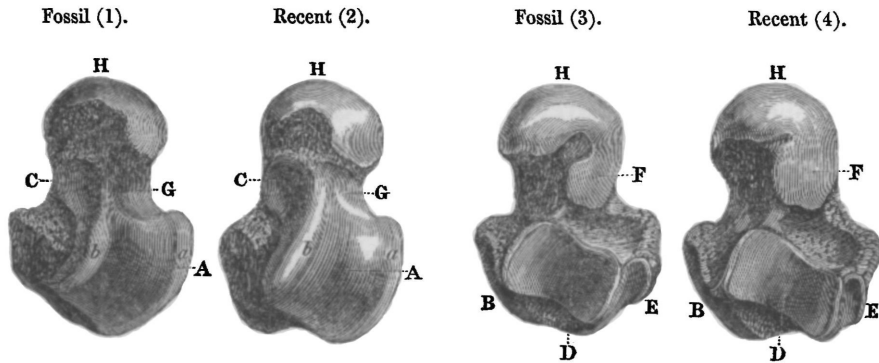
rent, and he still escape and feed on his wonted fruits, undisturbed by the destruction around. When the debt of nature comes to be paid, his carcass falls to the ground, and immediately becomes the prey of the numerous predaceous scavengers of torrid regions, the Hyæna, the Chacal, and the Wolf. So speedily does this occur, that in India, where Monkeys occupy, in large societies, mango groves around villages, unmolested and cherished by man, the traces of casualties among them are so rarely seen, that the simple Hindoo believes that they bury their dead by night.

When the ancient races of India began to open upon us in the new forms and the exuberant variety which the fossils of the Sewalik Hills exhibit, we were early led to anticipate that some trace of quadrumanous animals would soon be met with to perfect a series, which would be incomplete without them. Several months ago we became possessed of a solitary specimen, which put the matter, in our own minds, beyond all doubt. We deferred making it public, however, in the hope of soon finding specimens of the cranium and teeth; being unwilling to rest the announcement on any thing less characteristic. That chance has since fallen to our fellow-labourers in the pursuit, Messrs. Baker and Durand, of the Bengal Engineers, who have lately discovered a specimen, consisting of a considerable portion of the face, and the whole series of molars of one side, of a quadrumanous animal belonging to a much larger species than the bone we found.

Our fossil is the specimen which accompanies this communication. It is the astragalus of a right hind leg. It is completely mineralized, having a specific gravity of about 2·8, and it appears to be impregnated with hydrate of iron. Although but a solitary bone of the foot, the relations of structure are so fixed that the identity of the fossil is as certain as if the entire skeleton were before us. The very shallow excavation of the superior surface (A) [see wood-cut] for the pulley-like articulation with the tibia; the form and extent of the lateral articulating surfaces (B, C) for the external and internal malleoli; the considerable elongation of the apophysis for the head and neck of the bone (G, H); the slight obliquity with which it is sent off from the body; and the diagonal direction and form of the principal articulating surface (D) with the calcaneum, are characters which, taken in conjunction, incontestably prove that the fossil is a quadrumanous astragalus. It would be needless, therefore, to dwell on the points of difference between it and the astragali of those orders of Mammalia which have an allied form. It is only requisite to ascertain how it agrees with the corresponding bone in existing species of *Quadrumana*. It closely resembles, in size and general form, the astragalus of the *Semnopithecus Entellus*, which we send along with the fossil for comparison.

The principal dimensions are as follow :—

Dimensions.	Sewalik Fossil Monkey.	<i>Semnopithecus Entellus</i> .
Extreme length of astragalus	1·3 inch.	1·35 inch.
Extreme width of body of astragalus.	1· —	1·03 —
Length of body	0·8 —	0·85 —
Greatest diameter of navicular head	0·65 —	0·65 —
Thickness of ditto	0·45 —	0·5 —



The chief peculiarities of the fossil astragalus, compared with that of the Entellus, are these :—The upper articulating surface for the tibia (A) is more convex than in the Entellus, and less square in the outline, the lateral margins (a, b) approximating as they run backwards; the outer one being also more elevated. The peroneal articulation (B) is precisely of the same form and extent as in the Entellus; and the rough fossa between it and the large calcanean surface (D) also corresponds. The articular surface (C) for the inner malleolus somewhat differs: in the fossil it is long, shallow, and rather pyriform in outline, while in the Entellus it is cup-shaped, deeper, and more extensive. The other pits and inequalities of the inner side correspond; but the entire surface slopes off more obliquely in the fossil. The great calcanean surface (D) has the same diagonal direction, with reference to the upper surface, as in the Entellus: it has also the same form, but it is more vaulted, and has less stretch and width. Its inner margin is bounded by the shallow, pulley-shaped fossa (E) for the tendon of the *flexor pollicis longus* muscle, entirely as in the Entellus; and the rough pit between it and the anterior calcanean surface (F) is alike in both. The head-and-neck apophysis is sent off as in the Entellus. The upper surface of the neck (G) is narrower and less sloped. The scaphoid surface of the head (H) is altogether less extensive. The head itself is not so thick and massive, and its long direction slopes more obliquely upwards than in the Entellus; its inferior articular surface is less, and there is a wide, rectangular, rough gutter or fossa (x) running half way across, so as to make two surfaces. In the Entellus the fossa is obsolete, and

only indicated by a minute foramen, so that these articular surfaces run into one. This is the greatest difference observable in the fossil. The rough fossa at the outer side of the neck is alike in both.

With these inconsiderable peculiarities, the fossil agrees so closely in size and general form with the astragalus of the *Entellus*, that it probably belonged to the same sub-genus : still the points of difference are sufficient to leave no doubt, that the fossil must be assigned to a distinct species. In equalling the *Entellus*, it would belong to the larger *Quadrumana*. This is all the information the specimen conveys, regarding the animal from which it came ; but we may hope to meet with remains, which will develop its entire osteology, more especially that of the cranium and face. The fossil was found by a party of Hindoo collectors employed by us on the fossil tract of the Sewalik Hills ; and was brought to us mixed up with a promiscuous collection of the remains of the Hippopotamus, Mastodon, Ruminants, &c., like the specimens which have been sent to the Society. We have not therefore the means of knowing the exact locality where, and the circumstances under which, it was found.

The discovery is interesting in itself as supplying a deficient link in the series of the former tenants of the globe ; but greatly more so in connexion with the races with which the fossil was associated. We have excavated from, or found in the debris of, different beds of the same formation which yielded the fossil astragalus, the remains of a species of *Anoplotherium* *, the *Crocodylus biporcatus* and *C. (Leptorhynchus) Gangeticus* †, respectively the Magar and Gavial, two species which at the present day inhabit the quiet waters of the Ganges. Here then are two most instructive facts : *Quadrumana* co-existed with a member of the oldest ascertained pachydermatous genus of Europe ; and two reptiles now the contemporaries of man in the East, lived, and may have laved, in the same waters along with a species of one of the mammiferous genera which characterise the Eocene period of the West ;—affording another illustration of constancy in the order of nature, of an identity of condition in the earth of the olden time with what it exhibits now, and of the invariableness of organized forms. The two decurrent ridges on the face which specifically distinguish the *C. biporcatus* of the present day,

* *Anoplotherium Sivalense*, (No. 6.) a new species, of a size somewhat larger than the *A. commune* of the Paris basin. The species is known to us by two upper jaws in our possession with the series of molars complete. We therefore quote it unhesitatingly.

† Known to us by specimens comprising the whole of the cranium and muzzle. They do not differ more from the existing individuals than these do from one another in varieties dependent on age and sex. Asiatic Researches, Vol. xix. Part II., Art. II.

are as marked and distinct on the individuals which existed perhaps centuries of centuries ago; and an ankle bone of the Sewalik fossil Monkey so closely resembles that of a living species, that it is difficult to explain the difference.

The Sewalik fossils abound in monuments of this sort. There is a mixture of the new and of the old, of the past and of the present, of familiar with surprising forms, together with a numerical richness, such as no other explored region has exhibited within so comparatively limited a space. The Camel*, the Antelope, and Anoplotherium, have been found, intermixed with each other in the *same bed*. There are remains of the Elephant, Mastodon, Hippopotamus†, Anthracotherium, Rhinoceros‡, Hog, and Horse; the Tapir alone of the large existing Pachydermata being without a representative. In the Sivatherium§ is seen a huge Ruminant exceeding in size the largest Rhinoceros; it is also armed with four enormous sheathed horns, divided and foliated like the Dicranocerine Antelopes, and able to contend for mastery with the Mastodon. Contrasted with him in the same family is the puny Musk Deer, scarcely larger than a Hare. There are the Cat|| and the Dog tribe, the Hyæna, Bear¶, and Ratel**, and other Carnivora. In the feathered races, there are Grallæ, greatly surpassing in size the Gigantic Crane of Bengal (*Ciconia Argala*). Among the Reptilia, besides the Magar and Gavial, there were other Crocodiles†† of enormous bulk, approaching the largest Saurians; and the Testudinata, which have hitherto held but a humble rank beside their Saurian co-ordinals, here show their giant representatives. In addition to numerous species of Emys and Trionyx not bigger than the

* *Camelus Sivalensis* (Nob.), Asiatic Researches, Vol. xix. Part II., Art. X., a species of the size of the existing Camel.

† Asiat. Res., Art. III. *Hippopotamus Sivalensis* (Nob. & *H. dissimilis*, Nob.).

‡ Journal of the Asiatic Society, Vol. iv. p. 706, and vol. v. p. 486.

§ Asiat. Research. *ut supra*, Art. I. *Sivatherium Giganteum* (Nob.). Since the memoir was printed, Col. Colvin, Bengal Engineers, has got a specimen of the cranium with the bases of the four horns attached, and we have in our possession an almost entire rear horn, which has given the characters noted above.

|| *Ibid.* Art. XI. *Felis cristata* (Nob.). Smaller than the Tiger.

¶ *Ibid.* Art. XII. *Ursus Sivalensis* (Nob.). Size of the *U. Spelæus*.

** Messrs. Baker and Durand, Journ. Asiatic Society, Vol. v. p. 581.

†† *C. Leptorhynchus crassidens* (Nob.), an immense species far exceeding existing ones, and forming a passage from the Gavials into the true Crocodiles. It has the cylindrical muzzle and synostorized lower jaw of the former with the blunt thick teeth of the latter.

small Terrapins of the sluggish brooks of Hindoostan, we possess humeri and femora of this tribe (with corresponding fragments of the bucklers) as large as the equivalent bones of the Indian Rhinoceros. As the Pterodactyle more than realized the most extravagant idea of the Winged Dragon, so does this huge Tortoise come up to the lofty conceptions of Hindoo mythology: and could we but recall the monsters to life, it were not difficult to imagine an Elephant supported on its back.

Suharun Poor, Nov. 24th, 1836.