A Memoir on the living Asiatic species of Rhinoceros.—By Edward Blyth.

Among the investigations to which I devoted particular attention during my late rambles in Burmá, was the endeavour to corroborate and *confirm* the statement of Helfer and others, that the three known Asiatic species of Rhinoceros inhabited that region. In this I succeeded, so far as the two insular species (*viz.* the one-horned Rh. sondaicus and the two-horned Rh. sumatranus) are concerned; for these prove to be the ordinary Rhinoceroses of the Indo-Chinese region and continuous Malayan peninsula; and I have reason now to believe that they are the only Rhinoceroses of that great range of territory; the huge Rh. indicus (so far as I can discover) appearing to be peculiar to the *tarai* region at the foot of the Himálayas and valley of the Bráhmaputra (or province of Asám); the Rhinoceros still common in the eastern Sundarbáns, and also of the Rájmáhal hills in Bengal (where fast verging on extirpation), being identical with that of Jáva and Borneo, in the great oriental archipelago; while the Asiatic two-horned species (Rh. sumatranus) appears to be more common than the lesser one-horned (Rh. sondaicus) in the Indo-Chinese territories,—this animal extending northward to the Ya-ma-doung range of mountains which separates Arakan from Pegu, where Col. Yule observed it as high as the latitude of Ramri island, and I have been assured by Major Ripley that one was killed not long ago in the vicinity of Sandoway. What the particular species may have been that was hunted by the Mogul Emperor Báber on the banks of the Indus cannot now be ascertained; unless, indeed, some bones of it may yet be recovered from the alluvium of that river. It is remarkable that he compares its bowels to those of a Horse! A species is also stated by Duhalde to inhabit the province of Quang-si in China, in lat. 15°. This is much more likely to prove either Rh. sondaicus or Rh. sumatranus, than the large Rh. indicus.

It is true that the late Dr. Theodore Cantor, in his 'Catalogue of the mammalia of the Malayan peninsula' (*J. A. S.* XV, 263), asserts that both Rh. indicus and Rh. sondaicus "seem to be numerous" there; but he does not mention that he had examined specimens;

and he moreover notices that "a two-horned Rhinoceros is stated by the Malays to inhabit, but rarely to leave, the densest jungle." As this animal is common in parts of Burmá, as well as in Sumátra, it may be confidently predicated to inhabit the intervening region of the Malayan peninsula: but the more common and ordinary species of the peninsula would appear to be RH. SONDAICUS; and a friend who has killed as many as nine individuals in the southern half of that region, to whom I shewed several skulls of INDICUS and of SONDAICUS, is positive that all which he saw there were of the lesser one-horned species, as distinguished from the larger. The former, as before remarked, inhabits the islands of Jáva and Borneo in the archipelago, but not Sumátra;* whereas the two-horned species, as an insular animal, appears to be peculiar to Sumátra.† In the volume on Elephants, &c. in Sir W. Jardine's 'Naturalist's Library,' the lesser one-horned Rhinoceros is erroneously styled "the one-horned Sumátran Rhinoceros;" a mistake which might have been rectified by reference to Sir T. St. Raffles's paper in the 13th Vol. of the 'Transactions of the Linnæan Society,' which indeed is cited by the compiler.‡

The vernacular topical names of *Jávan* and *Sumátran* Rhinoceroses had now better be disused; seeing that both species have an extensive range of distribution on the mainland of S. E. Asia; the latter should rather be denominated 'the Asiatic two-horned Rhinoceros;' and the two others 'the Great one-horned' and the 'Lesser one-horned;' unless, indeed, the alleged discovery should be confirmed of the existence of a one-horned species in inter-tropical Africa, in addition to the four two-horned species which are now recognised

* The range of BOS SONDAICUS is similar; excepting that this animal does not extend to Bengal, like RHINOCEROS SONDAICUS.

† As also the Malayan Tapir, the continental range of which extends northward to the Tenasserim provinces of Tavoy and Mergui.

‡ The adult male Rhinoceros which lived for many years in the gardens of the Zoological Society, Regent's Park, London, (and for which the considerable sum of £1000 was paid,) is stated to have been captured in Arakan; but he was not nearly so large as several that I have since seen in India; and, therefore, I entertain an exceedingly strong suspicion that he was no other than SONDAICUS. His bones have doubtless been preserved. The two Asiatic one-horned species, indeed, resemble each other a great deal more nearly, in external appearance, than the published figures of them would lead to suppose. Certainly no sportsman or ordinary observer would distinguish them apart, unless his attention had been specially called to the subject. The best figure I know of adult RH. INDICUS is that published by Cuvier and Geoffroy, in the *Menagérie du Museum d'Hist. Nat.*

upon that continent (in which case the 'Great Indian' and the 'Lesser Indian' might be deemed sufficiently appropriate; as the range of the 'Asiatic two-horned' does not extend to India proper, which of course comprises Bengal but not Burmá). The existence of an African one-horned Rhinoceros was long ago affirmed by James Bruce of Kinnaird, in addition to the two-horned species which he pretended to figure;* and Sir Andrew Smith assured me that he had been repeatedly told by natives that such an animal occurred in the regions northward of the tropic of Capricorn. In the *Comptes Rendus*, tom. XXVI (1848), p. 281, an elaborate letter is published 'Sur l'existence d'une espèce Unicorne de Rhinocéros dans la partie tropicale de l'Afrique,' from Mons. F. Fresnel, then Consul of France at Jidda ('Djedda'), to which the reader, curious on the subject, is referred.

* Bruce's figure of the Abyssinian Rhinoceros, it is well known, is a reversed copy of Buffon's representation of true Rh. INDICUS, with a second horn added.—Dr. Rüppell ascertained the species to be Rh. AFRICANUS, the ordinary 'Black Rhinoceros' of S. Africa. The earliest-published *genuine* figure of this animal is that in the Supplement to Buffon's work; but certainly the most spirited as well as correct pictorial representations, alike of the Rhinoceroses and of various other animals of Africa, are given by modern sporting travellers, as Cornwallis Harris, and especially C. J. Andersson. By a slip of the pen, the latter writer alludes to Rhinoceroses in the island of Ceylon! As even Humboldt referred to the Tiger of Ceylon in his *Asie Centrale!*

There are capital figures of some of the arctic animals, also, in Mr. J. Lamont's 'Seasons with the Sea Horses' (1861); among the rest, of the Spitzbergen Deer, represented with well-developed vertical brow-plates to their horns (*vide J. A. S.* XXIX, 376). The question about the development of these Deer, as compared with those of Lapland, (mooted *loc. cit.*, p. 382,) is elucidated by Mr. Lamont, who states that—"They do not grow to such a large size as the tame Rein Deer of Lapland, nor are their horns quite so fine; but, they attain to a most extraordinary degree of condition. For further details, *vide* his extremely interesting volume. However, I may remark that in all his figures of Rein Deer the brow-plate is represented as being well-developed upon each horn; whereas I suspect that it is, generally, only rudimentary upon one of the pair; this, however, is probably a mistake on the part of the lithographer!

In further reference to the article alluded to, in which I commented upon the late Professor Isidore St. Hilaire's remarks upon domestic animals, and contended that we do not owe the domestication of the Turkey to the Spanish invaders of America, (a most unlikely people to have accomplished anything of the kind,) I may remark, that so completely familiar had this fowl become in Shakespere's time, that its then almost recent introduction into Europe had already been forgotten; for the great bard of Avon considerably ante-dates the existence of Turkeys in England, making it prior to the Spanish discovery of the New World! In the first part of the drama of King Henry IV, Act II, Sc. 1, one of the carriers introduced exclaims—"'Odsbody! The turkeys in my panniers are quite starved." But it is not impossible that Shakespere meant the Guinea-fowl; albeit not very probable: though, in either case, he had ante-dated the appearance of the domestic bird in European countries.

Professor Schinz, in his *Synopsis Mammalium* (1845), makes out as many as eight living species of Rhinoceros. The two Asiatic one-horned species, of course; and SONDAICUS only from Jáva: SUMATRANUS from Sumátra only; and of this he remarks—"Cornu anterius mediocre, posterius minutum" (not having seen Bell's outline of the horns of the male, in the *Phil. Trans.* for 1793, to be noticed presently). His *Rh. niger* and his *Rh. Camperi* must alike be referred to RH. AFRICANUS (seu *capensis*). Next, RH. SIMUS and RH. KEITLOA; but, of course, neither RH. OSWELLII nor RH. CROSSII. But what is his *Rh. cucullatus*, Wagler (Schreber's *Supp.*, *tab.* CCCXVII,—F. Schinz, *Monagr.*, *t.* 4)? Unless an ill-stuffed RH. SUMATRANUS! "Rh. cornubus duobus, capite sensim elevato, plicis cutis profundis [!], clypeo scapulari indiviso, supra latiori, epidermide verrucis parvis obsita. Capite elongato, auriculis subcylindricis, labro elongato prehensili, cauda mediocri. Long. corporis 6, 11″, caudæ 1′ 7″. Altitudo stethiaei 3′ 4½″, uraei 3′ 4½″. Habitat —— ? Hospitatur in museo Monacensi."

From examination of an extensive series of skulls of Asiatic Rhinoceroses, it is impossible not to discern that there are three well marked species, each of which varies considerably in the shape of the cranium. Of each there is a shorter and broader type, higher at the occiput, wider anterior to the orbits; and also a type the opposite of this, with every intermediate gradation. This amount of variation in the existing Asiatic species of the genus should intimate caution in the acceptance of *all* of the very numerous fossil forms that have been named by palæontologists.

The RH. SONDAICUS and RH. SUMATRANUS are very inadequately represented by the figures of skulls published by Cuvier and de Blainville. Those of both authors represent the narrow type, as distinguished from the broad type; whereas their figures of the skull of RH. INDICUS (seu *unicornis*, L.,) represent an unusually fine broad example of the species (doubtless the skull of the individual figured from life in the *Menagérie du Museum d'Hist. Nat.)*; which gives a far greater amount of contrast of appearance to the skulls of INDICUS and SONDAICUS, than exists in average specimens of those of the two species.

The skulls of INDICUS and SONDAICUS appear to differ only, *constantly*, in the former being considerably larger, and having the con-

dyle of the lower jaw (proportionally) much more elevated; imparting a conspicuously greater altitude to the vertex when the lower jaw is *in situ*. Both species would appear to exhibit precisely the same amount of variation. On present evidence (which, however, I suspect to be fallacious), it would seem that the broader type of SONDAICUS prevails in Bengal, and perhaps the narrower far southward; but we have both from the Tenasserim provinces; and they completely grade into each other, as equally in the analogous instances of INDICUS and SUMATRANUS.

In illustration of the skulls, I cite the figures of Cuvier and de Blainville (*Oss. Foss., Atlas*, pl. 42, f. 1, pl. 160, f. 1,—*Osteographie, Rhinoceros*, pl. 2), as exemplifying the broad-faced type of RH. INDICUS; and a very similar skull is that upon the skeleton of a *female* in the museum of the Calcutta Medical College. This female is one of a pair that lived about 45 years in captivity in Barrackpore park. I have repeatedly seen the pair when alive, many years ago; and remarked that they shewed no *secondary* sexual diversity, being exactly of the same size and general appearance. They never bred; and I have been informed that a pair of Tapirs similarly kept, for many years,in Batavia,shewed no disposition to propagate their species. They should, of course, have been separated for a time now and then, and again put together. We learn, from this Calcutta Medical College specimen and others, that the two forms of skull presented by the Asiatic species of Rhinoceros are not indicative of sex, as might probably have been suspected.

I now figure (pl. I, fig. 1, and pl. II, fig. 1,) a very fine example of the narrow type of skull of RHINOCEROS INDICUS; a splendid adult male, with its horn. Let this be compared and contrasted with the figures of the broad-faced type of skull published by Cuvier and de Blainville. The skull now represented belongs to Capt. Fortescue, of the late 73rd Regiment of Bengal Native Infantry; who killed the animal on the Butan side of the river Tista, not far from Jálpigári. He has taken it to England. Two specimens in the Calcutta Medical College museum are very similar; a third is intermediate, though decidedly rather broad than otherwise; and a fourth (that already noticed, with complete skeleton, *female*, as before specified,) very closely approximates—even to minute details—the superb broad skull figured by the eminent French zoologists. Five examples, in all, under

examination, besides the figures referred to. Strange to say, we do not yet possess a single 'spoil' of this species in the museum of the Society! But I trust and have reason to believe that this singular *hiatus* in our series will speedily become a record of the past.

Plate I, fig. 2, represents the broad type of skull of Rh. SONDAICUS, from the Bengal Sundarbáns; and pl. II, f. 2, the same from the Tenasserim provinces. Pl. I, f. 3, and pl. II, f. 3, represent an aged specimen of the narrow type of SONDAICUS, *from Jáva.* We have Tenasserim examples quite similar, except that they are not so aged; but I figure the Jávanese one, that there should be no misapprehension about the identification of the species. I have already remarked that these comparatively broad and narrow types completely grade into each other, as likewise in the preceding species. It is simply impossible to trace a dividing line in the instance of either one of the three.

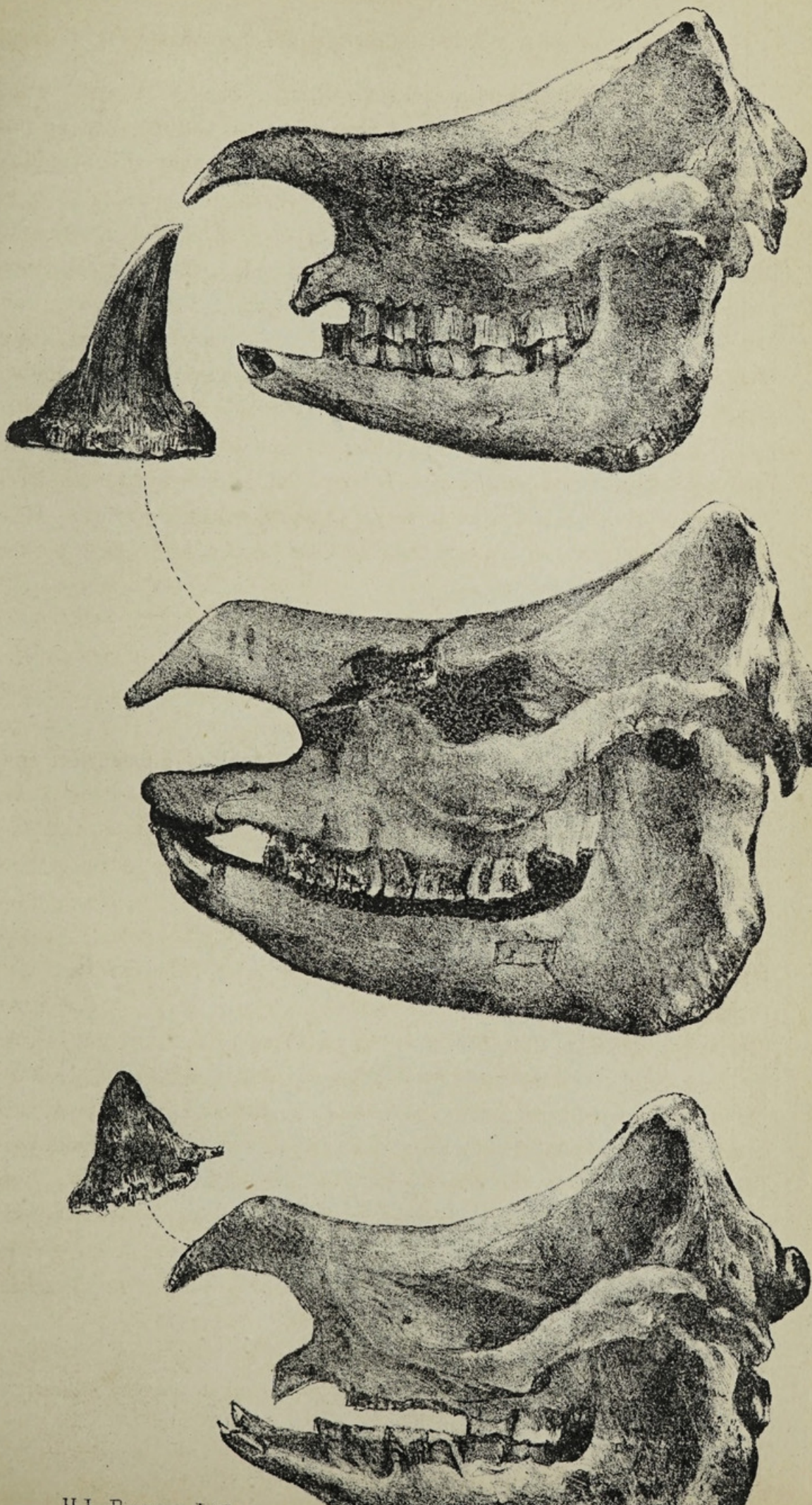
Plate III, fs. 1, 2, represent the corresponding types of males of the two-horned RH. SUMATRANUS; f. 3, of a female, of which the stuffed skin of the head is also in the Society's museum. All are from the Tenasserim provinces.

Plate IV, f. 1, is from a drawing which I took of a beautiful specimen in the possession of Lt.-Col. Fytche, Commissioner of the Martaban and Tenasserim provinces, at Moulmein.* The animal was killed in Tavoy province, near the frontier of Siam. When I first saw this specimen, the horns were attached to the skin; and they now *fit* to the rugosities of the bony surface. The resemblance of the anterior horn (more especially) to the extraordinarily fine horn figured as that of a new species, RH. CROSSII, Gray (in the *Proc. Zool. Soc.* 1845, p. 250, and copied in pl. IV, f. 4), induced me to conjecture that the latter was merely a magnificently developed specimen of the anterior horn of RH. SUMATRANUS; but the difference of size (that of RH. CROSSII measuring 2 ft. in span of curvature from base to tip) seems to be too great. Of the near affinity, however, there can be no doubt; and it is just such a horn as the nearly akin (however huge) RH. PLATYRHINUS of Cautley and Falconer, from the Siwâlik deposits, might have borne.† Other kindred fossil species

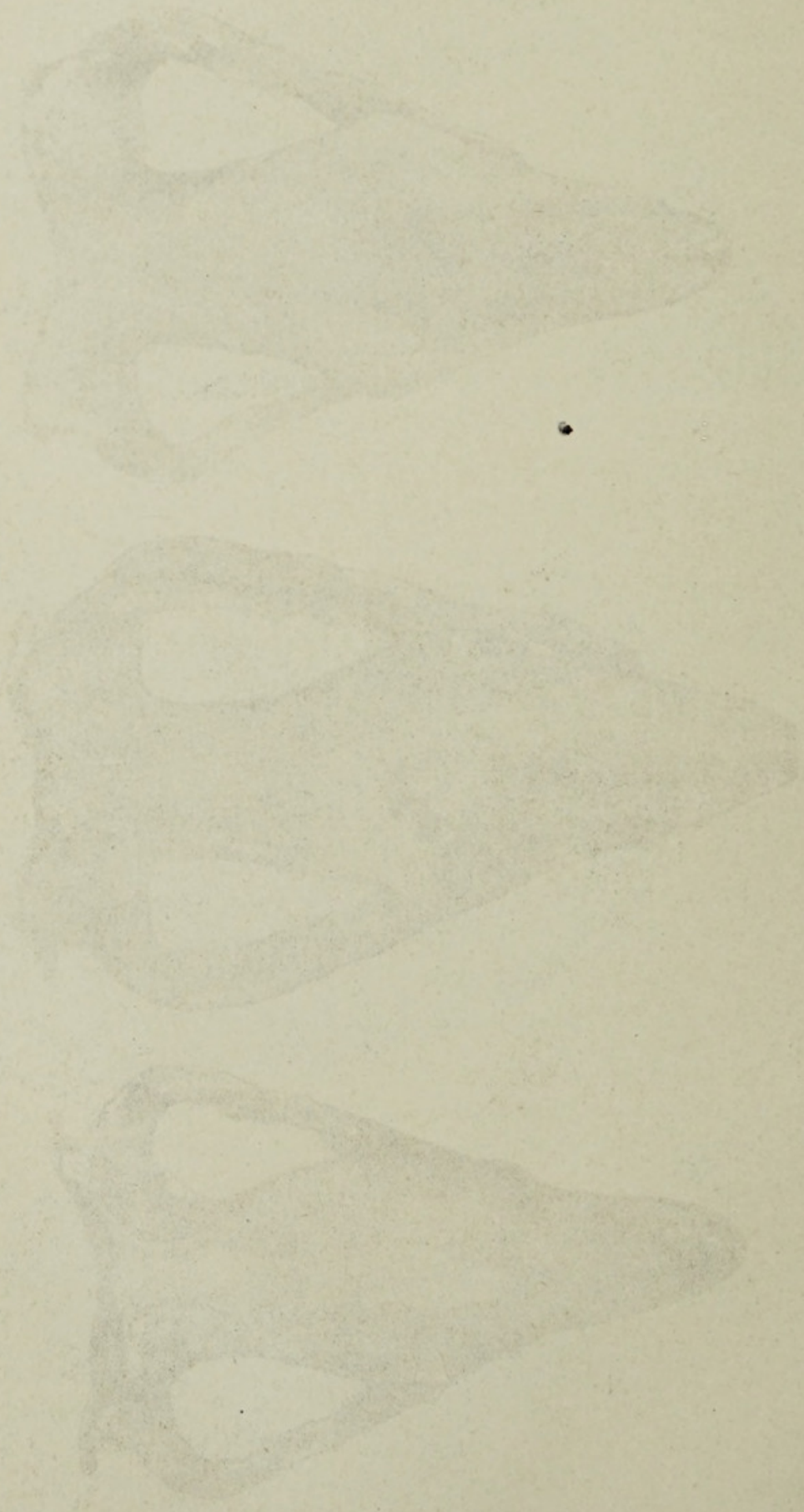
* The horns, as represented in the lithograph, are not sufficiently massive.

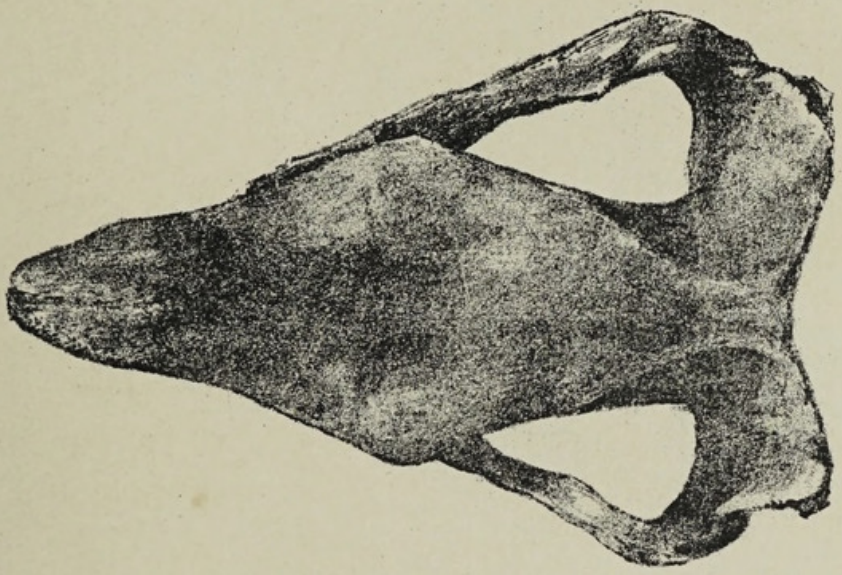
† In a letter just received from Col. Fytche, who had recently returned from a tour in the southern Tenasserim provinces, that officer writes—"I came across

Pl. I.

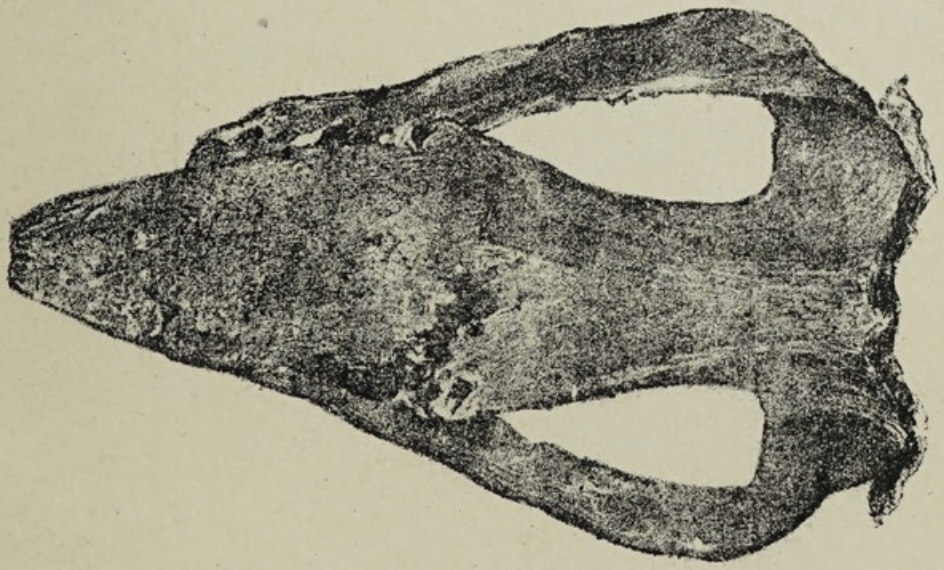


H.J. Fraser Lith.





f. 2.



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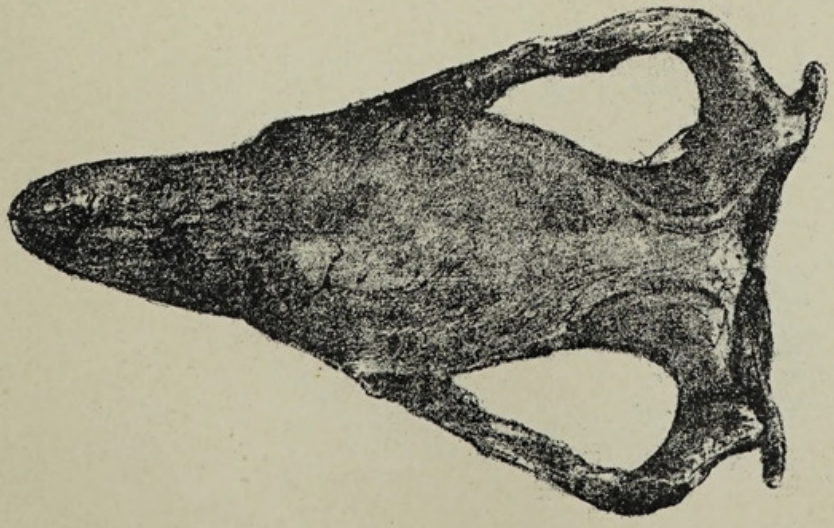

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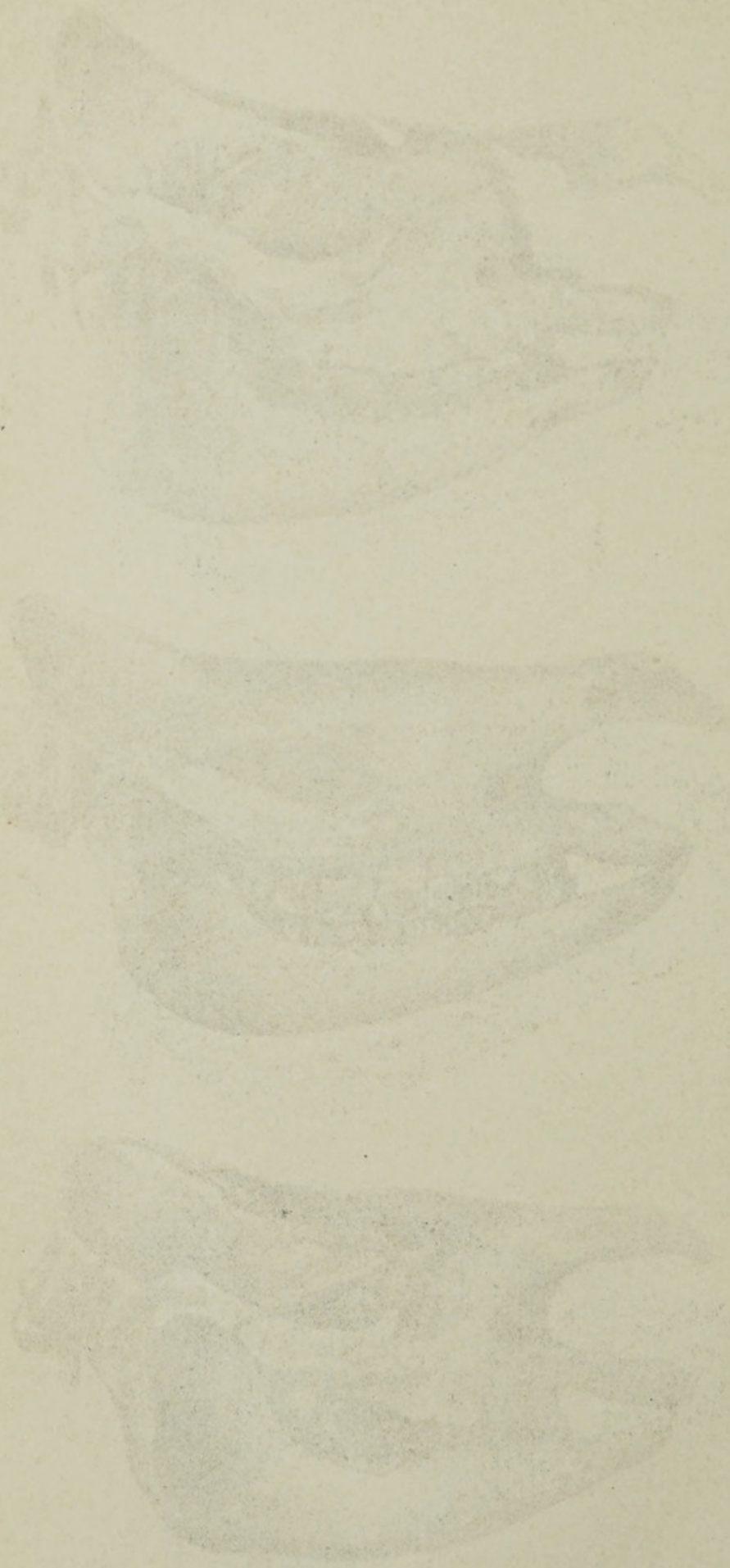

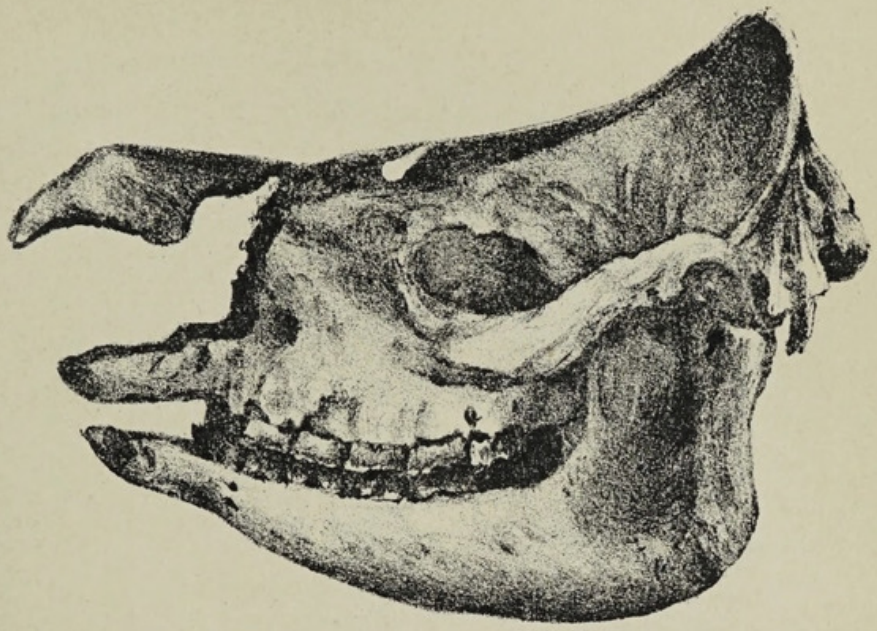

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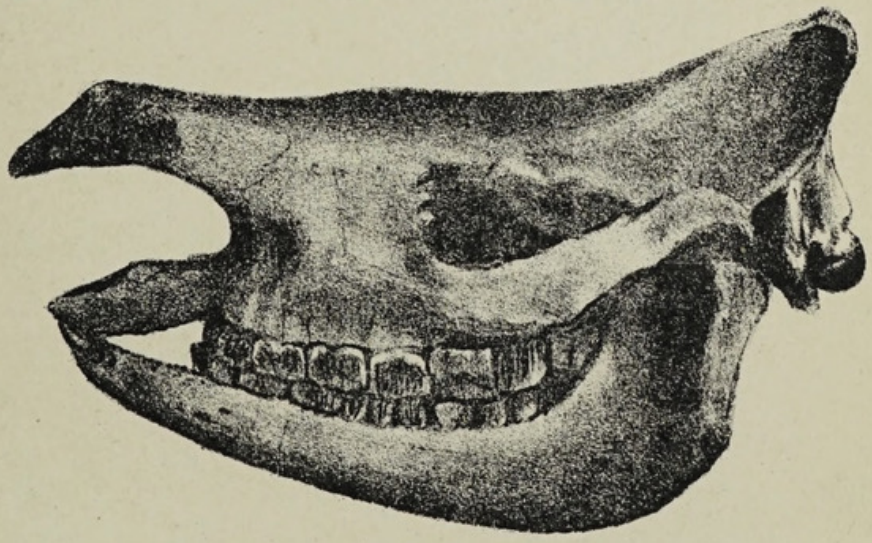

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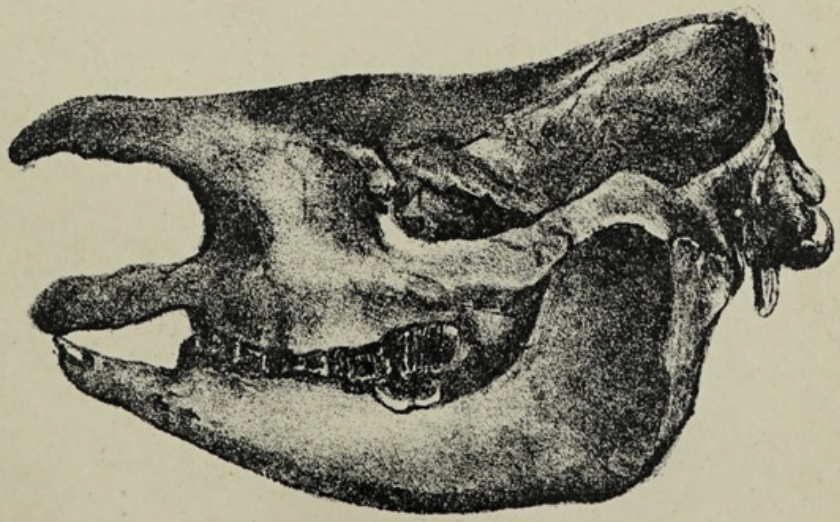
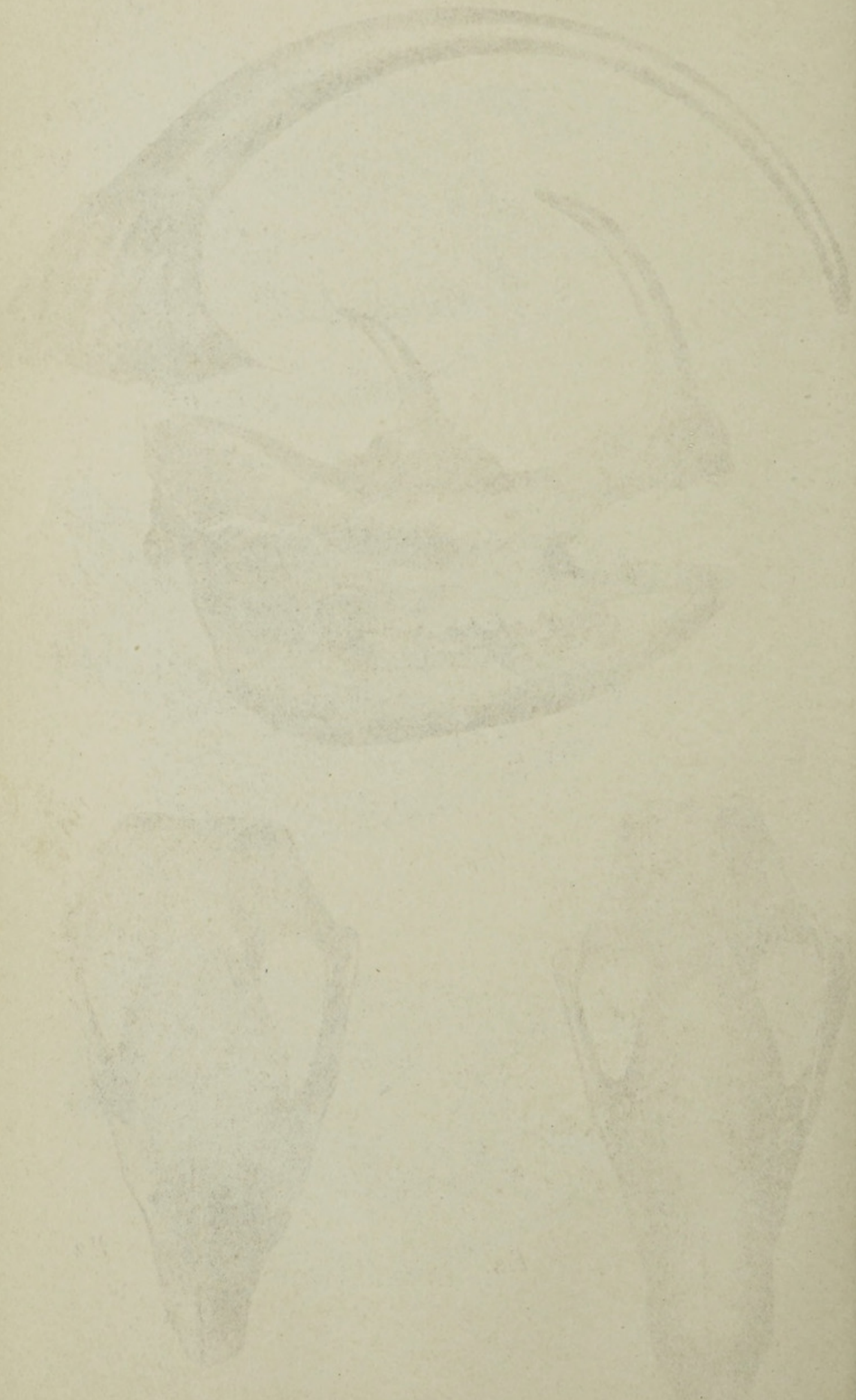
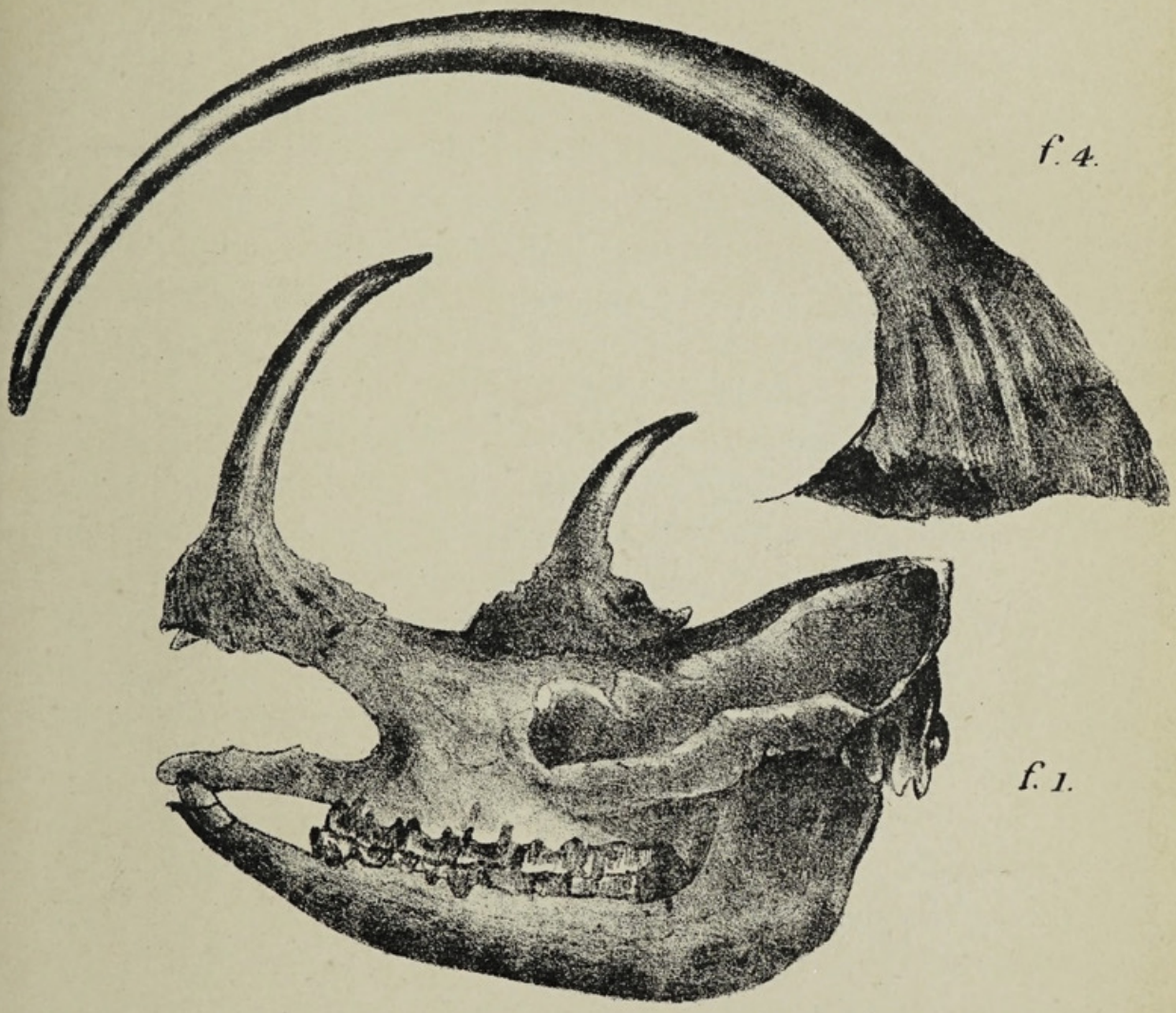


f. 3.

H.L. Frazer Lith.



Pl. IV



f. 4.

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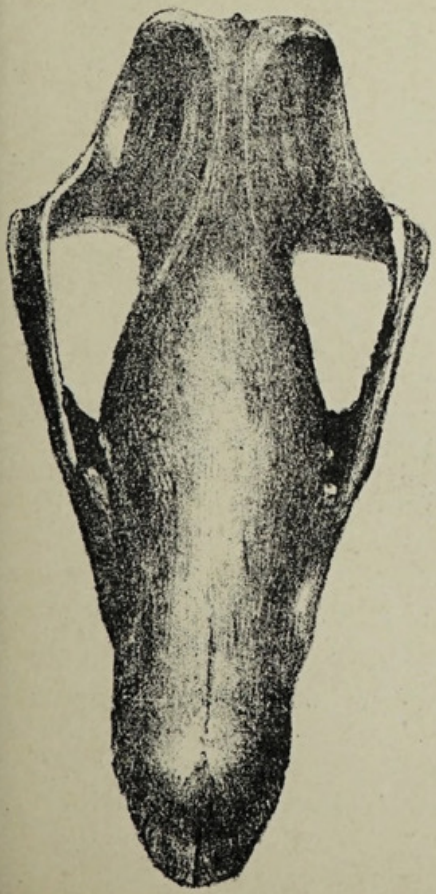

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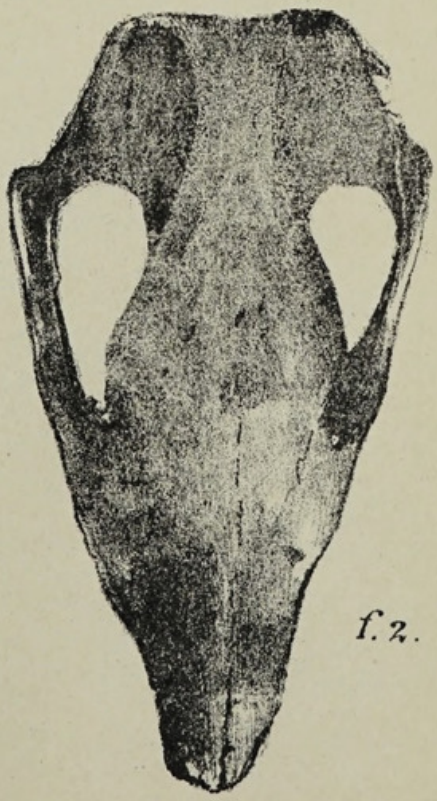

f. 2.

are (or were) the Rh. LEPTORHINUS of the later European tertiaries, apparently also the Rh. SCHLEIERMACHERI (v. *megarhinus*), and I cannot help thinking even the immense Rh. TICHORHINUS,—all of these exemplifying an Eurasian or Europæo-asiatic (and more or less hair-clad) type of two-horned Rhinoceros, as distinguished from the existing two-horned African type, which is represented by as many as four living species (falling under two groups, with prehensile and non-prehensile upper lip, and browsing or grazing habits accordingly,—those of the latter habit being more gregarious and also more gentle in disposition*). Figs. 3 and 4 of plate IV, represent the front view of the skulls fs. 2 and 3 of pl. III; but I have reason to suspect that the united nasal bones of f. 4 of plate IV, are rarely so narrow in the female of Rh. SUMATRANUS, as in the example represented.

With the exceptions of fs. 1 and 4 of pl. IV, all the representations given were photographed together in one focus, so that the relative sizes are quite accurately rendered. The scale of all is $1\frac{1}{2}$ in. to 1 ft.†

So far as I can learn, the Rh. SUMATRANUS is the only existing species of Rhinoceros which presents secondary sexual distinctions; inasmuch as the horns of the male are very considerably more deve-

three Rhinoceroses down to the southward, but was unsuccessful. One, the monarch of the forest, I tracked up a mountain some 4,000 ft. high, which took me six hours to get up; and close on the top, he rose up before me within six feet, a magnificent beast. He was sideways towards me, and I distinctly saw his two horns, which were at least ten to twelve inches longer than those I have got. He would have been a great prize; but, unfortunately, I had not my rifle in my hand at the time, and the man who was carrying it fell down on his face in a fright, and rolled down the hill. The beast was certainly a rather startling apparition; his advent being so very sudden, as if he had come up through a trap-door in a pantomime, giving a tremendous roar, something between that of an Elephant and that of a wild Boar."

* For figures of the heads of these animals, in a collated group, *vide* Mr. C. J. Andersson's 'Lake Ngami,' 2nd edit., p. 986. The affinity of the extinct European species with Rh. SUMATRANUS has been long ago remarked by Cuvier and Owen. The Siwálik Rh. PLATYRHINUS of Cautley and Falconer is just Rh. SUMATRANUS enormously magnified; and the Rh. SIVALENSIS of the same naturalists comes exceedingly close to the existing INDICUS (with the narrow form of skull, and their Rh. PALÆINDICUS to the same with broad form of skull). Can it be the identical species which has lived down to the present time? The discrepancy is, at least, not greater than subsists between BISON PRISCUS and the modern *Zubr*, which are considered by Owen to be one and the same.

Since writing the above, I have read Prof. Owen's memoir 'On a National Museum of Natural History.' Even he, evidently, had no idea of the two insular species of Rhinoceros extending their range to the mainland, as appears from his casual notice of them.

† For these and other photographs of objects of Natural History, I have to thank my esteemed friend T. S. Isaac, Esq., C. E.

loped than those of the female. It further differs from the four existing African species of two-horned Rhinoceros, not only by possessing slight skin-folds, but also by having the bases of the horns separated by a considerable interval: Bell's figure (in the 'Philosophical Transactions' for 1793) represents, as I believe, their full development in an adult female; as shewn likewise in a (Tenasserim) stuffed head in the Society's museum, already referred to: and over Bell's figure of the skull of a male are represented in outline the horns of an ordinary male; not quite so fine, however, as those upon Col. Fytche's specimen; and that officer informs me that he has possessed a head with still finer horns, some five or six inches longer. Unfortunately, fine horns of RH. SUMATRANUS are exceedingly difficult to procure; as they are eagerly bought up at high prices by the China-men, who not only value them as medicines, but carve them into very elegant ornaments.* Still the horns which Dr. Salomon Müller figures, upon what he calls an adult male, are small; and when I was at Pahpoon, amid the forests of the Yunzalin district of Upper Martaban, in November last, an animal of this species was killed within five miles of me; but I did not learn of this in time, and was only able to procure the facial bones with the two horns. From their size and appearance I took them to be the horns of rather a juvenile male; but, on cleaning the bone, the nasals were found to be most completely and solidly anchylosed and united, and of the usual width in the male sex. The Karens obtained the animal by means of a heavy falling-stake, such as they set for Tigers and other large game;† and the carcase was completely hacked to pieces by them, and every edible portion of it devoured.

The Rev. Dr. Mason remarks, in his work on 'The Natural Productions of Burmah' (1850), that the hide of the two-horned Rhinoceros of that region is "smooth like a Buffalo's." This expression might mislead into the suspicion that the species is not exactly the same as that of Sumátra. Col. Fytche writes word, on this subject,

* The anterior horn of Col. Fytche's specimen is worth (I was told) about fifty rupees, or £5.

I have seen a pair beautifully carved and polished, and set with the bases upward, in a black wooden frame similar to the stands on which Chinese metallic mirrors are mounted; and am sure *now* that they were the two horns of one individual of RH. SUMATRANUS, of about the same development as those upon Col. Fytche's specimen.

† *Vide* Andersson's 'Lake Ngami,' 2nd edit., p. 258.

—"I have, myself, shot three Rhinoceroses; one single-horned, on the borders of Asám [INDICUS, of course]; and the other two, not far from Bassein in the Yomatoung range separating Pegu from Arakan. I saw the skin of the one whose skull you have got [that of RH. SONDAICUS (of the narrow type), shot by my friend Dr. Hook of Tavoy near Tavoy Point, where there is a small isolated colony of the species], and it was exactly, in every respect, like the one I shot in Asám. The two-horned fellows I shot had smooth skins, as stated by Mason; they were, however, very thick, and there were slight rumples or folds about the neck and shoulders, I remember, but nothing to be compared in size to the mailed armour of the single-horned species." In Burmá, people distinguish only a one-horned kind and a two-horned kind; and though the skull from Tavoy Point, referred to, is very nearly adult and of fair size, Col. Fytche thought it to be that of a small and immature animal, as compared with the huge INDICUS that he killed in Asám. I must frankly confess that I have only quite recently discriminated the two one-horned species; fancying, as a matter of course, that the numerous skulls of single-horned Rhinoceroses in the Society's museum, from the Bengal Sundarbáns, &c., especially of the broad-faced type, were necessarily of the hitherto reputed sole Indian species. F. Cuvier's figure of RH. SONDAICUS is that of a very young animal; and, with those of Horsfield and S. Müller, conveys the appearance of a more evenly *tessellated* hide than I remember to have seen in any living continental example. I have, however, been comparing our stuffed Sundarbán example (less than half-grown) with the figure of adult RH. INDICUS in the *Menagérie du Museum d'Hist. Nat.*, and with the figures of RH. SONDAICUS by S. Müller and others; and perceive that it must be referred to the latter and not to the former. The tubercles of the hide *are* much smaller than in INDICUS; and a marked difference between the two species, as represented, consists in the great skin-fold *at the setting on of the head* of INDICUS, which is at most but indicated in SONDAICUS. In skulls of adults, however those of both species may vary in width, and especially in breadth anterior to the orbits, the following distinctions are *trenchant*. Length of skull, from middle of occiput to tip of united nasals (measured by callipers),—in INDICUS 2 ft. ($\frac{1}{2}$ in. more or less),—in SONDAICUS, $1\frac{3}{4}$ ft. at most. Height of condyle of lower jaw,—in

INDICUS 1 ft. (or even a trifle more),—in SONDAICUS 9 in. Breadth of bony interspace between the tusks of the lower jaw,—in INDICUS $1\frac{1}{2}$ to $1\frac{3}{4}$ in.,—in SONDAICUS $\frac{3}{4}$ to 1 in. These measurements are taken from exceedingly fine examples of both species.

Sir T. Stamford Raffles asserts, of RH. SUMATRANUS, that "the female has a larger and heavier head than the male, but is similar in other respects." (!) This decidedly does not apply to the two-horned species inhabiting Burmá; nor even to Bell's figures of *Sumatran* individuals! Raffles further remarks that—"Dr. Bell's description and representation of this animal are extremely correct. The skin of the Sumatran Rhinoceros," he adds, "is much softer and more flexible than that of the Indian one, and is not, like it, corrugated into plates of mail. It has, however, some doublings or folds, particularly about the neck, shoulders, and haunches, rather more distinct and defined than in Dr. Bell's drawing. The natives assert that a third horn is sometimes met with; and in one of the young specimens procured, an indication of the kind was observed." (*Lin. Tr.* XIII, 268.) In Mr. C. J. Andersson's 'Lake Ngami' (2nd edit., p. 263), the same is remarked of one or more of the ordinarily two-horned Rhinoceroses of Africa. This traveller writes—"I have met persons who told me that they had killed Rhinoceroses with three horns; but in all such cases (and they have been but few) the third or hindmost horn is so small as to be scarcely perceptible." This seems a not unlikely character to have been developed more frequently in the great fossil RH. TICHORHINUS of N. Europe and Asia.

Bell further mentions, of RH. SUMATRANUS, that—"The whole skin of the animal is rough, and covered very thinly with short black hair." The latter is conspicuously represented in F. Cuvier's portrait of the species in the *Planches des Mammifères*, less so in Bell's figure in the *Phil. Trans.*, and in that by Dr. Salomon Müller; and it is well shewn about the *jowl* and base of the lower jaw of our stuffed skin of the head of an adult female. In Dr. S. Müller's figure of what he styles an adult male (but the horns of which are quite small, as in the adult Martaban example before noticed*), the shoulder-plait is rather more strongly developed, especially towards

* Can these animals, under any circumstances, occasionally shed and renew their horns, which consist only of a mass of agglutinated hair? There is certainly no physiological objection to the possibility of their doing so.

the elbow, than in the figures published by Bell and F. Cuvier,—F. Cuvier's figure representing a young male, and that by Bell a mature female, while the skull represented by Bell is that of a male with finer horns than appear to have been hitherto represented elsewhere. The figure in the 'Naturalist's Library' (*Elephants*, &c., pl. XI,) is an exaggerated and very incorrect copy of that by F. Cuvier, with the skin-folds greatly too much developed.

Sir T. St. Raffles further remarks, of the Asiatic two-horned Rhinoceros (in Sumátra), that—"They are not bold, and one of the largest size has been seen to run away from a single Wild Dog." We hear, however, of a "fire-eating Rhinoceros" in Burmá, from its habit of attacking the night-fires of travellers, and scattering the burning embers and doing other mischief, being attracted by unusual noises instead of fleeing from them as most wild animals do. Prof. Oldham's camp was attacked in this way, in Tavoy province; and the animal being mortally wounded by a 2 oz.-ball, its skull was recovered three days afterwards, and proved to be that of SUMATRANUS. The same propensity is ascribed to the ordinary black Rhinoceros of S. Africa (RH. AFRICANUS). Thus Dr. Mason cites—"This animal appears to be excited by the glow of a fire, towards which it rushes with fury, overcoming every obstacle. It has been known to rush with such rapidity upon a military party lodged among the bush covering the banks of the Great Fish river, that, before the men could be aroused, it had severely injured two of them, tossed about and broken several guns, and completely scattered the burning wood." I am not aware that the same ferocity has been remarked of either of the mailed one-horned species.

In Java, the RH. SONDAICUS is reputed to be rather a mild animal; though I could cite a rumour of one attacking a sailor's watering party. (*Zoologist*, p. 7328.) According to Professor Reinhardt, this animal is (in Jáva) "found everywhere in the most elevated regions, and ascending, with an astonishing swiftness, even to the highest tops of the mountains." (*Edinb. Phil. Mag.* XIII, 34.) Dr. Horsfield also notices that "it prefers high situations, but is not limited to a particular region or climate, its range extending from the level of the ocean to the summits of mountains of considerable elevation.*** Its retreats are discovered by deeply excavated passages, which it forms along the declivities of mountains and hills.

I found these occasionally of great depth and extent." In Bengal, I believe that the identical species is found in the Sundarbáns, and also (formerly, at least,) in the Rajmáhal hills at all elevations; but it has hitherto been universally mistaken for RH. INDICUS, a species which may inhabit the same localities,—only that now remains to be ascertained, as also if RH. SONDAICUS extends its range to the region tenanted by the other. All evidence at present attainable points to the opposite conclusion.

So long ago as in 1838, the late Dr. Helfer remarked that—"The Tenasserim provinces seem to be a convenient place for this genus; for I dare to pronounce almost positively," he then wrote, "that the three known Asiatic species occur within their range. The RH. INDICUS being found in the northern part of these provinces, in that high range bordering on Zimmay called the Elephant-tail mountain; the RH. SONDAICUS, on the contrary, occupies the southernmost parts; while the two-horned RH. SUMATRANUS is to be found throughout the extent of the territories from the 17° to the 10° of latitude. In character the RH. SONDAICUS seems to be the mildest, and can be easily domesticated; the powerful Indian Rhinoceros is the shyest; and the double-horned is the wildest." (*J. A. S.* VII, 861.) Mason (in 1850) remarked that "the common single-horned Rhinoceros [SONDAICUS] is very abundant. The double-horned is not uncommon in the southern provinces:" and then he alludes to the alleged 'fire-eater' of the Burmans, supposing that to be SONDAICUS, as distingished from "the common single-horned" kind, which he thought was INDICUS. Very decidedly, I consider that the alleged existence of the great sub-Himálayan INDICUS in Bengal, the Indo-Chinese region, and Malayan peninsula, remains to be proved; the broad and narrow types of skull of SONDAICUS having, I suspect, been mistaken for INDICUS and SONDAICUS respectively. That the real species denoted by these names was so early discriminated, I opine is mainly due to the accident of SONDAICUS having been first obtained in Jáva, which induced the suspicion of its being probably different from the only then recognised continental species, inhabiting Upper India; likewise to the accident of the Paris museum containing a particularly fine skull of the true INDICUS, which (as before remarked) is probably that of the individual figured in the *Menagérie du Museum d'Hist. Nat.*

The museum of the Calcutta Medical College contains, as we have seen, three noble skulls of INDICUS, besides that with the entire skeleton of an old female (both the broad and narrow types of skull being represented); but it has neither SONDAICUS nor SUMATRANUS. The Society's museum still wants the first species; but is tolerably well supplied with the two others. Sir T. H. Maddock, in 1842 (*J. A. S.* XI, 448), presented us with two skulls of SONDAICUS (of the broad and the narrow types), and also with two of SUMATRANUS (one wanting the lower jaw),—all from the Tenasserim provinces: and the skulls of an old male and of an adult female of SUMATRANUS, the skin of the head of the latter, its *axis* vertebra, the long bones of the limbs (*minus* the right fore-limb and *scapula*), and the two scapulæ and long bones of the four limbs of the male, were presented to the Society by E. O'Reilly, Esq. (then of Amherst) in 1847 (*J. A. S.* XVI, 310, 502). In the *As. Res.* Vol. XIII, *App.* XVIII, "part of the head of a two-horned Rhinoceros" is recorded to have been presented; and again, p. XIX, "the horn of a Rhinoceros from Sumátra." The latter was not in the museum when I took charge of it in 1841; but the former I think that I recognise in a pair of united nasal bones (certainly belonging to this species), and in this case the specimen would probably be from a Sumátran individual.* Of SONDAICUS we have also a fine series of skulls (one of them from Jáva, presented by the Batavian Society in 1844), the almost complete skeleton of a very nearly full-grown female (being considerably smaller than that of the female INDICUS in the Medical College museum), and the small stuffed specimen to which I have before referred: the limb-bones of the skeleton being considerably more robust than those of SUMATRANUS. For this skeleton, (and those of Elephant and Camel,) we are indebted to a former Náwâb Názim of Bengal; and it is, doubtless, either from Rajmáhal or the Sundarbáns: the skull being of the broad type, though less strongly marked than some others, in fact intermediate, though scarcely quite mid-way intermediate.

The following notice by Sir T. Stamford Raffles may be advantageously reproduced here.

"The one-horned Rhinoceros of India is not known to the natives of this part of Sumátra; and the single horns, which are occasionally

* Add also the facial bones with small horns which I brought from Martaban.

procured, appear to be merely the longer horns of the two-horned species separated from the smaller one. There is, however, another animal in the forests of Sumatra never yet noticed, which, in size and character, nearly resembles the Rhinoceros, and which is said to bear a single horn. This animal is distinguished by having a narrow whitish belt encircling the body, and is known to the natives of the interior by the name of *Tennu*. It has been seen at several places; and the descriptions given of it by people, quite unconnected with each other, coincide so nearly, that no doubt can be entertained of the existence of such an animal. It is said to resemble in some particulars the Buffalo, and in others the *Badak* or Rhinoceros. A specimen has not yet been procured; but I have several persons on the look out, and have little doubt of soon being able to forward a more accurate description from actual examination.

"It should be remarked," continues Raffles, "that the native name, *Tennu*, has, until lately, been understood to belong to the Tapir. It is so applied at Malacca, and by some of the people at Bencoolen. In the interior, however, where the animals are best known, the white-banded Rhinoceros is called *Tennu*, and the Tapir *Gindol*, and by some *Babi Alu*. It is not impossible, that, as both animals have white bands, the names may have been confounded by people little in the habit of seeing either, and deriving their information solely from report. In a country like Sumátra, where the inhabitants, in a great measure shut out from general communication, are divided into an infinity of tribes, speaking different dialects, a perfect consistency or uniformity of nomenclature cannot be expected, and it is not always easy to reconcile the synonymy." (*Lin. Tr.* XIII, 269.)

It naturally occurs to the mind, that, if the *Tennu* really exists, it would long ere this have been discovered, in all probability, in the neighbouring Malayan peninsula: but how little is even now known of the great animals inhabiting that peninsula! The late Dr. Cantor, when he wrote his Catalogue of the Vertebrated Animals of the Malayan peninsula, was unaware of the existence there of Bos SONDAICUS in addition to B. GAURUS, only includes a two-horned Rhinoceros on the testimony of the Malays, and whether the ELEPHAS SUMATRANUS occurs on the mainland of Asia (like the Tapir and the two insular species of Rhinoceros, the Bos SONDAICUS and others,) is still undetermined. It is possible enough, though doubt-

less rather improbable, that such an animal as the *Tennu* may have escaped observation there even to this time. But it might not extend its range into the peninsula (as in the instance of the large *Siamang* Gibbon, which is peculiar to Sumátra); and not very much has been accomplished in the investigation of the zoology of the great island of Sumátra since the time of Raffles. At all events, I think the present opportunity a meet one to recal the subject to notice.

Baron Cuvier long ago remarked, I think in his *Leçons dans l'Anatomie Comparée*, that even then it was not probable that any more existing large quadrupeds remained to be discovered: and it is worthy of notice that no remarkable genus of large quadruped has been since brought to light, though additional species have been discriminated of several of the old genera. The small HIPPOPOTAMUS LIBERIENSIS of the late Dr. Morton is scarcely an exception; although since raised to generic rank by Dr. Leidy, by the name CHŒROPSIS.* Of the three genera containing the most bulky of existing land quadrupeds, additional species have been distinguished; though, for the most part, they may not yet be universally accepted. Of ELEPHAS, the E. SUMATRANUS, Temminck and Schlegel (to which Sir J. Emerson Tennent refers the Ceylon Elephant†). Of Rhinoceros, a

* *Journ. Philad. Acad., n. s.*, I, 231, II, 207.

† The grinders of ELEPHAS SUMATRANUS are said to be intermediate in form to those of the Indian and African species; and I have just purchased a pair of table-weights, formed each of a thick horizontal section of an Elephant's molar-tooth, which seem to me to be of this species. The little boxes formed of sections of Elephant's molars, which are commonly brought from Galle, are (so far as I have seen) of the Indian species; but these are not necessarily from Cinghalese individuals. It is worthy of remark, however, that whilst among the Elephants of Sumátra and Borneo fine *tuskers* would appear to be common (and the ivory is an article of export from both islands, as I am assured by a gentleman who has collected the article in Borneo), they are exceedingly rare among the Elephants of Ceylon; where, nevertheless, it has been suggested that tuskers are so much sought after that they are seldom permitted to develope their ivories.

With reference to Sir J. E. Tennent's speculation regarding the former continuity of land between Sumátra and Ceylon—and Africa, of which the intermediate character of the ELEPHAS SUMATRANUS is one of his presumptive proofs, it may be remarked that the *two-horned* RHINOCEROS SUMATRANUS (with its only slight skin-folds) interposes a link between the two-horned and smooth-skinned African and the single-horned and mail-clad Asian species; but (not to allude further to the alleged existence of a single-horned African species) the presence of the second horn in RH. SUMATRANUS is much less remarkable, when we bear in mind the several fossil two-horned species of Europe and Asia, to which moreover the existing two-horned Asiatic Rhinoceros is much more nearly akin than it is to the different African two-horned species, as before remarked.

second black African species, the Rh. KEITLOA, A. Smith (long previously indicated by Sir J. Barrow by the name *Jekloa*), and a second white African Rhinoceros, the (Rh. OSWELLII, Elliot),—besides the Rh. CROSSII, Gray (founded on the horn only, and the habitat of which is unknown); and of HIPPOPOTAMUS, the species of N. and S. Africa, respectively, are distinguished by Dr. Leidy and others (sinking *H. senegalensis*, auct., as a synonyme of the former), and there is also the H. or CHŒROPSIS LIBERIENSIS, which is a most undoubted species, considered—as we have seen—entitled to generic rank by Dr. Leidy. Whether external differences exist between the great Hippopotami of N. and S. Africa, remains to be shewn; as also in the case of the European and American Beavers, which Owen separated on account of differences in the configuration of the skull: in another animal first so discriminated, the PHASCALOMYS LATIFRONS, Owen, good external distinctions have since been discovered, which characterize it well apart from the Ph. WOMBAT. Of other *Pachydermata* of Cuvier, more EQUI (of the *Asinine* type) have been added to the list; and several species of Swine. Among the *Bovine* ruminants, the three species of flat-horned *Taurine* cattle proper to S. E. Asia have only recently been properly distinguished;* also the BUBALUS BRACHYCEROS of intertropical Africa; and there are others (as I believe) not yet sufficiently established, and more species also of large Deer and Antelopes. Among the *Carnivora*, no animal worthy of much note, unless *Phocidæ* (as might have been expected); and ditto with *Cetacea*—my BALÆNOPTERA INDICA for example (which is perhaps the largest of existing animals,—but these latter

Prof. Owen, in his late minute—'On a National Museum of Natural History,' (which I have only seen since penning the above,) writing of this genus, remarks—"There is also a two-horned Rhinoceros in Sumátra; and the Rhinoceros of continental India is one-horned, as is that of the island of Java." He would appear thus to consider the Rh. SONDAICUS and Rh. SUMATRANUS as exclusively insular species. He further adds that—"The two-horned Rhinoceros of Sumatra offers, of all living Rhinoceroses, the nearest resemblance to certain fossil kinds found in Europe. When half-grown, this Rhinoceros retains a conspicuous coat of short, straight, bristly hair. It is generally known that one, at least, of the extinct European Rhinoceroses [Rh. TICHORHINUS] was covered with hair when full-grown. * * * What I have said of the Rhinoceros applies to the Elephant. Bishop Heber's first announcement of the young hairy Elephant which he met with in the Himálaya mountains excited much surprise. This character, transitional in the modern Elephant, was persistent in the Mammoth, or northern Europeo-Asiatic Elephant." The RHINOCEROS TICHORHINUS, it may however be noticed, is stated to have had no skin-folds.

* Dr. S. Müller unites the three in his description of BOS SONDAICUS!

are not four-limbed). Among the *Quadrumana*, the grandest of all—the huge Gorilla—has been re-discovered; for its reputed existence was regarded as fabulous by Baron Cuvier. Lastly, in the bird class, it is most remarkable that the number of *brevipennate* species has quite recently been more than quadrupled*:—still, however, no remarkable new genus, excepting the New Zealand Moa; and of this at least two species have just been discovered to maintain a lingering existence, as I have learned from a letter recently received from Mr. E. L. Layard, who is at present in New Zealand as Private Secretary to Governor Sir G. Grey. One of these, of comparatively small size (about 3½ ft. high), has actually been killed and eaten by a famishing party of explorers and *fifteen* others seen. Of the other, one of the large Moas, only the fresh foot-steps (15 in. long) have been traced, as Mr. Layard states by a party who had lost themselves; and therefore the instance does not appear to be the same as that lately recorded in the *Zoologist* (p. 7847). Both of these living species inhabit the little explored Middle Island.†

March 1st, 1862.

* *Vide J. A. S.* XXX, note to p. 92. Even a *sixth* Cassowary has since been added by the Baron von Rosenberg of Amboyna. It is from the island of Salawatti; and has *no wattles*, as in all the others. He terms it CASUARIUS KAUPI. Vide *Ibis*, July, 1861, p. 312. The BALÆNICEPS REX must be considered as a remarkable discovery among large birds; and this is quite a new genus.

† The notice in the *Zoologist* is copied from the *Nelson Examiner* of July 12th, 1861. It is as follows:—"About three weeks ago, while Mr. Brunner, Chief Surveyor of the province, and Mr. Maling, of the Survey Department, accompanied by a native, were engaged in surveying on the ranges between the Rewaki and Takara rivers, they observed one morning, on going to their work, the foot-prints of a large bird, whose tracks they followed for a short distance, but lost them at length among rocks and shrub. The size of the foot-prints, which were well defined wherever the ground was soft, was fourteen inches in length, with a spread of eleven inches at the points of the three toes. The foot-prints were about thirty inches apart. On examining the bones of a foot of a Moa in the museum, we find the toe to measure, without integuments, eight inches and a half, and those evidently form part of a skeleton of a very large bird: the length of the impression of the toe of the bird in question was ten inches. The native who was in company with Messrs. Brunner and Maling was utterly at a loss to conjecture what bird could have made such a foot-print, as he had never seen anything of the kind before. On a subsequent morning similar marks were again seen, and, as a proof that they had been made during the night, it was observed that some of them covered the foot-prints of those which the party made the preceding evening. The size of these foot-prints, and the great stride of the supposed bird, has led to a belief that a solitary Moa [why one only?] may yet be in existence. The district is full of limestone caves of the same character as those in which such a quantity of Moa bones were found, about two years ago, in the neighbouring district of Asrere. We believe that it is the intention of the Government to take steps to ascertain the character of this gigantic bird, whether Moa or not, which keeps watch in these solitudes."