THE NATURALIST.

NOTES ON RHINOCEROSES, ANCIENT AND MODERN.

THE AFRICAN RHINOCEROSES, as already mentioned (*Field*, June 18), 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 scarcely 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 (of which, by the courtesy of Messrs Macmillan, we are enabled to give a figure), 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, 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.

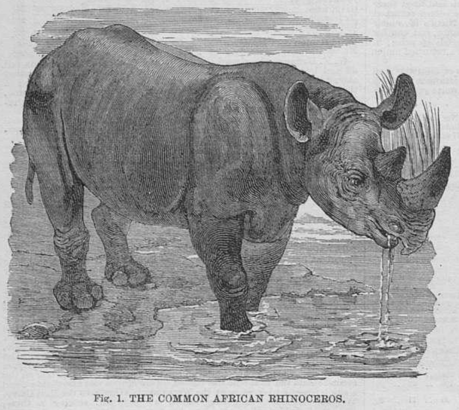

Fig. 1. THE COMMON AFRICAN RHINOCEROS.

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

The common African rhinoceros has an extensive geographical range, occurring from the 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 Kilima-Njaro 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 last year, 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—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 most other writers on African sport.

By far the largest of all the living representative of the genus is Burchell's, or the square-mouthed, rhinoceros (R. simus), which stands as much as 6½ft. 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 pattern of those of the great Indian rhinoceros. 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 indicate grazing habits. This indication, needless to say, is of great importance when we have to investigate the probable habits of 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 18in. to over 4ft. in length. Mr Selous states, however, that, owing to the finest specimens of the animal having been killed, it is now rare to meet with horns exceeding 3ft. 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 57in. 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 40¼in. long, and 22in. in local circumference, and weighing 13lb. Although commonly supposed to be restricted to the regions south of the Zambesi, a horn of 3ft. in length and of great thickness, shown to Sir S. Baker at Khartum, which had been brought from the regions to the westward of Lake Chad, suggests that Burchell's rhinoceros may occur on the west coast to the north of the equator, unless it be that we have to deal with an undescribed species.

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. Here, however, its destruction is but a matter of time, even if still unaccomplished; and it is but too probable, unless it should turn up in Western Africa, 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 probable now that such an addition to our Zoological Gardens will never be made. Thus, in reply to inquiries as to the possibility of obtaining a living example, Mr Selous, writing in 1882 from the Matabele country, stated that he was afraid the chances of effecting such a capture were very small. 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. Indeed, Mr Selous at that date had been unsuccessfully trying for a whole year to shoot a specimen for the British Museum.

Unfortunately, in spite of the number of individuals shot by the earlier pioneers of African sport, our museums are 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 in the manner mentioned by Mr Selous. There is also a fine stuffed head, with the skull preserved separately, in the Free Museum at Liverpool. Seeing the scarcity of specimens of this rhinoceros in our museums, it is to be hoped that sportsmen who have the opportunity will do something towards supplying the want ere it be too late.

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, 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 precisely 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 carcases preserved in a frozen condition in the ice of the Siberian "tundras." From these mummified specimens we learn not only that the 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 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

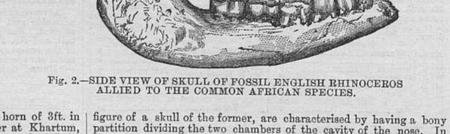

Fig. 2.—SIDE VIEW OF SKULL OF FOSSIL ENGLISH RHINOCEROS ALLIED TO THE COMMON AFRICAN SPECIES.

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 usual 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 we have not yet received complete skulls of either.

These Indian two-horned and tuskless rhinoceroses, together with the large Platyrhine 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 comminuting grass by a grinding motion, came into existence.

Hitherto I 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 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.

Such is, very briefly, the present state of our knowledge of the history of rhinoceroses; and it is one which especially shows how essential is the study of the extinct members of a group to arrive at any proper estimate of the relations of its existing members.

R. LYDEKKER.

A TRIP TO THE BULL ROCK FOR SEAFOWL'S EGGS.

WE CAST OFF from the pier at Berehaven on May 11, at 5 a.m., and with smooth water and just enough wind to create a draught on our furnace and a strong ebb tide in our favour, we were soon alongside the Bull Rock, a small islet lying about two and a half miles N.W. of Dursey Island and 292ft. high. This is the most southerly breeding haunt of the gannet on the Irish coast.

There is deep water close to the rock, and in fine weather a small steamer may lie close in to a remarkable arched hole worn by the action of the sea through the island. A good view of the buildings on the east side may be obtained, and the effect of the view under the almost perpendicular cliff is somewhat heightened by the probability that some of the loose stones, which jut out here and there from the face of the rock, will one day fall from their places into the abyss below.

After landing a few tons of coal for the use of the light-keepers, I took one of the men with me and went ashore in search of sea birds' eggs. The ascent is not difficult, there being concrete steps built all the way up to the lighthouse, but the moment we arrived at the summit a cold clammy wind blew in our faces, with a fine rain that penetrated our clothing and made our foothold very slippery and difficult. A thick fog prevailing at the time, the watchman on the look-out station was busy with the fog-signal—charges of gun cotton, which he fired at short intervals—the concussion from which was very considerable when at close quarters. We were informed by one of the keepers that the nearest way to the gannets' nesting places was close past the signal station. Just as we were passing it one of the charges was fired, and within a few feet of us; the concussion was so great that it nearly knocked us down. I shall never forget the look of dismay on Pat's face as he crossed himself and said "Oh Blessed Virgin, but they'll blow us into smithereens; for the love of God, sor, come away out of this."

The weather now cleared up and became beautifully fine and warm, and we were enabled to obtain a good view from the summit. The light-keepers' dwellings, with the lighthouse, signal station, and gasometer, with thousands of seafowl, some circling overhead, but the majority sitting on their nests, gave the rock a very homely and animated appearance compared to what it was when I visited it some years ago, before these buildings were erected.

During the breeding season the birds are very tame. The puffins seem to have no fear whatever, though wary enough when on the water and away from their nests. We captured several of them with a landing net, but let them go again. I have sat for hours within a few feet of these birds, making sketches of them, and no better place could an artist find for studying the habits and attitudes of sea birds than this wild, rocky isle of the Irish coast.

The puffins and razorbills seem to keep on friendly terms enough with one another, but will not permit the gannets or seagulls to associate with them. I have watched the puffins and razorbills sitting side by side in the most friendly manner. The puffins, with their furrowed and painted beaks, remind one strongly of the highly coloured pasteboard noses of preponderous shape and size which decorate the windows of the toy shops at Christmas time; this, with their look of utter indifference, strike one as very laughable. For pugnacity and impudence, a town-bred cock sparrow is difficult to beat, but for a look of thorough contentment and utter indifference to all surroundings, commend me to a puffin on the Bull Rock.

We made a good collection of eggs, the gannet, puffin, razorbill, and kittiwakes being very plentiful, but difficult to get at; one has to stick as close to the rock as a limpet when creeping along the narrow ledges of the precipices, only a few inches wide. This is very dangerous work to one not accustomed to it, as a false step, or a loose stone, will end your egg-collecting days for ever in this world. It was only a few weeks ago one of the light-keepers on the Tearaght, one of the Blasket group of islands off the Kerry coast, lost his life whilst collecting "sea parrots'" eggs. He was on a very dangerous part of the rock at the time, and was in the act of taking a puffin's egg, when the bird, which happened to be in the hole at the time, bit his finger, and in suddenly pulling back his hand he overbalanced himself and fell backwards, rolling down some 50ft. of the sloping part of the rock, and then disappeared over the precipice some 400ft. into the sea below. His body was never recovered!

After collecting what eggs we required, we returned on board the Waterwitch and steamed to the Cow, another rock lying about one mile inside the Bull, to collect some eggs of the black-backed gull, guillemot, herring gull, cormorant, and shag, and which do not breed on the rock we had just left. We found these eggs in great quantity, and in a short time collected all we required. One could easily fill a small boat with eggs on this island if so inclined; it is almost impossible to walk about without breaking some of them. It is comparatively easy work collecting here, the top of the rock being quite flat, and with the exception of the cormorants and shags, which build on the sides, all the other birds built on the summit, where their eggs are easily procured.

There is a good deal more vegetation here than on the Bull Rock, though of the same kind. A good deal of spinach grows on both, and the light-keepers assured me they often cook it, and that it is excellent eating, and far superior to that cultivated on the main land.