

WILD ANIMALS OF BURMA

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RHINOCEROSES

There are five living species—two African and three Asiatic. The two African species are the African Black rhino and the African white or Square-lipped rhino. Both of these are two-horned.

“The Black Rhinoceros of Africa is the most common rhinoceros today. Although it has been exterminated in much of South Africa, it is still found in goodly numbers in Tanganyika and Kenya. This animal seems to prefer the dry open country, but it also enters the mountainous forests to some extent. It never is found far from water, for it delights in mud baths. This animal is a browser, feeding on the leaves and twigs of certain trees: it seems to prefer the thorny acacias. The pointed upper lip is of great assistance in pulling food into the mouth. Like all the rhinoceroses its eyesight is poor but its sense of smell and hearing is acute. It is the most pugnacious of the rhinos and will sometimes charge without provocation.

“Unlike the black rhinoceros, the white rhinoceros is a grazer, preferring the open grassy country. It is more social than the black rhinoceros, small parties associating together. It is also of a much more peaceful disposition. In walking, it holds its heavy head very low, the nose almost touching the ground.” Mochi, U & Carter, T. D. (1953).

“The White or Squared-lipped Rhino, the second largest terrestrial mammal of Africa, was made known to science by W. Burchell in the year 1817. He first came across it in which is now the Northern Cape Province in 1812 and named it in a description published in a French journal in 1817. Two subspecies are recognised, a Northern one found in the Southern Sudan and adjacent parts of the Congo and Uganda, and a Southern one, the Zululand White or Square-lipped Rhino occurring in Zululand. The latter was saved from extinction by the measures taken in Natal since 1897 to preserve it.” I.U.C.N. Bulletin. New Series No. 12 July/September 1964: p. 5).

All of the world's five species of rhino are in peril of becoming wiped out by man; and because of this danger a world committee has been appointed to try and save them from extinction.

The African Black (or Hook-lipped) rhino are now believed to number 13,500 while the African White (or Square-lipped) are fewer, about 1,700. The number of black rhinos living in 64 zoos is 57 males and 62 females and record of captive breeding is 20 in June 1964.

The number of White rhinos living in 10 zoos is 10 males and 12 females and the record of captive breeding is 1 in June 1964.

“The three Asiatic species belong to two quite different genera, both distinguished from the African forms by, among other characters, the presence of incisor teeth. The genus *Rhinoceros* includes two species, the Great Indian (*R. unicornis*), and the Javan, or Lesser One-horned (*R. sondaicus*). Apart from the single horn, both species have the skin arranged with deep folds crossing the sides of the neck, behind the shoulders, and over the hind quarters. The Indian is the second largest species of rhinoceros, and is probably very slightly smaller than the White.

“The Indian rhinoceros is the largest of the rhinoceroses found in Asia. Its strange form, ungainly head, thick skin with the numerous folds and the horn on the nose, make one think of some prehistoric creature. Indeed it is a creature from the past, for fossil remains found from the Pliocene and Pleistocene eras show that at one time the rhinoceroses were much more common than they are today and that there were many more kinds. They were found in Europe, Asia, Africa and North America. Formerly the Indian rhinoceros was found throughout most of India; but now its range is limited.

"The two lower incisor teeth of the Asiatic rhinoceroses are sharply pointed tusks which are too small to be visible when the animal's mouth is closed; but it is with these tusks that the animal does its fighting and not with its horn as many people suppose. The African rhinoceroses do not have such tusks, and their horns are their weapons. The horn of the rhinoceros is made of solidified hair-like fibre which grow from the skin. When the animal is skinned, the horn can be removed from the skull with the skin since it is not solidly attached.

"The Javan rhinoceros looks very much like a small Indian rhinoceros, but the texture and the fold of the skin on the fore shoulder serve to distinguish it. In the Indian rhinoceros this fold has a backward sweep as it reaches the upper shoulder, but it does not quite join the fold that continues over the back just behind the shoulder. This backward sweep of the forward fold gives the shoulder "plate" the appearance of a triangle. In the Javan rhinoceros the front fold extends up over the fore shoulder continuously to the opposite side and is more or less parallel to the fold of the rear shoulder. The female differs from the female Indian rhinoceros in that it has no horn. The Javan rhinoceros is at the present time one of the rarest of animals. From its former extensive range it is now restricted to a few isolated spots. The Javan rhinoceros prefers thick jungle and is even found in the mountainous forests. Like the Indian rhinoceros it spends much of its time wallowing in the mud and water and often these characteristic mudholes reveal its presence.

"The Sumatran rhinoceros has shared almost the same fate as the other Asiatic rhinoceroses. The incessant hunting of the animal for its horns has wiped it out from most of its original range.

"The Sumatran rhinoceros lives in dense mountain forests and in former years wore deep trails along the mountain sides. The thick cover makes it a difficult animal to hunt, but the natives dig pits in the trails and in this way capture the animal. Like the other Asiatic rhinoceroses it makes deep wallows in the mud where the natives wait for its coming. The young Sumatran rhinoceros is covered with curly brown hair, but this disappears as the animal grows older." Mochi, U & Carter, T. D. (1953).

"The Great Indian One-horned Rhinoceros (*Rhinoceros unicornis*) and its relative the Smaller One-horned, or Javan Rhinoceros (*R. sondaicus*) have an obscure genealogical history. No representatives of these true and typical rhinoceroses have been discovered anywhere but in south-eastern Asia. Their remains are not found in the more ancient Siwalik beds. But they appear with relative suddenness in the uppermost and more recent beds in the form of two species known as the Siwalik Rhinoceros (*R. sivalensis*) and (*R. paloeindicus*), the ancient rhinoceros of India.

"The Asiatic Two-horned Rhinoceros (*Didermocerus sumatrensis*) was on the other hand widely distributed in the past. It was quite abundant in the Siwalik Hills in Pliocene times. It was a geological period when these animals, favoured by a genial climate, inhabited a broad forest belt which stretched from the east coast of England southward and eastward across southern France and northern Italy to India.

"All the living rhinoceroses are included in a single family. Their massive build, the thickness and solidity of their bones, their short stumpy legs each furnished with three toes are some of the family characters. The skin in all the living forms is either thinly clad with hair or naked, and in all the Indian species the heavy hide in places is thrown into deep folds. The nasal bones are enlarged to serve as a support for a single horn or double horns. When two horns are present they are situated one behind the other in the middle line of the snout. The horn is formed of a closely-matted mass of horny fibre issuing from the skin. It has no connection with the skull, although a boss of bone in the skull may serve as its foundation." Prater, S. H. (1965:228-9).

GREAT ONE-HORNED RHINOCEROS OR INDIAN RHINOCEROS

Rhinoceros unicornis Linnaeus

Description:

"Largest of the Asiatic rhinoceroses, this great animal reaches a height of over 6 feet at the shoulder and a length of more than 14 feet. The weight of a large adult may be as much as 2 tons. There is a single horn, thick at the base and often quite blunt, probably averaging 8 to 9 inches in length; specimens with horns up to 2 feet long have been taken. The thick hide hangs in great folds at the neck, shoulders and hindquarters, giving the appearance of armour plate. A fold in front of the shoulder does not continue all the way across the back of the neck, as it does in the slightly smaller Javan rhinoceros. Like the Javan, there are folds continuing across the back behind the shoulder, in front of and across the thigh and around the neck. The legs merge from beneath other folds, looking far too slight for the weight they must carry. The legs, the flanks and occasionally the sides of the body, are studded with large, round, rivet-like tubercles which further add to the armoured appearance. The skin is hairless, except for a fringe of hairs on the ear tips and tail. As with other rhinoceros, the color usually is determined by the mud of its most recent wallow. The unusual individual that happens to be clean, perhaps just having swum a river, is brownish gray with a very slightly pink or reddish tinge to the edges of skin folds, ear and nostrils.

"The only animal with which the Indian Rhinoceros could be confused is the Javan Rhinoceros, as both of the African species and the other Asian one (*Didermocerus sumatrensis*) have two horns and a relatively smooth hide. The Javan rhino is a little smaller than the Indian, has usually a shorter and slighter horn, and has the transverse fold of skin in front of the shoulders extending all the way across the back of the neck. The Indian rhino appears the more massive animal, partly due to its great depth of body." Talbot, L. M. (1960:187).

Habits:

"Some people say it is slow of hearing and short-sighted, but I am not so sure of this.

"I myself think that it is generally slow-witted and foolhardy. Most wild animals in India instinctively run away from danger and seek concealment in thick cover. The blundering rhino does the opposite. It continues grazing till danger is quite close, and then instead of retreating and hiding it is liable to expose itself still more by charging. Also it has the habit of depositing its dung at certain fixed places, and a would-be slayer can wait for a rhino at one of these large dung heaps, to which the animal finally approaches backwards.

"Although the rhino is a solitary creature, I have seen as many as seven of them all together in one wallow; but these came from different directions and departed from the wallow, when disturbed, in seven different directions.

"Several writers on animals have described the Indian rhino as only uttering one noise, a grunt! I have heard four different noises: a roar or a bellow when newly captured, a snort when excited or disturbed, a grunt when not disturbed and a peculiar whistling sound at the time of courting and mating. I think it is the female which makes this whistling sound, while the male grunts; but I notice that several sportsman-writers of the old days have described a whistling noise made by a mortally wounded rhino." Gee, E. P. (1964:158).

"The animal is solitary as a rule though several may occupy the same patch of jungle. Its food consists chiefly of grass.....Breeding takes place at all times of the year. From observation of animals in zoos it would appear that the male undergoes a period of "heat" as does the female, and these periods must coincide before mating can take place. Mr. E. P. Gee gives four records of these animals observed mating in the wild state. All four

incidents occurred between the end of February and the end of April. He also records the instance of a newly born female found dead on the 22nd of April. The period of gestation is 19 months. In Nepal it is believed to be one year. A fully developed calf taken from the uterus measured 4 ft. 1 in. (124 cm.) and scaled 120 lbs. (54 kg.).

"Many legends and beliefs are attached to this animal. In Europe during the Middle Ages, its horn was generally believed to have peculiar medicinal virtues." Prater, S. H. (1965:230).

"For the first time in the history of Zoological gardens, in 1956, the breeding of *Rhinoceros unicornis* succeeded in that the Basel pair became the parents of "Prince Rudra" on September 14. This first born, a male, weighed at birth 60.5 kilos. (Note: 1 Kilo = 2.2 lbs). Already after one hour, he stood up on his feet, and another hour later he started feeding on his mother's milk. Herewith the ice was broken, and the following year the Whipsnade Zoo announced the birth of the second rhino, a female *unicornis* born on October 30, 1957. Harold Tong, the Zoo's director has given the following particulars about the birth. When the keeper came to the rhino's quarters in the morning, the baby was already on its feet and sucking the mother's milk. Unfortunately, this animal was so bad-tempered that the baby's weight could not be registered. Because the mating of the pair had not been observed, one calculated the gestation-period from the last "heat in the female and got the number of 488 days, whilst in Basel one counted 474 days."

"Also Basel's female became in "heat" again and on April 26, 1957 mating was observed. When in the early morning the bull was let in with the cow to their huge out door enclosure the two animals charged right across the entire length of the grounds clashing together violently. Now ensued a wild pursuit and finally the two giants stood side by side expressing their fondness for the rest of the day. The female obviously played the more active part and in the afternoon we had the impression that the bull was tired of her constant advances. However, when the Zoo closed its gates and the visitors disappeared he woke up and shortly before 8 p.m. the mating took place which lasted for 54 minutes. Since then no other "heat" has occurred. In the afternoon on August 17 the birth took place. We registered its weight at birth with 67 kilos.

"Already with the first born male and now again with the female rhinoceros we noticed a surprising increase in body weight which was so far quite unknown in such large animal-species. We registered a regular daily increase of 2-3 kilos which doubled the birth weight within 34 days." Lang, E. M. (1959:15-16).

In the only previously known instance of an Indian rhino born in captivity (Calcutta Zoo, see *J. Bombay nat. Hist. Soc.* 31:1031,—1927) the gestation period was estimated as about 19 months.

For the African Two-horned Rhinoceros (*Rhinoceros bicornis*) the period of gestation is given as 530-570 days (The Natural History of Mammals by F. Bourliere, 1955:165).

According to the Red Data Book published by the Survival Service Commission, I.U.C.N. in January 1963 the breeding rate in wild is "One calf every two or three years."

This rhino has long been known to the western world, specimens having been shown as far back as the period of the Roman Empire.

The Great Indian Rhino lives longer in captivity than any of the other species.

The longevity record for a single specimen is forty-seven years, and is held by a female which was shown in the Zoological Garden at Alipore, Calcutta, India for two years, after living forty-five years in a private menagerie.

Estimated Numbers:

Red Data Book. January 1963.

India — 440

Nepal — 160

Number in zoos: 14 males and 12 females living in 18 zoos.

Records of captive breeding—7 (Minutes of a meeting of the Survival Service Commission. Sunday, 21st June, 1964.)

A female name "Rosie" was presented by the Prime Minister of Nepal to the Zoological Gardens, Rangoon, when Sir Harcourt Butler was Governor of Burma. This rhino was killed when Rangoon was occupied by the invading Japanese army in March 1942. Capt. Rangoon

Occurrence:

"If the Great Indian Rhinoceros ever inhabited Burma, its range by the late 1800's was probably limited to the areas adjoining Assam and Bengal." Talbot, L.M. (1960:188).

Present; In February 1962, a small group of rhinos about 6-8 animals was discovered on the lower slope of Bumpha Bum, Sumprabum Sub-division, Myitkyina district. U Ding Ra Tang, Chairman, Kachin State Affairs Council who comes from the area says "They are the Great Indian Rhinos which had wandered east from India." described

Legislation:

Completely protected.

LESSER ONE-HORNED RHINOCEROS OR JAVAN RHINOCEROS

Rhinoceros sondaicus Desmarest

Local Names:

Burmese — *Kyan, Kyan-Sin,*
Meeza Kyan

Description: "It is about a third smaller than *R. indicus* from which it is readily distinguished by having the tubercles of the hide uniformly of the same small size, and also by having a fold or plait of the skin crossing the nape, in addition to that behind the shoulder-blades. In *R. indicus* the corresponding fold does not thus meet its opposite, but curves backward to join—or nearly so in some individuals—the one posterior to the shoulders." Blyth, E. (1875:50).

"The Javan Rhinoceros looks much like a slightly smaller edition of the Great Indian Rhinoceros. Males may be 5 feet 10 inches high at the shoulder and females 5 feet 6 inches approximately 6 inches lower than the Great Indian Rhinoceros. The Javan is said to be of slighter build than its Indian relative, but from personal observations at close range of both animals in the wild, I find it difficult to detect much difference between them in size, although the Javan rhino appears to have a slightly less deep body than the Indian.

"The obvious points of distinction between the two rhinos are the horns and the body folds. While the Indian rhino has a prominent horn which attains a length of 2 feet, and both sexes are conspicuously horned, the male Javan rhino's horns may be only slightly over 10 inches in length; the female's horn is very slight or totally lacking.

"Both Indian and Javan rhinos have prominent folds in the hide across the back, over the withers, and behind the shoulder. In addition to those, the Javan rhino has a similar fold just in front of the shoulder. Reports state that the skin is broken into scaly mosaic by small cracks (the Malay name "badak tenggiling" means scaly rhino) but these were not evident on the wild specimens I saw even at 5-6 yards range." Talbot, L.M. (1960:204).

"According to Lydekker the most authentic measurements of the height of wild specimens of this rhinoceros are those of a male and female which stood 5 ft. 10 ins. and 5 ft. 6 in. at the shoulder respectively. The male possesses a single horn whilst the female frequently if not invariably has none. Male horns of between 10 and 10½ ins. in length are recorded. The skin is dusky-grey, devoid of hair and divided by cracks into small polygonal scale-like discs. Owing to the absence of the deep groove on the rumps possessed by other rhinoceroses the tail of this species stands out quite distinct from the hind-quarters so that its whole extent is exposed in a side view." Smith, H.C. (1935:46).

Habits:

Rhinoceros sondaicus is found at all elevations, as remarked of it by Dr. Horsfield, in Java; and from the mountains of Palouk, thirty miles north of Mergui, a writer quoted by the Rev. F. Mason observes—"we were on the summit of the highest range of mountains in the provinces. The tall timber trees at the first ascent were dwindled into a thick growth of stunted bushes, unmixed with a single shrub. The path, which was narrow and steep, had reached a level spot, that had been in the rains the wallowing place of a rhinoceros; for it has the habit of wallowing in the mire no less than the hog and the buffalo." Blyth, E. (1875:51).

"The Javan rhinos are so rare and secretive that even less is known of their habits than those of the Sumatran rhino. They have wallows which Mr. Hoogerwerf states they may use for from several days to a month, before moving on to another. These wallows appear much like those of the Sumatran rhino, some even being located on hill sides, although never in as steep a situation as some of the Sumatran examples. I found one fresh one on hill side in dense jungle. It measured 12 feet by 6 feet. Along the well-worn path to it was a tree, about 4 inches in diameter, with its bark worn smooth to a height of 5 feet. Apparently it is used as a rubbing post. Mr. Hoogerwerf states that these rhinos do not use their feet for digging wallows and he believes that they may enlarge pig wallows or natural depressions. He thinks that the animals are territorial to some extent, at least to the degree that they have established centres of activity, though they roam considerably through other rhino's areas. There are well established rhino paths leading into streams and rivers, smooth sided trenches several deep in places. But like the Sumatran, the Javan rhinos show considerable agility in scrambling up steep banks and over or through obstacles.

"As with other species of rhino, the Javan's eyesight seems rather poor, while the sense of smell and hearing are acute. None of the six animals I closely approached seemed to recognize me as a human being by sight, and I was within 5 meters of one female with a baby! When disturbed from the down wind side, the rhinos snorted and made short dashes cross wind through the jungle growth, possibly in an attempt to pick up my scent. When this failed, they would rush off directly up wind.

"For forage the rhino seems to choose *tepus* (*Nicolaia* sp.), young bamboo of various types.....To get at the leaves, twigs, and possibly fruits of same trees the rhinos merely pushed them over. Judging by the tracks they accomplish this by leaning a shoulder on the tree, and then, as it starts to give way, they walk up over it forcing it down between their front legs. In this manner they had pushed down trees up to 6 inches in diameter and over 20 feet high". Talbot, L. M. (1960:211-212).

"This rhinoceros is popularly supposed by certain natives to devour fire. It is said to charge when wounded or cornered with its mouth open using its teeth instead of its horn as weapons of offence." Smith, H. C. (1935:46).

The Javan rhino is not known to have bred in captivity.

"Breeding rate in wild: No precise data, but probably a single calf every third year. (Red Data Book. Survival Service Commission. I.U.C.N. January 1963).

Occurrence:

Once probably fairly plentiful in several parts of Burma, this rhinoceros was realised as being in danger of becoming very rare early in the present century. But it was not until about 1927, partly as a result of the activities of Thai poachers near the Sittang river, that the Forest Department became seriously alarmed and decided that special measures would be necessary if the species was to be saved from extinction. These measures included the formation in 1928, of a sanctuary some sixty-two square miles in area designed to protect the survivors of this rhinoceros in Burma; This was known as the Kahilu Sanctuary. Unfortunately it was established too late. A thorough investigation of this sanctuary conducted in 1938 by the late Theodore Hubback, showed that some at least of the rhinoceros inhabiting the Kahilu belonged to the Sumatran (two-horned) species.

In 1940-41 the Game Warden (C. E. Milner) stated the rare *Rhinoceros sondaicus* no longer existed in the sanctuary. About January 1954, one Javan rhino was shot by Mon insurgents on the Tenasserim Yoma in the Northern part of Tavoy district bordering the Amherst district. (*J. Bombay nat. Hist. Soc.* 53: 257-8).

According to the Co-ordinating Secretary, Regional Working Group on the Conservation of Nature and Natural Resources in Tropical South East Asia, a gang of Karen poachers of uncertain citizenship yearly crossed over the Thai-Burma border to hunt

rhinos in the Burma side. This gang came across one male Javan rhino in 1958, killed a pregnant female Javan rhino in 1960, and came across one Javan rhino in 1961. Conservation News, S. E. Asia. No. 3. August 1963. p. 23.

It is possible that there may still be a few animals surviving in the northern sector of the Tenasserim Yoma which falls within the Kawthulei State and Moulmein (Old Amber) district, Burma.

Today, the Ujung Kulon Reserve in the western extremity of Java is the main place where this species exists. According to the Red Data Book issued in January 1963 by the Survival Service Commission. I.U.C.N. the estimated number is 24-50.

"It was said in the report of Dr. Lee Talbot who has made a survey on its status at Ujung Kulon in Indonesia very recently that there were still a few dozens of Javan Rhinos there. All of them were full grown ones, but they had not even one young. This is a problem to be solved." Conservation News, S.E. Asia. No. 5. January 1965. p. 45.

This rhino, on the very verge of extinction, is the rarest of the rhinos and has been exhibited less than any other species.

The longevity record is held by a male which lived in the Zoological Gardens of Adelaide, Australia for approximately twenty-one years.

Legislation:

Completely protected.

ASIATIC TWO-HORNED RHINOCEROS OR SUMATRAN RHINOCEROS

Didermocerus sumatrensis Fischer

Local Names:	Burmese	<i>Kyan</i>
	Kachin	<i>Dun</i>
	Karen	<i>Ta-do, Ta-do-khaw</i>
	Malay	<i>Badak-ryia</i>
	Shan	<i>Sawon, Song</i> (Grose)

"Under Sumatran Rhinoceros I am including the Sumatran Rhinoceros of Borneo and Sumatra, *Didermocerus sumatrensis sumatrensis* (G. Fischer); the Chittagong or Hairy-eared Sumatran Rhinoceros of Bengal and Assam, *Didermocerus sumatrensis lasiotis* (Buckland), and the Malaccan Rhinoceros of Burma, Siam, the former French Indo-China, and the Malay States, *Didermocerus sumatrensis niger* (J. E. Gray)." Talbot, L. M. (1960:169).

"There is some question whether there is more than one true species of Asiatic Two-horned Rhino. The typical form is the *Didermocerus sumatrensis* which has long been known to science as the form from the islands of Sumatra and Borneo and the Malay Peninsula. It is commonly referred to as the Sumatran Rhino. In 1872 an Asiatic Two-horned Rhino arrived in London from Chittagong, India and created quite a sensation because it was so different from the typical form. It was named *Didermocerus s. lasiotis* and commonly called the Hairy-eared Rhino. The latter is said by some to be a separate species larger than the typical form, and replacing it in the northern mainland range of the Asiatic Two-horned rhino. It is thought at the present that *lasiotis* is not a true species but a sub-species or northern race of this rhino." Reynolds, R. J. (1960).

Description:

"The Sumatran Rhinoceros is much smaller than the preceding species with a harsh and rugose skin, which is black, and clad with bristly black hairs, the ears less widely separated at base, and filled internally with black hairs, the muzzle anterior to the nasal horn much broader, and the tail conspicuously longer, tapering, and not tufted at the end. Horns attaining considerable length, and curving but slightly backwards, as represented in Journ. As. Soc. B.

"This is the ordinary two-horned Rhinoceros of the Tenasserim provinces, extending into Siam, and southward throughout the Malayan peninsula and Sumatra; but in Borneo there would appear to be a still smaller species, which is referred to the same by Professor H. Schlegel. How far northward its range extends has not been ascertained, but I suspect that it does not occur in Arakan." Blyth, E. (1875:52-3).

"This is the smallest of the living rhinoceros. Height at the shoulder may be from 4 to 4½ feet; length from snout to root of tail, 8 to 9 feet. There are two horns, the anterior one generally under a foot long (there is one 19 inches long from Sarawak and a 32½ inch one in the British Museum of Natural History), the posterior 2 to 4 inches. The posterior horn is often quite small, especially in females, and from a distance it may appear to be missing entirely. This probably gives rise to the numerous reports of "One-horned rhinos" from areas outside the present range of either the Indian or the Javan rhinoceros. Unlike the Javan and Indian rhinos, whose skin, appears to be made of armor plates, the Sumatran rhino's hide appears relatively smooth, with a conspicuous fold just behind the shoulder. On closer examination, the surface of the skin is seen to be quite rough and, in young animals at least, is thinly covered with short hair. The color and density of this hair varies with

the geographic locality. Indonesian specimens being generally grayer and less densely covered with hair than those from the mainland. Judging from the few pictures of Sumatran rhinos that exist, their hair covering is not very conspicuous." Talbot, L.M. (1960:169).

"The smallest living rhinoceros and the most hairy. The average height is 4 ft.—4 ft. 6 ins. at the shoulder. The skin is finely granular and earthy-brown to black in colour. Most of the body is thinly clad with hairs of some length, the ears and tail being especially hairy. Folds are present but they are less marked than in *R. sondaicus*. The weight is estimated at about 2,000 lbs. Two horns are present in both sexes. The average length of the front horn of males is probably about 8 ins. and that of the back horn about 3 ins. The posterior horn is often a mere knob. Horns of females are considerably smaller. Lydekker mentions that the longest known specimen of the front horn is in the British Museum and has a length of 32½ ins with a basal girth of 17¾ ins." Smith, H. C. (1935:47-8).

A male Two-horned Rhinoceros shot by E.H. Peacock within Shwe-u-daung Game Sanctuary on 27 October 1930 measured between pegs 9 ft. 5 ins. in length and 4 ft. 5 ins. in height. The front horn measured 7 ins in length along the curve from base to tip. The tracks are a shade less than 8 in. (1931, *J. Bombay nat. Hist. Soc.* 35:447).

Habits:

"Their most acute sense appears to be that of smell, and, I think they rely much more on it than sight or hearing. Making a certain amount of noise, walking through the jungle, will not always disturb them, and they assuredly are not very quick of sight, but the faintest puff of wind is more than enough." Evans, G. H. (1905:558-9).

"This animal has a very keen sense of smell, its eyesight and hearing being moderate. It is said to be an active and dangerous beast when wounded, otherwise it is shy and inoffensive and endeavours to avoid man. It is extremely agile and the more difficult the country the more it seems to like it. It appears to descend steep hillsides by sliding. When alarmed it can move at a smart gallop. It can swim well. These animals are great wanderers, covering long distances for no apparent reason." Smith, H. C. (1935:48).

In 1940 the Game Warden (F. J. Mustill) had an excellent view and photos of a rhinoceros in its wallow were obtained at a very close range in Kahilu Game Sanctuary. Mr. Mustill writes "The behaviour of the rhino seen by the writer confirms the previous impression formed on these animals, namely a very poor sense of smell and sight and a general lack of wariness which is so apparent in other game animals." (Annual Report on Wild Life Preservation in Burma for the year ending 31st March 1941).

When wallowing this rhino is said to make a series of snorts, grunts and blowings, after which it may settle down to a low humming or buzzing sound which can be heard some distance away. A kind of grunt or harsh blowing sound apparently indicative of anger or fear is uttered when charging. When suspicious of danger it will give a terrific blast from its nostrils.

"These rhinoceroses are not great grass-feeders but prefer to browse on leaves, twigs, shoots, etc. and they seem very partial to fruits.

"In the dry season the stomach generally contains wild mangoes, figs (*Cicca macrocarpa*), leaves of trees and bamboo leaves.....The twigs, shoots and leaves of the bamboo are also freely partaken of, no doubt those of the most plentiful variety of bamboo growing in their haunts. That found in the stomachs of two animals was that of 'Kayin-Was.' Evans, G. H. (1905, *J. Bombay nat. Hist. Soc.* 16:558.)

"They are evidently largely ground feeders, a number of large citrus fruits resembling oranges, merely bitten in half and swallowed, being found in the stomach of the specimen shot. With the exception of these, the stomach contained green vegetable matter, probably the fallen leaves of the same tree. They may also feed on bamboos, but in their feeding places there is not the same amount of broken down vegetation as there is where an elephant has been feeding." Shortridge, G. C. (1915, *J. Bombay nat. Hist. Soc.*: 23:772).

"It seems to relish the tender shoots of certain thorny plants and the leaves and shoots of the *wathabut* and *kayinwa* bamboos. It is said by Burmans to rush at and devour fire and also its foes." Smith, H. C. (1935:48).

"*R. sumatrensis* spends most of its time in the heaviest forest it can find and only occasionally climbs into the open grass-clad ridges and spurs which are a feature of the Sanctuary (Shwe-u-daung) at elevations above 4000 feet." Peacock, E. H. (1931, *J. Bombay nat. Hist. Soc.* 35:447).

In 1933 a forester reported he had seen two rhinoceroses mating in the Kahilu Sanctuary on the 19th July 1933.

Theodore Hubback also saw a pair of *D. sumatrensis* mating in Malaya, but does not mention the day or month.

"A. D. Bartlett (Procs. Zool. Soc. London 1873:104-6) records the birth of a calf. From observations recorded in this case, the period of gestation would seem to be about thirty weeks. The newly born calf was 3 feet in length, 2 feet high and weighed a little over 50 lbs." Theobald, W. (1882:453).

Dr. M. K. Boorer *in litteris* (August 1964).

"Sanyal, R. B. 1892. Handbook of the management of animals in captivity in Lower Bengal, Calcutta. Refers to hybrid *sumatrensis lasiotis* bred in the Zoo. No gestation given. Born 30 January 1889. Was as big as the mother (*lasiotis*) at two years seven months but still suckled sometimes.

"Thom, W. S. 1943. *J. Bombay nat Hist. Soc.*: 44:257-74. Gives opinion that *sumatrensis* breeds at 20 years, gestation 7 months. I don't believe either figure. One is certainly too long and the other probably too short.

"Ulmer, F. 1958. *Amer. First Zoo.*, 10: No. 3. States his belief that Bartlett's estimate of gestation at 8 months is too short. Suggests 16 months.

"Evans, G. H. 1905. *J. Bombay nat. Hist. Soc.*: 16:555-61. Says he has only twice seen tracks of young each time in January.

"From the above evidence, which is admittedly far from strong, it seems possible that mating takes place in the middle of one year and birth is towards the end of the next, giving a gestation very roughly as long as Ulmer suggests. This fits in better with the known gestations of the admittedly larger species than does Bartlett's 8 months which is based solely on reports that a rhino was seen mating just before the specimen which gave birth was caught."

R. J. Reynolds (1960). "Only one Asiatic Two-horned Rhino has been bred and born in captivity. This event took place in the Zoo at Alipore, Calcutta, India in 1889. Not only was this the first rhino of any species to be bred and born in captivity, but the baby is a hybrid, the father being the typical form *sumatrensis* and the mother *lasiotis*. There have been two captive births of females bred in the jungle. The first was a

sumatrensis born in 1872 aboard the steamer *Orchis* in London harbour and the second was a *lasiotis* born in Calcutta, India in 1895."

Red Data Book. Survival Service Commission, I.U.C.N., January 1963.

"Breeding rate in wild. A solitary calf which remains with the mother for several years. Gestation period unknown, probably about 16 months."

"Burmans and Karens, as a rule, with the exception perhaps of the hunters, are much afraid of these animals, and this is perhaps not to be wondered at if we bear in mind the very ferocious character attributed to them. They are said to attack human beings without provocation, and to be most vindictive and persevering in their pursuit of the object of their anger; they do not fear elephants or tigers. Furthermore they are credited with not only stamping out but even devouring fire, and rushing in the direction of any noise they may hear. Burmese and Karen hunters, who in days gone by had some experience in hunting rhino, appear to be unanimous in considering them dangerous animals, and especially so when wounded. This has also been the experience of two or three Europeans over here..... they are astonishingly agile. When wounded, if the assailant be in view and the animal not too sick, he may charge, and he is, as I have remarked, an active and dangerous beast and what is worse requires some stopping. I have only heard of a couple of instances in which unwounded animals have given trouble. On one occasion two rhinos held up a party of survey coolies in the course of their work, and on the other a rhino chased a gun bearer or hunter who managed to climb a tree, but had not got far enough up before the rhino overtook him and was able to give him a bite as well as afford him a hoist up. The Burmans state that in attacking, these brutes use their incisors freely, also the horn, and finish up by trampling on this adversary." Evans, G. H. (1905:555-6)

"As far as I have been able to find out *Rhinoceros sumatrensis* and *sondaicus* occur in Southern Tenasserim in about equal numbers, and the many enquiries I have made seem to show that both species are equally well known to the natives, while they appear to exist in the same situations and to be similar in habits, although in the Dutch Indies I was always told that *sondaicus* was much more of a mountain animal than *sumatrensis*. Besides the rhinoceros I shot I have heard of two other instances of a rhinoceros being shot near Victoria Point by an European; one of these specimens, of which I have seen the skull, was *sondaicus*, obtained some years ago by Captain McCormick, a former planter in the district, but it is too well known that they are persistently hunted by Siamese and Chinese shikaris, who shoot them over water holes during the dry season for the sake of the valuable medicinal properties they are supposed to possess, which without doubt accounts for their scarcity, the thick jungles and comparatively sparse population where they still exist being probably the only things that have prevented their extermination long ago. One Siamese shikari near Victoria Point is said to have accounted for sixteen rhino, probably a very high percentage of those existing in the whole district....."

"Rhinoceroses are said to occasionally swim from the mainland to some of the islands near the coast, but which species, or whether both, do it I have been unable to find out. I have been told that once as many as eight were seen together on one of these islands, but this must have been a very exceptional instance, as in addition to their scarcity, I believe them to be rarely, if ever, intentionally gregarious, going about as a rule in pairs and possibly often wandering about singly, although a pair will probably keep in touch and meet in the course of the night.

"For its size a rhinoceros does not leave a big track although easy to follow owing to the pits made in the ground by their toes. I had many opportunities of following and observing rhinoceros tracks, both at Bankachon and Maliwun. The usual thing is evidently for a pair to frequent a district for a month or so, and then to move off somewhere else, their movements being probably affected by the water-supply. They apparently do not care for clear running streams and are said only to visit the low ground during the hot season when their drinking pools in the hills have dried up. Where there are plenty of well beaten tracks 'wallows' will occasionally be found which besides being drinking places are used for rolling

in, owing to which habit they are always covered more or less thickly with a coating of mud which probably serves as a protection against mosquitos. Two 'wallows' found were quite small, more or less oval in shape, about 8 feet by 6 and full of stirred up mud,.....

"The track made by a rhinoceros is quite different to that of an elephant. While an elephant will break a path a rhinoceros will make a tunnel, even creepers three or four feet from the ground stretching across their path will not be broken but burrowed under." Shortridge, G. C. (1915, *J. Bombay nat. Hist. Soc.* 23:772).

"I think it is always a local animal in the most restricted sense. It lives for a week, a month, or considerably longer in an area of, say, three to four square miles, then moves to a considerable distance, returning often after three or four moves, to the original locality. I know a small area in the Pegu Yomas where a rhino has lived for at least eighteen months. X

"Old and fresh tracks had been found at Christmas, 1914, and I found fresh tracks, and tracks from the 1915 rains, in January 1916." Mackenzie, J.M.D. (1918, *J. Bombay nat. Hist. Soc.* 25:475.)

"*Rhinoceros sumatrensis* wander generally in pairs, and a former experience was duplicated in that the mate returned to the body of the one killed a few minutes after the shooting, and had to be driven off by a shot fired over her head. They appear to have a fair share of the pugnacity attributed to their African relatives and are not the kind of animal one would care to meet at very close quarters when unarmed.

"The rhinoceros in the Sanctuary (Shwe-u-daung) conform to the practices common to the species of making sometimes quite large collections of their droppings; wallowing frequently in liquid mud, and breaking down and twisting small saplings along the routes favoured by them. On one occasion I saw a sapling that had, in some amazing manner, been twisted into a simple knot." Peacock, E. H. (1931, *J. Bombay nat. Hist. Soc.* 35:447).

When alarmed it can move at a smart gallop. It seems to be a strong swimmer. In 1882, Dr. John Anderson referred to one "seen swimming off the Burmese shore near High Island which is a good 20 miles from the mainland although there are islands in sight around." In 1946, a young female rhino wandered from the Shwe-u-daung Sanctuary, swam across the Irrawaddy river, proceeded as far as the Kaukwe river, turned back, re-crossed the Irrawaddy river, and then crossed the Taiping river, a feeder of the Irrawaddy. At first it was a strange animal. Once it was known to be the rare rhino, its fate was doomed. It was shot in the Maubin tract, Bhamo district.

"In short the Sumatran rhino seems to frequent any habitat not occupied by man, from sea level to over 6,000 feet, from grass-land and swamp to jungle and open pine forest. Freedom from human persecution is the one common factor and given that, the animal seems able to adapt itself to any available non-arid situation throughout its geographical range.....

"Usually when rhinos are spoken of, they are associated with wallows. I had expected to find wallows in lowlands or at least in flat lands, and so they are when such land is available. But here I found wallows on the steepest slopes. The local belief is that the rhinos dig the whole wallow themselves. It appeared to me that they merely enlarged some natural depressions, such as a rotted-out stump, mud backed up by a fallen tree trunk, or the hole left by an uprooted tree. When pigs occur, rhinos may take over pig wallows. Mr. Hoogerwerf who was then director of wild-life research in Indonesia, believes that they do not use their feet in digging, but make wallows by rolling, just as the Javan rhinoceros does.

"Reports given me in Burma, Malaya and Indonesia stated that a Sumatran rhino may return to the same wallow for long periods of time, unless disturbed by man. In Burma they are reported to feed early and late in the day, and occasionally at night, spending much of the day in the wallow. The fresh tracks I saw in Sumatra had been made at all times of day, although in two cases the rhinos may have been moving near midday because of our presence, rather than for their own undisturbed purposes.

"The rhino droppings were most commonly found in the vicinity of wallows, but not in them, but were also found rather indiscriminately throughout the forest floor. Reports from Burma (Editorial Board—*Burmese Forester*, 1955) and other areas say that this rhino when undisturbed, returns to the same spot to drop its dung, thus collecting piles mean as much as 2 feet high by some 4 feet across. The Indian rhino has this habit, also, on small hills several times that size. But apparently in Sumatra the rhinos are less graphically regular in their habits.

"Even while following its tracks, it was difficult to believe that an animal the size of a rhino could get through such rough and steep country. Undisturbed rhinos had wandered through rivers—not only calm, gravel-bottomed rivers but extremely swift ones, up to 4 feet deep, with slippery rounded rocks for a bottom. Rhinos which I followed scrambled over large logs lodged crossways at water level, rather than swim under them in deep water. From the tracks and other signs the most frequented rhino paths were stream beds. Next came game trails, ruts in the mud up to 3 feet deep with roots and logs smoothed by elephant and rhino. They also just wandered cross-country. Judging by tracks, muddy, vine-covered slopes too steep for men to climb straight up, were ascended with ease by the wandering rhinos. On more level terrain an undisturbed rhino track would zigzag from tree to bamboo clump to thorn patch with no apparent set direction.

"The Sumatrans say that the rhino eats a number of kinds of trees and bushes, and that he is a browser, breaking down or twisting down saplings. This agrees with the animal's reputation on the mainland.

"The Sumatran rhino's sight is reputedly quite poor and his senses of smell and hearing very good. It seems a much more wary creature than either the Javan or Indian rhino. This may explain why the Javan rhino was apparently exterminated from Sumatra while the Sumatran one survived. The Sumatran rhino is also widely feared as potentially quite aggressive. I found its reputation more sinister even than that of the much more impressive Indian Rhinoceros." Talbot, L. M. (1960), *Oryx*, Vol. V:183-6.

A male was captured on 25th March 1884 in the Bassein district, close to the ocean. It was brought to Rangoon on the 27th March 1884 and taken immediately to Calcutta. Sent to Regent's Park Zoo in exchange. Died in 1886.

The Zoological Gardens, Rangoon received a male from the Straits Settlement in 1909. It was seen by Flower when he visited the Zoo on the 5th and 7th May 1913. The date of its death is unknown.

The longevity record for Asiatic Two-horned Rhino was held by a female *lasiotis*, captured near Chittagong, in January 1868 and which arrived at Regent's Park, London in 1872. This rhino lived in captivity a total of thirty-two years and some eight months.

Occurrence:

This species occurs throughout Burma in suitable localities and is nowhere plentiful. It is now confined to remote and difficult country covered with dense evergreen viz: the crest of Pegu, Arakan and Tenasserim Yoma ridges, Lasai Tract and Burma—Tirap Border in the Myitkyina district, Kachin State and Tamanthi (Naga Hills) in the Upper Chindwin district. It is estimated that there are some 26 animals still surviving in the Union of Burma. Protective measures already taken.

Shwe-u-daung Sanctuary, (126 square Miles) constituted in 1918 is partly situated in East Katha Forest Division, Burma, and Mongmit Forest Division, Shan State.

Considerable depletion of wild life took place in the sanctuary during and since World War II, until about 1956, anti-Government elements having made protective control by the Forest Department impossible. From local evidence it seems that since about 1940 at

at least 17 rhinos had been killed. This figure may represent only a part of the total destruction. From all available evidence it appears that there are now only two rhinos (some believe 3) living inside the sanctuary, confined to the upper reaches of the streams in the remotest parts of the sanctuary.

Kahilu (62 square miles) constituted in 1938, now falls within the Kawthulei State. In 1947-8 one Sumatran rhino was seen occasionally. No information later than 1948 is available.

Four animals have been reported in Tamanthi (Naga Hills) Reserve—430 square miles. Upper Chindwin—Myittha Forest Division in 1965. Notification issued in 1963 for constitution a Sanctuary.

Legislation:

Although the live animal is completely protected by law, it is legal to sell rhino blood and other parts as medicine, and in recent years several rhinos have been killed on official permits by high Burmese officials "for medicinal purposes."

The Future:

What an attractive commercial proposition a dead rhino can be to the poachers is shown by the values attached to the various parts of the body, given as under:

Dried Blood	—	5½ Kyats	— \$	1.05	U.S. per half ounce
Fresh blood	—	500 Kyats	— \$	105	" " viss (3.65 lb.)
Bone	—	50 Kyats	— \$	105	" " viss
Skin	—	100 Kyats	— \$	21	" " viss

Horn varies from 500 Kyats (\$105) to 1000 Kyats (\$210) per inch. Gangs of poachers are ever ready to penetrate into the heaviest jungle to acquire such a valuable animal as the rhinoceros. The flesh and other parts of this ill-fated creature are supposed to be a cure for all kinds of diseases. For this "medicine" people will pay the highest price especially when supply is short.

"The rhinos reported are mostly single animals with a very few pairs, very rarely three at a time. This would be expected from a widely ranging animal, but the fact that these individuals are so very widely separated would seem seriously to reduce their chances of reproduction. With so few rhinos, harassed as they are, the odds on one even encountering another would seem quite slight. The chances of this encounter coinciding with the biological period of mating for both animals are even more slight. Evidence supporting this surmise is provided by the lack of observations of young rhinos, possibly two out of the rhinos reported were noted as being young animals.

"The Sumatran rhinoceros is an extremely rare animal in Burma. The widely dispersed survivors are being hunted down constantly, and unless effective measures can be taken soon, there may be no survivors in a few years' time. Small as Burma's rhino population is, it is still the largest known "concentration" of Sumatran rhinos left in any one country which shows the extremely critical state of the Sumatran rhino throughout its range." Talbott L. M. (1960) *Oryx*. Vol. V: 178-8.

Even when they can be protected in their natural environments, it is impossible to safeguard them completely against the results such as epidemic disease, earthquakes and floods or the effects of political upheaval. Once an animal is reduced in numbers to a very low figure, protection is usually too late to save it. The future depends on controlled breeding in captivity either in reserves or in zoos if the few rhinoceroses still surviving in Burma are to be saved and preserved to posterity.

The following estimates of numbers have been made: Burma, 26; Northern Sumatra, 20; Northern Borneo, 20-30." *Conservation News*. S. E. Asia-August 1963.

Breeding potential in captivity: No data but there appears to be no reason why the Sumatran Rhinoceros should not breed as successfully in captivity as the Indian Rhinoceros.