The Dawn Horse or Eohippus

By CHESTER STOCK

RECENTLY COMPLETED in the laboratory of vertebrate paleontology at the California Institute of Technology is the first free or open mount of a tiny early member of the horse family. The difficult task of preparing this specimen and of reconstructing missing parts was accomplished by William Otto, sculptor and preparator at the Institute. An innovation is the use of leucite in the supporting framework of the skeleton, giving a lightness and clarity of presentation rarely achieved in the preparation of such materials. While thousands of fragments of jaws and skulls, teeth, and parts of skeletons of **Eohippus** have been collected by a number of institutions, there are only three or four mounted skeletons of this animal in existence. With the exception of the present individual, the other two or three have been prepared on plaques or as half mounts in which, for the most part, only one-half of the body is shown.

Eohippus, as the early ancestor of the modern horse has come to be called, occurs in lower Eocene strata that were deposited some 45 millions years ago. It is interesting to note in passing that the name of this animal was actually coined by Thomas Henry Huxley during a visit to the United States in 1876. On that occasion, Huxley, the great proponent of the theory of evolution, was much impressed by the factual evidence in support of the theory offered by the Yale University collection of fossil horses. The collection had been gathered by Professor O. C. Marsh in the course of his explorations for fossils in the badlands of the Great Plains and Rocky Mountains. It was not long after Huxley's comments during this visit that Marsh applied the name **Eohippus** to a type of horse discovered in the lower Eocene deposits of the West.

The California Institute specimen shown in figure 1 was collected in the summer of 1931 by Professor E. L. Troxell of Trinity College, Connecticut, who discovered the material in landlaid strata of the Big Horn Basin, northwestern Wyoming. Unfortunately, the skeleton and skull do not belong to the same individual, but the disparity in size of the skull with regard to that of the body is such as to not give the head an appearance of being disproportionately large. Both parts of the mounted specimen were found in the same deposit. When discovered the skull was badly smashed and preserved in an extremely well indurated, fine grained sandstone. The available parts were removed from the matrix and oriented in proper position, as they would have occurred in an undamaged skull. This operation required considerable skill and patience on the part of Mr. Otto.

The most obvious difference between **Eohippus** and the modern horse is the tiny size of the former (see figure 2). The **Eohippus** specimen has a shoulder height of only 13 inches, in contrast to 5 feet, 3 inches which represents the height of a modern horse of average size. There are many additional features to be seen in this diminutive early member of the horse tribe. Its body, for example, is long and the back is arched. The bones of the legs retain their primitive and generalized relations. Those of the lower segments of the limbs do not show the coalescense and reduction of elements seen in later, more specialized types of horses. **Eohippus** likewise possesses a greater number of functional toes, namely four in the front and three in the hind feet, while in **Equus** there is only a single functional digit in each foot. The cheek-teeth are short-crowned with low cusps, and thus noticeably different from the long-crowned

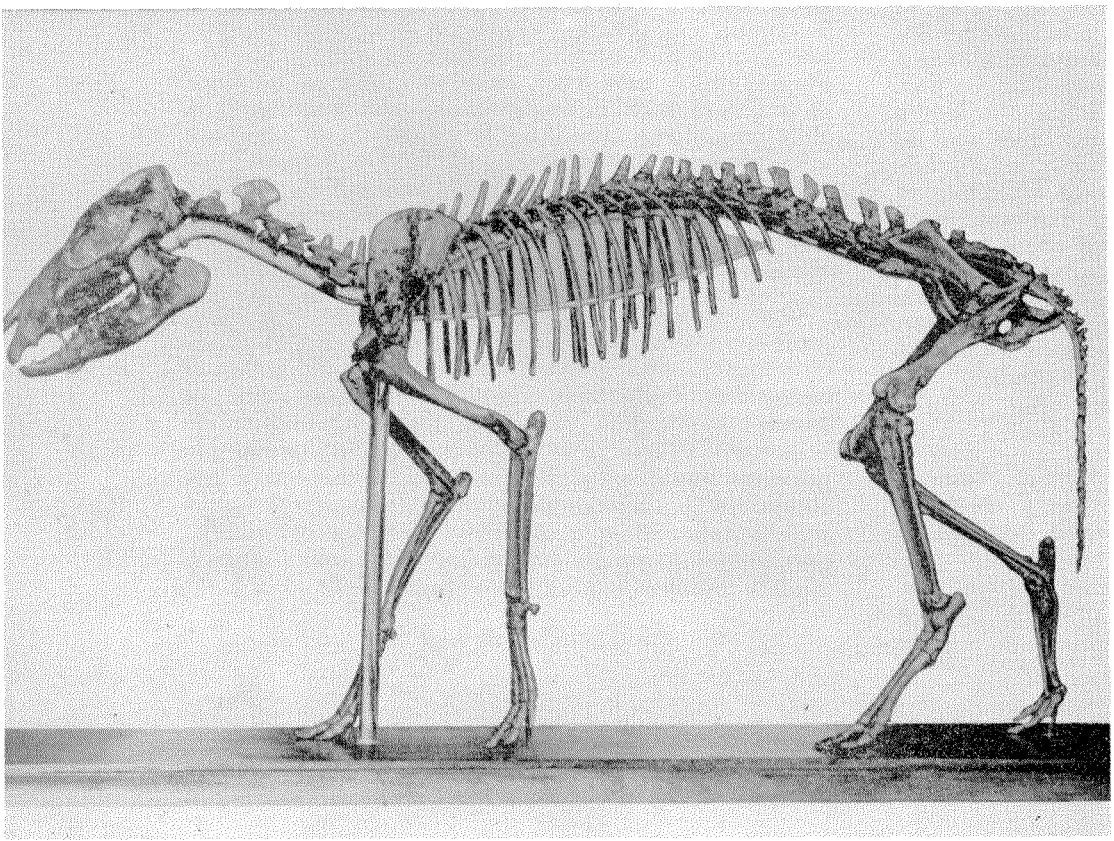
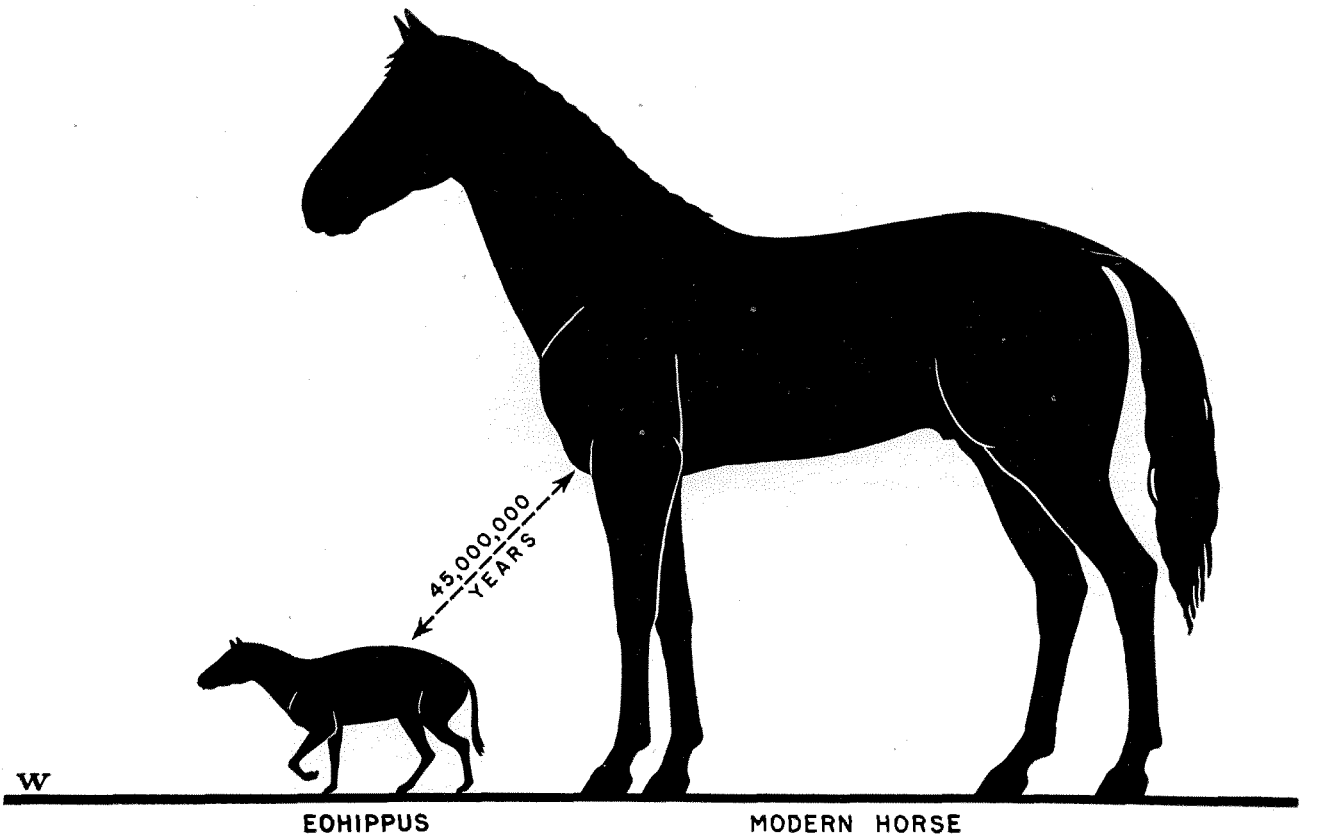


Figure 1. Skeleton of EOHIPPUS, discovered in the Big Horn Basin, northeastern Wyoming, and mounted by the Division of Geology's Paleontological department. One-fifth natural size.



EVOLUTION OF THE HORSE
FROM *EOHIPPUS* TO *EQUUS*

Figure 2.

grinding teeth in **Equus.** Moreover, in **Eohippus** the premolars are unlike the molars, whereas in the modern horse all these teeth are essentially alike in appearance and construction, with the exception of the first premolar which has become either greatly reduced in size or has been lost.

Judging from its dentition **Eohippus** was probably an omnivore feeding on a variety of plant foods. Ample evidence is available from a study of the fossil plants of the lower Eocene to indicate that forests were widespread on the North American continent at the time. It seems reasonable to infer from the delicate construction of **Eohippus,** and from the characters of the teeth and feet, that the animal often sought the shelter of a wooded environment (figure 3). Moreover, this ancient member of the horse family was probably more a browsing than a grazing mammal. **Eohippus** had not yet acquired the fleetness of foot that distinguishes its larger plains dwelling descendants of later geological time.

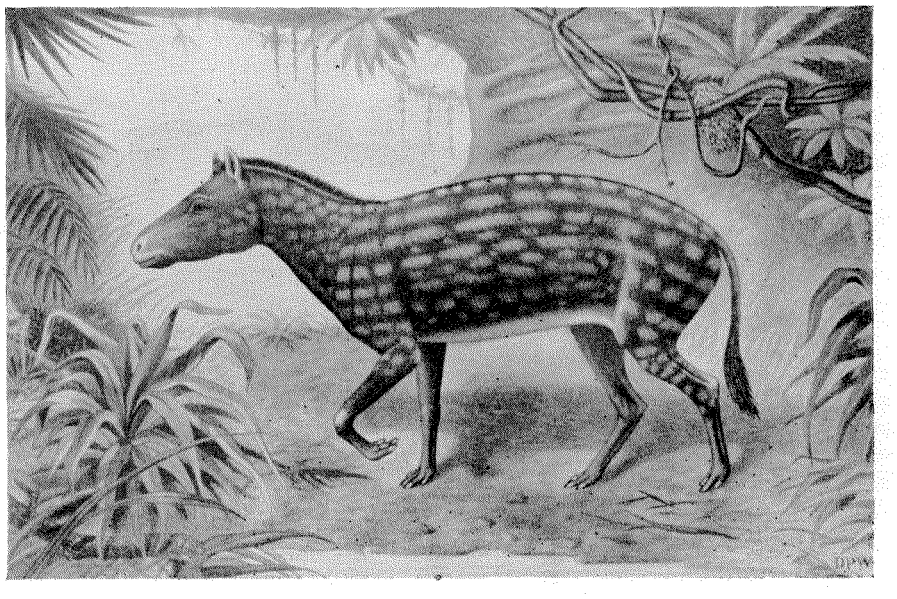


Figure 3. Restoration of EOHIPPUS. Teeth and feet of the skeleton indicate that this predecessor of the modern horse was a forest-dwelling animal.