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# The Rhinoceros in Asia

BY ANDREW LAURIE



PHOTO: A. LAURIE

Some 100 years ago, on a hot humid day in May 1871, R.B. Foote, accompanied by his field assistants, trudged up the Chickdowlee Nullah, a small stream which runs into the Gatparba River near Gokak in the modern Indian state of Karnataka, 250 miles south-east of Bombay.

Mr Foote, a stratigrapher employed by the Geological Survey of India, took time off from his mapping work that afternoon to extract the fossil bones and teeth of a rhinoceros from the clay bank of the stream.

He had discovered them by chance, exposed by recent floods and in imminent danger of being swept away that very afternoon.

As dusk drew near, and with it the prospect of a 7-mile walk back to camp in the dark, Mr Foote and his assistants were still there, standing or squatting in the stream bed and painstakingly extracting every last fragment of bone and tooth.

*Rhinoceros deccanensis* was the name Mr Foote gave to his find in a publication which described each tiny piece in the minutest detail. Later workers renamed it *Rhinoceros unicornis fossilis*, the direct precursor of the living greater one-horned or Indian rhinoceros.

It was through the efforts of men like Mr Foote and in particular those palaeontologists who excavated the Siwalik strata of northern India that we now know so much about the ancient fauna and flora of the subcontinent.

Four million years ago in the Pliocene era, the moist, forest-covered southern slopes of the Himalayas drained into the long, broad valley of the Siwalik River which flowed westwards from Assam to northern Pakistan: in the opposite direction to the modern Ganges.

A mosaic of grassland and woodland is thought to have covered the alluvial plains; the climate was warm, water was abundant, and rivers from the newly-formed Himalayas carried down silt rich in minerals.

In this fertile environment lived a diverse vertebrate fauna which included the bizarre *Sivatherium* and several species each of elephants, mastodons, rhinoceroses, horses, camels, hippopotamuses, giraffes, antelopes, apes (including orang utans), monkeys, sabretoothed cats, ostriches, crocodiles and enormous tortoises, some of them more than six metres long.

Petrified remains of these animals have been preserved in deposits of alluvial detritus subsequently folded and elevated into the outermost foothills of the Himalayas, where to this day they are excavated by palaeontologists seeking to discover more secrets of the past.

Ranging in age from late Miocene (5 to 9 million years ago) to early Pleistocene (1 to 2 million years ago), the Siwalik fauna is now largely extinct, suddenly impoverished by the advent of severe climatic conditions at the start of the Ice Ages.

However, there are a few animals, such as the rhinoceros, which have remained relatively unchanged to the present day.

The living Indian rhinoceros has been roaming the swamps, forests and grasslands of the Himalayan foothills for a million years or more.

Until the later Pleistocene it is also known to have occurred in southern India, Sri Lanka and Java. At that time Java and neighbouring islands were part of the mainland of south-east Asia and probably consisted of forested hills, scrub and alluvial grasslands in broad river valleys.

After a rise in sea level and climatic changes which led to the disappearance of the lowland grasslands and woodlands, *Rhino-*

*ceros unicornis* and many other large mammals died out in south-east Asia although forest species such as the living Javan and Sumatran rhinoceroses survived the changes.

The rhinoceroses probably originated in North America where the earliest known remains are found in Eocene deposits more than 40 million years old. They are of small forest-dwelling horse-like creatures called hyrachyids which varied in size from that of an Alsatian dog to that of a small pony. They had long necks and legs with four toes on the front feet and three on the hind feet.

As the Eocene forests retreated and made way for large areas of savannah-woodland mosaic there was a rapid evolution of ungulates to exploit the new environments. The rhinoceroses were no exception. The family includes more than 30 genera ranging from the giant hornless *Baluchitherium* at 5.5m tall, the largest mammal ever to walk the earth, to the small *Diceratherium* which had two horns side by side and *Teleoceras* which looked like a hippopotamus and, like hippos, lived near water in large herds.

But as climates became cooler the North American and Eurasian rhinos largely died out, very few lines surviving into the Pleistocene where they had to contend with a severe climate and the accompanying habitat changes as well as hunting by early man.

Nevertheless, as little as a quarter of a million years ago two species of twin-horned rhinos grazed on the banks of the Thames in England and the last woolly rhinos roamed the tundra as little as 20,000 years ago.

Of the 170 species of rhinoceros so far described, only five survive today. All but a few were extinct long before man came on the scene, but probably for as long as they have shared their habitat with humans the remaining large pachyderms have been hunted for meat and for their tusks and horns. Now, however, the remaining habitats themselves are threatened; particularly the rainforests of south-east Asia which are being felled at the rate of 300,000 km<sup>2</sup> per year with little attempt at reafforestation.

Apart from the effects of continuous habitat destruction the rhinos are threatened by a 20-fold increase in the wholesale value of rhino horn in the last seven years, which has inevitably led to increased poaching despite the establishment of reserves and national parks.

World rhino populations are probably 10 per cent of what they were 100 years ago and numbers have fallen by 50 per cent since 1970. The three species of Asian rhinos, Indian, Javan and Sumatran, together number fewer than 1,800 animals, and the rarest of the five, the Javan rhino is down to fewer than 100.

## The Indian Rhinoceros

The Indian rhinoceros—*Rhinoceros unicornis*—is the largest of the three. Adult females weigh about 1,600 kgs and adult males up to 2,100 kgs. They stand 1.6 to 1.9 metres at the shoulder. Both sexes have a single, well-developed nasal horn which may reach 60 cms in the wild but is usually worn down to a thick knob or into an abnormal shape in captive animals. There are a pair of large, flattened incisors in the upper jaw and a pair of lower canine tusks which are larger in the male and used in fights in preference to the horn. The cheekteeth are complex and high crowned indicating a diet predominantly of grass.

Six hundred years ago the Indian rhino was distributed from Pakistan to northern Burma along the river systems of the Indus, Ganges and Brahmaputra. Now there are fewer than 1,500 survivors largely restricted to the Kaziranga National Park in Assam, the Royal Chitawan National Park in Nepal and several smaller reserves scattered along the Himalayan foothills in Assam and West Bengal.

This massive reduction in range was caused primarily by the disappearance over the last 300 years of most of the alluvial plain grasslands of the northern Indian subcontinent under cultivation. Habitat destruction made hunting easier and already depleted populations were hunted relentlessly in India during the 19th and early 20th centuries. By the middle of this century rhinos were largely restricted to reserves and parks and their sur-

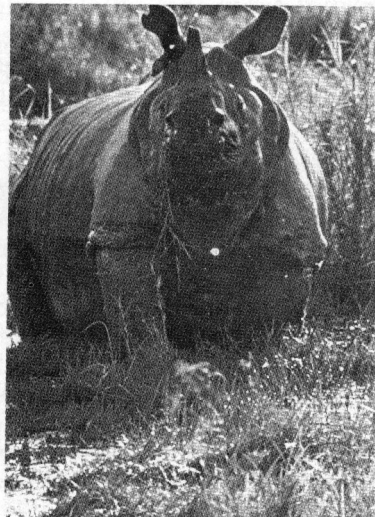
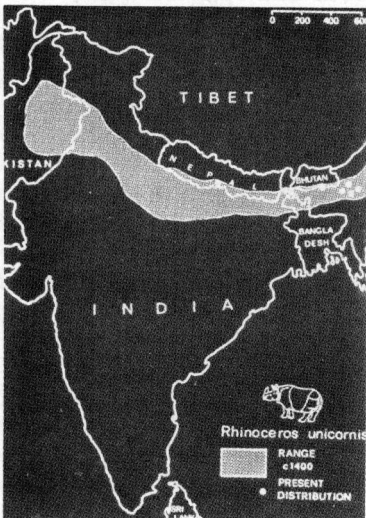


PHOTO: A. LAURIE

The Indian Rhino (right) once ranged from the Indus Valley to northern Burma



vival depended on efficient legal protection against poaching.

The small sizes of the present protected areas means that rhinos are within easy reach of and regularly feed in cultivated land and in woodland areas transformed by human activity and by domestic stock into short grassland with scattered trees and scrubby undergrowth. The alluvial plain habitats are characterised by rapid and very marked changes in weather and vegetation. Fires, the annual monsoon floods and frequent changes in river courses maintain a high diversity of early successional vegetation stages on the valley floor and human activity and stock grazing increase the habitat diversity where the protected areas border on arable or grazing land.

Indian rhinos at Chitawan are known to feed on at least 183 species of plants with grasses (53 species of them) making up between 70 per cent and 90 per cent of the diet according to the season. Other foods include fruits, leaves and branches of shrubs and trees, sedges and ferns, submerged and floating aquatic plants and agricultural crops such as rice and maize which are defended by villagers from machans such as this. Rhinos use the prehensile upper lip to curl around tall grass stems, saplings or branches. In very tall grass rhinos often walk forward with the stems, or canes, between their legs, pushing the stems down and grazing from the tips before walking on. The same method is used when browsing on saplings and often brings foliage within the reach of an accompanying calf. Short grasses and herbs are grazed close to the ground using the lips like a hippo: the tip of the prehensile upper lip is curled back into the mouth and opposed against the lower lip.

Because of seasonal changes in food availability rhinos move between vegetation types at different times of the year, ranges being smallest where the diversity of vegetation types is greatest. Population densities vary from one rhino per two km<sup>2</sup> to two per one km<sup>2</sup>.

Apart from cow-calf pairs Indian rhinos rarely form groups. The most common type consists of two or three subadults. Adult males are usually solitary but sometimes occur in temporary associations of up to nine rhinos of various sex and age classes formed at wallows and grazing grounds where animals often feed or rest together but move independently from each other. These subadults comprise a more permanent group.

Breeding males display by squirting their urine and dragging their hind feet, forming furrows in the ground. There is some degree of range exclusivity among breeding males but no true territoriality. The rapidly changing distribution of food sources and hence of females probably precludes year-round defence of a small territory as by white rhino breeding males.

Mating takes place throughout the year. An adult male locates an oestrous female by following her tracks, sniffing the ground intently from time to time and performing flehmen. He accompanies her intermittently for several days, she usually repelling his advances by simply turning and snorting. Horn to horn confrontations eventually develop and often result in fights, although the males are much more restrained with females than with other males. Prolonged chases take place, sometimes over several kilometres, with loud honks and bleats by the female and squeak-pants by the male.

Copulation which lasts an hour or more is usually achieved only after several attempts.

The birth of the calf takes place 16 months later. Up to the age of six months calves are left alone for periods of up to 90 minutes while their mothers feed up to a kilometre away. Tigers take young calves. I recorded one case per year in Chitawan and there are usually three or more cases per year in Kaziranga. A cow which lost her calf to a tiger shortly after its birth remated again within a month.

## **The Javan Rhino**

The Javan or lesser one-horned rhino has one more skin fold than most Indian rhinos, stands 1.4 to 1.7 metres at the shoulder, has a smaller horn than the Indian but comparable lower canine tusks. The upper lip which is pointed and prehensile is used in browsing on saplings, vines and palms. Unlike that of the Indian rhino it cannot be turned in and used for grazing short grasses.

The Javan rhino occurred formerly in Java, Sumatra, West Malaysia, Thailand, Indochina, south-west China and parts of the Brahmaputra Valley and the Sunderbans. Today the only known population is in the rainforested Ujung Kulon National Park in western Java where there are approximately 60 individuals. It is possible that a few individuals still survive in the Bolovens plateau region of Laos, the Cardaman Mountains of Kampuchea and the Tennasserim Range on the Burma-Thailand border.

The present population density of one in six to ten km<sup>2</sup> is much lower than densities reported in many parts of Java in the early nineteenth century when it was said to "live gregarious", possibly taking advantage of secondary growth in deserted shifting cultivation sites.

It appears to have been originally an animal of lowland swamp forest and forest edges, separated from the greater one-horned rhinoceros in both Java and India by being unable to graze on short grasses but that it ate a certain amount of palms and tall

grasses. Its main diet is of saplings and branches of trees and shrubs. Fights between males and long noisy chases similar to the Indian rhino's have been reported.

### Sumatran Rhino

The Sumatran rhinoceros is the smallest of the five living species, both males and females standing only 1.2 - 1.4 m at the shoulder and weighing less than 1,000 kg. There are two distinct skinfolds and the skin is often hairy. There are two horns and tusks in both sexes. The cheek teeth are low-crowned indicating a non-specialized browsing diet.

Until early this century the Sumatran rhino was still widely distributed in hilly, rainforested areas from Assam to Vietnam, including Bangladesh, Burma, Thailand, Malaysia and Kampuchea and on the islands of Sumatra and Borneo. Formerly it was also found in Laos and parts of southern China.

Now there are probably only three viable breeding populations: at Gunung Leuser in North Sumatra, Endau Rompin in Johore, West Malaysia and Silahbukan in eastern Sabah on the north-eastern tip of Borneo. Remnant populations of doubtful long



PHOTO: A. LAURIE

As human population increased the rhinos had to share their grazing grounds with cattle



term viability occur in other parts of Sumatra, West Malaysia and Sabah and a few individuals are still reported from several areas in Thailand and Burma. The total population is probably fewer than 250 individuals.

The Sumatran rhino feeds on saplings, leaves, twigs, shrubs and fruit. Its food supply is more sparsely distributed but more predictable than the Indian rhino's and its method of feeding, which involves breaking down saplings by pushing or walking over them, produces fresh new growth of food for subsequent visits to the same area. Population densities are rarely more than one individual per 40 km<sup>2</sup>. Most Sumatran rhinos live in primary upland rainforest. Little is known of their behaviour. One rarely sees more than tracks. But they are fond of rivers and wallowing in mud holes and frequent sulphur springs and salt licks.

All three species of Asian rhino are endangered and the main priority in all cases is to maintain protection of the present viable populations in reserves or national parks. They are still threatened by poaching and human encroachment on the habitat but there are now additional threats which stem from the concentration of the few remaining rhinos into a small number of tiny reserves.

More than 1,200 of the estimated 1,500 surviving Indian rhinos live in two national parks with a total of 500 km<sup>2</sup> of suitable habitat, much of it flooded during the monsoon. Any catastrophe such as epidemic disease (15 died in an outbreak of haemorrhagic septicaemia in Kaziranga in 1974), severe flooding, or a breakdown in poaching control could drastically deplete the total population. Furthermore, in these small patches of alluvial plains there is a danger that changes in the courses of the rivers could result in vegetational succession proceeding to a climax condition of pure woodland unsuitable for rhinos.

Other problems for the Indian rhino include habitat modification by the proliferation of exotic plants such as the creeper *Mikania scandens* which smothers the local vegetation and the water hyacinth *Eichhornia crassipes* which sinks with floodwaters onto the open areas around the rivers and lakes of Assam after the monsoon and prevents regrowth of the short grasses which are such an important food source for the rhinos.

With the Javan rhino the main problems are similar: too many eggs in one basket and signs of overcrowding. Five died at the end of last year of disease, possibly the same one that killed 15 in Kaziranga in 1974. There was an epidemic of it just outside the Park in the previous month which killed 50 buffaloes and 350 goats.

There are several possible courses of action which could aid in the conservation of rhinos. First, habitat management within

existing protected areas. For instance, control of introduced plants in Assam, judicious use of fire to provide grazing, and cutting of *Arenga* palms in Ujung Kulon to allow increased growth of the saplings which the rhinos feed on.

Second, enlargement of existing protected areas and the creation of buffer zones wherever possible.

Third, the reintroduction of rhinos to protected areas within the former range of the species. This is most feasible with the Indian rhino and seems essential to reduce overcrowding and spread the risks of a catastrophe. There are several suitable sites for reintroduction in northern India and southern Nepal and work on such projects has already started on a small scale.

There are possible sites too in Sumatra for reintroduction of Javan rhinos, but with such low numbers to start with the project should be approached with more consideration for the effects on the remaining population.

There are three viable populations of Sumatran rhino, all of low density, and few, if any, sites which could be considered suitable for reintroduction. Emphasis should be on maintaining protection of the known viable populations and fighting for the highest possible conservation status for the Silahbukan area in Sabah.

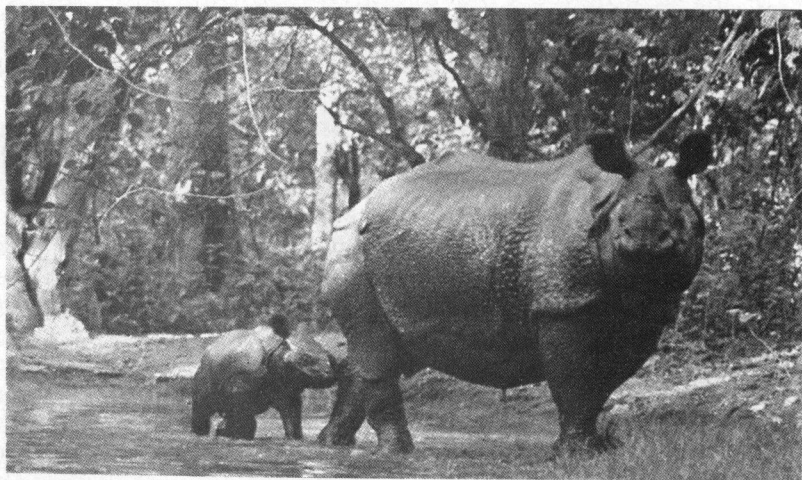


PHOTO: A. LAURIE

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