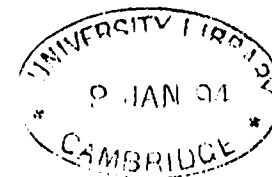
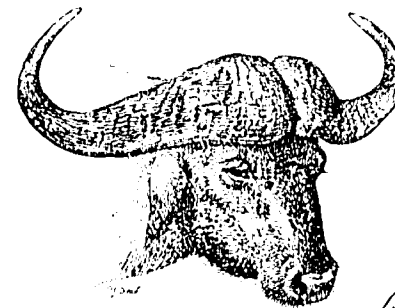


HORNS AND HOOFS,
OR XXI. 62. 22
CHAPTERS ON HOOFED ANIMALS.

By R. LYDEKKER.



LONDON:
HORACE COX,
"THE FIELD" OFFICE, WINDSOR HOUSE, BREAM'S
BUILDINGS, E.C.

—
1893.

mentions that wart-hogs will not unfrequently seek refuge in the holes of aard-varks or other animals, from which they are with difficulty dislodged. If, however, they do bolt, they have the curious habit of turning a somersault on to the back of the hole instead of coming straight out in the ordinary way, and are thus very dangerous to the unwary, who are exceedingly likely to take their stand on the very spot where this extraordinary manœuvre is performed.

It need scarcely be mentioned, in conclusion, that all wild pigs are exclusively confined to the Old World, their place in nature being taken in America by the peccaries, which represent a distinct family.

CHAPTER IX.

RHINOCEROSSES, ANCIENT AND MODERN.

IT is not uncommon, in works devoted to the sporting rather than to the strictly scientific aspects of natural history, still to find rhinoceroses alluded to as pachyderms, or members of the Pachydermata. Now, although, as being, in every sense of the word, thick-skinned, these animals are undoubtedly entitled to the appellation Pachydermatous, yet the use of this term implies zoological relationships which do not exist. The pachyderms of Cuvier included elephants, hippopotami, swine, rhinoceroses, and tapirs; and, although all these animals belong to the great order of Ungulata, or hoofed mammals, a more miscellaneous assemblage could not well have been got together. As a matter of fact, while elephants represent a distinct group by themselves, the hippopotami and swine are now affiliated with the deer, antelopes, camels, &c., to constitute a second primary group, a third group being formed by rhinoceroses, tapirs, and

horses, all of which agree in having the toe corresponding to our middle finger, symmetrical in itself. For these reasons we hope—although we scarcely venture to expect—that the term pachyderm may, for the future, be allowed to drop into the oblivion it merits.

To those who have not made an especial study of natural history and comparative anatomy, it may seem that there is little in common between such clumsy ill-shapen brutes as the rhinoceroses and neat smart-looking animals like horses and zebras. Palæontology teaches us, however, that the single toe of the horse and its modern allies is but a comparatively recently acquired character; and that, as we go backwards in time there were numerous three or four-toed horse-like animal, with feet so like those of tapirs and rhinoceroses, that there can be no sort of question as to the near relationship of all these three families of animals. Moreover, the whole of them agree in having molar teeth constructed on the same peculiar general plan; this type of tooth (Fig. 77) consisting of an outer wall (which may, as in the figure, be entire, or may be divided into two columns), from which two oblique transverse ridges run towards the inner border of the crown, where they generally terminate in more or less expanded columns. A comparison

of an upper molar tooth of a horse with our figure of that of a rhinoceros will, indeed, reveal a great difference between the two, although a more careful examination will show a general uniformity of plan. Much of the difference between the two is, however,

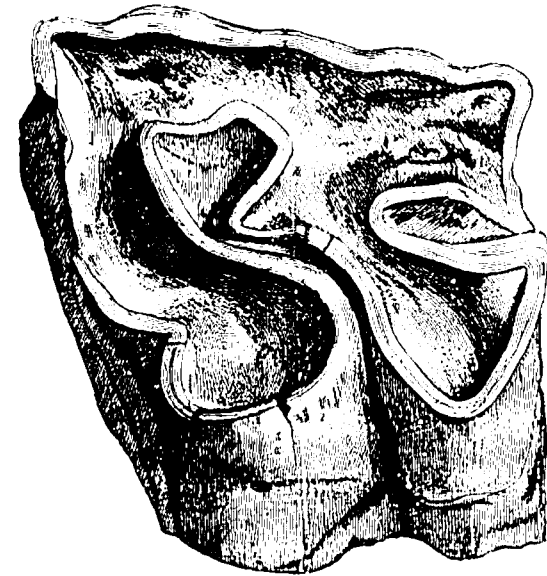


FIG. 77.—A LEFT UPPER MOLAR TOOTH OF A RHINOCEROS, IN A HALF WORN CONDITION. The lower border of the figure is the inner side of the tooth.

due to the great elevation of the crown of the tooth of the modern horse, and the filling up of the hollows corresponding to those which occur in that of the rhinoceros by the comparatively soft substance known as cement. And it will be found that the molar

teeth of the ancestral horses were very like those of rhinoceroses in their general structure.

Having said this much as to the relationship of rhinoceroses to the other odd-toed ungulates, we may proceed at once to our notes on the former animals, since, whatever may be the case when extinct types are taken into consideration, no one is the least likely to confound a rhinoceros with any other living animal.

Among few groups of our larger mammals has there been a greater diversity of opinion as to the number of species that exist, than is the case among the rhinoceroses. Thus in 1869 the late Dr. Gray considered that he had evidence of no less than ten species of living rhinoceroses, six of which were Asiatic, and the remaining four African. Somewhat later, Mr. Sclater came to the conclusion that there was another Asiatic species different from any of those described by Gray, while some other writers have thought that a hornless rhinoceros from the Sanderbans of Lower Bengal indicated yet another species. If all these so-called species were admitted as valid, the number of living rhinoceroses would thus reach a round dozen. This, however, is not all, for, instead of following the good old Linnæan plan of including all of them in the single genus *Rhinoceros*, Gray came to the conclusion that such an

arrangement was far too simple and straightforward for the needs of the scientific zoologist, and he accordingly split up the living rhinoceroses into four distinct genera, two of which are African and two Asiatic.

Fortunately, however, for the popularisation of zoology there is now a tendency, at least in England, for greater simplicity of arrangement, and all the rhinoceroses are once more included in the old Linnæan genus. Then, again, instead of the ten or twelve species referred to above, most writers are now agreed that there are but five living species of rhinoceroses, two of which are African and three Asiatic.

While agreeing in their clumsy build, and the presence of three toes to each foot, existing rhinoceroses differ from one another, both in regard to the number of their horns, and also as to the presence or absence of tusks and cutting-teeth in the front of the jaws, while there is a further distinction due to the presence of marked folds in the skin of certain species, which are wanting in others.

On the whole, while the variation in the number of the horns seems to be a character of minor importance, the other two points of difference carry greater weight. Thus, whereas two of the Asiatic rhinoceroses have but a single horn apiece, the third,

which is otherwise nearly related, has two of these appendages. On the other hand, the whole of the three Asiatic species have the skin thrown into more or less strongly-marked folds, and are furnished with tusks and cutting-teeth in the front of the jaws; whereas the two African species are distinguished by the absence of both those features.

Both the Asiatic one-horned rhinoceroses have comparatively small and insignificant horns, which afford but poor trophies to the sportsman. In addition to its much larger bulk, and the thicker folds of its tubercle-covered skin, the great Indian rhinoceros (*R. unicornis*), which is strictly confined to the country from which it takes its name, is distinguished from the Javan rhinoceros by the structure of its upper molar teeth—the difference being so great that a single tooth is sufficient to decide to which species it belonged. Thus, whereas the upper molars of the Indian rhinoceros are very similar to the fossil tooth represented in Fig. 77, having a nearly straight outer wall and very tall crowns, those of the Javan rhinoceros have shorter crowns, with the outer wall much curved, so as to form a kind of buttress at the front angle of the tooth (the left top corner of Fig. 77). A further peculiarity connected with the type of molar teeth occurring in the Indian rhinoceros is that the grinding-

surface of the crown forms a nearly level plane; whereas in the Javan species it is raised into two

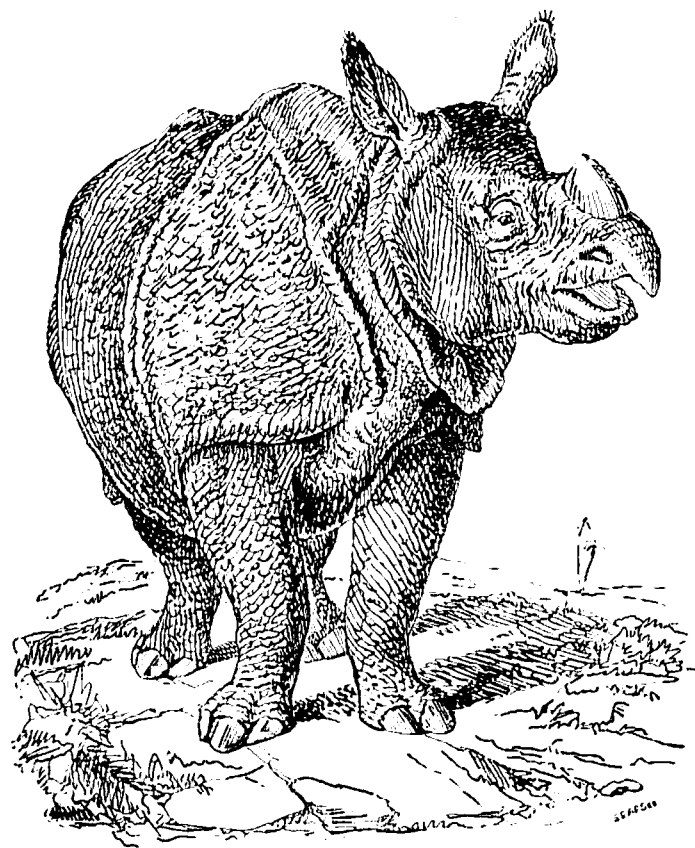


FIG. 78.—THE GREAT INDIAN RHINOCEROS.
The figure is drawn from an aged animal in which the tusks were worn down.

distinct ridges. In consequence of this difference, the jaws of the Indian rhinoceros have mainly a

grinding motion, from back to front and from side to side, after the manner of a horse; whereas, in the other species, the motion is more of a "champing" kind, like that we may observe in a pig. These features indicate that the Indian rhinoceros is what naturalists call a more specialised animal than its Javan cousin.

Then, again, whereas the females of the Indian rhinoceros have horns nearly or quite as large as the males, the females of the Javan species are frequently or invariably hornless. A large male Indian rhinoceros, measured by General Kinloch, stood 5ft. 9in. at the withers, and measured in girth one inch less; while its total length, exclusive of the tail, was 10½ft. As a rule, the horn is not more than 8in. in length, although specimens have been recorded slightly exceeding a foot. This species is a grass-eating animal, now confined to the grass-jungles of the plains of Northern India. Within historic times its range extended, however, into the Punjab; and fossilized teeth found in various parts of India prove that in earlier epochs it ranged over the greater part of the continent, extending as far south as Madras. Moreover, a nearly allied fossil species found in the Siwalik Hills of Northern India, of which a tooth is represented in Fig. 77, indicates that this type of rhinoceros has existed in India from a date when the

country was peopled with a host of extinct mammals quite unlike any now living.

The Javan rhinoceros (*R. sondaicus*) is so-called on account of being the only species inhabiting Java; but, far from being confined to that island, is also found in Sumatra, Borneo, the Malay Peninsula, Burma, Assam, and the Bengal Sanderbans. At the shoulders, according to Mr. Blanford, it stands scarcely, if at all, lower than the Indian rhinoceros, but is a smaller headed and smaller bodied animal; while it differs in the arrangement of the folds of the skin, and the absence of the large tubercles studding the hide of the larger species. Precise measurements of adults are, however, still wanting, and sportsmen will do good service to natural history by supplying this deficiency. Single-horned fossil rhinoceroses closely resembling this species in the structure of their molar teeth are found in the Siwalik Hills of Northern India, thus indicating that India was probably the original home of this type. What, however, is far more remarkable is the occurrence of remains of a rhinoceros probably allied to this species on the Hundes plateau of the Himalaya at an elevation of some 16,000ft. And since it is highly improbable that the Himalaya can have been raised to such a stupendous height since the comparatively recent epoch when these rhinoceroses lived, the

minds of some writers have been much exercised to discover how such creatures could have acquired sustenance in regions now so barren and desolate. When, however, we remember, that the yak—a near ally of the bison of the plains—flourishes in these regions, we fail to see why a rhinoceros allied to one now dwelling in the plains of India should have had any special difficulty in adapting itself to similar conditions of life.

The Sumatran, or two-horned Asiatic rhinoceros (*R. sumatrensis**), has nearly the same distribution as the preceding species, but is unknown in Lower Bengal and Java, and is found in Siam. This is by far the smallest of all living rhinoceroses, the average height of full-grown individuals being estimated by Mr. Blanford at from 4ft. to 4½ft. One adult female measuring only 3ft. 8in. at the shoulder has been recorded. In regard to its horns this rhinoceros affords the sportsman far more satisfactory trophies than either of its Asiatic cousins. Above their bases both horns are slender and well-formed, the longer front one, corresponding to the single horn of the other species, when well developed, sweeping backwards in a shapely curve. The largest horn hitherto

* The author is indebted to Messrs. Macmillan & Co. for the figures of this and the African species.

recorded measured upwards of 32in. along the curve, but anything like this length is very rare.



FIG. 79.—SUMATRAN RHINOCEROS. (From "Nature.")

The Sumatran rhinoceros is far more hairy than

any other living member of the genus ; but there is considerable individual variation in this respect, and also as to the colour of the body and hair, that of the former varying from an earthy brown to black, while that of the latter is some shade of brown or black. It was an unusually long-haired specimen, of a light colour, and with the edges of the ears fringed with long hairs, which led Mr. Sclater to believe that there were two living representatives of this group. Accordingly, it was proposed to distinguish the more hairy form, in which a rufous tint prevailed in the hair, as a distinct species, under the name of the hairy-eared rhinoceros (*R. lasiotis*). In spite, however, of certain differences in the form of the skull, this new departure has not commended itself to the majority of naturalists, who prefer to regard the more hairy form merely in the light of a variety of the Sumatran species.

The Sumatran rhinoceros is a forest-dwelling animal, whose diet probably consists mainly of leaves and twigs. In this respect it agrees with the Javan species, which has molar teeth of precisely the same structure ; this type of tooth, as we shall see latter on, being invariably associated with leaf and branch-eating habits, while the type found in the Indian rhinoceros indicates grass-eating habits. The Sumatran rhinoceros is especially addicted to hilly

districts, and has been found in Tenasserim at an elevation of 4000ft. Mr. E. Bartlett states that it is now becoming rare in most parts of Borneo. So far as our present information permits of judging, it would appear that rhinoceroses of the type of the Sumatran species are comparatively recent immigrants into the east, since their remains are unknown in the rocks of the Siwalik Hills and other Indian fossiliferous deposits. Extinct European rhinoceroses found in the Lower Pliocene and Upper Miocene deposits of the Continent, such as Schleiermacher's rhinoceros (*R. schleiermacheri*), attest, however, the antiquity of this group of the genus ; and, taken in connection with other fossil animals, show that there has been an eastward migration in later times of types formerly inhabiting western Europe.

The African rhinoceroses, as already mentioned, differ from the Asiatic species in the total absence of tusks and cutting-teeth from the front of the jaws, and in the want of permanent folds in their skin. Both species, it need hardly be mentioned, have two horns, which may attain far larger dimensions than those of any of the Asiatic species.

The common or so-called black African rhinoceros (Fig. 80) is the smaller of the two species, and is readily characterised by its prehensile upper lip.

This species—technically known as *Rhinoceros bicornis*—has molar teeth of the pattern of those of the Javan and Sumatran species, and subsists entirely upon twigs and branches. The natives believe that there are two species of this rhinoceros,



FIG. 80.—THE COMMON AFRICAN RHINOCEROS. (From "Nature.")

applying the name of borele to that variety in which the second horn is not more than about 8in. in length; while those individuals with the second horn of from 1ft. to 2ft. in length they term keitloa.

Mr. Selous has, however, shown conclusively that there is a perfect gradation from specimens in which the second horn forms a mere nodule, to those in which the two horns are nearly equal, and thus to those rare instances where the second is the longer of the two.

Sir Samuel Baker states that the longest horn of any individual of this species he ever shot measured 23in. long; but, although Mr. Selous does not give us the benefit of his experiences in this matter, specimens are on record of over 40in.

The common African rhinoceros has an extensive geographical range, occurring from Cape Colony to Abyssinia, in such regions as are suitable to its habits. Although formerly abundant, this species has of late years been greatly reduced in numbers. Mr. Selous tells us that while this rhinoceros always walks with its nose high in the air, and the calf invariably follows its mother, in the case of the next species the nose is carried close to the ground, and the calf trots in front of its dam. A male of this species, shot by Sir John Willoughby in the Kilimanjaro district, had a small and irregularly-formed third horn, placed a short distance behind the second.

This rhinoceros has been exhibited in European menageries, where it thrives well, a large male,

which died there in 1891, having been in the menagerie of the Zoological Society since 1868. Since this individual was about two years old when received by the society, its age at the time of its decease may be roughly estimated at from twenty-four to twenty-five years. That it had not reached its full term of life is, however, indicated by the cause of its death being due to disease of the heart, complicated by cancer of the stomach, and a cutaneous complaint. This rhinoceros came from Upper Nubia, and is the one represented in our illustration. Mr. Selous attributes to this species a gentle and inoffending disposition; but in this respect he is not in accord with Mr. Drummond and several other writers on African sport.

By far the largest of all the living representatives of the genus is Burchell's, or the square-mouthed, rhinoceros (*R. simus*), which stands as much as $6\frac{1}{2}$ ft. at the shoulder, and is, next to the elephant, the largest of all land mammals. Although frequently known as the white rhinoceros, there is, according to Mr. Selous, no perceptible difference of colour between this and the preceding species, both being of a slatey hue. The bluntly truncated upper lip (apart from its superior size and its enormous head) serves, however, at once to distinguish the present species.

Burchell's rhinoceros feeds exclusively upon grass, and has tall-crowned upper molar teeth of the general pattern of those of the great Indian rhinoceros, but of still more complex structure, and with the hollows filled with cement. As we have already seen that the branch-eating common African rhinoceros has molar teeth like those of the forest-dwelling Javan and Sumatran rhinoceroses, and since the Indian rhinoceros is an inhabitant of grass jungles, we may take it as certain that, while molar teeth of the type of those of the Sumatran species indicate branch-eating habits, those of the Indian and Burchell's rhinoceroses are correlated with grazing habits. This indication, needless to say, is of great importance when we have to investigate the probable habits of the fossil members of the group.

The horns of Burchell's rhinoceros attain a greater length than those of any other living species—the front horn varying from some 18 in. to over 4 ft. in length. Mr. Selous states, however, that, owing to the finest specimens of the animal having been killed, it has been of late years rare to meet with horns exceeding 3 ft. in length. Although usually bent somewhat backwards at the tip, some examples of the front horn are either straight or curve slightly forwards. When a straight or

forwardly bent horn exceeds 3ft. in length, it will obviously touch the ground in front of the animal's nose at such times as the head is bent down in feeding; hence, as Mr. Selous points out, the front surface of the tips of such horns is usually abraded by friction with the ground. The same writer states that a front horn of this species may always be distinguished from that of the common species by its more or less flattened anterior surface. In length, the posterior or second horn may vary from a mere nodule to upwards of 2ft.

The largest example of the front horn of Burchell's rhinoceros appears to be one in the British Museum, measuring $56\frac{1}{2}$ in. along the curve. Mr. Selous states that he has seen a horn of 54in. in length, and has shot a rhinoceros in which the front horn measured 43in. One exhibited by Mr. Oswell in 1890 had a length of 45in.; while there are specimens in the British Museum measuring 43in., 42in., 40in., and 37in.; and Sir E. G. Loder has one in his collection at Horsham measuring $40\frac{1}{4}$ in. long, and 22in. in basal circumference, and weighing 13lb.

Instead of frequenting the wood-clad, broken ground favoured by the common species, Burchell's rhinoceros is found on the forest-clad sand-belts and broad grassy valleys skirting the hills in the districts

to the southward of the Zambesi. In former years this species appears to have been common enough in South Africa, some of the earlier hunters writing of their having shot as many as eight in a single night at their drinking pools (more's the pity!). Now, however, this rhinoceros is exterminated from most parts of South Africa, although in the years 1878 and 1880 Mr. Selous reports having found it still fairly numerous in a small tract of country in north-east Mashonaland, where a few individuals still lingered in 1892. Here, however, unless special means of protection are taken for the few survivors, its destruction is but a matter of time, and it is but too probable that ere long this magnificent species will cease to exist throughout the length and breadth of the Dark Continent. No example of Burchell's rhinoceros has ever been brought alive to Europe, and it is now probable that such an addition to our Zoological Gardens will never be made. Mr. Selous, writing in 1882 from the Matebele country, stated that the very few individuals of this rhinoceros that still survived in that part of Africa were then almost entirely restricted to the "fly"-infested districts, so that their pursuit was well nigh an impossibility.

Unfortunately, in spite of the number of individuals shot by the earlier pioneers of African sport, our

museums have been hitherto badly off for skulls of this species, while of the skeleton there are absolutely no examples in this country. The British Museum possesses, indeed, two adult and two young skulls; while the museum of the Royal College of Surgeons has one magnificent skull, with the horns still affixed, which was shot by Gordon Cumming. The length of this skull is 35in., that of the front horn 34in. in a straight line, and that of the second horn 10½in. The front horn, which is nearly straight, shows the mark on the front of the tip made by rubbing against the ground. There is also a fine stuffed head, with the skull preserved separately, in the Free Museum at Liverpool. Mr. Selous has, however, recently procured a fine skull and skin for the British Museum.

It is a curious fact in natural history that, whereas a considerable number of large animals of peculiar types are now restricted to Africa, yet in past times such creatures were well represented in other regions of the globe. And in no instance is this better exemplified than in the case of the smooth-skinned, two-horned rhinoceroses without tusks or cutting teeth, which, although now confined to Africa, had formerly a wide distribution.

Of those allied to Burchell's rhinoceroses there are two well-marked fossil species, one of which

occurs in the rocks of the Siwalik Hills of Northern India, belonging to the Pliocene period of geologists, while the other was distributed over Northern Europe and Asia during the succeeding Pleistocene age. The Indian Siwalik species, known as the broad-nosed rhinoceros (*R. platyrhinus*) is represented by a magnificent skull in the British Museum, which indicates an animal nearly or quite as large as the living African species. Its molar teeth are nearly similar to those of the latter, and we may hence confidently assume that it was a grass-eater; while, from its geological and geographical positions, it may not improbably be regarded as the ancestral type of both the African Burchell's rhinoceros and the under-mentioned extinct species.

The woolly rhinoceros (*R. antiquitatis*), as the fossil European species of this group is commonly termed, is known to us not only from skeletons, skulls, and teeth found in various parts of Europe, but likewise by entire carcasses preserved in a frozen condition in the ice of the Siberian "tundras." From these mummified specimens we learn not only that this animal was covered with a thick coat of woolly hair, to afford protection against the cold of the regions in which it dwelt, but also that its skin was devoid of the folds characteristic of the Asiatic species, and thereby resembled that of its African

ally. The horns of this mighty beast have also been in many cases preserved in the ice, and appear, although I have not measurements of the largest examples before me, to have nearly, or perhaps quite, rivalled those of Burchell's rhinoceros in point of size.

From the similarity in the structure of its molar teeth to those of the last-named species, there would seem but little doubt that the woolly rhinoceros was also a grass-eater—at least, originally. It appears, however, that in the interstices of the molar teeth of at least one Siberian example, portions of needles of conifers and leaves of other trees have been detected; and it has accordingly been assumed that this animal was a branch-eater. Unfortunately, little or nothing is known of the condition of Siberia in those early days, although it may be doubted whether grass would have been found in sufficient quantity to satisfy the wants of such bulky animals as these rhinoceroses. Hence it is quite probable that, although the woolly rhinoceros in the more southern part of its range was altogether a grass-eater, yet that by stress of circumstances it may have been compelled in Siberia to supplement its proper diet, to a larger or smaller extent, by leaves and shoots.

The earliest known ally of the common African

rhinoceros (*R. bicornis*) is a species from the early Pliocene strata of Attica, known as *R. pachygnathus*, which was so closely allied to the living species that some attention is necessary to find out well-marked points of distinction between the two. There were, however, many other species of extinct rhinoceroses, more or less nearly allied to the common African

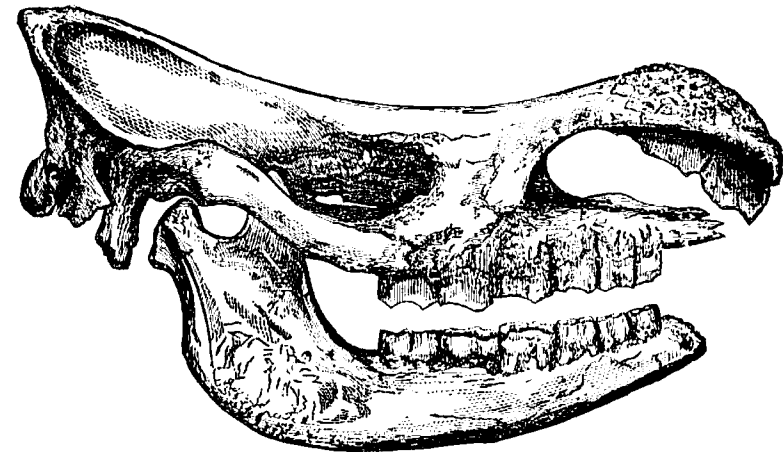


FIG. 81.—SIDE VIEW OF SKULL OF FOSSIL ENGLISH RHINOCEROS.

rhinoceros, which inhabited various parts of the world during the succeeding Pleistocene age. Thus, in England, and Europe generally, there were no less than three kinds of rhinoceroses of this group living in the last-named period; all of which agree with the African *Rhinoceros bicornis* in the structure of their

molar teeth, and the absence of tusks and cutting-teeth in the front of the jaws. Two of these, respectively known as the Leptorhine and Megarhine rhinoceroses, have left their remains in the brick-earths of the Thames Valley; while the third and smaller species, known as the Etruscan rhinoceros, occurs in the somewhat older deposits of the Norfolk coast termed the "Forest-bed," and likewise in the uppermost beds of the Pliocene period in Italy and France. The Leptorhine and Megarhine species, as shown in the figure of a skull of the former, are characterised by having a bony partition dividing the two chambers of the cavity of the nose. In this respect they resemble the woolly rhinoceros already referred to; and it has been suggested that the object of this ossification was to aid in strengthening the skull for the support of the massive horns. Since, however, a similar feature is occasionally found in one of the smaller Asiatic rhinoceroses, while it is invariably wanting in Burchell's rhinoceros, it would seem that this is not the true *raison d'être* of the partition in question. That all these three species lived on boughs and foliage may be safely inferred from the structure of their molar teeth; and, as further evidence of their affinity, it may be mentioned that a carcase of either the Leptorhine or Megarhine kind found in the Siberian ice showed

that the skin was of the smooth type characteristic of the African rhinoceroses.

Fossil rhinoceroses akin to the African *R. bicornis* were, however, by no means restricted to the European area. Thus from the superficial and cavern deposits of Southern India there have been obtained remains of two small species—respectively known as the Deccan and the Karnul rhinoceros—which, from the absence of tusks and cutting-teeth in the jaws, and the structure of their molars, were evidently allied to the common African rhinoceros, although complete skulls of either have not yet been discovered.

These Indian two-horned and tuskless rhinoceroses, together with the large Platyrrhine species allied to Burchell's rhinoceros, already mentioned, clearly show that in its earlier days India was inhabited by rhinoceroses nearly related to those now restricted to Africa; while the occurrence of remains allied to the Javan and Indian rhinoceros as unmistakably indicates that it was likewise tenanted by kinds akin to those still characteristic of Asia. This blending of African and Indian forms occurs in other groups of animals found in the Pleistocene and Pliocene deposits of India; and we have at present no satisfactory explanation to offer of the circumstance that, while those types which now occur in Africa have disappeared from India,

such as persist in the latter area are unknown in the former.

This completes our list of rhinoceroses now living on the globe and their nearest extinct relations. In some of the Tertiary rocks of India and Europe there occur, however, remains of other rhinoceroses which differ from all living forms in the total absence of horns. Moreover, in such of these earlier species as the limbs have been discovered, the fore feet differ from those of all modern rhinoceroses in having four separate toes; so that, in this respect, these animals were one step less widely removed from the tapirs than are their existing allies. Some of these extinct hornless rhinoceroses were of gigantic size, and all of them were provided with cutting-teeth and tusks in the jaws, while their molar teeth were of the type obtaining in the Sumatran species. Hence we may conclude that these early rhinoceroses were branch and leaf-eaters. This, indeed, is exactly what might have been predicated *à priori*, since all the older Ungulate mammals had short-crowned molars adapted for champing boughs, leaves, or succulent reeds; and it was not till a later period, when we may presume that extensive grassy plains first formed a prominent feature in the landscape of the world, that species with tall-crowned teeth, adapted for com-

minuting grass by a grinding motion, came into existence.

Hitherto we have spoken only of Old World rhinoceroses, but certain kinds found fossil in the Tertiary rocks of the United States prove that this group of animals formerly extended to North America, although they are quite unknown in the southern half of the New World. These North



FIG. 32.—BACK VIEW OF GREAT INDIAN RHINOCEROS.

American rhinoceroses were hornless, but, instead of resembling their Old World hornless cousins in having four toes to the fore feet, they agreed with the living species in having only three toes to all the feet. In bodily form, the American hornless species were, however, different from all others. Thus, whereas the Old World rhinoceroses have legs of considerable length in relation to their bodies, the

American species were distinguished by the extreme shortness of their legs, and the great length of their bodies. Consequently they had more the general appearance of a hippopotamus than that of an ordinary rhinoceros; and from this peculiarity we may infer that they constituted a side branch which had no connection with the direct pedigree of modern rhinoceroses.

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