

A colony of White-bellied Swiftlets in the reservoir overflow tunnel is the largest in the Kuala Lumpur area, a conservative estimate puts their numbers between 10,000 and 20,000. This colony has been the subject of various research studies over the past two decades. A record of the Hoopoe is one of the most southerly in the peninsula. No less than six out of Malaysia's nine Hornbills can be found at Ampang. This impressive list continues — amongst the remainder are 13 Woodpecker, 4 Broadbill, 18 Bulbul, 17 Babbler and 14 Flycatcher species. Two years ago a Masked Finfoot appeared there, one of the more mysterious birds of the peninsula.

BUTTERFLIES

In preparing this article, one of the biggest surprises for me was the list of butterflies found at Ampang by W.A. Fleming. No less than 350 species are there, equivalent to 35% of the total for the peninsula. Of these 59 have been described as uncommon, 38 rare and 23 are very rare insects of which only a few specimens are known to exist. A recent survey in the grounds of the Forest Research Institute, Kepong, yielded 147 species (Tho & Mahyudin, *Malayan Nature Journal* 35 : 77 – 81). They attributed high species diversity to habitat diversity. Over twice this number are on record at Ampang.

THE POTENTIAL OF THE AREA AS A NATURE RESERVE

These notes on a few major groups are not the full extent of our knowledge of the Ampang forest. An inventory of the major tree species has been made; the reservoir was the subject of a limnological study; investigations of the figs and fig-wasps uncovered earth figs there. Thus although a formal survey is lacking, a wealth of knowledge about the site has been built up over the years. From this data-base a picture emerges of an area of tropical lowland forest which, although slightly disturbed, contains a wide variety of fauna and flora representative of the region, including several species listed as rare, very rare or endangered.

The remarkable thing is that this wealth of natural history is only five miles from the centre of Kuala Lumpur. Few capital cities in the world can offer a good example of the country's prime habitat right on the doorstep. The Nairobi National Park is similarly situated and is acclaimed throughout the world, attracting many tourists due to its easy access. **The tropical rain forest is perhaps the most threatened of**

all the world's habitats. Thus the Ampang Forest Reserve is a unique site, only a few minutes by road out of Kuala Lumpur. At the present time the Ampang forest enjoys the protection afforded to a forest reserve and water catchment. However a portion has already been excised and destroyed; great care must be taken to ensure the remainder stays intact.

Along with the neighbouring Ulu Gombak Forest Reserve, the opportunity exists to create a Nature Reserve of over 50 square miles, unique in the world due to its proximity to the amenities of the capital. If such a reserve could be created a significant slice of Malaysia's natural heritage would be effectively conserved. It could serve as an educational area affording young people in schools and colleges the opportunity to see the forest at first hand. With easy access to airport, railway station and hotels, a new stream of tourists with special interest in wildlife could be attracted. **The importance of the site for botanical and zoological interest has already been established, with the site secured for posterity it could easily become one of the best documented areas of tropical rain forest anywhere in the world.**

The protection that Ampang currently receives means that access to the public is restricted and is possible only by writing to the Selangor Water Authority. The MNS Selangor Branch organizes regular excursions to the area and interested members are advised to look out for those.

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C.J. Hails,
Lecturer in Zoology
University of Malaya

ASIAN RHINOCEROSSES: DOWN BUT NOT OUT

There are probably between 15,000 and 20,000 living rhinoceroses in this world. This is not very many when you compare it with over 4 billion human beings, or the same number of rats; and even less when it is realised that there are five species making up the number. The two species of Africa, the Black Rhino (*Diceros bicornis*) and the White Rhino (*Ceratotherium simum*), account for nearly nine-tenths of the total — although just because they are relatively

numerous does not mean that their future is secure — leaving a mere 2,000 or so to be shared out among the three species that live in Asia.

Two of the three Asian species are rather alike, and are placed in the same genus, *Rhinoceros*. They have one horn on the nose: all other species are two-horned. They have a thick skin, sparsely haired if at all, thrown into characteristic folds: two on the neck, one behind the shoulder, one over each limb at the base, one behind the foreleg and one in front of the hindleg, one in the middle of the haunch, and one on either side of the tail. They have glands in the forefeet. The skull is a characteristic saddle-shape, making the dorsal outline deeply concave. The snout is wrinkled and pliable, the upper lip long and prehensile.

The differences between the two species of the genus are not great, but quite characteristic. The fold behind the shoulder is different in shape: nearly always, but according to Laurie (1978) a very few Indian Rhino (*Rhinoceros unicornis*) have the shape that otherwise defines the Javan Rhino (*R. sondaicus*). The skin is studded with raised knobs in the Indian Rhino, but with superficial cracks like a mosaic floor in the Javan. There are differences in the skull and teeth: the long, procumbent tusks in the lower jaw point more forward in the Javan Rhino, and wear against the upper incisors sharpens them; in the Indian Rhino the tusks point more to the side, and

become blunt with wear.

The Sumatran Rhino (*Dicerorhinus sumatrensis*) is much smaller than the Indian and Javan; it has two horns; the skin-folds are poorly developed, and only the one behind the forelegs is fully formed; the skin is thinner, and sparsely but noticeably covered with bristly hair. There are no foot-glands. The skull is flatter, and in general less specialised; the lower tusks blunt with wear, like the Indian Rhino, but are closer together at the base and do not have little peg-like median incisors between them as do Indian and Javan Rhinos. The upper lip is shorter, not prehensile, and not as extensible, the snout being heavily cornified.

The Indian Rhinoceros in the time of the Mughal Emperors was found from the Middle Indus valley of Pakistan via Nepal to the Brahmaputra valley and somewhat beyond. Its habitat was, and still is, swampy flood-plain grasslands, bordering on open forest. In the western part of the range they were exterminated by hunting and by habitat degradation; today they are confined to a few patches in Nepal, West Bengal, Assam and the Putao district of northern Burma. In only two of these patches is it still abundant: in the Chitawan National Park, Nepal, and in the Kaziranga National Park, Assam. In Chitawan the numbers were drastically reduced by poaching and by cattle grazing in the 1950s, but since then



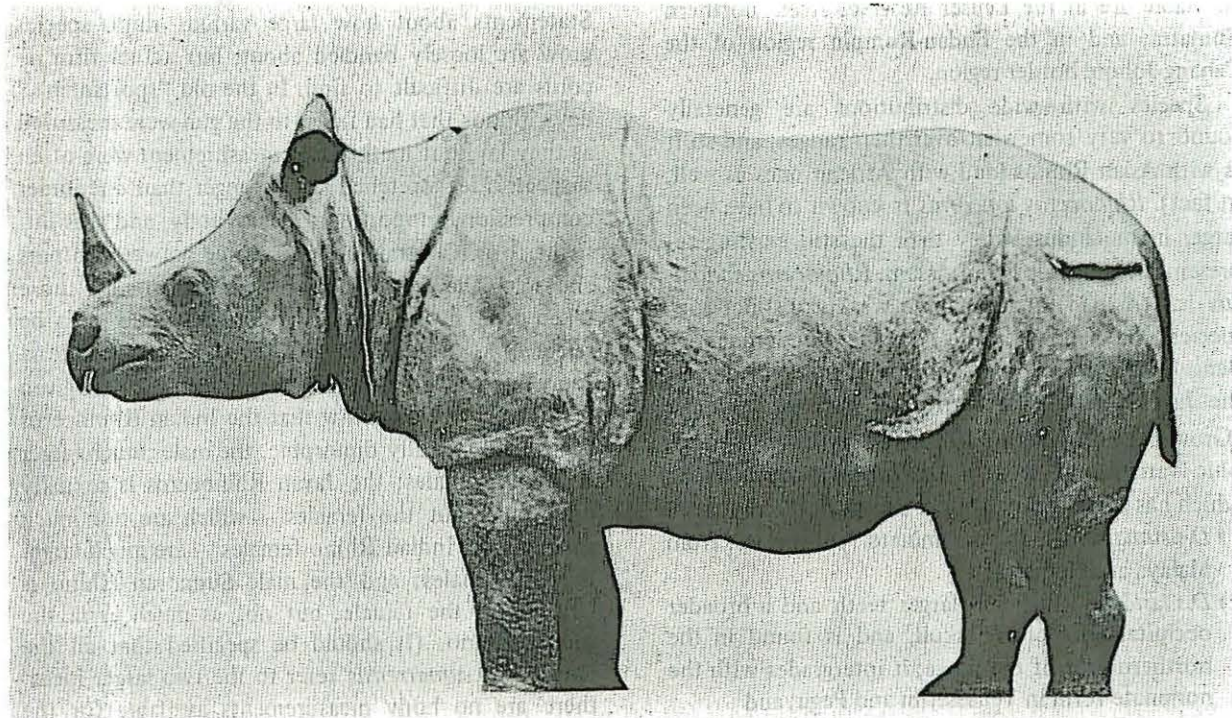
Indian Rhinoceros

their habitat has been well protected and there are upwards of 400 in the Park. In the Kaziranga area the numbers are thought to have been as low as a dozen in the early years of the century, but again protection has had a dramatic effect and the National Park now has more than 800 rhinos. Both Parks are probably overstocked, and there are moves to reintroduce the species to places it formerly inhabited so relieving the pressures. This, of course, is where politics intervenes: not only international — imagine the bureaucratic problems in transferring rhinos from India or Nepal to Pakistan! — but also between Indian states: for Assam has a virtual monopoly on rhinos at the moment, and will not readily relinquish such a wonderful tourist attraction to another state such as Uttar Pradesh.

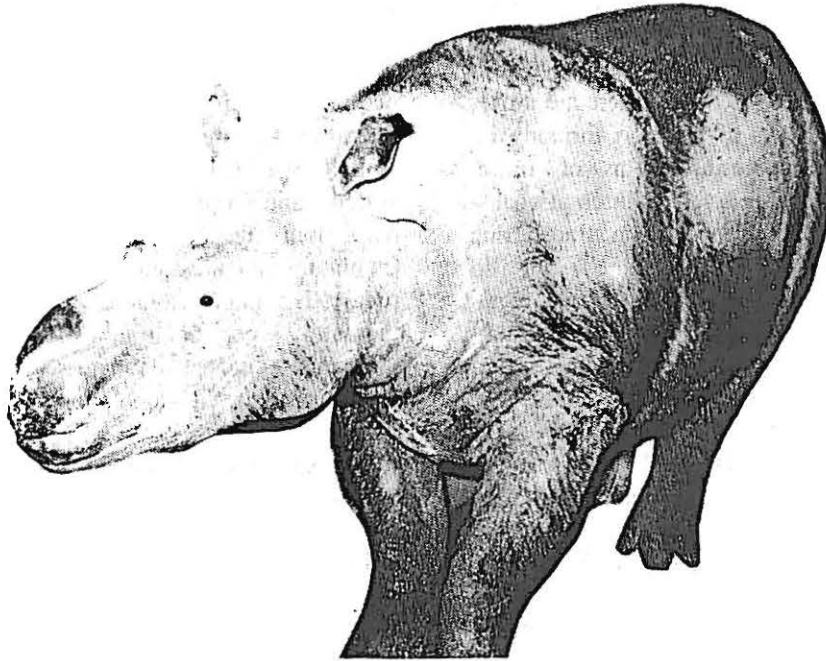
The Javan Rhinoceros until recently rated as a kind of "international basket case" among endangered species. It was formerly abundant in West Java, and at least patchily in Sumatra, Peninsular Malaysia, southern Thailand and the Tenasserim district of Burma; there was a hiatus in the distribution, and Javan Rhinos occurred again in Vietnam and Laos; and again in Bengal and the borders of Bhutan. (Why this odd distribution will be discussed below). The species was solidly hunted out from most of this range; by about 1960, apart from occasional

reports from southern Thailand and from the hinterland of Vietnam, it was restricted to the Ujung Kulon peninsula in West Java, Indonesia. This area, already a reserve in the Dutch colonial times, was placed on a sound footing with an efficient conservator (Bp. Widodo) and Swiss finance in 1966, and recently became one of Indonesia's first National Parks. According to annual censuses conducted by Professor Rudolf Schenkel, Dr Lotte Schenkel-Hulliger, Bp. Widodo and the staff of the reserve, the numbers have risen steeply under protection from 21–28 (minimum and maximum limits) in 1967 to 47–57 today. The numbers increased very slowly at first, then at 17% per annum up to 1972, and more slowly since then — indeed the increase has almost stopped, suggesting that the population may be at carrying capacity.

The Sumatran Rhinoceros is more numerous than the Javan, and more widespread, but far less secure. Its former range extended from Sumatra via the Malay peninsula through Burma to Bengal and Assam; it is unknown how far into the Indochinese region it extended, but records seem to suggest it lived in the Annamite chain, while the Javan rhino was more coastal in distribution (Rookmaaker, 1980); finally, it occurred throughout Borneo. Apparently it still occurs sporadically over most of this range, but the



Mounted Javan Rhinoceros, British Museum (Natural History) from Tenasserim, Burma. This is the only fully-horned female known.



Mounted Sumatran Rhinoceros, British Museum from S. Nyang, Perak. Her front horn is extremely worn.

only populations known to be respectably large and so viable are in the Leuser Reserve, Aceh, northern Sumatra, and in the Endau-Rompin region of the Pahang-Johore border region.

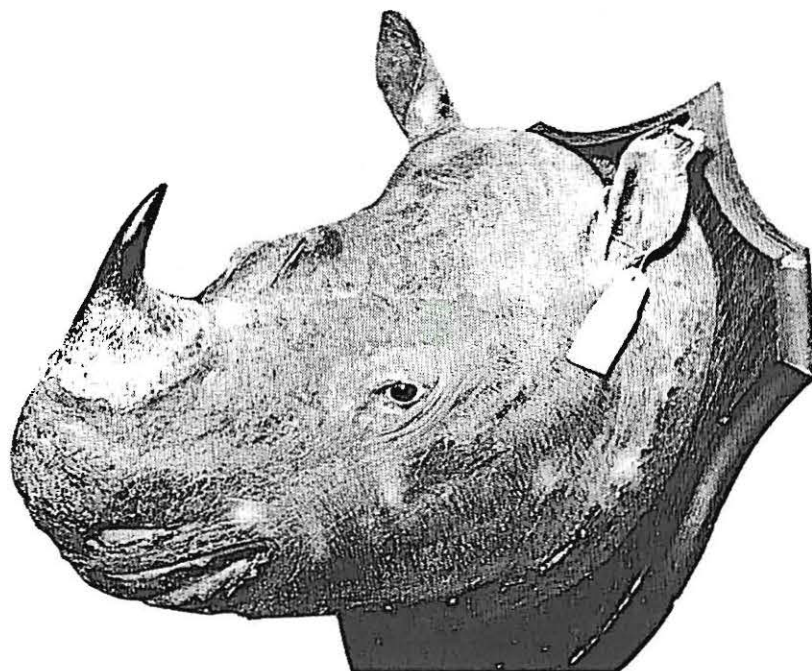
Species with wide distributions are generally found to vary somewhat over their ranges; and so it is with Asian Rhinos (and with African ones as well, in fact). *Rhinoceros unicornis* is known to have been larger in the Indus Valley than the still existing representatives of Nepal and Assam. *Rhinoceros sondaicus* has (or had) at least three weakly distinct subspecies: one, now extinct, in the Sunderbans of Bengal, one in the Indochinese region, and one in the Java-Sumatra-Malaya-Thailand part of its range (Groves, 1980; Guerin, 1980). The strongest geographic variation is seen in *Dicerorhinus sumatrensis*, which has three highly distinct subspecies:

- 1) *D.s.sumatrensis*, the "nominate" subspecies, from Malaya and Sumatra;
- 2) *D.s.lasiotis*, which has larger teeth and a broader occipital part of the skull, and is found in the northern part of the range; it intergrades with the nominate form in Tenasserim and Pegu; and
- 3) *D.s.harrissoni*, distinguished by its small size, confined to Borneo. This is in fact the smallest of all living rhinos.

Size and Growth of Asian Rhinos

Statements about how large various rhino species grow are loosely bandied about, but actual firm records are difficult to find. In the old "sportsmen's" days, rhinos that had fallen to the gun were measured as they lay, but methods of measurement were often suspect: a leg stretched out is longer than one under compression, supporting a heavy body; and it is difficult to get a straight-line distance between withers and sole. The most accurate measurements are those taken from living animals; but even these must be selected, as there is evidence that *R.unicornis* at least can be somewhat stunted in captivity. The data given in the table below show that the Indian Rhinoceros is strongly sexually dimorphic, the males much larger than the females; the Javan Rhinoceros is sexually dimorphic, but the females — which are not much smaller than Indian Rhino females — are much larger than the males; and the male Sumatran Rhino is larger than the female, but not as much as in the Indian Rhino. (It should be specified that all the data for *D.sumatrensis* refer to the two larger races: there are no body measurements available for the small *D.s. harrissoni*.)

These findings are not entirely expected. Hoogerwerf (1970) was convinced that the female Javan



*Mounted head of Bornean Rhinoceros, British Museum, The horns are typical in shape and size for the species *Dicerorhinus sumatrensis* as a whole.*

Rhino is bigger than the male, but the evidence was not very good. More recently Guerin (1980) found the same on the basis of skulls of which the sex was known. I have measured a large number of skulls, and come to the same conclusion: in the measurements of the skull, as of the external body, males are larger than females in Indian and Sumatran Rhinos, but smaller in Javan.

The newborn Indian Rhino averages 4.4% of its mother in weight, 37% of her height. The newborn Sumatran rhino is relatively lighter in weight (2.8%) but taller (46%). The Indian Rhino calf grows at an initial rate of 2 to 3 kg per day and at one year of age weighs ten times as much as at birth. (These figures are based on data published by Lang, 1977; and personal communication from Prof. Lang. They are greater than the figures that can be calculated from Laurie's (1978) study in the wild, implying a somewhat faster rate of growth in optimal captive conditions). The female is fully grown, in captivity, at about 4 years of age, at which time she becomes sexually mature; but in the wild she is not fully grown until some 6½ years, which is when she normally bears her first calf. The male becomes sexually mature at much the same age as the female, but does not reach full size until 8 years of age in captivity,

and still later – 10 years, perhaps – in the wild.

Data on Sumatran Rhinos are incomplete. The best clues we have suggest that initial growth is very rapid, and that the young are nearly of adult stature by 2½ to 3 years, but continue to grow slowly for some years after that; their dental eruption carries on and all the teeth are not in place until some 9 years of age, which is no earlier than Indian (or African) Rhinos. Evidence from skulls supports this: at an early stage of development, when the milk teeth are beginning to break through, Sumatran Rhino skulls are already some 85% of their final adult size, whereas Indian and Javan Rhino skulls are only 60% of adult size (and African Rhinos about 43%).

For the Javan Rhino the data are still poorer. One kept in captivity in Java and documented by Horsfield (1824) grew from 130 cm to 170 cm in four years – making it larger than any wild male recorded! – and implying that full size is reached in captivity by about 5½ years of age, in the case of the male; i.e., earlier than the male Indian Rhino.

Rhino Horn

Rhino skulls can be sexed in most cases by measuring the width of the nasal bones, which are roughened to

MEASUREMENTS OF ASIAN RHINOS

	Indian Rhino <i>Rhinoceros unicornis</i>	Java Rhino <i>Rhinoceros sondaicus</i>	Sumatran Rhino <i>Dicerorhinus sumatrensis</i>
Height (cm):			
Adult female	162.5 159-173 (11)	158.5 137-170 (5)	129.5 117-137 (6)
Adult male	175.4 170-186 (7)	142.8 120-166 (6)	133.8 121-137 (4)
Newborn	60.0 56-64 (6)	-	60 - (1)
Weight (kg):			
Adult female	1604 1599-1608 (2)	1500 - (1)	900 - (1)
Adult male	2101 2070-2132 (2)	1200 - (1)	-
Newborn	71.3 59-78 (20)	-	25 - (1)
Horn length (mm):			
Average male	200-300	200-250	300-400
Average female	100-200	absent!	100-200
Maximum (wild)	529	273	810

form a base for the horn: even in Javan Rhino skulls, this measurement is larger in males than in females. Sure enough, we now have good evidence that the horns are both longer and, more especially, broader at the base in males than in females for all three Asian species. The Sumatran male often has quite a respectable anterior horn; in the female it is shorter, and the posterior horn may actually exceed it in length. The Javan Rhino has the smallest horn of the three: the male's is short and has a small, poorly expanded base, while the female rarely has one at all. On a young adult female Javan Rhino found dead in

Ujung Kulon a few years ago the horn was represented only by a low, rounded bump.

The horns of the three Asian species (of all five species, in fact) are quite easy to distinguish. Indian and Javan horns have a broad groove up the front surface of the horn. Sumatran horns have a smaller base, but the whole snout is keratinised so that the horn base is difficult to delimit.

The horn is made of ordinary epidermal filaments growing over dermal papillae, like hooves or fingernails (Ryder, 1962): it is not compacted hair, as has sometimes been stated. At any rate, there is no reason

whatever to suspect that the horn might have special qualities. The main reason why all five rhino species have been over-hunted, the three Asian ones to near extinction, is for their horns. Martin (1979) has recently made a worldwide survey of the international rhino horn trade: in East Asia rhino horn is still in demand and in use as a fever-reducing drug (not as an aphrodisiac, as has been all too commonly stated), while in Yemen it is used to make dagger handles. In the first five months of 1979 South Korea imported 72kg of horn from Indonesia, 20 from Thailand, 20 from India and 10 from Malaysia, at \$396 U.S. per kg. Hongkong, Macao, Taiwan, China itself, and Japan also imported horn. When we consider that, except for India, all horn from exporting Asian countries comes from the Sumatran Rhino, and whatever species is involved it is all illegal, the future looks rather grim.

Just what Asian rhinos use their horns for is somewhat enigmatic. Subadult males in Chitawan are noted to spar with them; Hoogerwerf (1970) saw two male (adult? subadult?) Javan Rhinos sparring with their horns. There is evidently an element of sexual display involved, as the males have noticeably larger horns than females. What they do not do with horns is fight seriously: this is done with the tusks in the lower jaw, and Indian Rhinos would in the "old days" rip up big game hunters' elephants with their tusks; and the adult males cause horrendous wounds on each others' thick hides with them.

Home Range of Rhinos

Laurie (1978) found that female Indian Rhinos occupy overlapping home ranges; males' home ranges, about 3-4 km² in area, overlap those of females, but within them the bigger males, at least, avoid coming into contact as much as possible. When two "strong" males do meet, they display frontally to each other, and there may be fierce, even lethal fights. "Weak" males, which seem to do little or no breeding, may share the "strong" males' ranges; subadult males form small associations with one another, otherwise they are liable to be attacked by older males.

The Javan Rhino is less well-known. Hartmann Amman, of Basel, has recently completed an ecology study in Ujung Kulon, but his results are not yet analysed. As visibility is much less in the rain forest of Southeast Asia, visual displays of enlarged horns and shield-like neck folds will presumably be redundant. Indeed, as we have seen the adult male Javan Rhino looks no different from the subadult: whereas

the male Indian Rhino keeps on growing, the male Javan Rhino stops growing quite early on. What consequences might this have for the species' social life? One might be that adult males would be able to associate peacefully with each other; Hoogerwerf (1970) published a series of photos of two males in Ujung Kulon wallowing together, occasionally sparring with their horns. The age of the animals is not certain, but their horns are well-formed and even, in one of them, somewhat worn as if by twisting down branches. I suggest that adult male Javan Rhinos, lacking the display features of mature Indian males, might behave towards one another more as sub-adults among Indian Rhinos.

What the size of a Javan Rhino's home range might be is not known fully; but the famous Pinjih Rhino, in Peninsular Malaysia, "seldom left an area of some 40 square miles", i.e. 102 km² (Maxwell, 1907). This is far larger than the range of an Indian Rhino; it might be because of the already advanced depletion of the species' numbers in Malaya at that date (the 1870s), but it is possible that the animal's sheer aggressiveness enabled it to patrol a wide area. Even though the population in Ujung Kulon, as I have suggested, is at or near carrying capacity, the density there is still only some 0.14 per km², whereas *R. unicornis* in different parts of its range lives at anything from 0.45 to 1.79 per km².

Sumatran Rhinos have long been known as wanderers. According to Kurt (1971) the females occupy small home ranges of 2 to 3.5 km in diameter (so perhaps 3 to 9.5 km²) which overlap, while males wander much more widely. He points out that traps placed over well-used rhino paths will therefore catch females, which do constantly revisit the same areas. If there are 40 to 50 rhinos in the 1000 km² G. Leuser Reserve, this means that the species is living at a density of 0.04 to 0.05 per km²: less than either Indian or Javan Rhino.

Both Javan and Sumatran Rhinos live mainly in secondary forest, forest margins and so on. Records of *R. sondaicus* outside Java are almost invariably from low-lying, partly swampy country, while for *D. sumatrensis* records are more from hilly, even mountainous areas. In Java, *R. sondaicus* has also been reported from mountains: evidently the two species competed where they occurred together, and the Javan Rhino at least underwent what is known as "ecological release" in places the Sumatran had failed to reach. Food records indicate the Javan Rhino feeding mainly on twigs, saplings and other woody items; the same foods appear in species lists

for Sumatran Rhino, but a lot of fruit is also recorded for the latter.

This explains some of the physical differences between them. The Javan Rhino's extensible, prehensile upper lip is used — as I have seen myself in Ujung Kulon — for pulling small branches towards it, often branches hanging down, and into its mouth. The Indian Rhino, when feeding on branches, does the same; but when feeding on grass it tucks its lip into its mouth making a hard, square cropping surface like a cow's. The hard muzzle of the Sumatran Rhino would serve to pick up fallen fruit, pluck hanging fruit, and bite off short twigs and low-growing branches. Both Javan and Sumatran Rhinos have been reported to walk over small saplings, pushing them down with their forelegs or chests and stripping them of bark or twigs.

Rhino Behaviour

All rhinos in Asia spend long hours wallowing in mud; Javan and Sumatran Rhinos kick trough-like depressions out of a slope with their feet, and these become wallows when it rains. Javan and Indian Rhinos also bathe in pools and streams, but I do not know that this has been recorded for Sumatran. In all species dung is deposited in piles along trails, different animals adding to the piles; in the Indian Rhino, adult males use these piles most, and the piles are highest and most extensive (up to 80 cm high!) where there are most rhinos — so, the piles are smaller in Ujung Kulon and it seems likely that in Sumatran Rhino country they are the products of single animals only.

Adult males in all three species squirt urine up to 3 or 4 metres behind them, in five or ten spurts, often up to heights of a metre; females squirt only in oestrus. The adult male Indian Rhino rubs his head and horn vigorously on trees and shrubs while squirting, and often walks stiff-legged, dragging his hind toes and leaving parallel furrows in the earth. This form of display, at least the drag-marks, occurs in the Javan Rhino too, but it is questionable whether it occurs in the Sumatran.

Adult males of Indian and Javan Rhinos fight at times over a female; as mentioned above, in the Indian Rhino they may even be fatal, but this is not reported for Javan; nor for Sumatran, in which fights between males have also been reported. In Indian and Javan Rhinos there are long mating chases between males have also been reported. In Indian and Javan Rhinos there are long mating chases between the male and female, the female squealing

loudly, sometimes bringing other males to the scene to take part; these chases seem not to occur in Sumatran or African rhinos.

Mating, when it finally occurs, is a long-drawn-out process, and takes often an hour or more. The female is pregnant for an average of 479 days (with a range of 462 to 491) in the Indian Rhino; we do not know how long gestation lasts in the Javan; and there is only one, rather questionable, record of 240 days in a Sumatran. If this last figure is true, it means that the whole maturation process is accelerated in the Sumatran species — short gestation, and three years or so to reach full size.

The sex ratio at birth in the Indian Rhino is 119 males to 100 females; in different adult populations Laurie (1978) found anything from an equal sex ratio to a ratio of two females to one male, there being relatively fewer males where the population was denser. We have no idea what the sex ratio is in the Javan Rhino; but Hoogerwerf (1970) observes that sightings of females in Ujung Kulon are much rarer than for males: could it be that, in a population which has been increasing rapidly, all those born have been surviving to maturity, so that if the sex ratio at birth is like the Indian Rhino the adult sex ratio will be the same?

In the Sumatran Rhino, the ratio of museum specimens is equal — I presume that all these are rhinos that have been shot, after having been either tracked or encountered by chance. But captive records are very skewed: there have been 22 females kept in zoos at different times, but only 9 males. Most of these have presumably been caught by placing stockades or digging pits on well-used rhino paths: such a method, as explained above, would be most likely to catch females.

Rhinoceros Conservation

What does all this imply for rhino conservation? **Indian Rhinos** can and do exist in high densities, in suitable habitats. Reserves for them can be fairly small — Kaziranga is only 430 km², Citawan 544 km², the other reserves still smaller — and still contain large numbers of rhinos. Males are in strong competition for females, especially where populations are densest, and are very aggressive towards each other, even fighting to the death; so males can be caught and exhibited in zoos, giving the public an understanding of, and admiration for, this endangered species.

With the **Javan Rhino** the evidence is that larger areas are needed, but again fairly large populations can be built up in suitable localities. Like Indian

Rhinos they prefer low, potentially swampy country, with streams and ponds, but in forest not in grassy areas; so, like it, areas suitable for them will be sporadic rather than continuous. If, the Ujung Kulon protection scheme having been so successful, re-introduction elsewhere is contemplated, it must be borne in mind that not all forest areas will be suitable. We do not know the proper sex ratio, nor the degree to which males compete (though we may suspect that they do compete, but not as lethally as in Indian Rhinos), so we cannot with safety recommend the capture of supposedly "surplus" males for zoos. One point does demand attention: what were the consequence of the species being exterminated from so many places? It is quite clear from observations in Ujung Kulon that to a degree the Javan Rhino facilitates its own existence: it breaks saplings and small trees, "bulldozes" areas — and of course drops dung (often in water), which may contain seeds. The exploited areas regrow, and are visited again and again by the rhinos to feed on the new shoots. I would expect, therefore, that forests which have lost their rhinos — Javan Rhinos, at least — will lose much of their low growth; the saplings will mature, and the forest will grow up and acquire a different physiognomy. This strongly suggests that an area into which it is intended to reintroduce this species should be managed at first, to ensure that right from the start the habitat is optimal for the rhinos. Once this is done, then we can expect a rapid growth of the rhino population.

Sumatran rhinos, unlike their one-horned relatives, did not build up high populations in any one place, but were thin, evenly spread throughout their range. The males wander very widely, moving at considerable speeds over all kinds of country, pushing through dense undergrowth with their hard keratinised muzzles, and managing steep hillsides with great agility. The females, as Kurt (1971) found, live on ecotones: forest edge, or the boundary between Lowland Rain Forest and Mountain Moss Forest, in Aceh: areas, that is, of the greatest vegetational diversity. For such a creature, adapted to a diverse environment, very large areas are necessary; one is almost tempted to say that, to contain an adequate number of them, such large areas must be set aside that the "reserve" concept becomes meaningless. While there must clearly be such reserves, it is essential that the species be rigidly protected everywhere, and that the public be informed about the species and be willing to leave it alone: as the protection in the reserves succeeds, the rhinos will spill out of it,

and males, in particular, will wander into villages and cultivated areas as they travel from one female-inhabited nucleus to another.

If this can be done — if reserves can be maintained and the ridiculous reasons for hunting rhinos can be combated — then perhaps the Sumatran Rhino will have a bright future after all. If it is true, as the indications point, that it has a short gestation and matures quickly, then there is great potential for population increase. Surely it is worth trying — worth an education effort to save this thoroughly unique animal?

I have not talked about the distinctive Bornean subspecies, *Dicerorhinus sumatrensis harrissoni*. Smaller than the Sumatran and mainland races, with a different skull, the admittedly sparse evidence suggests that it may not be sexually dimorphic — that males may be the same size as females, and so may play a different role in the social structure. It lives on an island where the Javan Rhino never penetrated. Has it, therefore, been ecologically "released"? Does it occupy a greater diversity of habitats? What are the implications of its small size and lack of sexual dimorphism? If the loggers in the Silabukan forest reserve, Sabah, have their way, we may never know. To the logger (quoted on p.7 of *Malayan Naturalist*, June, 1981) who asked, "Tell me how protecting a few rhinos can help an industry that last year gave Sabah \$1.2 billion", we can give several answers. We can say, if you continue to cut forests at the present rate, they will soon all be gone: then we will have neither rhinos nor \$1.2 billion. If you log scientifically, selectively, as part of a wildlife management plan, you can have both: you have your logging industry, and at the same time preserve a scientific and cultural heritage of national as well as international value; perhaps you can have a wildlife tourist industry (why should Kenya have all the benefits?), a regulated wildlife export industry, and the enormous international prestige that comes from a responsibility successfully carried out.

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Colin P. Groves,
Department of Prehistory and Anthropology,
Australian National University,
Canberra, A.C.T. 2600,
Australia

THE KLANG GATES RIDGE

The Klang Gates Ridge is a massive quartzite vein which runs east of Kuala Lumpur in a west north-west to west direction from Sungai Batu to the Ampang Hills. It is about six miles in length. Its sheer cliffs, free of vegetation, rise above the surrounding vegetation, in some places with a rock face about

120m high, in other places it is divided by wind gaps. The top is a jagged knife edge, in some places only a few feet wide, with precipitous drops on either side. The highest point is 280m above sea level.

The ridge is usually climbed onto near the entrance to the Klang Gates Reservoir. Adams (1953) described a route up the Sungai Kemansah onto the ridge at the Ampang end. Although the climb onto the top is stiff, it is possible for anyone who is reasonably fit. It is best to start in the early morning (the ridge becomes very hot as there is little shade on the top) and to carry water. The walk along the top involves a little scrambling in places. Some of the wind gaps present a sheer drop and it is not safe to cross these unless you have ropes and some experience in climbing.

The climb is rewarded by magnificent views to the east over the reservoir and untouched forest with the grey crowns of seraya, *Shorea curtisii*, and the crowns of the bayas palm, *Oncospermum horridum*. To the west, Kuala Lumpur presents a panorama of skyscrapers in the distance and urban sprawl right up to the ridge. In the early morning the ominous dark grey streak of polluted air sits on Kuala Lumpur.

The massive size of the ridge is an unusual geological feature. The quartz vein was formed together with the granite rock of the main range which has subsequently weathered away to leave the vein exposed. In some places large rock crystals about 7-10cm long can be found; in other places the cavities of rocks are lined with minute needles of quartz. The quartz weathers into a coarse sand which is very poor in nutrients and has low water retention and the vegetation on the top is sparse and low compared with the lowland forest round the reservoir.

History Of The Exploration Of The Ridge

At the beginning of the century there was a bungalow perched above the present tunnel leading to the reservoir. It was in this area that Ridley collected plants

