

# WILDLIFE IN DANGER

AUTHORITATIVE INFORMATION  
ON MAMMALS, BIRDS  
AND OTHER ANIMALS  
AND PLANTS OF THE WORLD  
THAT ARE THREATENED WITH  
EXTINCTION, BASED ON  
THE FILES OF THE  
INTERNATIONAL UNION FOR  
CONSERVATION OF NATURE AND  
NATURAL RESOURCES  
PREFACE BY  
JOSEPH WOOD KRUTCH





THE WORLD WILDLIFE FUND  
LIBRARY

# Wildlife in Danger

by

James Fisher, Noel Simon, Jack Vincent

and members and correspondents of the  
Survival Service Commission of the International Union for  
Conservation of Nature and Natural Resources

Foreword by

Harold J. Coolidge

and

Peter Scott

Preface by

Joseph Wood Krutch

A Studio Book  
THE VIKING PRESS  
New York

WORLD WILDLIFE FUND Library  
Ref. No.:

100-5027

persecution by man, and the animal has therefore been eliminated from much of its former range. That this is not an entirely new factor is shown by Starker Leopold, who states that the Central American tapir had already disappeared from Yucatan by the time of the Spanish conquest, "presumably as a result of Mayan settlement and clearing of the forest". The same author asserts that "there remains no secure and assured population anywhere" in south-eastern Mexico.

Because of the inability of the species to adapt itself to the changed conditions resulting from settlement and transformation of the environment, only a few have survived in some of the more remote areas. The only hope for its continued existence appears to lie in the establishment of well-protected national parks or similar sanctuaries to embrace some of the few

areas of virgin forest that, almost miraculously, still exist.

Starker Leopold, writing of Mexico in 1959, states: "One such area that might well be designated as a permanent rain forest reserve for tapirs and other elements of the wet tropical fauna and flora is the north-eastern slope of Volcán San Martín in the Tuxtla Range of southern Veracruz. There may still be other suitable sites in southern Campeche, Quintana Roo, or Chiapas. The creation of one or more rain forest preserves and the extension of effective legal protection to tapirs everywhere in southern Mexico are steps that should be taken quickly to save this unique member of the Mexican fauna from ultimate extinction".

Leopold's proposal is applicable with almost equal urgency to the other countries in which the species still precariously exists.

## Family Rhinocerotidae: rhinoceroses

### GREAT INDIAN RHINOCEROS *Rhinoceros unicornis*

The genus *Rhinoceros* (the one-horned rhinoceroses) is represented by several species in the fossils of the Pleistocene Ice Ages, when it appears to have ranged through Eurasia from Europe to Taiwan and Japan, and through the Asian mainland to Sumatra, Java, and Ceylon. It is now represented by only two relict living species, the great Indian rhinoceros, *R. unicornis*, and the Javan rhinoceros, *R. sondaicus*. The former is the largest of the three living species of Asiatic rhinoceroses, and more heavily built than the Javan one-horned species, attaining a height of over 6 feet at the shoulder and a length of more than 14 feet. A fully grown specimen may weigh over 2 tons.

The most striking feature of the great Indian rhinoceros is its thick hide, which has several loose folds, notably on its neck, behind its fore-quarters, and in front of its hindquarters, giving the impression that the animal is encased in armour-plate. This illusion is heightened by the convex tubercles, looking almost like rivets, with which the sides and upper parts of its legs

are studded, and by the almost total absence of hair on its skin, except for a bristly fringe around its ears and the tip of its tail. Its head is large, its eyes small, and, like that of the black rhinoceros of Africa, its upper lip is prehensile. Its lower jaw contains a pair of sharp incisors that have developed into tusks, which are used with considerable effect on the rare occasions when the animal attacks.

The animal's massive bulk and somewhat intimidating appearance are deceptive, since it is normally shy and inoffensive and seldom acts aggressively unless wounded or with young.

The great Indian rhinoceros is an animal of territorial habits (although to what extent has yet to be determined), and is never far from water, in which it bathes daily, or mud, in which it wallows. Its food consists mainly of grasses, shoots, and reeds. Normally it feeds in the early morning and evening; for the remainder of the day it rests or wallows, especially during the hot weather — a practice that may alleviate the persistent attacks by hordes of insects in the swamps.

A single young is born after a gestation period of 474 to 486 days (Dr Ernst Lang). On the

assumption that she suckles her calf for at least six to ten months, an adult female will not normally breed more often than every third year. If, as has also been suggested, the calf is suckled for two years, births may possibly occur only once in four years.

During the Middle Ages, the Indian rhinoceros was distributed over much of the northern part of India and Nepal, extending from Peshawar and Kashmir in the west, along the Himalayan foothills as far as the frontier with Burma. The southern limit of its former range is uncertain, but, because the animal is so closely associated with water, it may not have existed beyond the plain of the Ganges river system. Earlier reports of its existence in South-East Asia are questionable, and may refer to one of the other two species of Asiatic rhinos. On the evidence available, it seems unlikely that *R. unicornis* ever extended eastwards more than a short distance beyond the borders of Assam and Bengal.

Increasing pressure on the land by the human population, and the consequent drastic alteration of its natural habitat, have driven the Indian rhinoceros from most of the region in which it formerly lived. The fertile lowlands were first taken over by agriculture. The rhinos retreated to the hills, but, as these in turn came gradually under cultivation, the animals were eventually eliminated everywhere except only in the most remote or inaccessible parts of their range. In more recent years, increased hunting has accelerated the decline of the tiny remnant of a species already greatly reduced in numbers through loss of habitat.

An indication of the relative abundance of the animal less than a century ago can be gained from the fact that, as recently as 1876, the Government of Bengal was offering a bounty of Rs.20 to anyone who shot a rhinoceros, on the ground of damage to standing crops. In the fields of the Terai, the Nepalese used to build raised platforms of bamboo on which, as harvesting time approached, people would beat gongs and ring bells to frighten the rhinos away.

By about 1910 numbers had been so reduced that the hunting of rhinos in Bengal and Assam had to be prohibited; and a series of sanctuaries was proclaimed in the upper Brahmaputra

valley and Bengal for the purpose of protecting the species and parts of its natural habitat. But the creation of sanctuaries was not in itself enough protection against well-organized gangs of poachers; and on more than one occasion the Assam Rifles had to be called in to help in restoring order.

There has long been a considerable demand for rhino horn in India, but, following the near-extinction of the Javan rhino in South-East Asia (which had previously met much of the demand from China), the market value of horn multiplied (see also p. 115). A lucrative trade developed, and poaching became widespread.

The Indian rhinoceros is now confined to eight reserves in India and Nepal. Occasional reports of individuals in other areas nearly always refer to stragglers wandering beyond the boundaries of sanctuaries. Small, isolated populations may still exist, however – for example, in the Tirup Frontier Tract in Assam, where unverified reports mention the presence of a small group.

The total number in 1966 was estimated at about 740, of which 575 were in India and the rest in Nepal. By far the largest and most important stock in India existed in the Kaziranga Sanctuary (166 square miles) in Assam, where the numbers were estimated at about 400. A major shortcoming of the reserve is that domestic animals are permitted to graze within its boundaries. In theory stock is allowed to use only a very small part of the sanctuary, about 3 miles long and 1 mile deep; but in practice supervision is negligible, and little attempt is made to keep the regulations. A considerable threat to the rhino and other wild animal species has therefore developed through competition for the limited available fodder; and there is a possibility that disease may spread. It seems essential that measures should be taken to exclude all domestic animals from Kaziranga, so that it could become a sanctuary in fact and not only in name. Poaching is also strong in Kaziranga: no fewer than thirteen rhinos were killed in 1966.

The largest stock of Indian rhinos in Nepal in 1966 consisted of 165, which inhabited the Chitawan Rhinoceros Sanctuary, in the Rapti valley. It is hoped that this sanctuary will shortly

be given national park status. Since Chitawan has an exceptionally important bearing on the future of the species, and because the recent history of the area is such an outstanding example of effective practical conservation, its story needs telling.

Until the downfall of the Rana Prime Ministers in 1952, the Rapti River valley was a wild and sparsely populated region used by the powerful Rana family as a hunting-ground. It was here that lavishly organized tiger hunts were staged in honour of visiting royalty. In addition to many other species of wild animals, 800 Indian rhinos were estimated to inhabit the western end of the valley.

Following 1952, large numbers of land-hungry hill people took advantage of the period of political instability to move into the valley. At the same time the Government sponsored a scheme designed to eradicate malaria from the valley and encourage the large-scale settlement, in the open grasslands, of many thousand immigrants from the hills.

Within a few years the new settlers began to encroach upon the forests; as a consequence, the rhinos were driven from their principal habitat into the swamps south of the Rapti River and on to islands in the Narayani River.

In 1958 the I.U.C.N. received a report that, during the previous year, a gang of Indian poachers had been operating in the Rapti valley and were believed to have killed a very large number of rhinos. The I.U.C.N.'s Survival Service Commission thereupon arranged for one of its members, E. P. Gee, to visit Nepal, investigate the situation, and make proposals for proper protection of the species.

Gee visited the valley early in 1959, and estimated that the population had been reduced to about 300. By 1961 the number had declined still further to approximately 165. The results of Gee's investigation, and his subsequent recommendations for improving the situation, were incorporated into his *Report on a Survey of the Rhinoceros Area of Nepal, March and April 1959*, which was prepared for and adopted by the Survival Service Commission.

In 1963, as a result of strong representations made to the Government of Nepal by the Forest Department, a committee of inquiry was

appointed to investigate the chaotic situation that had by then developed in the Rapti valley. The inquiry was followed by the appointment of a Land Settlement Commission, with responsibility for determining which settlement was legal and which illegal, and with full powers to remove illegal squatters and resettle them elsewhere.

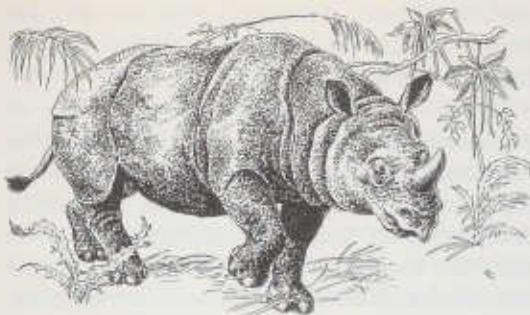
By the time the Land Settlement Commission had completed its work in 1965, some 22,000 people had been removed from the forest areas, including 4,000 from the rhinoceros sanctuary itself, some of them on the personal instructions of King Mahendra. The whole of the rhinoceros sanctuary and the proposed national park is therefore now clear of settlement; as a result, poaching has been brought under firm control, and the outlook for the rhinoceros has immeasurably improved. If poaching can be kept down, there is every reason to think that the rhinoceros population will prosper.

It is difficult to exaggerate the significance of this almost unprecedented action for the survival of the Indian rhinoceros. By its timely and forthright intervention, the Government of Nepal has set a splendid example to other countries of what can be done with drive and determination to safeguard an endangered species.

## JAVAN RHINOCEROS

*Rhinoceros sondaicus*

The Javan rhinoceros is similar in appearance to the Great Indian rhinoceros, except that it is rather smaller, its shoulder height being on average about 6 inches less. There are, however, some obvious differences. Both sexes of the Indian rhino are equipped with horns, whereas the female Javan rhino has none or at most only a very small one. It is in fact the only one of the five species of rhino in which the females are almost always hornless. Moreover, the male's horn is normally less than half the length of its Indian relative's. The skin folds also differ, the Javan rhinoceros having an additional fold in front of the shoulder, while the skin structure lacks the "rivets" of the Indian rhino, being marked overall with a pattern of scale-like disks.

Javan rhinoceros *Cécile Curtis 1966*

The tail stands out more prominently from the hindquarters through lack of a deep fold across the rump.

In Pleistocene (Ice Age) times, as fossils show, the Javan rhinoceros extended as far west as East Punjab, and a form of it lived in Ceylon. Little more than a century ago it was still found throughout most of South-East Asia, from the Sikkim Terai and Brahmaputra River valley in Assam and Bengal eastwards to the southern border of China, and possibly extending over the border into Yunnan and Kwangsi, notably along the Mekong and Song Koi rivers. Until as recently as the First World War, the species was said to be abundant along the greater part of the Mekong valley, and was hunted in the marshy plains not far from Saigon.

There is considerable uncertainty, however, about the identity of the rhinos formerly existing in parts of South-East Asia, through the failure of early reports to differentiate clearly enough between the three Asiatic species.

The Javan rhinoceros also formerly existed over the greater part of the islands of Java and Sumatra. In Sumatra the last specimen in South Palembang was said to have been shot in 1928, but a few lingered on in other parts of the island until the Second World War, since when there has been no evidence of the animal's continued existence.

During the last 100 years the human population of Java has increased more than tenfold, with the result that agricultural expansion has deprived the rhino of much of its natural habitat, forcing it to retreat into more inaccessible areas, where the remnant has been persistently hunted for its horn.

The horns were valuable enough to form part of the annual tribute sent by the King of Luang-Prabang to the Emperor of China and the Emperor of Annam; and a rhino horn was frequently included in the dowry of the royal princesses of Luang-Prabang.

The horn trade (see also p. 115) has been responsible for the virtual annihilation of the Javan rhinoceros throughout its range, with the exception of the Udjung Kulon Reserve in extreme western Java. It is possible that a few specimens may still exist in the Tenasserim area on the south-western borders of Thailand, where it is known to have once been especially abundant, and where local tribesmen claim still to hunt the species.

Until there is definite evidence to the contrary, though, Udjung Kulon must be regarded as the last remaining stronghold of the Javan rhinoceros, and thus the reserve can justifiably claim to be one of the most important in the world. It is also of considerable botanical interest, as it is the only area of the lowland forest indigenous to Java that remains. It extends over approximately 117 square miles, and in January 1967 contained, as estimated by Dr J. Verschuren, a population of not more than forty rhinos.

A disturbing feature of the present situation in Udjung Kulon is the apparent lack of an adequate number of young rhinos. Lee Talbot, during his 1955 field mission on behalf of the I.U.C.N., suggested that the population had reached such a low level (about forty) that adequate reproduction might no longer occur. During the subsequent ten years only six calves were reported, and approximately twice as many animals died or were killed. Such a low replacement rate is not enough to replenish losses. The fact that no sightings of young have been recorded may, of course, be partly due to the retiring habits of the species. In dense forest it is extremely difficult to see them.

Even in ideal circumstances, the reproductive rate of the Javan rhino is low. Its gestation period is about seventeen months; and, since the single calf is suckled for as long as two years, mature females probably do not breed more often than every fourth or fifth year.

The Netherlands Indies Government set aside the Udjung Kulon Peninsula as a nature

monument in 1921, essentially for the protection of the Javan rhinoceros, the Javan tiger, and the banteng, all three of which appeared to be endangered.

Some ten years later the status of the area was changed to that of a game reserve. All human habitation has been excluded, and even the headquarters of the reserve are situated on an island off the peninsula's north-western coast.

Apparently the rhinos are found mainly on the low-lying central plateau and in the southern sector of the reserve, but, since they wander for considerable distances, they probably use other areas, at least to some extent.

Talbot records observations indicating that the favourite food of the Javan rhino appears to be the very peculiar "tepus" plant, *Amomum coccineum*, one of the ginger family, resembling the cardamom, which throws up 18-foot broad-leaved spikes, but carries its red flowers at or even below ground-level. The animals also eat young bamboo leaves and fruits of various kinds. Sometimes they push over trees up to 6 inches in diameter to get at the foliage and possibly the fruit. Talbot also states that the director of the reserve "reported seeing the rhinos knee deep in the sea and he believed they ate the intertidal *Rhizophora*".

Udjung Kulon Reserve has the further distinction of harbouring the world's rarest predator, the Javan tiger, of which fewer than a dozen are believed to exist. Talbot states that, shortly after the Second World War, a gang of poachers entered the reserve with the intention of slaughtering the rhinos for their horns. One of the poachers was killed by a tiger, and, as the local villagers refused to cooperate in taking action against the carnivores, because of the belief that tigers harbour the souls of their departed ancestors, the poachers decided to leave.

Although it is possible that a tiger could kill a very young rhino calf, losses from this cause are no longer very probable. There is such an abundance of alternative prey species, and so few remaining tigers, that a tiger can have little need to risk an attack by such a formidable opponent as a cow rhino defending its calf.

Various proposals have been made for ensuring the survival of the Javan rhino. In considering the merits and demerits of the

various schemes, it becomes clear that all hope for the future of the species hinges on the Udjung Kulon Reserve.

The Government of Indonesia – and in particular the Forest Service, which is responsible for administration of the peninsula – deserves high praise for having maintained the reserve in the face of almost insuperable difficulties since the Second World War. So long as this protection continues, there is cause for optimism. To strengthen the hand of the Indonesian authorities, however, it is essential to learn more about the animal and its ecological requirements. With the aid of the Fauna Preservation Society and the World Wildlife Fund, the I.U.C.N.'s Survival Service Commission, in cooperation with the Indonesian Forest Service, has started a series of ecological studies designed to provide the scientific data for planning the effective management of the rhinoceros and its habitat.

Pending the outcome of ecological investigations, every possible step should be taken to protect the reserve and, in particular, to prevent intrusion by poachers, whether civilian or military. Only the most stringent protection can save the species from becoming extinct.

## SUMATRAN RHINOCEROS

*Didermocerus sumatrensis*

The Sumatran rhinoceros<sup>1</sup> is the smallest of the world's living rhinos. Adult specimens are seldom more than 4 feet 6 inches high at the shoulder; they are 8 to 9 feet long, and weigh 1 ton. This rhino is readily distinguishable from the other Asiatic species not only by its smaller size but also by its two horns. Its front horn is the larger, being generally about 15 to 20 inches long on adult males, while its hind horn is much

<sup>1</sup> The genus *Didermocerus* (some authorities prefer the name *Dicerorhinus*), was represented in (and before) the Pleistocene Ice Ages very widely, and by a succession of species that penetrated, when the climate was suitable, as far west as Europe (including the British Isles); they were observed by Stone Age Europeans, painted on the walls of Lascaux's famous cave (whose rhino is certainly not the plains and tundra woolly rhino), and hunted by some of them. Indeed, these two-horned hairy forest rhinoceroses ranged over wooded Eurasia (including Asia Minor) to north-eastern China and Yakutia in Siberia, and their fossils have also been found in Africa north of the Sahara. The sole living survivor is indeed but a relict of a successful Pleistocene genus.

smaller — usually little more than a large boss protruding only a few inches. On some specimens it is so small that it appears to be missing, which may account for earlier reports of one-horned specimens. Both sexes carry horns, but those on the female are about one-third the size of the male's.

A further difference is that the Sumatran rhino's skin folds are rather less conspicuous than those of the other two Asiatic species; and the skin itself is relatively thin and smooth. Immature animals have a covering of hair, which appears to vary in density according to geographical locality, but which seems to diminish as the animals mature.

Two subspecies are usually recognized, the "typical" race, *D. s. sumatrensis*, being restricted to Sumatra and Borneo, and the race *D. s. lasiotis* (usually known as either the Chittagong or hairy-eared) living on the mainland. The latter is reputed to be somewhat larger than the island race, and to have paler and somewhat longer hair, a shorter and more fully tufted tail, and a more strongly developed fringe on the edges of its ears.

The habits of the Sumatran rhino are apparently similar to those of the Javan species. Both favour forested hill country, often at a considerable height, and both live within reach of water so that they can bathe and wallow. Lydekker quotes a report that "in the Mergui Archipelago a rhinoceros, which may have been this species, is stated to have been seen swimming from island to island . . ." Talbot confirms that they are strong swimmers, and refers to a 1954 report by U Tun Yin of a rhino seen swimming off the coast of Burma "near High Island which is a good twenty miles from the mainland although there are islands in sight all round".

At one time the Sumatran rhino was distributed over a wide region, extending from parts of East Pakistan and Assam, throughout Burma, much of Thailand, Cambodia, Laos and Vietnam, Malaya, Sumatra, and Borneo. In the two big islands its fossil remains have been found in prehistoric human sites far from its present limited haunts.

Like the other two Asiatic species, *D. sumatrensis* has been hunted almost to extinction throughout its range because of the widespread

belief in the value of its horn, and almost every other part of it, as an aphrodisiac. The principal market is China, where there is evidence of a substantial trade in horn going back many hundreds of years. The price is said to have reached its peak shortly before the Second World War, when horn was nearly worth its weight in gold. In Thailand at that time there was even a special customs duty levied on it.

It seems impossible to shake the belief of the Chinese that rhino horn is one of the most powerful aphrodisiacs: they will pay almost any price to obtain it. Every part of all three Asiatic species is used by Chinese pharmacists, including horns, hide, meat, various organs, blood, bones, and even urine.

Although the Sumatran rhino lived in inaccessible regions remote from human habitation, the price offered proved an irresistible incentive and it was hunted ruthlessly wherever it existed. The Dayaks of Borneo, for example, made a very good business of hunting it for sale to the Chinese. The nomadic Punans of Central Borneo were reputed to have developed the method of silently following the animal, if necessary for weeks, until they found an opportunity of using their blowpipes and poisoned darts.

In Sumatra the Battas were said to creep up close to the rhinoceros and hamstring it with a sharp knife. Other hunting tools included deadfalls made from weighted spears suspended over rhino paths, or well-camouflaged pitfalls dug in the ground along their trails.

As the human population increased and spread, the rhino's habitat diminished correspondingly, and pressure on the remaining population thus multiplied. During the last 100 years this multiplication has even further accelerated, the fate of the species being finally sealed in most areas by the introduction of more sophisticated weapons.

Small and isolated populations of Sumatran rhinos still exist in a few widely separated localities in Burma, Thailand, Malaya, Sumatra, and Sabah. Others may possibly have survived in the Lushai Hills and the Tirup Frontier Tract in India, and in the Chittagong Hills of East Pakistan, as well as in parts of Cambodia, Laos, Vietnam, and Kalimantan.

The total world population is estimated at between 100 and 170, and is distributed as follows: Thailand (on the Tenasserim border) six; Cambodia possibly ten; Borneo perhaps ten to thirty; Burma twenty to thirty; Malaya possibly thirty; Sumatra possibly sixty.

As recently as the 1920s the species was abundant in the Mekong valley, and at an earlier period it was widely distributed throughout Cambodia, Laos, and Vietnam. It has now almost entirely disappeared from that large region.

Only two of the existing reserves in Burma are thought to have resident rhinos. More sanctuaries are therefore needed to cover the range of the largest possible number of the surviving stock. Unless such sanctuaries are made and actively protected, it will be only a matter of time, and not a very long time, before the last specimen is exterminated.

In Malaya the pace of rural development, which has notably accelerated during the last five or six years, has caused large areas of wild country to be put under cultivation. Pressure on the few surviving rhinos is therefore constantly mounting. Only ten are definitely known to exist in the entire country, but a recent report suggests that there may be about thirty. They are scattered throughout the country, and consist mainly of solitary specimens or pairs. The maximum number in any one group is estimated at four, a situation suggesting that the few survivors are now so widely separated, and are subject to such disturbance, that breeding may possibly be inhibited, though David L. Strickland found evidence in 1966 that viable groups may survive in the Sungai Dusun Game Reserve and possibly in the Bintang Hijau Forest Reserve in northern Perak.

The most recent report from Sumatra estimates the total rhino population at sixty animals. Some of them live in the Löser Reserve of 1,090,000 acres in northern Sumatra; others are known to be in the wild and little known South Sumatran Nature Reserve. But the largest number is said to be in the low-lying swampy regions of Riau.

Less than a century ago, the Sumatran rhino was widespread in Borneo and in some localities was regarded as common, but the decline came

rapidly. According to Tom Harrisson, it is doubtful whether more than thirty individuals have survived in the whole of Borneo, and the animal has definitely ceased to exist in Sarawak. The only bright spot in an otherwise depressing picture is the recent report indicating the presence of a few specimens on Mount Kinabalu, an area that has recently been proclaimed a national park.

The species is legally protected over the greater part of its range, but the law is extremely difficult to enforce. In Burma, for example, there is a strange legal anomaly: although the animal is "fully protected" by law, the sale of rhino blood and other parts is perfectly legitimate. Moreover, several cases are known in which senior (Burmese) officials have been officially authorized to kill rhinos "for medicinal purposes".

Law-enforcement is essential if the species is to survive; but in several countries the law needs revision to plug the loopholes that prevent it from being fully effective.

At the same time there is a pressing need to reinforce the protection of the few reserves in which the species is known to exist, and to create new reserves wherever significant numbers of the animals are reported. But much additional survey-work is needed to ascertain precisely where these groups of survivors are, and to fix suitable boundaries for areas designed to protect them. This will not be easy, because the species is a wanderer; and reserves will have to be of a substantial size.

It is, of course, possible that the wandering habit may be to some extent a direct result of human disturbance, and that, if undisturbed, the animals might conceivably settle down in quite a restricted area. Not the least effect of the rising price in rhino products is that it is now very difficult for an investigator to obtain any information concerning the whereabouts of any surviving animals, because anyone with such knowledge would almost certainly want to keep it to himself and turn it to his own advantage.

Any attempt, therefore, to draw up a plan for the conservation of the Sumatran rhino is frustrated at every turn by the fact that so very little is known about the habits and requirements of the species. This is illustrated by the ignorance

surrounding the animal's breeding biology. Thus a female Sumatran rhino captured near Chittagong in 1868 was eventually purchased by the Zoological Society of London and reached England in 1872. While in the docks the animal gave birth, and, according to Lydekker's account, "from facts that came to his knowledge, the late Mr A. D. Bartlett was led to conclude that the period of gestation in the species was only a little over seven months". This statement is still quoted in recent publications, but is obviously inaccurate in view of the known gestation periods of the other two Asiatic species, which are almost three times as long.

In terms of practical conservation, the overriding fact that emerges from any discussion of the status of the three species of Asiatic rhinos is that Indonesia has the largest surviving stocks of two of them, *D. sumatrensis* in Sumatra and *R. sondaicus* in Java. The survival of these species is therefore primarily in the hands of the Government of Indonesia, a privilege and a responsibility that, if accepted and acted upon with vigour, would ensure Indonesia a leading place among the countries that have risen to the challenge of conserving the world's rarest species.

The sole animal presently in captivity, a female, has been in the Copenhagen Zoo for some years.

#### SQUARE-LIPPED or WHITE RHINOCEROS *Ceratotherium simum*

The genus *Ceratotherium* consists of a single species, with two living subspecies. It is the largest living land mammal after the elephant, an adult male standing 6 feet 6 inches at the shoulder and weighing 3 tons or more. Notable features are a massive head, a prominent shoulder hump, the twin horns, and a characteristic broad muzzle from which both the animal's common names are derived: the most convincing explanation of "white" rhinoceros is that it is a corruption of the Dutch *wijd*, meaning "wide". This rhino's front horn sometimes reaches a great length; the record is 62½ inches for the southern race, 47½ inches for the northern.

The square-lipped rhinoceros is essentially an animal of perennial grasslands, and at one time it occupied an extensive range in Africa south of the Sahara wherever suitable savannah country could be found. Indeed, in Pleistocene times, as fossils tell us, it ranged to Morocco and Algeria, north of the present Sahara. The living races are now restricted to two regions separated from each other by more than 2,000 miles.

Until the latter part of the nineteenth century the northern race, *C. s. cottoni*, was widely distributed from the west bank of the Nile in the Sudan to Lake Tchad, roughly between 9° N. and 13° N. Since the beginning of the century, however, both range and numbers have drastically declined.

Today, the northern race exists in the south-western Sudan west of the White Nile, in parts of the West Nile Province of Uganda along the western bank of the Albert Nile, and in the Garamba National Park in the extreme north-east of the Congo.

A few square-lips also cling precariously to existence in the Ndende and Birao areas of northern Ubangi in the Central African Republic. For more than fifty years no reliable information on the survival of the animal in that country could be obtained, and the species was assumed to have been exterminated there. In 1965, however, the I.U.C.N. received information that three individuals had been sighted, and that there might be up to a maximum of ten in the area. Earlier reports of extermination may, of course, have been correct, and the present animals may possibly be recent immigrants from the Sudan.

Until a few years ago, the most stable population was found in the Garamba National Park, where a census undertaken in 1960 showed a total of about 700 rhinos; by 1963 the figure had increased to perhaps 1,000. A little poaching by raiders from across the Sudanese border was kept firmly under control by the park's wardens and rangers. In 1963, however, the situation deteriorated abruptly when rebel forces crossed the border from bases in the Sudan, virtually occupying the entire national park and a large adjacent region. The rebel soldiery, who were armed with the most modern weapons, indulged in a great slaughter, as a result of which it has

been estimated that at least 900 rhinos were killed. It is thought unlikely that more than 100 survived the massacre—and this may be an over-optimistic estimate.

The situation in the Sudan is obscure. No wildlife survey has been undertaken in either the Bahr-el-Ghazal or Equatoria, the two provinces in parts of which square-lipped rhinos exist. Thus there are no reliable population figures, and estimates vary from a few hundred to 2,000. It is known that the subspecies was strongly protected until at least 1963, as a result of the rigorous measures taken by the Sudan Government against poachers; and it is possible that the southern Sudan harbours the largest numbers of square-lipped rhinos in the world, though no up-to-date information is available.

In Uganda there has been a very severe decline in numbers since the Second World War. Despite the efforts of the Game Department, poaching has for some years been rife in the strip of land (about 70 miles long and 20 to 30 miles wide) in which the animals existed; and numbers decreased from about 350 in 1955 to fewer than eighty in 1962. Because the situation was clearly hopeless, measures have been taken to capture some of the survivors on the West Nile and move them into the Murchison Falls National Park. Since 1961, a small breeding nucleus has been successfully introduced into the park, and it appears to be prospering. In view of the gradual development of the West Nile District, which includes proposals for the construction of new roads and a railway as well as increased settlement throughout the area, the survival of the species in Uganda appears to be wholly dependent upon this newly established group and any other specimens that can be added to it.

Enough has been said to show that the status of the northern race is unsatisfactory, and that a drastic decline has taken place throughout its entire range. The record during the last few decades, and particularly during the last five years, suggests that in prevailing circumstances the only practical means of safeguarding such a vulnerable animal lies in strongly administered national parks where it can be adequately protected.

This view is supported by the recent history of

the species in South Africa. In historical times the square-lipped rhino was widely distributed in the southern third of Africa as far south as the Orange River.

Before the coming of the Europeans it was extraordinarily abundant, and, being almost without natural enemies, it had (according to that great hunter, Selous) "increased almost to the limit of its food supply. Within fifty years, however, of the time when Cornwallis Harris had met with the white rhinoceros in almost incredible numbers . . . thousands upon thousands of these huge creatures were killed by white hunters, and natives armed with the white man's weapons, and the species had become practically extinct".

In spite of its huge size, the square-lipped rhinoceros, unless provoked, is normally an inoffensive animal that is ridiculously easy to approach and to kill. Not only were its horns in considerable demand, but its flesh was much esteemed: Selous declared the meat to be "superior to that of any other game animal in South Africa". In addition, its hide was valuable for making whips, which were widely used in those days, when ox wagons were the usual means of transport.

Selous recorded an instance of one trader who supplied firearms to more than 400 natives to hunt rhinos on his behalf. He also stated that the animal was still abundant in 1872 in what is now Rhodesia; but, from about 1880 onwards, it steadily declined. Fifteen years later almost every square-lipped rhino between Salisbury and the Zambezi had been killed.

Farther south the story was the same. By 1880 the animal had vanished from the northern Cape Province, South-West Africa, and Botswana; by 1896 it had been exterminated in Transvaal; and by the end of the century had ceased to exist in Mozambique.

The position today is that the southern race, *C. s. simum*, has been wiped out everywhere except for a small pocket in the south-eastern extremity of the range in Zululand comprising the Umfolozi and Hluhluwe game reserves and the land immediately adjacent. Stringent controls introduced by the Natal Parks, Fish and Game Preservation Board have given full protection to the animal, and each year for more than thirty

years the population has steadily increased. As a result of sound conservation measures, the southern race, once on the brink of extinction, has been restored to abundance, and its name has therefore been taken out of the Red Data Book. The very success of the Board's measures has in fact created a situation where sheer pressure of numbers has become almost embarrassing.

The Board's predicament is better appreciated when it is realized that, properly protected, the rate of reproduction of this rhino can be surprisingly rapid: the net annual increment in Natal is at least 12½ per cent and is thought to be increasing. Breeding may begin at the relatively early age of four or five years; and a single calf (there are occasional records of twins) is born after a gestation period of about eighteen months. The calf is able to accompany its mother within twenty-four hours of birth, and is suckled for about a year. Adult females may often be accompanied by two (and sometimes three) calves at different stages of development, ranging from new-born through half-grown to almost mature.

In August 1965 there were 606 square-lipped rhinos in Umfolozi, a figure that is well beyond the area's optimum carrying capacity, a further seventy-five at Hluhluwe, and about 130 in neighbouring parts of Zululand. To help the survival of the southern race, it will be necessary to reduce the population and so preserve the strictly limited habitat.

No fewer than 330 have been already introduced into other national parks in South Africa, Rhodesia, and even as far afield as Kenya, and a further 63 have been sold to zoos. The park authorities are offering specimens to interested conservation organizations. There are limits, however, to the numbers that can be disposed of in this way, mainly on account of the high costs arising from the time and effort involved in the capture and translocation of these bulky animals. Each year the total population increases by about eighty, and at this rate the market is quickly saturated.

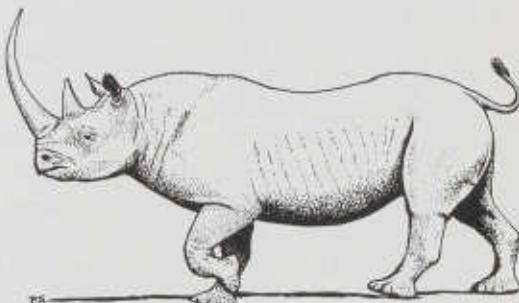
The recovery of the southern race is an outstanding recent example of what practical conservation can achieve. As long as the habitat can be properly protected against the effects of

overstocking, the future of the southern subspecies seems assured.

### BLACK RHINOCEROS

*Diceros bicornis*

The genus here consists of a single living species; but some authors also include its closest living relative, the white or square-lipped rhinoceros, in *Diceros*. The "black" rhino is smaller than the "white", standing about 4 feet 9 inches to 5 feet 6 at the shoulder and weighing about 1½ to 1¾ tons. The muzzles of the two species are markedly different in that the black rhino's upper lip is pointed and its tip prehensile, thus stressing the fact that it is essentially a browser whereas its relative is a grazer. The black rhino's "hooked" lip is used for stripping leaves and twigs from the bushes and shrubs on which it feeds. Both sexes have a pair of horns, the front one being the longer, averaging about 20 inches although the record is 53½. Individuals with more than two horns have occasionally been recorded. The species is normally associated with arid thorn-scrub country, but in Kenya it can also be found in the high forests of Mount Kenya and the Aberdare Range, sometimes existing at an altitude of more than 10,000 feet above sea-level.



Black rhinoceros Peter Scott 1967

The black rhino appears to have no particular breeding season; and a single young is born after a gestation period of about twelve to eighteen months. The calf stays with its mother for as long as two years, often remaining with her after the birth of the subsequent calf. Sexual maturity is reached at about five years of age. Under

normal conditions the net annual population increase has been estimated at about 5 to 8 per cent – considerably less than that of the square-lipped species.

The black rhino also differs substantially from its relative in temperament. Its reputation for being thoroughly bad-tempered has probably been exaggerated, but without question it is unsocially disposed and can be aggressive. Its truculence may be partly due to its poor eyesight, although it is keen of scent and hearing. When disturbed, it may undertake a blustering charge towards the source of the disturbance. It may equally well dash off at a tangent. In spite of its huge bulk, it is surprisingly agile and can "turn on a sixpence" as impressively as any polo pony.

The black rhino's poor eyesight is to some extent compensated by its association with tick birds. This association is mutually advantageous, the birds feeding on the parasites of their host, who is warned by their alarm notes of any potentially hostile intruders.

The black rhino is generally found alone or in pairs, and usually in a definite locality, which the male will defend vigorously against rivals. On occasion this apparently territorial behaviour can react to the animal's disadvantage, as, for example, during the 1960–1 drought, when 282 rhinos were known to have died of malnutrition in Kenya's Tsavo National Park. Almost all the casualties occurred along the Athi and Tsavo rivers. The rhinos could have saved themselves had they moved only a few miles over the Yatta plateau to the Tiva River, where browse was relatively abundant, but they preferred to remain in their own territories to the bitter end. By the time the rains came, approximately half the total number estimated to be living in the area had died.

The species was first encountered by Europeans in 1653 near Cape Town. At the time of its discovery, it was widely distributed in Africa from Cape Province and south-western Angola to eastern Africa, including Somalia, south-western Ethiopia, and the southern Sudan. From there the range extended westward along a relatively narrow strip between the southern edge of the Sahara Desert and the northern limits of the dense rain forests of the Congo and Nigeria, as far as Lake Tchad and Cameroon. Within this

huge region there were, of course, areas where rhinos were absent, as, for example, along the coasts of Kenya and Tanzania and between the Chobe and the Zambezi rivers.

The greatest retraction of range has taken place south of the Limpopo, where the species now exists only in Zululand, and south of the Cunene, where it is now found in small numbers only in the northern part of South-West Africa.

Elsewhere the black rhino has been reduced to a remnant, except in a few national parks and other sanctuaries where special measures have been taken to protect it. Hobley, writing in 1936, estimated that during the previous twenty years the rhino population had declined to about 20 per cent of its former numbers. Since then, of course, the rate of decline has not lessened, and in most parts of Africa it has accelerated – a trend that continues with scarcely a check.

Africans do not attribute any magical or superhuman qualities to rhino products. The Masai greatly prize a *rungu*, or knobkerrie, carved from the horn, although nowadays examples are seldom seen; and the Somalis value the hide for making the small circular shields in which they take such pride. According to Swayne, rhinos were killed in the western part of Somalia especially for their hide, "which cuts up into seven good shields, leaving besides some strips for making whips". Some tribes will eat rhino flesh; but most Africans regard rhinos from an entirely mercenary standpoint, knowing that they can obtain a good price (although but a fraction of the true value) from the unscrupulous Asian traders and middlemen who control the smuggling rings.

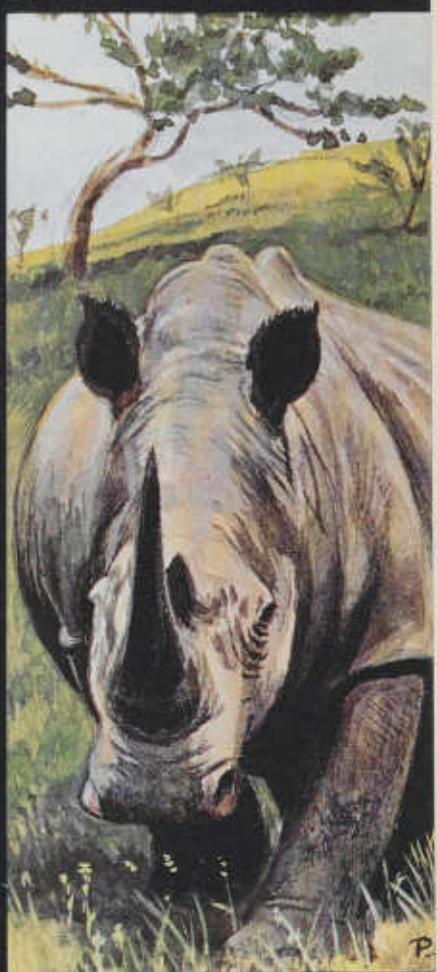
A survey undertaken by the I.U.C.N.'s Survival Service Commission in 1960 indicated that the total black rhino population was between 11,000 and 13,500. By far the largest surviving numbers (about half the total) are in Tanzania and Kenya. These figures show that the black rhino is the least rare of all the five living species. But it has been eliminated at an alarming rate,

PLATE 9 (a) Great Indian rhinoceros *C. F. Tunnicliffe*, *Brooke Bond* 1963; (b) Sumatran rhinoceros *Peter Scott*, *Brooke Bond* 1964; (c) Southern square-lipped rhinoceros *Peter Scott, Brooke Bond* 1964

(a)



(b)



(c)



The alphabetical references (b) and (c) should be transposed.

and the decline shows little sign of slowing down. Hobley mentions "one area in Kenya of about 1,600 square miles which twenty years ago contained several thousand rhino; today [1936] they have entirely disappeared from that region. European licensees may have killed a few hundred, the remainder have been poached. This rate of slaughter is widespread and not confined to one region".

A rather more recent example occurred shortly after the Second World War, when the Kenya Game Department commissioned J. A. Hunter to exterminate rhinos in the Makueni District so as to open an area of 50,000 acres for a Kamba agricultural settlement scheme. His final tally was 1,088 rhinos killed.

The Makueni rhinos were destroyed in order to make way for a settlement scheme on marginal land that was incapable of supporting more than the crudest form of subsistence agriculture. Between 1946 and 1959, a total of £307,535 was spent on bush clearance and the installation of water supplies, and a further £15,377 in the form of loans and grants. This heavy expenditure did not prevent the scheme from becoming a failure through lack of co-operation from the Wakamba settlers. Thus the destruction of the Makueni rhinos — animals ideally adapted to the prevailing harsh environment that made the region unsuitable for conventional forms of agriculture — does not appear to have served any constructive purpose.

In many other parts of Africa similar situations have arisen, although on a smaller scale. The presence of rhinos was incompatible with settlement: in many places they were systematically exterminated. The animals' huge bulk, stupidity, and blundering tendencies make them an easy prey to modern firearms. The species is

legally protected throughout the greater part of its range; but legal protection alone is not enough to counter the dual threat to its existence: loss of suitable habitat as development proceeds, and illegal hunting for its horn.

The best hope for the future of the species appears to lie in the national parks and equivalent reserves where adequate protection can be given. Efforts should be made to transfer animals from those areas where they conflict with development, or where they cannot be adequately protected, into suitable sanctuaries. During the last few years there have been some notable advances in the types of drugs and the techniques used for the immobilization of wild animals. The importance of these developments to the future of the black rhino and several other endangered species can scarcely be overstated: they have opened up entirely new fields of practicality. Ten years ago the only means of dealing with an "unwanted" rhino was to kill it; today it can be immobilized with drugs and transported to a sanctuary with relatively little difficulty.

Several countries have already used the drug and translocation method to introduce or re-introduce rhinos. The Kenya Game Department, for example, has for several years used a special "capture team" for the purpose, while Tanzania has succeeded in introducing more than twenty rhinos on to the island of Rubondo in Lake Victoria, transported there on rafts after being captured on the mainland in areas where they were in conflict with human interests.

Farther south, the National Parks Board of South Africa is considering the reintroduction of black rhinos into the Kruger National Park as soon as the programme for restocking the park with square-lipped rhinos has been completed.