

# THE TWO-HORNED ASIATIC RHINOCEROS.

(*DICERORHINUS SUMATRENSIS*).

BY

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(*With 8 plates*).

The Sumatran or Two-horned Rhinoceros (*Dicerorhinus sumatrensis*), of Asia, now regarded as a distinct genus, *Dicerorhinus*, the generic title *Rhinoceros* being reserved for the Indian and Java species, was once widely distributed, but owing to continual persecution for the sake of its horn and other parts of its anatomy it has been brought to the verge of extinction.

It is on observations made on this mammal in British Malaya that this monograph is based, but *sumatrensis* has been recorded from India, Burma, Indo-China, Siam, Sumatra and Borneo. Except in Sumatra, where its incidence has not been completely investigated, it appears that in these countries this species of rhinoceros is rapidly disappearing.

No doubt the habits of the Sumatran rhinoceros with local adaptations to different environments, would be much the same in all the above countries; still my ecological remarks must not be taken as applying to other countries than Malaya.

## HISTORICAL.

The Asiatic two-horned rhinoceros was, according to Blanford, in his 'Mammalia' in the *Fauna of British India*, first named *Rhinoceros sumatrensis* by Cuvier in 1817. (See *Cuv. Règne An.* 1, page 240, 1817.) I have been unable to ascertain when the first record was made establishing the fact that there was a two-horned rhinoceros in Asia.

Greek writers described certain animals bearing a single horn and designated one as the Indian Ass. The first Greek writer to mention the rhinoceros was Strabo who wrote just before and after the beginning of the Christian era.

Rhinoceroses were seen in Europe for the first time in 61 B.C. when Pompey the Great introduced them to the games of the Roman circus. Pliny (23-79 A.D.), the Latin writer, mentions the rhinoceros and describes its fights with elephants. But these were probably African animals because those represented on the coins and sculpture of the Romans are shown with two horns and there is nothing to justify us in believing that these may have represented the *sumatrensis*. Marco Polo (1298) appears to have seen rhinoceroses in Java, probably *Rhinoceros sondaicus*, and presently I shall quote what he said about the rhinoceros which provides us with a link between the unicorn and the rhinoceros.



It is well established that rhinoceroses have been known for centuries. The incidents of the unicorn as the animal of fable and the rhinoceros as the animal of fact may have some bearing on the superstitions attached to the rhinoceros. At least one legend associated with the unicorn has been passed on to the rhinoceros. The horn of the unicorn when made into and used as a drinking cup, was supposed to be able to detect poison and we find that even at the present time the same wonderful properties are assigned to the horn of the rhinoceros.

The idea of an animal's horn when used as a drinking cup detecting poison in any liquid placed in the cup is as old as Ctesias, who attributed this virtue to the horn of the Indian Ass, which, I think, must have been some species of Asiatic rhinoceros.

In a note in the 1840 Edition, published by Blackie & Son, Glasgow, of Oliver Goldsmith's *History of the Earth and Animated Nature*, which book, without the notes, was first published in 1774, we find the following in relation to rhinoceroses' horns.

'Thurnberg says, "It is generally believed that goblets made of the horns in a turner's lathe, will discover any poisonous draught that is put into them by making the liquor ferment until it runs quite out of the goblet. Such goblets are frequently set in gold and silver, and are regarded as suitable presents to kings, persons of distinction, or particular friends; or else they are sold at a high price, sometimes at the rate of fifty rix-dollars a goblet. When I tried these horns, both wrought and unwrought,—both old and young horns,—with several sorts of poison,—weak as well as strong,—I observed not the least motion or effervescence; and when a solution of corrosive sublimate, or other similar substance, was poured into one of these horns, there arose only a few bubbles, produced by the air which had been enclosed in the pores of the horn, and which was now disengaged from it."'

'Besides the use of its horns for goblets and handles of swords and daggers, there is scarcely any part of the animal which is not employed medicinally in the countries it inhabits.'

Another legend which long persisted in relation to the unicorn and was apparently also passed on to the rhinoceros was that this normally fierce animal was wonderfully gentle in the mating season, and from that evolved the idea that it became docile in the presence of a maiden and was lulled to sleep with its head on her breast. This fancy appears in the *Physiologus* which states:—'They send to it a pure virgin all robed. And the unicorn springs into the lap of the maiden and she subdues him and he follows her.'

But Marco Polo would have none of this in relation to the rhinoceros and when describing that animal wrote:—'It is a hideous beast to look at and in no way like what we think and say in our countries, namely a beast that lets itself be taken in the lap of a virgin. Indeed I assure you that it is quite the opposite of what we say it is.'

These superstitions attached to the mythical unicorn and bestowed on the substantial rhinoceros have been responsible for conferring on the rhinoceroses' horns and other parts magical properties resulting in its continual persecution which has brought all species of the Asiatic rhinoceros to the verge of extinction. The two-horned variety has in no way escaped the baleful influences of these illusions.

To come down to more modern times Prince Henri d'Orléans in his book *From Tonkin to India*, being an account of a journey made by him in 1895, records seeing the head of a two-horned rhinoceros in a druggist's shop at Mong-le, a small Chinese town in Yunnan, close to the Tonkin border, in, approximately, latitude 22.30N., and longitude 102E. The rhinoceros was alleged to have been killed about four miles away.

Again in the same book Prince Henri records that they found plenty of the spoor of rhinoceroses in the valley of the Nam-Tsai, near Assam. The rhinoceroses' trails must have been numerous because Prince Henri writes, 'We had to thank the latter (rhinoceros) for many an enlarged path and flattened bank.' He also stated that their guide Poulanghing explained that these were the tracks of the two-horned rhinoceros and that their flesh was good. This was in the Singpo country, approximately latitude 27.30N., and longitude 97E.

In view of what R. Lydekker wrote in his book *The Game Animals of India, Burma, Malaya and Tibet*, 1907 edition, regarding an unidentified species of two-horned rhinoceros which he suggested might be found in the Singpo country, this record is interesting. These two notes by so accurate an observer as Prince Henri show that the two-horned rhinoceros extended over a large area of country directly south of the Chinese and Tibetan borders, and as we know it is still to be found in Sumatra and Borneo no doubt in days gone by its distribution was very wide.

Henri Mouhot, the distinguished French Naturalist, in his book *Travels in Indo-China*, published in 1864, refers in Volume II to a rhinoceros hunt at which he was present in the Laos country, somewhere east of Luang Prabang, approximately in latitude 21N. and longitude 103E. There is an illustration accompanying this account which was drawn by M. Janet Lange from a sketch by M. Mouhot, but the animal depicted is obviously a *Rhinoceros sondaicus* and not a *Dicerorhinus sumatrensis*, the single horn and the fold across the back of the neck being clearly depicted. This is not very far from where Prince Henri d'Orléans recorded having seen the head of a two-horned rhinoceros in a druggist shop, and approximately six degrees of longitude east of the Singpo country. This indicates that at the time of M. Mouhot's journeys there were probably two species of rhinoceroses to be found in Indo-China and Northern Siam and this also may have a bearing on Lydekker's 'Singpo' rhinoceros.

The Asiatic two-horned rhinoceros has from time to time been divided into two or more species, *sumatrensis* and *lasiotis* being amongst them. Blanford in his 'Mammalia' in the *Fauna of British India* discusses these species and gives the reasons for their designation. He inclines to believe, however, that there is only one species but possibly more than one variety. This is supported by modern nomenclature. In the latest edition of Rowland Ward's *Records of Big Game* it is suggested that there are two local races, one *lasiotis*, embracing Assam to Borneo, and the other *blythi*, the race found in Tenasserim. It is doubtful whether the latter race would vary from that found in Malaya although the Malay



Peninsula, if *Records of Big Game* is to be followed, holds *lasiotis*.

Lydekker, in his *Game Animals of India, etc.*, 1907 edition, refers to even more than two varieties and suggests that the Malayan animal should be known as *R. sumatrensis niger*, but his premises are, to my mind, incorrect so far as the colour of the Malay animal is concerned. This I will refer to later on.

In *The Field* of the 23rd October 1915, R. I. Pocock wrote a note on the two-horned Asiatic Rhinoceros after having seen two recently mounted heads of this rhinoceros in Messrs. Rowland Ward's showrooms in London.

In this note Mr. Pocock remarks on the difference in the shape of the skulls and states that it would be important to ascertain if the difference is sexual as it was obviously not geographically racial the two specimens having been obtained in the same district. It was not sexual both the animals being mature males. In fact I think it extremely unlikely that the female of the *Dicerorhinus sumatrensis* would ever have such massive horns as are shown on these specimens.

Mr. Pocock refers also to the absence of fringes on the ears of these animals. I do not think that any rhinoceros which reaches maturity and lives in the dense thorny jungle of Malaya could hope to save the fringes on its ears, even if it ever had them. I have seen, in Malaya, a specimen of a baby *sumatrensis*, and it had much hair on its body and ears.

#### PHYSICAL ATTRIBUTES.

The *Dicerorhinus sumatrensis* is not a very large animal. I think the maximum height for a male would be about 4 ft. 6½ in. at the shoulder this being the measurement of an old male I obtained in Ulu Benus, Pahang. This beast which was stocky and bulky measured 96 in. in girth directly behind the shoulder and 102 in. in length from the end of his nose to the rump, as near as I could measure it. These measurements were taken on a steep hill side so cannot be considered as very accurate. But I have measured other rhinoceroses and the mature animal, whether male or female, has invariably measured more than 4 ft. at the shoulder. One very old female whose molars were worn right down almost to the gum measured 4 ft. 3 in. in height at the shoulder. The measurements of the horns of this animal are given under No. 4 in the table below.

The colour of the *sumatrensis* which has been mentioned as differing from the variety called *lasiotis* and which Lydekker thought was blacker than the northern variety does not, in my opinion, entitle the subspecies *niger* to be recognized. The colour of the hide of the Malayan variety is a dark grey and the underside of the skin, on the belly, under the forelegs, and in the groin, distinctly shades towards pink. The blackest part of the rhinoceros is the horn; even the head is not so dark as the horn. The tail is bare and short, tufted with sparse hairs. The ears, which have been taken as one of the parts which show a difference from

the more northern variety, have a very short fringe and a few hairs on the inside, but no mature rhinoceros living in the dense jungles of Malaya, behaving in the way they do, could possibly save long hairs on the edges of its ears. The young rhinoceros is hairy but this hair disappears as the animal ages and only very short hairs, almost bristles, are found on most of the exposed parts of the mature body. A young rhino following its mother passed on one occasion very close to some of my men as recounted later, and it was noticed as being hairy. It was not a baby by any means.

There are two very long horns in the British Museum which are labelled as having been produced by *sumatrensis*. These horns, according to Rowland Ward's *Records of Big Game* measure  $32\frac{1}{8}$  in. and  $27\frac{1}{8}$  in. in length, but the next horn recorded only reaches a length of 15 in. That horn came from the Malay Peninsula. The Datok Raja Kiah of Jelebu in Malaya, who is mentioned later on, told me that he had once obtained a *sumatrensis* whose front horn measured about 20 in. in length, but I am afraid I cannot attach much importance to the measurement although it was probably an abnormally long horn. I think that any anterior horn of a *sumatrensis* which measured over 10 in., and any posterior horn which measured over 5 in. should be considered as above the average. The females have smaller and less rugged horns than the males, and seldom show anything but a small development of the posterior horn. In an old male the whole of the top of the nose both around and in front of the horns becomes a mass of horn and at times may develop small lumps which might almost be called subsidiary horns. I have seen two heads with what were almost third horns, and the illustration of the mounted head of a male *sumatrensis* clearly shows a small horny protuberance over the left eye. The horn is merely agglutinated hair and as the *sumatrensis* is very fond of rubbing his horn against trees one can quite imagine that rough surfaces may easily become enlarged into embryo horns? The horn never appears to be used as a weapon, the large incisors in the lower jaw being the weapon of defence and offence.

The following are the measurements of the horns of four mounted heads of *Dicerorhinus sumatrensis* obtained in Malaya. Numbers 1 and 4 are illustrated.

| —     |     | Length on outside curve of horn |                  | Circumference of horn |                   |
|-------|-----|---------------------------------|------------------|-----------------------|-------------------|
|       |     | Anterior                        | Posterior        | Anterior              | Posterior         |
| No. 1 | ... | $10\frac{1}{4}$ "               | 6"               | 18"                   | $16\frac{1}{2}$ " |
| No. 2 | ... | 9"                              | broken           | 22"                   | 14"               |
| No. 3 | ... | $7\frac{1}{2}$ "                | $4\frac{1}{2}$ " | $16\frac{1}{2}$ "     | $12\frac{1}{2}$ " |
| No. 4 | ... | $8\frac{1}{2}$ "                | $1\frac{1}{2}$ " | 15"                   | 10"               |

Numbers 1, 2 and 3 are those of males, number 4 that of a very old female with teeth worn right down to the gums.

These measurements can be taken, I think, as typical of the class of horn that was obtainable in Malaya.

The *sumatrensis*, for his height, has a fairly large foot. The greatest measurement of the track of a fore foot that I have recorded was  $9\frac{1}{2}$  in. across the widest part which would be to the outer edges of the two lateral toe nails. Measurement of the centre toe nail, in this case, was  $3\frac{1}{2}$  in. wide. Another track that I measured of what was a slightly smaller beast was  $8\frac{1}{2}$  in. across with a centre toe nail measuring  $2\frac{3}{4}$  in. These were all measurements of fore feet. The hind feet are narrower and the toe nails generally slightly longer. The older the rhinoceros the more he digs his toes in when going up hill, which I believe he must do every day of his life! Anyway he always did whenever I followed him! The result is that his toe nails get shorter as he gets older. The impression of a short but wide toe nail indicates old age. This is in contradiction to the wild elephant which gets down on his heels the older he gets so that his toe nails are inclined to grow longer. The most extraordinary portion of the rhinoceros's external anatomy is his sheath and penis. The sheath points backwards and the result is that when the male urinates he does so behind. This is the only definite clue that can be obtained as to what is the sex of the animal one is following.

The illustration Plate IV shows the sheath and although not very clear it can be seen to hang down like a scrotum. If the male urinates when he is walking or even running he appears to throw his penis backwards and his urine shoots up into the air between his legs. The result is that, when following a track, splashes and drops of urine can be seen on leaves of the bush he has passed through, even up to a height of six feet. One's attention is sometimes drawn to the fact that the animal has urinated, because of the smell which is thus brought so close to one's face. In an article in the *Journal* of the Bombay Natural History Society, volume xxxviii, No. 1 published in August 1935, written by Mr. W. S. Thom on Rhinoceros Shooting in Burma, he states that this phenomenon of urinating on the bushes is done by the female, but I do not think that this is so. I have followed rhinoceroses for too many miles to be mistaken in what I have written above. Several other peculiarities mentioned by Mr. Thom in his article do not correspond with my experience, but I do not wish to criticise further the writings of a very experienced shikari, so I will merely record the deductions I have made from my own observations.

#### HABITS AND TERRAIN.

In the Malay Peninsula the *Dicerorhinus sumatrensis* was to be found in many parts of the mountainous country and sometimes in the coast belts. The *sumatrensis* is now almost entirely a mountain animal due, I think, to having been driven back from the lower lands. It is, however, very occasionally found someway

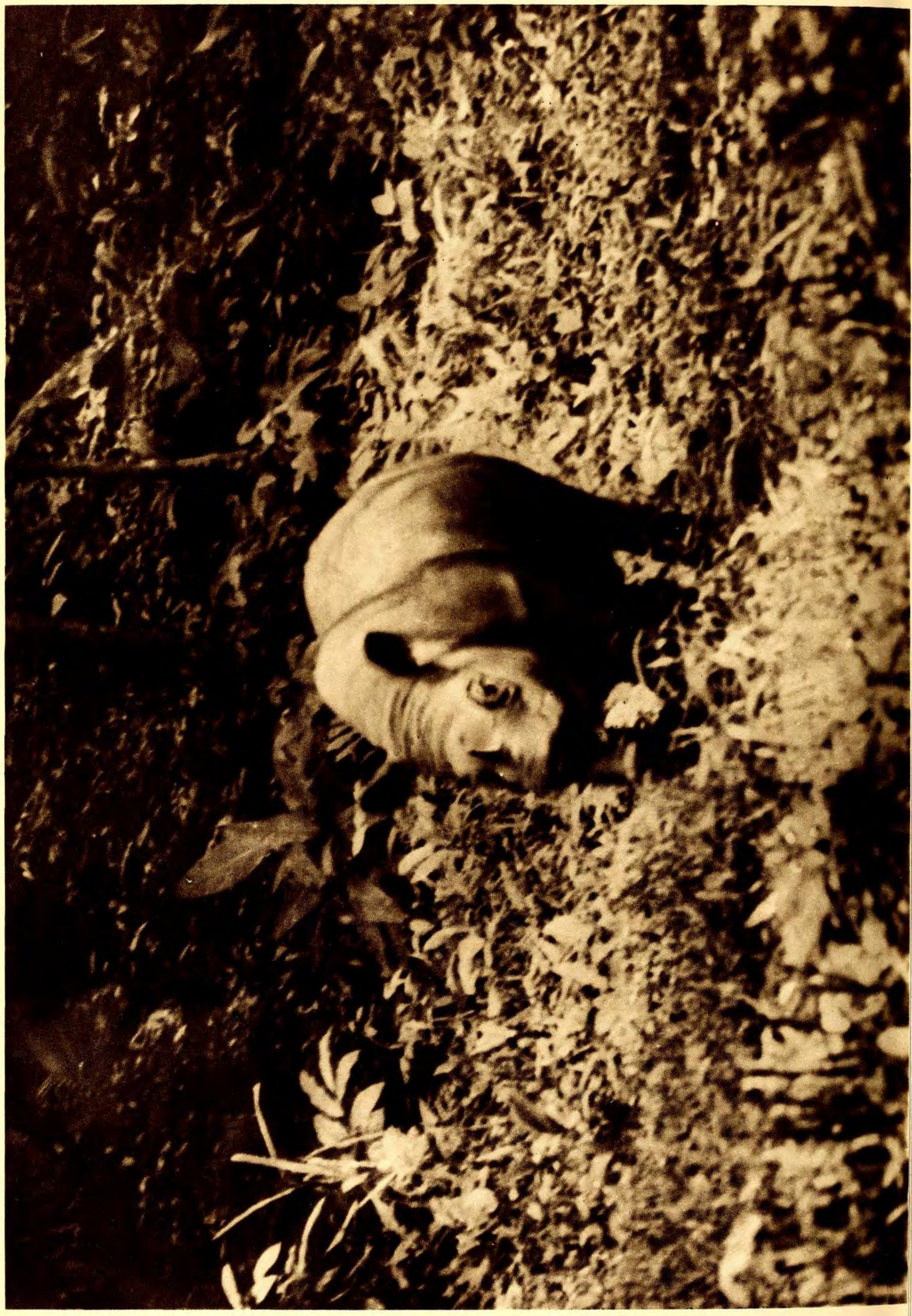
from the mountains in foot hills or dense low-lying jungle. It lives in the thickest and roughest jungle terrain it can find and that alone, up to this time, has saved it from extermination.

The two-horned rhinoceros seldom travels except alone, it being most unusual to find two of them together.

The Datok Rajah Kiah of Jelebu, an old and experienced rhinoceros hunter, who belonged to a type now passed from Malaya, informed me many years ago that he thought when two rhinoceroses were seen together that they were probably mother and calf except on the rare occasions when two came together for propagation purposes. I have on four occasions followed two rhinoceroses. In one case they were mating but on the other occasions when I came across two they may have been mother and calf, because apparently the calf runs with the mother until nearly full grown. The evidence that I have on the latter point is not very convincing, but taken cumulatively it does seem to point to slow maturity and long association with the parent.

The 'To Raja Kiah caught a baby male rhinoceros which he carefully tended and kept for seven years. I did not see it when it was very young but the 'To Raja told me that it was still hairy when he got it. He shot the mother and found the baby near by. At the end of seven years the rhino had grown to a little over three feet in height: obviously not full grown. It was just showing the anterior horn, but there was no sign of the posterior horn. It foraged in the jungle during the day as it got older, had its own wallows, and returned to the 'To Raja's house in the evening for a feed of rice. When the rice was ready one of the household would call with a loud and shrill, Hoh! Hoh! Hoh! and the rhino would answer from the jungle and come back at full speed for his evening meal. He slept under the house.

I have frequently seen tracks of rhinoceros at least as big as this one following a larger one and I think one may presume that they were mother and calf and that the calf was no longer extremely young. This tends to show that the rhinoceros is a long-lived animal although there is insufficient evidence to be dogmatic about it. The 'To Raja learnt two lessons in connexion with his rhinoceros. He had an offer from another Malay for the rhinoceros but with the usual financial jugglings of such people the 'To Raja was persuaded to part with the young rhino by promises of payment so soon as the purchaser was able to get in touch with his principal who lived some 50 miles away. Foolishly the old man allowed the animal to be taken away. About a week afterwards the would-be purchaser returned with the rhino to the 'To Raja and told him that it was sick and could not proceed any further on the journey. The poor little beast had been dragged along a jungle path, had never been given a chance to wallow, and its skin was cracked in dozens of places. It died shortly afterwards and the 'To Raja had neither his rhino, to which he had been very much attached, nor the money which he expected for it. The two lessons were:—(1) avoid greed, (2) a rhino cannot exist unless allowed to wallow. As I have written above rhinoceroses have a poor development of the herd instinct and are extremely unsociable. I have followed



rhinoceroses on foot through dense jungles for days and days but have seldom come across more than one animal. Although at times I have followed fresh tracks which crossed the fresh tracks of another animal I have seldom known them to join up. On one occasion when following the tracks of two big beasts another one crossed their trail and followed them. So then there were three. But the reason was obvious, because presently we came to a place where two of them had had a tussle and the third had laid down close by, no doubt wondering which of the two was to be her future lord and master. I hoped I was going to see a rhino fight and followed up the tracks but I was disappointed. I came upon some more traces of struggles and then one of them went away and left the two to continue their honeymoon. Perhaps it was the lone male which had intruded into the party and which now took up the running? I do not know, but I do know that the solitary one which I went after, it being easier to deal with one animal than two, was a very old male with his posterior horn broken off. This animal is mentioned on page 598 and is No. 2 in the list.

Of all the difficult and exasperating animals to follow through dense jungle the rhinoceros easily takes first place. They invariably go through the thickest undergrowth they can find and deliberately leave a game path to go through, or under, or over, some fallen tree which appeals to their sense of humour, I suppose. They do this normally as recreation when going about their lawful occasions, but when once wise to the fact that they are being followed they excel themselves in ingenuity. Nothing is too difficult for them. I remember once tracking a rhinoceros up a steep hill side in very rough country with many rocks about. We came up to him almost on the top of the hill. He heard us, I suppose, and turned round to face the direction we were coming from, but carefully put a large fallen tree and a dense thicket of rattan between himself and the line of our approach. We could see nothing, but were suddenly brought up standing by a tremendous snort just in front of us. Then a short rush away from us—cessation of all sound, and another magnificent snort, more like an engine blowing off steam than anything else. This was followed by a shrill squeal, denoting that he had smelt us and away he went crashing through everything. We saw nothing at all. He rushed down a dry gully and when we followed painfully in his rear—by that time he was far away—we found that, when tearing down this dry water course which was full of granite boulders, he had come to a place where the formation broke away to a sheer drop of twenty feet. This did not bother him, he just took it in his stride, nor did the flat slab of granite at the bottom on which he landed check him in any way, he had continued his rush as if nothing out of the ordinary had happened. The drop to this granite bed would have seriously injured if not killed any other heavy animal, but a rhino is the toughest animal on earth. His short leg bones enable him to do these things without much inconvenience. We followed him up for some miles before he stopped, apparently to amuse himself by rubbing his horn against a tree, taking off rather more bark than

usual, and kicking up a greater amount of earth at the foot of the tree than is customary. That was the only indication that he remembered that granite bed rock. And so it is always with them. They seem impervious to any physical feeling of discomfort. Their walking powers in bad country are phenomenal. I have often followed up a rhino which has laboriously climbed—I should say we have laboriously climbed—a high mountain merely to go down the other side. A rhino that has been scared may do this two or three times during a day without stopping, except to take a quick wallow if he comes across a mud hole, and, at the end of the day, the unfortunate people following him will be perhaps far enough behind him to take two or three days to catch him up. The hunting of rhinoceros by tracking is a very difficult business and, if that was the only way to get them, then the rhino would have been in no danger of extinction. But unfortunately the rhinoceros with all his highly developed senses will continually follow the same game trails, especially near wallows or near salt licks, and it is due to this habit that they have been so persecuted. Even to this day, one finds rhinoceroses' game paths passing alongside some long disused and partially filled-up pit, showing their extraordinary obsession for keeping to and following almost the exact paths which generations of rhinoceroses have used. This has resulted in pits being dug on their accustomed trails by poachers anxious to obtain their horns. I have described the procedure later on.

When travelling through the jungle on their ordinary rounds rhinoceroses move slowly and steadily covering a great deal of ground during the twenty-four hours. But occasionally finding some particular patch of jungle that he likes, a rhinoceros may hang about in the vicinity for some days. They particularly favour the heads of narrow valleys, where they generally have well used wallows, plenty of thick undergrowth and nice precipitous sides to the valley to give them plenty of exercise. An ideal place for a rhinoceros to frequent is jungle so dense, that a man can see nothing within five yards except a wall of forest, and so steep that he cannot walk without holding on to something, which something will almost certainly be thorny. Another delightful type of jungle favoured by rhinos is one interspersed with the large bamboo known to Malays as *buloh semeliang* (*Dendrocalamus giganteus*). This bamboo grows quickly and to a great height. Not having much rigidity, much of this bamboo leans towards the ground while still alive and, on steep hill sides, thus presents an almost impenetrable tangle. But the rhinoceros does not bother about this; he goes under the bamboo letting the tangled mass pass over his back. This bamboo fractures easily leaving an edge as sharp as a razor which will cut to the bone with ease. To follow a rhinoceros along a steep hill side where he has passed under *buloh semeliang* is a very ticklish business and if your party gets through without casualties you will have done well. I have seen an elephant's trunk cut very severely by one of these bamboos when he was rushing down a hill after getting a taint of human scent. But they do not bother the rhinoceros; in fact, nothing, except human scent, seems to worry them. They go about their business without fuss or haste.



To follow rhinoceroses with the hope of making observations or watching their movements is extremely difficult and few opportunities ever come one's way.

There was an old rhinoceros in a very remote part of the Malayan jungle of which I wanted to make an intensive study. I tried to. I followed on his fresh tracks for an accumulative period of forty days, spread over five separate expeditions after him. I heard him three times, was very close to him several times but saw him never. His habits were fairly regular until he became alarmed and then he was the cunningest thing in the jungle. The country he frequented was not high but extremely steep and covered with thorns of many sorts. The worst obstruction was a palm called by Malays *chuchor* (*Calamus castaneus*). It grows in dense clumps to a height of about ten feet, and is very thorny. This palm jungle was interspersed with rattans of several varieties and most of the terrain followed by this rhino, when he was alarmed, was along steep hill sides heavily wooded and covered with *chuchor*. Directly he knew he was being followed he tried every trick known to rhinos to give us the slip. He never stayed for any time in his wallows—to make up for that he wallowed frequently—and he continually made huge circles coming back on tracks about once in two days. One day he came close to a camp which had been used by us two days previously. Some way off, he became aware of the proximity of the old camp and stopped before he came to the banks of the river which separated him from our camping place. He then turned back and went in another direction. His habits seemed to indicate that he was very old. He had a track which measured  $9\frac{1}{2}$  in. across, exceptionally wide for a *sumatrensis*, with short toe nails. He also had little control over his urine, when alarmed he had an almost continual dribble for a mile or two. But I have noticed, on other occasions, that rhinos when alarmed and panicky would do the same thing, but they did not go on for half an hour as this old fellow did. He never ran far but he never seemed to stop. A fast walk which he could keep up for miles defeated us. When we did get up to him and he got away without our seeing him—that was always—we knew that it would be two or three days before we would have a chance of getting close to him again. We used to track him all day, camp on his tracks at night, and off again early next morning; still he defeated us.

His food consisted chiefly of twigs of the trees sought by rhinoceroses, which indicated that his teeth were much worn. Generally they chew up more of the trees they push down than just the slender twigs. He found and demolished large quantities of jungle fruits which were easy to swallow, which he did stones and all, but his digestion was all right because they never seemed to upset him. A favourite trick of his was to get into a river and follow it for half a mile or more; he would then find a place well concealed on the bank and leave the river by climbing over stones or roots or something which would be difficult for us to spot a day or two afterwards. I remember following a rhinoceros which went down to a river and first walked about half a mile upstream,

then about a mile down stream, then back again for about a quarter of a mile upstream to the mouth of a small stream which was full of large stones; he walked on these stones until he was well away from the main river, climbed the bank and disappeared into the jungle. This manœuvre delayed us the best part of a day. The account of following the old rhinoceros has not been an exception to the rule, it is merely a good instance of what the rhinoceros can do when it really tries to get away from the nasty smell of man.

All rhino are very fond of wallowing. As I have already written it is essential for their very existence that they should be able to wallow. Their hides are extremely thick but the epidermis is thin and sensitive and the number of flies that follow them no doubt irritate them and make their habit of wallowing a very natural one. Normally the rhinoceros wallows once or twice in the twenty-four hours, more in hot, dry weather. It is also fond of walking and swimming in the rivers. I have never seen any evidence of them lying down in the rivers although they invariably lie down in their wallows. The wallows are generally situated under a bank, sometimes in a swamp. Wallows under banks are made in such a position, I believe, because the rhinoceros likes to dig into the bank with his horn. This is done, I presume, to make the mud in the wallow of the right consistency, because after heavy rain the mud would be very thin and would probably not stick sufficiently to his hide; so he thickens it up a little by breaking down the bank with his horn or with his fore feet, but more usually his horn. The banks become hollowed out as the illustration shows (Plate V).

Before the days of intensive rhinoceros destruction in Malaya it was possible to find a regular battery of rhinoceroses' wallows in one place, as many as seven or eight would be found under a bank and all in use. At one salt lick in Ulu Pahang, a salt lick well patronized by rhinoceroses in their palmy days, I found no less than five large wallows in a series, almost touching each other. Near another lick were eight. They are no longer used. To adapt two lines of Tom Moore's poetry one might well say:—

The pits are still there

But the rhino have gone.

I have known a rhinoceros which had been disturbed, to wallow as many as six times during the day, remaining only a few minutes in each wallow, rolling about to get himself thoroughly covered with mud and then going on again. In one place, he had obviously thrown himself into the wallow, probably hot and bothered, because the mud was splashed everywhere in the vicinity. On another occasion when following a rhinoceros in very rough country, too rough even for him to find a wallow, he actually tried to wallow in a little stony gully with about two inches of water at the bottom. As a wallow it was not a success. I think that their necessity to wallow must be very great otherwise alarmed animals would not be so anxious to perform the rite. Possibly the sensitiveness of their skin demands a coating of mud, although that is scarcely consistent with their fondness of going through all the thickest and thorniest jungle they can find. Flies certainly



bother them, especially a large unidentified kind of *Tabanus*, with a blue abdomen. They are also attacked by a special type of tick which is the only jungle tick that I have come across which will with ease drive its mandible through thick shikar cloth. Of course compared with rhino hide this feat must be nothing to it, but the ticks which attach themselves to the wild cattle of the Malayan jungles cannot do it. The ticks appear to fall off the rhino long before they are gorged, in fact at times I have seen rhino ticks on the trail followed by a rhino which had evidently not had a meal at all, and yet I believe that they must have come from the rhino's body.

Most of the salt licks affected by rhinos are sulphur springs which are generally situated amongst rocks. These rocks are polished quite smoothly by the animals using these licks. For many years I thought that these polishings were the result of the licking of the rocks for some inherent benefit in the rock itself. I subsequently found out that the rocks are licked to remove from the lips or mouth of the animal a peculiar type of small leech, akin to the horse leech, which lies in the slime of the sulphur water. When an animal puts his muzzle down to drink the leech secures its hold. I first noticed this fact whilst watching a tapir in a sulphur lick and subsequently often saw sambhur deer do the same trick. I have a cine film showing quite clearly a sambhur stag rubbing his lips on the rocks after taking a long drink at the sulphur water. The rocks are also polished by the animals' bodies, as well as in the process of removing leeches from their mouths and lips. It is not surprising that centuries of such contacts have smoothed over all the rocks in the vicinity of a lick.

Rhinoceroses also visit mud-licks which show no exudation of sulphur but probably contain some trace of sulphur or possibly a saline which attracts them. There is I think no doubt but that wild animals visit salt licks for the purpose of cleansing their stomachs and intestines of parasites. Wild cattle droppings will be almost pure mud after a visit to a mud-lick, and I have often come across the dung of elephants slimy and covered with mucus after a visit to a salt lick.

#### SENSES.

The senses of hearing and smelling in *Dicerorhinus sumatrensis* are extraordinarily acute. The enormous nasal cavities surely enhance its power of scent. The habit that this rhinoceros has of curling up its pointed upper lip when testing the wind is no doubt an effort to utilize more of the inner surface of the nostrils in trying to discover the direct line of scent. A rhinoceros, once he has decided that the wind is tainted, wastes no time in getting away and, as I have described elsewhere, he voices his fear in no uncertain manner. I have no doubt but that the rhinoceros relies more on his nose than any other organ to give him warning of danger. His hearing is also very acute, despite the fact that he has small ears which do not look as if they would be capable of catching much sound. The Datok Raja told me that, when

approaching a rhinoceros, on no account to break anything along the side of the trail, except the smallest twig, if it was necessary to mark the route, because a rhinoceros could hear so extraordinarily well that he would be put on guard and would immediately start to test the wind in every direction. This is sound advice although a little difficult to follow along a steep hill side with a thorny rattan holding one back by the lobe of one's ear!

In the dense jungles favoured by rhinos there is little movement in the air, except during a storm, and I have no doubt but that the rhinoceros with his extraordinary powers of smell would detect human scent from almost any direction if sufficiently close to him even on the stillest day. Their sight is poor, in fact probably of little use to them for detection purposes and can be ignored when stalking them.

The rhinoceros has several distinct methods of expressing pleasure, annoyance or alarm and uses both his throat and his nose to give vent to his feelings. It is interesting to know that a rhinoceros when alarmed has a very distinct way of showing his fear as against an extremely truculent demonstration when only suspicious. As I have written already, a suspicious rhinoceros will face the direction where he thinks there is something out of the normal and then give vent to a terrific blast from his nostrils. He may then turn round and trot away a few yards and repeat the performance. It is merely bluff. When he gets a taint of your wind his attitude immediately changes into one of abject fear. Of all animals I think the rhinoceros must hate the scent of man most. Possibly it is due to his being so seldom confronted with it, that to him it is the most horrible smell on earth! Occasionally a rhinoceros when suspicious will turn round and run away without any vocal display, stopping in a short distance to listen intently. It is then very difficult to approach him because he will keep absolutely still and one is liable to almost run into him. But when he gets one's wind the procedure is very different. The animal immediately goes off at full speed in any direction—if facing you he is liable to run straight in your direction—making a noise something between the bark of a dog and the quack of a duck. It is not exactly a squeal but a noise peculiar to a thoroughly alarmed rhinoceros. The intensity of the quacking will generally indicate the distance he will go before he slows up. When hunting in the mountains, I used to despair when I heard a rhino rush away making a series of long and plaintive quacks, knowing perfectly well that it would be days before we would be able to catch him up. On the other hand, if alarmed, he snorts violently and then rushes off; but he will nearly certainly pull up within a hundred yards or so, probably wondering what had disturbed him.

When feeding and quite undisturbed a rhino will continually squeak and talk to himself making some of the noises through his mouth and some with his nose. These noises can be heard for some distance. I have never heard them after a rhino has been disturbed, although followed all day. Apparently he only makes these noises when he is completely at peace with everything. There is a peculiar noise that a rhinoceros makes when in a wallow,



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[T. Hubback

A disused wallow of the Asiatic two-horned Rhinoceros—*Dicerorhinus sumatrensis* (Cuv).

This is a quite distinctive sound and not at all like a rhinoceros. The first time I heard it I was with the old Datok Raja and we could hear a rhino splashing about in a wallow but could see nothing. Presently I heard a noise which I took to be made by a monkey, probably a gibbon I thought. I whispered to the Datok that there was a monkey evidently close to the wallow who had spotted the rhino and that we must be careful that he did not spot us too. The old man smiled and shook his head. 'That is the rhino; they make that noise when enjoying themselves in a wallow.'

I often heard that noise on other occasions and was often hard put to it to believe that it really was the rhino and not a gibbon. The sound was low and rather plaintive, something like the low note of a white-handed gibbon, but also with a faint resemblance to a bird. A noise impossible to describe accurately. Finally a rhinoceros will squeal terribly when dying a violent death, not unlike the screaming of the sambhur deer under similar circumstances, but an even more distressing sound.

In addition to noises which present some sort of endeavour to express its feelings there is a complete series of snorts and grunts and blowings which the rhinoceros sometimes gives vent to when wallowing, probably due to trying to get the mud out of his nose and eyes. But generally speaking, they do not make much noise when settled down in a wallow for a good rest. When lying down on the ground, and probably also in a wallow, they never, I believe, lie on their sides, but fold themselves up with their legs tucked under them.

#### FOOD.

I do not think that *Dicerorhinus sumatrensis* ever graze; I have never seen any evidence of them doing anything of the sort. They eat fallen fruit and so far as that goes do take food off the ground but do not appear to eat grass or roots of any sort. Their principal food is the small branches of certain trees, and bitter or astringent fruits. I have once seen a rhinoceros eating lichen, or possibly some fungus off a fallen tree, but their main food supply is from young trees that they break down. Whereas the other species of large wild life in Malaya will often find food in secondary jungle, the *sumatrensis* invariably feeds only in virgin forest or very old regenerated jungle. They seem to feed indiscriminately, that is to say they do not appear to have any regular hours, although they do frequently sleep during the heat of the day. They may however wallow at any time.

Rhinoceros are particularly fond of trees of the SAPOTACEÆ family, some of which are enumerated below. Other trees and fruits which they eat are included in the following list. The native name is given in brackets.

Trees and Fruit eaten by *Dicerorhinus sumatrensis*.

ANACARDIACEÆ. *Mangifera* sp. (Machang berlawin) fruit eaten.

APOCYNACEÆ. *Dyera* spp. (Jelutong).

EUPHORBIACEÆ. *Sapium baccatum*....(Memaya).

GUTTIFERÆ. *Garcinia* spp. (Kandis); *Kayea Kunstleri* (Gaha).

LEGUMINOSÆ. *Pithecolobium* sp. (Keredas); *Saraca* sp. (Tengelan), flowers eaten.

MYRISTICACEÆ. *Myristica* spp. (Penarah).

MYRTACEÆ. *Eugenia* sp. (Kelat merah, kelat kuning, etc. etc.).

RUBIACEÆ. *Urophyllum* spp. (Manai badak, manai pahit, manai rumpah).

SAPOTACEÆ. *Palaquium* and *Payena* spp. (Nyatoh, several varieties); *Payena costata* (Mengelut or Salut), fruit eaten; *Palaquium Gutta* (Taban merah, etc.).

Of the many species of *Eugenia*, which are common in the virgin forests of Malaya, young trees are often broken down and the smaller branches and leaves eaten. Many trees containing gum or getah are favoured by rhinoceroses. *Jelutong* seedlings they are fond of. The gum from large *jelutong* trees is the principal ingredient of chewing gum. The several species of the shrub *Manai* which grow in patches on hill sides are often eaten down by rhinoceroses which are very fond of the bitter leaves.

The principal jungle fruits that they are fond of belong to the genus *Mangifera*, as well as the fruit of a tree called *Mengelut* or *Salut* which has a thick sticky creamy juice, no doubt palatable to the rhinoceros. Once when following a *Rhinoceros sondaicus* on the coast of Tenasserim, Lower Burma, I found that the animal had eaten large quantities of the bark of a tree, *Ceriops Candolleana* which grows in mangrove swamps and in tidal water. It has a bright orange inner bark and it is, I believe, used for tanning. The urine of this rhinoceros was stained bright orange by the juices in the bark and dried on the leaves like small discs of gelatine.

The rhinoceros obtains most of his food by breaking down small trees, pushing against them with his forehead or chest until the tree is sufficiently bent over to enable him to walk it down by pressing the tree under his belly. Sometimes when the tree is fairly large he puts his fore feet on it to bring more weight into play. He may even hold a tree down by standing on it with his fore feet; I have often seen the marks of his toe nails on the trees that have been broken down.

Having defeated the tree, the rhinoceros proceeds to eat the twigs and small branches. He will move round and round the end of the tree continually altering his position during the process of demolishing the leaves and ends of the branches.

A favourite trick of the rhinoceros when feeding is to get a sapling behind his front horn and twist it round and round until it is thoroughly decorticated and covered with mud from his head. I do not know exactly how this is done never having caught a rhino *flagrante delicto*; but it is generally supposed that this is only done by a rhinoceros which has sufficiently long horns to enable it to twist the saplings between the two horns. I found that this was not the case. In one instance I was following a rhinoceros which had twisted a number of saplings but discovered

later that it had a very poor and stumpy posterior horn. Also, I believed, for the same reason, that a female rhinoceros could not twist saplings and, when following rhino's spoor and finding twisted saplings, I concluded that I was on the track of a male which had a good horn. I disproved this by finding saplings twisted in approved style by a cow rhinoceros which was accompanied by a calf. I do not now believe that the length of the horns has anything to do with the thoroughness of the twistings and such indications are no guide either to the sex of the animal being followed or the size of the horns.

Another favourite trick of the rhinoceros is to rub his horn against smallish trees and take the bark off. This is frequently accompanied by pawing up of the earth at the foot of the tree and the sprinkling of the surrounding shrubs with urine. In this case there is generally some indication of the type of horn possessed by the rhinoceros: an old rugged horn will knock large chunks of bark off; a young horn will merely plane the bark off. Much disturbance in this way to the tree and the ground around it will almost certainly indicate a male rhinoceros. I think that the pawing up of the ground may show that there is some sexual connexion between the rubbing of the horn and the disturbed earth which is spread about in all directions, no doubt some of it being directed against his sheath. Female rhinos do rub their horns against trees in a similar fashion but I have never noticed that it has been accompanied by pawing.

#### GENERAL OBSERVATIONS.

Rhinoceros frequently defecate into water but also on land. I have only once seen a place where a rhino had returned to a particular spot to defecate. Their droppings consist of round balls rather larger than a cricket ball in the case of a mature beast. It is impossible to tell the female from the male fæces. The fæces of an old animal will contain coarse and only partly digested twigs, no doubt due to defective or much worn teeth. Often during the fruit season their fæces are full of the stones of jungle fruits, unbroken but clean of all fibre. Thus does the rhinoceros spread trees, useful to himself and other animals, throughout the jungle. I have often seen young *Mangifera* seedlings growing out of an old accumulation of rhinoceros dung.

A rhinoceros will never defecate in a wallow or a salt lick; at least I have never seen any signs of one having done so. An elephant will defecate in a salt lick and foul the whole place for any other animals, and even seladang (*Bibos gaurus*) are known to occasionally offend in this way.

I am afraid I cannot write much about the young of rhinoceros. I have sometimes come across their tracks but have only once been very close to a rhinoceros calf. All my men saw it but I did not.

We were looking for the tracks of the old rhinoceros mentioned earlier and had been following along a game trail on the top of a narrow ridge. The ridge dipped and then climbed again. I was

ahead with one man, and some way behind were six Malay carriers and behind them six Sakai, the aboriginals of the Malay Peninsula. Presently we crossed a fresh track of what was obviously a large rhino. The lateral toe nails were far apart and I mistook the track for that of the old male. The wide spreading toe nails of this rhinoceros should have indicated to me that they were the tracks of a big female and not those of the old male I was looking for. I had noticed this trait before and think that it is due to the result of an ageing body and flabby muscles of the foot, which may not be so pronounced in the male. I think the track of a large splayed foot may be taken as an indication, but only an indication, when following the spoor of a *Dicerorhinus*, that the animal is a female. The tracks were very new and I sent my companion back along the trail to stop the carriers, natives cannot restrain their chattering and I did not want them to upset the whole business. While my man was on his way back, I heard directly below me the breaking of a tree and then the swishing of some branches. That was the rhino. I started to move nearer the edge of the ridge but before I had gone five yards the rhino became aware of my presence and rushed off. I was well above it and the wind should not have played me such a dirty trick. The animal made a low squeaking noise and ran back towards where my men were. Soon I heard weird noises and then cries of alarm from the Sakai. It all happened too quickly for any of the men to realize what was happening. I had not far to go to find them. The rhinoceros, which was a female followed by a calf, had run right between them. I heard stories of bravery which, knowing their characters, astonished me!

Apparently the rhinoceros having got my scent rushed back more or less on the level until it came out on the game path just in front of my Malays who were plodding along the narrow ridge. The rhino had nowhere else to go so just carried on. The men who had stopped, having heard something coming towards them through the jungle, scattered to each side of the ridge, no doubt looking for suitable trees to climb, but before they could do anything the rhino had passed. The same thing had happened to the Sakai who had rather more time being a hundred yards in the rear and some of them were up trees when the rhino passed them.

What interested me was the calf. I questioned the Malays and Sakai very closely regarding the position of the calf, and those that observed anything more than the bole of a tree told me that the calf was so close to its mother that its head was almost entirely hidden between her hind legs. I extracted this information when inquiring if they had seen whether the calf had any signs of a horn. One of the men said that he distinctly noticed that the calf showed a good deal of hair on it and they all said that the cow proceeded at a slow trot and was blowing hard. They also said, which I confirmed afterwards by examining the tracks, that the calf was not a very small animal.

The route taken by the rhino was a perfectly natural one and was more or less in the direction it was moving when I disturbed



it. But had this incident occurred when I was not there it would have been described as a desperate charge and still another story of the ferocity of the rhinoceros would have come into being. The track of the rhino along the ridge showed that she had followed more or less the centre of the path and, for all she cared, the men might not have been there at all. Her main object was to get away from my smell!

I examined the place where the rhinoceros with her calf had been when I disturbed it. There was a wallow there which was very nearly dry but they had been stamping about in the mud. Here the cow had twisted up a small sapling in approved style. My men had noticed merely a small anterior horn on the cow and no signs of a second horn at all.

The tracks of the calf which were very faint on the ridge were very visible in the drying mud of the wallow and were those of a young, but not very young rhino. It is very difficult to spot the tracks of a calf, when with its mother, as generally it keeps either just in front and so has its tracks covered by those of the larger animals or follows close behind stepping into the depressions made by the mother's feet. The dung of a calf is hardly ever seen; I saw some on this single occasion. It was near the wallow. Datok Raja told me that the mother covers up the dung of the calf with her own dung, and the only way to find the calf's droppings is by moving those of the cow very carefully to see if there are any small-sized *fæces* underneath. I give this for what it is worth; native observations of this sort are not of much value.

The rhinoceros has three toes on each foot. The only other animal in the Malayan jungle that has three toes on its hind foot is the tapir. But the tapir has four toes on his fore foot, so its tracks should not be confused with those of a rhinoceros, but when tracking is difficult, and the fourth toe of a tapir obliterated by the track of its hind feet, mistakes can be made except by experienced trackers. The tracks made by a rhinoceros are not easy to follow. Its large spongy feet press down leaves which spring back to their original level and only faint indications may be left by the toe nails. An old track of a day or two may easily be confused with a new track, especially during dry weather. Heavy rain will almost completely obliterate rhinoceros's tracks at times, and it is often terribly disappointing after a long day's tracking to have a night of heavy rain and know that a long, difficult and tiring day is ahead of one until such time as the rhinoceros has reached some spot, probably miles away, when the rain had ceased.

There is one great help to the tracker and that is the rhinoceros's habit of wallowing. His hide is always dirty. As I have written, the only other animal whose tracks in any way resemble a rhino's is the tapir and an oldish track of a large tapir which had been perhaps partially washed out by rain might easily be mistaken for that of a rhinoceros. Since the tapir never wallows a careful examination of the saplings or trees that the animal has rubbed against will soon show traces of mud or a mud smear if the animal is a rhinoceros.

## POACHING.

If salt licks have been a benefit to the rhinoceros they have also spelt his doom. Their habit of making periodical visits to salt licks has enabled poachers to set traps for them along the many game trails which lead to these licks. In Malaya, there is little trapping of rhinoceroses done now for the simple reason that rhinoceroses are very few and far between. But a few decades ago there was a regular business done in pitting for rhinos and hundreds must have been destroyed.

I have travelled a great deal through what was once rhinoceros country and have found dozens and dozens of old disused pits. Most of them were in the vicinity of salt licks, but some in places where there were well defined trails.

At one lick I found no less than 18 of these pits and I certainly did not find all the pits that had been dug. They were twenty to thirty years old. So many pits indicate a large rhinoceros population. There are none there now at all, although this is in an entirely unopened part of the country. At another well known salt lick I found eleven old pits, but on one side of the lick I did not make a careful investigation. This lick is still very occasionally visited by rhinoceroses, but every year their visits become less. In this lick I found, a few years ago, a shooting platform recently constructed, no doubt with the hope of getting a pot shot at a rhinoceros. At another lick, in quite a different part of the country, about twenty years ago, I found that a fence had been made covering each game trail into the lick and a spring bamboo spear placed so as to command a small opening left in each piece of fence. This was the work of Sakai, an aboriginal predatory tribe who do much damage to wild life in some places.

These pits, of which I give an illustration (Plate VI), were made with much care, every trace of the activity of man being removed. There was no difficulty in finding where to make a pit, because there were numerous game trails leading to these salt licks and, in the old days, these trails were regularly used. Such a pit is about seven feet deep, nine to ten feet long, and three to four feet wide. It is so constructed that when a rhinoceros falls into it he is wedged between the slightly sloping sides of the pit and thus kept from reaching the bottom with its feet. A big animal would thus be tightly held by its own weight and entirely helpless. The chances of its getting out are very small, unless it fell so that it could get its head into the sides of the pit, when it would probably be able to dig itself out. In the north of the Malay Peninsula, I understand, that the pits used were lined with round jungle rollers of hardish timber so that there could be no question of an animal being able to dig himself out, but I have never seen any signs of any lining to any pit in Pahang where most of the pitting took place. In selecting the locality for a pit hard soil was searched for, and generally the pit was made on the side of a hill along which ran a game path. Every particle of earth removed from the pit is carried away for some distance and no trace of it was left near the spot. I think that this was more to remove the

scent from the earth in which the poachers had been working than to avoid the chance of the rhinoceros noticing a change in the landscape, because the rhinoceros has very poor eyesight. A fascine of jungle saplings would then be made and placed over the pit, the entire place being covered up with earth and leaves until it looked exactly like any other part of the game trail. I do not think that the poachers visited the pits very often, the extreme sensitiveness of the rhino's nose making it imperative that as few visits should be made as possible. But, so long as the poacher was satisfied that his work had been good enough to assure the capture of an animal falling into the pit, that was all he cared about. What did he care for the sufferings of the unfortunate animal? From what I have gathered these wretched animals very often starved to death. Under such circumstances only the horn would be taken and if the animal was an immature one quite possibly there was nothing to take at all.

Although the pit was the commonest and the most deadly way of obtaining rhinoceroses other methods were adopted. A platform made in a salt lick was one, but this was, I believe, a not very satisfactory business because in those days there were no electric torches and a rhinoceros would seldom come into a lick during the day time. The *belantek*, the spring bamboo or steel spear, was sometimes used as I have already mentioned, but the device was not so certain as the pit, although other animals,—a deer or a seladang might be thus added to the bag.

The tracking of rhinoceroses was seldom undertaken by poachers, although an experienced hunter, like the Datok Raja, used no other method. In fact he told me that, when persons started pitting in the Negri Sembilan where he lived, he gave up hunting rhino in disgust. He complained bitterly that pits very soon drove all the rhinos out of the district and described with scorn the methods of people who were only capable of getting a rhinoceros by digging a pit for it.

The tragedy of the whole thing lies in the fact that the *Dicerorhinus sumatrensis*, one of the cleverest, cunningest, sturdiest and most harmless of jungle animals should be driven from the face of this earth by superstition and greed. For years, in Malaya, this rare animal has been protected by laws which being ineffective are merely marks on pieces of paper, with the result that nothing practical has been done to try to save it from extermination.

#### COMMERCIALIZED SUPERSTITIONS.

There has been for many decades in Malaya a demand for horns and other parts of the rhinoceros due to the fact that Chinese shop-keepers and others have always been willing to pay big prices for such articles. In fact, I have known of Chinese who financed poachers, or at any rate would be willing to give them credit for provisions for a horn not yet obtained.

This stimulated the business and it went on steadily for many years until the *Dicerorhinus* has been brought to the verge of extermination.

In Northern Pahang, the largest of the Federated Malay States, and the least developed, a tremendous amount of destruction was done to the rhinoceros population at the beginning of this century, despite the fact that from 1896 there was a law in Pahang making it a punishable offence for any person, who was not licensed so to do, to capture, kill or wound any rhinoceros. Not that anyone was either licensed or punished. These poachers were not hampered in any way by an enforcement of the law and the inertness of the Government must be considered as a contributory cause for the disappearance of the rhinoceros.

Many years ago, I had the following conversation with an old Malay on the disappearance of rhinoceros from much of the country where we were at the time. I had been for some weeks trying to locate rhinoceroses but without success.

'What,' I said, 'has become of all the rhinos?'

'I do not know,' he answered.

'Do you remember if there were many here during your youth, because there must have been many at some time or other according to the number of game trails I have seen which were obviously made by rhinoceroses?'

'Yes, there were very many when I was a boy. I remember a man, who devoted all his time catching rhinos in pits, coming here with a sack full of rhino's horns. I have not seen a rhino horn now for years, nor do I know where all the animals can have gone to.'

I had my answer.

That the number of rhinoceroses must have been large, if the old man's story is to be believed, is confirmed to some extent by the numerous trails made by them over the country we were talking about. A rhinoceros game path is different from that of an elephant—sometimes of course they use the same paths—being narrower, as the rhino's footprints continually overlap. Thus they wear a deep furrow down the middle of the path when the track is in steep country. I have seen a trail leading down to a wallow which was six to seven feet deep and much too narrow for an elephant to pass along. But the most astonishing trail I ever came across was in limestone country, where the 'sack full of rhino's horns' came from. Here there is a huge limestone massif, 2,000 feet high, which was often circled by rhinoceroses when travelling that way. In this case a trail passed between two large limestone boulders, both of which were well polished for a height of about three feet. These boulders rested on bed rock,—limestone—and in this bed rock the trail had been worn down a few inches! How many thousands, nay! tens of thousands, of rhino's feet must have passed along that trail?

None pass now, because there are none to pass.

As I have shown in an earlier part of this article, parts of the rhinoceros's body have been used since ancient times for magical rites or as medicine. This has been the main incentive to the hunting and killing of these animals in Asia so as to bring them to the point of extermination. Killing for profit, and large



profits in the case of rhinoceroses, will always be fatal to rare species.

In Malaya the rhinoceros's horn is the chief attraction, Chinese being willing to pay as much as £2 (U.S. \$10) or even more per ounce for the horn or part thereof. The dried blood is also a marketable commodity, fetching 5*sh.* (U.S. \$1) a pound. It is collected and dried on paper, brown paper for preference—it weighs more—then dried over a fire, the resulting blood-soaked paper fetching the above price. But almost all parts of the body are considered valuable medicine of one sort or another, even the contents of the small intestines before they have been evacuated have a value to the medicine seller. The skin, roasted like pork cracknel, is considered a great delicacy. The horn is purchased by Chinese almost solely as an aphrodisiac. I cannot trace when this was first discovered but it is undoubtedly considered now as an infallible stimulant. Whether the effect of taking powdered rhinoceros horn in your tea or other vehicle is psychological or physiological it is difficult to determine, although it is quite possible that the powdered horn has some irritant effect on the generative glands and so produces a sense of virility which is normally not there. On the other hand, substitutes have been used as the following incidents show. Some years ago throughout Malaya imitation rhinoceros horns were hawked around the country by Chinese vendors who sold them to the Chinese medicine shops which are to be found in every small village. These imitations were good efforts to represent a rhinoceros's horn to anyone who had never seen the real thing, and went like hot cakes. The Chinese medicine shopkeepers knew, of course, that they were not rhinoceros's horns, but the ignorant Chinese labourer who felt the want of something to stimulate his desire, did not.

These imitations were made from buffalo horn and shaped like a rhino's horn.

There was one instance where one of these imitation horns was found in a Chinese medicine shop and displayed alongside a genuine rhinoceros's toe nail; just to show that there was no deception! These were seized by the Police who did not realize the difference between a real and a genuine horn. I saw the Chinese medicine man and asked him what he meant by having in his possession a rhinoceros's horn without a permit. The law requires one to have a permit. He immediately said that it was not a rhinoceros's horn at all. I explained that such was no news to me but he had apparently been selling shavings from this horn as rhinoceros horn and what was he going to do about it? That rather puzzled him. However I switched off on to the rhino's toe nail and he had a perfectly satisfactory explanation for that. However I warned him that he might still be prosecuted for cheating and the nail and horn would be held as exhibits.

Now, to finish this story I should have a string of satisfied or dissatisfied witnesses who testified to the efficiency or otherwise of the false horn. Unfortunately they were not forthcoming so the conclusion is incomplete. But the fact remains that this faked horn business was for some time quite a good line for the medicine

shop-keepers, so possibly the superstition may be founded and supported on psychology only.

Malays attach all sorts of qualities to the rhinoceroses' horns which are merely childish. One is that a deep seated thorn can be extracted by rubbing the sore part with a rhinoceros's horn; another is that a severe stomach ache or any other ache can be relieved immediately by the application of a rhino's horn to the affected part, and so on. They are never willing to substantiate their claims by a demonstration—the horn is never forthcoming.

Still, these legends persist and so long as they persist and so long as there is no serious attempt to tackle the problem of how to preserve the rhinoceros for posterity, the *Dicerorhinus sumatrensis* is doomed.

In Malaya the *Rhinoceros sondaicus* is on the verge of complete extinction due to these superstitions and the failure of poor efforts to conserve it.

#### POSTERITY.

What will Posterity say of the present generation which is allowing, in many parts of the world, the fatal progress of the extermination of species, while professing an anxiety to save such species for future generations?

Unfortunately in the present state of our civilization those who have most to say are frequently those who know the least about their subject. Wild Life Conservation is no exception to this unfortunate state of affairs as all true conservationists will agree.

*Dicerorhinus sumatrensis* is on the threshold of a position that will inevitably cause it to disappear. I do not suggest that the last of its race will necessarily die a violent death but, due to disturbance and lack of proper facilities to enable them to exist under congenial and natural conditions, they will not breed.

The *sumatrensis* is, I believe, a long-lived species, and as such there will be for many years a solitary one or two left in remote places, which the opponents of proper conservation, and there are many of them, will point to as evidence of the adequateness of the futile arrangements, mostly on paper, that have been made for their salvation.

In the new Wild Life Protection Act, 1936, Burma, which might be considered as the last word on Wild Life Protection, the killing, taking, importation or exportation of rhinoceroses or any part thereof, is prohibited, although there is a provision to enable the Local Government to give special licences to do some of these acts for scientific purposes.

This sounds as if the rhinoceros was very well protected but unfortunately a proviso has been inserted in the Act which reads as follows:—

‘Provided that it shall not be an offence for any physician or druggist to possess or sell or for any person to possess for private medical purposes rhinoceros blood or any preparation thereof: . . .’

How anyone can become possessed of any part of a rhinoceros when all killing and hunting of that animal is prohibited, when all

import of the animal or any part thereof is prohibited, and still keep within the law, seems problematic. Why therefore insert a clause which seems to provide a very large loophole for illicit dealings in rhinoceroses' blood which means dead rhinoceroses?

Possibly the Local Government anticipates the giving of licences to such persons as those mentioned above to possess 'for scientific purposes', and if so the trade in these objects will not be stopped.

Possibly the difficulty will be overcome by substituting buffalo's blood for rhinoceroses' blood and so placate Public Opinion which appears to have been responsible for the loophole in this Act.

But it does not help the preservation of rhinoceroses which are now far too rare to be dealt with in any other way than by complete and adequate protection.

To save them from complete extinction, the only hope that remains for the rhinoceros in Malaya, and I think I may add in Burma, is to constitute inviolable sanctuaries in their own habitat where a suitable environment is known to exist. These sanctuaries must be properly guarded and freed from human interference and severe penalties should be provided for any breaches of such laws as are enacted to make these places real refuges for the rhinoceroses in them.

There must be no loophole in the Act such as there is in the Burma Act. Whatever superstitions there may be connected with the rhinoceros, it must be recognized that these superstitions have brought all species of the Asiatic rhinoceros to the verge of complete disappearance, and, unless steps are taken to make it practically impossible to continue to commercialize these superstitions, then we must realize that we are impotent to save the *Dicerorhinus sumatrensis* from extinction.