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A NEW LINK IN THE ANCESTRY OF THE HORSE

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The series of American Tertiary ancestors of the horse is one of the classic examples of evolution provided by the fossil record and the most complete and convincing among the mammals. Nevertheless, it is well recognized by those who have made a special study of it, that, while the broader lines of descent are beyond reasonable question, there are definite gaps between some of the successive stages and many minor problems as to the details of phylogeny. It has been confidently believed that these gaps would be filled by the discovery of fossil Equidæ in the intervening strata heretofore barren, and from time to time such discoveries have been made and the predictions as to their character always more or less precisely verified.

The most serious gap that exists at present is between the Upper Eocene *Epihippus* and the Lower Oligocene *Mesohippus*, and this gap still remains. I anticipate that it will, at least partly, be filled by systematic search in certain western and northern outliers of the White River Oligocene, which contain an older fauna than the main exposures but are very little known.

A second gap existed twenty years ago between *Miohippus* of the upper Oligocene and *Merychippus* of the later Miocene, but this has been filled by the discovery in 1905-1916 of numerous species of *Parahippus* in the intervening Lower Miocene strata, so that it is now not easy to draw the lines of demarcation above and below *Parahippus*.

A third gap existed between the Lower Pliocene *Hipparion-Protohippus-Pliohippus* group and the Pleistocene and uppermost Pliocene *Equus*, the modern type of horse. The importance of this gap has been somewhat overestimated by some European authorities, whose estimate was probably based upon comparison of the European species of *Hipparion* with the true *Equus*; it is in fact a rather small gap, if comparisons be made with the various American species of these three genera. Some of these, however, were very incompletely known. The Middle Pliocene species referred to *Pliohippus*, from the Blanco formation of Texas and the Etchegoin of California, were intermediate in geological

age, and in characters as far as known; but all that was known of them was a few teeth from the Blanco and three or four teeth from the Etchegoin.

Mr. Childs Frick, who has been making a special study of the Equidæ, had urged upon me for some time the importance of further work in the Blanco formation and provided the funds for such field work. This work was taken up this spring with very satisfactory results. We were fortunate to secure among other things a nearly complete skeleton, lacking only the skull, and a second partial skeleton with well-preserved skull, of the large so-called *Pliohippus* from the Blanco. The first was found by myself, the second by my assistant, Mr. George Simpson. It proves to be a very interesting type, intermediate between the typical *Pliohippus* of the Lower Pliocene and *Equus* of the Lower Pleistocene, so far as the characters were observed in the field.

This form is of the size and limb-proportions of the average Pleistocene species of *Equus*, much larger and more robust than true *Pliohippus*. The teeth are most like *Pliohippus*, but longer-crowned and less curved, with heavier mesostyle and larger and more nearly isolated protocone. The cement lakes of the upper molars are narrower, and their enamel borders have a few simple inflections. The skull has the elongate proportions of *Equus*, in contrast to the shorter skull of typical *Pliohippus* and earlier equids. It retains in the forefoot tiny vestigial nodules representing the trapezium and fifth digit, progressively reduced in the earlier stages of Equidæ, normally absent in modern *Equus*. The splints are from two-thirds to three-quarters of the length of the cannon bone, nearly or quite as much reduced as in *Equus*, while in true *Pliohippus* the splints are almost as long as the cannon bone, and it is not certain that the lateral phalanges had entirely disappeared. Many other characters will doubtless appear in the course of preparation and study of the two skeletons.

The intermediate character of the California and Blanco species has been recognized by Dr. J. C. Merriam from the few teeth which he had for study. The discovery of the entire skeleton now makes the osteology of this stage completely known, and will enable us to trace in detail the transformation of every part of the skeleton. It remains, of course, to be seen whether our Blanco species is in all respects intermediate; it may prove to be a little off the direct line. But the genus that it represents is certainly the desired intermediate stage between *Pliohippus* and *Equus*, and may be known as **Plesippus**, a somewhat syncopated compound from $\pi\lambda\eta\sigma\iota\omicron\varsigma$, "near," $\iota\pi\omicron\varsigma$, "horse." The species is probably *P. simplicidens* Cope, described as a species of *Equus*, referred by Gidley in 1907 to *Pliohippus*. *Pliohippus proversus* Merriam is referred to the new genus.