

Volume 13

MAMMALS IV

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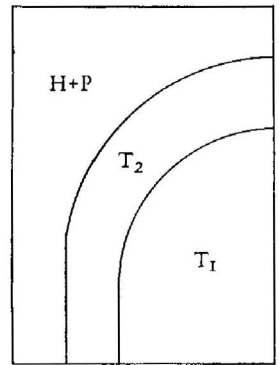
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the list of the endangered species. So far, only very few Central American tapirs have been kept in zoological gardens. By chance, an occasional animal may come into one of the smaller Central American zoos. This large tapir probably does as well in captivity as the lowland tapir and may, according to L. S. Crandall, reach a similarly old age. In the New York zoo a male lived for fourteen years; in Chicago a female reached approximately twenty-seven years. In 1967 each of the zoos in Philadelphia and San Francisco had one female Central American tapir. So far, reproduction occurred only in a few individual cases. As N. Alvarez del Toro reports, the zoo of Tuxtla Gutierrez (Mexico), in 1954 received a male which had been seriously injured by a jaguar. He was approximately half a year old. In 1955 a female, four weeks old, was put together with him. The first young of this couple was born in 1960; however, it was not raised. In 1964 another young was born which, interestingly enough, was part albino. In the San Francisco Zoo a lowland tapir male and a Central American tapir female had several offspring. The young were raised and some of these interesting hybrids are now displayed in the Los Angeles Zoo.

The graceful MOUNTAIN TAPIR (*Tapirus pinchaque*) who is adapted to his alpine habitat is much more delicate and more difficult to keep. His tracks may be found up to the snow line of the Andes. His dense, woolly fleece offers effective protection against the very low night temperatures at these elevations. The mountain tapir, also, seems to be an endangered species. Hardly anything is known about his behavior. So far the mountain tapirs are extremely rare in zoological gardens and the attempts at keeping them have been rather unsuccessful. They turn out to be extraordinarily susceptible in captivity. Apparently, they are not able to adjust to the climatic conditions of the lowland. In New York a mountain tapir lived for two and a quarter years which to date comprises the rather poor record of keeping them.

The MALAYAN TAPIR (*Tapirus indicus*) is different from the American species by the extraordinary contrasting pattern of his coat. One would imagine that such a striking coloring does not contribute to hiding the animals from their enemies; but apparently just the opposite is true. In their natural habitat, the brush of the forest which has changing light and shade patterns, this "tripartition" practically breaks up the outline of the body. Lying down during the daytime, a Malayan tapir is said to resemble a pile of rocks, and therefore is hard to detect along the rock-strewn creeks of his habitat. As in all the other species of tapir, the young Malayan tapir also has horizontal stripes and dots on his coat. The white part begins to show at the age of about sixty-eight days, according to G. H. Pournelle's observations in the San Diego Zoo. After this time the light coloration becomes more and more pronounced, while the stripes fade out rapidly. Finally, 155 days from the date of birth, the stripes disappear almost completely.



The Phylogeny of the Odd-toed Ungulates
A. Horse-related animals (Hippomorpha, described in Vol. XII)

1. Brontotheria
2. Paleotheria
3. Horses: with a detailed genealogical tree of the horses in Vol. XIII

B. Rhinoceros-related animals (Ceratomorpha)

- I. Rhinocerotidae
4. Hyrachyidae
5. Hyracodontidae
6. Amaryndontidae
7. Rhinoceros

II. Tapiridae

8. Tapirs

C. Ankylopoada

9. Chalikotheria

Present-day species of animals are shown in color and extinct ones are shown in gray. Extinct phyla are marked with a cross.

Geological ages (see figure above):

(T₁) Early Tertiary, approximately seventy to twenty-five million years ago.

(T₂) Late Tertiary, approximately twenty-five to two million years ago.

(P+H) Pleistocene (Glacial Period) and Holocene (Present) from approximately two million years ago onward.

CERATOMORPHA

HIPPOMORPHA



Ceratotherium



Equus



Diceros

Elasmotherium

Coelodonta



Aceratherium



Metamynodon



Dicerorhinus



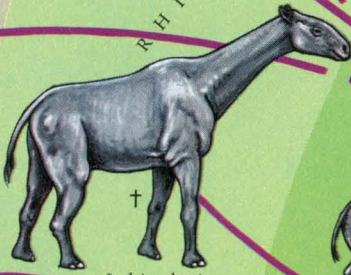
Hyracodon



Brontotherium



Rhinoceros



Indricotherium



Trigonias



Hyrachyus



Palaeotherium



Eotitanops



Tapirus terrestris



Tapirus indicus



Protapirus



Moropus

RHINOCEROTIDAE

TAPIRIDAE

EQUIDAE

BRONTOTHERIIDAE

LOPHODONTIDAE

PALEOTHERIIDAE

HYRACHYIDAE

HELALETIDAE

DEPERETELLIDAE

ISECTOLOPHIDAE

CHALICOTHERIIDAE

ANCYLOPODA

CONDYLARTHRA

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2 Rhinoceros

The presently living rhinoceros are a well defined group of animals whose members closely resemble each other, in spite of the fact that two of the species live on the African continent and three in Asia. Similar to the history of the tapirs, the superfamily Rhinoceroidea consisted of many more species during the Tertiary Period and were classified into several rather different families. Among these families were light-footed runners with long, slender limbs, the *Hyrachyidae* and the *Hydracodontidae*, which appeared in North America during the Eocene age, approximately fifty million years ago. Even though they resembled the contemporary members of the horse family, they were originally like hornless rhinoceros. The *Hydracodontidae* became extinct during the Oligocene (about 40–45 million years ago), leaving no descendants; we probably would have to search among the original *Hyrachyidae* in order to find the original ancestors of all the other Rhinoceroidea (Color plate, p. 31). However, during the early Tertiary Period, there were rhinoceros-like animals which looked quite different, for example the *Amynodontidae* of Eurasia and North America whose appearance resembled that of a hippopotamus, and was rather plump.

The true rhinoceros of the *Rhinocerotidae* family during the Tertiary were also a widely distributed group of many species. During the Eocene, a hornless, small form with slender feet, probably not too different from the other odd-toed ungulates of this era, first appeared. The skull was low and flat, without any indications of horns. The molar teeth consisted of premolars and molars with low crowns and ridges across and on the sides. This basic structure, in spite of some variations, is the same as found in the later rhinoceros. Fossils of members of the subfamily *Caenopodinae* (*Eotrionias*, *Caenopus*, etc.), which belong to the most primitive, oldest rhinoceros, and fossils of several such forms have been found in the Early Tertiary stratum of North America and Europe. These slender-footed, hornless, primitive rhinoceros still had a complete set of front teeth and molars.

Phylogeny
by Erich Thenius

Rhinoceros once in Europe

Of the contemporary rhinoceros, the ASIATIC TWO-HORNED RHINOCEROS (*Dicerorhiniae*) may be traced back approximately forty million years into the Oligocene. At first they occurred as small animals, *Dicerorhinus tagicus*, which were less than the size of a tapir and soon split up into different lines. One line led to the well known, early glacial WOOLLY RHINOCEROS (*Coelodonta antiquitatis*). He was a cold-resistant species with a long-haired, thick coat. Knowledge about him is gained not only from bones, but also from complete bodies with skin and fur which were discovered in the Siberian permafrost soil. In addition, the people of the Early Stone Age have portrayed him on their cave drawings. He was extinct by the end of the glacial period. The woolly rhinoceros had a long drawn out skull and high crowned molars which were especially adapted for the crushing of the hard grass of the steppe. His front teeth had completely disappeared, as in the contemporary SQUARE-LIPPED RHINOCEROS (see p. 64), which also is a grass-eating animal of the steppe. But this similarity in adaptation does not indicate any closer relationship. We find a similar evolution in the somewhat older relative of the woolly rhinoceros, the STEPPE-RHINOCEROS of the earlier and middle glacial period of Europe (*Dicerorhinus hemitoechus*). The larger MERCK RHINOCEROS (*Dicerorhinus kirchbergensis*) from the same glacial periods, however, was rather a forest type. The only contemporary species of this group, the SUMATRAN RHINOCEROS (*Dicerorhinus sumatrensis*) is much closer to the phylogenetically older forms than his glacial relatives, a fact which is frequently found in the inhabitants of the tropical prime forests. Since he still has front teeth and molars with low crowns, which are not suitable for the crushing of hard steppe grass, we have to consider him as a slightly modified survivor from the Tertiary Period.

The GREAT INDIAN RHINOCEROS, which live in South Asia today, can also be traced back to the Tertiary (Miocene, approximately twenty-five to ten million years ago). *Gaindatherium browni* from the lower and middle Siwalik strata of India can easily be traced from the Early Tertiary genus *Caenopus*, and thus represents the original form of the glacial species of *Rhinoceros sivalensis* and *Rhinoceros sinensis* as well as of the present-day Great Indian and JAVAN RHINOCEROS (*Rhinoceros unicornis* and *Rhinoceros sondaicus*). The Javan rhinoceros is the older of the two species, remaining almost unchanged since the late Pliocene of more than a million years ago.

The African rhinoceros form a separate branch (subfamily Dicerotinae) which includes the present-day BLACK RHINOCEROS (*Diceros bicornis*), which originally fed on foliage, and the SQUARE-LIPPED RHINOCEROS (*Ceratotherium simum*), which is a more highly evolved grass-eater.

From the Eocene until the Miocene (approximately sixty to ten million years ago), the Paraceratheria or Baluchitheria (subfamily Paraceratheriinae) lived in Eurasia. They were hornless, long-necked

rhinoceros with huge, column-shaped legs. The largest terrestrial mammals of all times belonged to this group, the genera *Paraceratherium*, *Indricotherium*, and *Benaratherium*. The *Indricotherium asiaticum* was five meters in height and seven meters long. The bones of this giant animal, which were approximately thirty-five million years old, were found in Kazakhstan on the banks of the Tschulka River. Those giant rhinoceros became extinct during the Miocene without leaving any descendants.

However, this list nowhere near exhausts the multitude of prehistoric forms of rhinoceros. There were slender-footed, long-legged rhinoceros, for example, the predominantly hornless *Aceratherium* which had long tusks in the lower jaw; furthermore, there were short-footed savannah types like the genus *Teleoceras* from North America and the genus *Brachypotherium* from Europe; and finally, there was the North American-Eurasian genus *Diceratherium*, which had two horns side by side on the nose. Another extinct line of the rhinoceros are the Elasmotheria from the glacial period of Eurasia. *Elasmotherium* was a giant form with a skull almost one meter long. This skull bore on its forehead a huge bony pad on which a correspondingly large horn must have sat. The dental enamel of the molars was ruffled, which is unknown in any other rhinoceros.

Compared to this multitude of forms in the tertiary and glacial rhinoceros, the surviving four genera appear rather stunted in spite of their size. They all live in remote habitats, seemingly because they have not been able to compete any longer with the other ungulates, especially the ruminants. Above all, however, human influence has basically changed wide areas of Africa and Asia, thus making them uninhabitable for rhinoceros. Since man first pursued animals, the rhinoceros have been hunted. The pictures in the Early Stone Age caves of Pech-Merle, Rouffignac, Colombière, and Les Trois Frères tell an obvious story. But they also show that these animals already had mystical significance in earlier times.

The present-day rhinoceros (family Rhinocerotidae) are either hairless or barely villous. HRL 200-400 cm, TL 60-76 cm, BH (shoulder) 100-200 cm, weight 1000-3600 kg. The surface of skin is distinctly sectioned, especially in the Asiatic species. On the nasal bone are one to two horns. There are 24-34 teeth arranged as follows: $\frac{0-1 \cdot 0 \cdot 3-4 \cdot 3}{0-1 \cdot 0-1 \cdot 3-4 \cdot 3}$. The gestation period is 419-550 days. One young is born.

It is commonly held that rhinoceros horns consist of matted hair. This is not quite correct. The horns consist throughout of ceratin, and they do not have a bony pith like the horns of cattle. Under a microscope, however, one can see that the individual rods are not coated with an individual protective layer as is real hair. They adhere densely together in layers, thus they resemble neither the hair nor the horn of a ruminant, but rather the material of the hoof. This construction

▷ Rhinoceros

1. Great Indian Rhinoceros (*Rhinoceros unicornis*)
2. Javan Rhinoceros (*Rhinoceros sondaicus*)
3. Sumatran Rhinoceros (*Dicerorhinus sumatrensis*)
4. Square-lipped Rhinoceros (*Ceratotherium simum*)
5. Black Rhinoceros (*Diceros bicornis*)

▷▷

A black rhinoceros mother with her sub-adult young. The African black rhinoceros (*Diceros bicornis*) is the only species of rhinoceros which still occurs rather frequently in many areas of its distribution.

Present-day rhinoceros by E. M. Lang

Distinguishing characteristics

Of what does the horn consist?