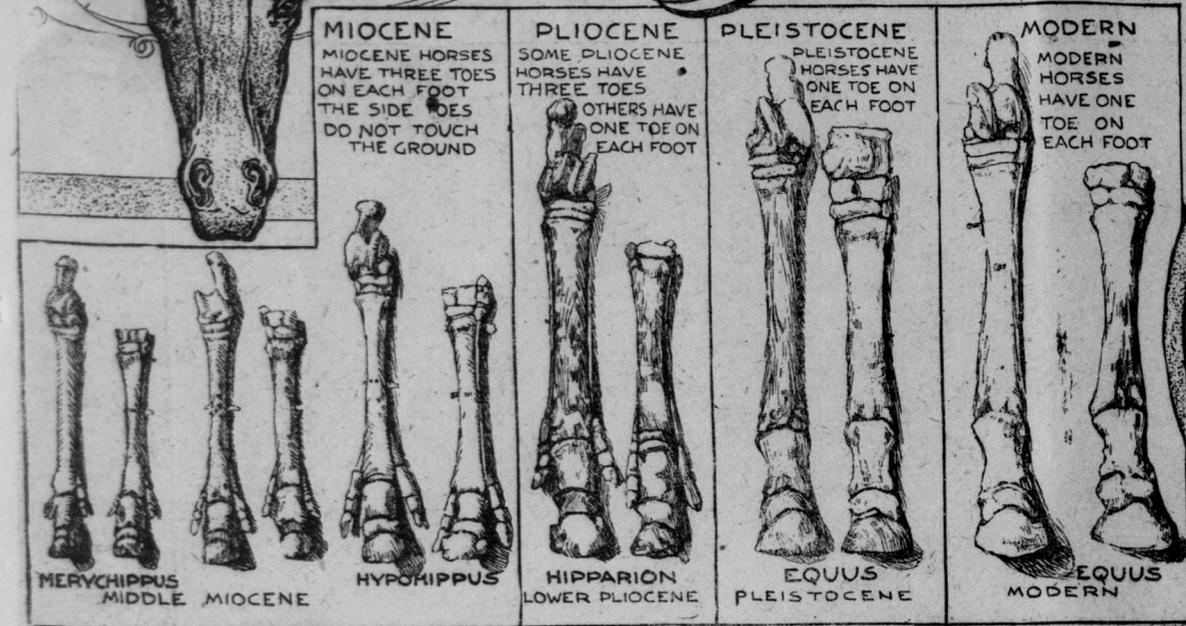


Evolution of the Horse



Showing Evolution of the Feet

There is no conclusion of the science of evolution that has been accepted the world over it is the demonstration of the descent of the horse from a little animal no larger than the fox.

The discovery of the bones of the ancestors of the horse has been made chiefly in the United States, and in all the museums of natural history from New York to London and Berlin are models showing the steps in this evolution of the most useful animal known to man from a very small animal to a large one.

In order to appreciate the position of the theory, as now held, a brief statement of what the authorities have to say is necessary.

If we study a hind foot and fore foot of a modern horse we will find that on the hind bone the heelbone, or "hock" (the calcaneum), stands at the top of the ankle. Below you see the three bones which constitute, as in fingers and toes, what is called the digit. Then there is a long bone, which is the metatarsal bone. In the front foot the similar bone is called the metacarpal. At the top of these are several short bones joined together; these are the tarsus, or ankle, and the carpus, or wrist (so called knee of the horse's front leg), respectively. It is apparent, then, that the horse walks on the very last joint of its toes and keeps the foot and the hock upright, so that the heel is right above the toe, instead of behind it, as in ourselves and the bears. On each side of the long bone of both hind and fore feet is a small long bone. These delicate splint bones, as they are called, are all that remain in the modern horse of two additional toes.

single toed modern horse, with its splint bones as the sole representative of the two outer toes.

Occasionally modern horses are born with two complete little toes provided with hoofs and attached to the splint bones, one on each side of the big central toe. This is what is called an

stunted herbage, which is the natural habit of the horse.

Prehistoric Horse Size of Cat.

"In the series of ancestors of the horse we can trace every step in the evolution of those marked peculiarities of teeth and feet which distinguish modern horse from an ancestor which so little suggests a horse that when its remains were first found, forty years ago, the animal was named by the great paleontologist Richard Owen, the Hyracotherium or 'coney-like beast.' Its relation to the horse was not at that time suspected by Professor Owen and was recognized by scientific men only when several of the intermediate stages between it and its modern descendant had been discovered. On the other hand, this first ancestor of the horse line is very difficult to distinguish from the contemporary ancestors of the tapir and the reindeer. Referred to all the modern quadrupeds have diverged from a single type, each becoming adapted to the needs of its special mode of life."



The Middle and Upper Miocene, have but one (the central) toe touching the ground, the side toes having almost disappeared in some specimens.

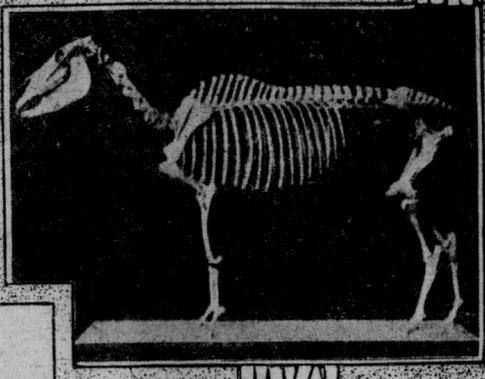
Equus, the twelfth and final stage, is found in the Pleistocene and recent stages. In this real horse the side toes have disappeared entirely, being represented only by the side splints. There is no trace on the fore foot of the little nodules which in the Protohippus represented the first and fifth digits. The skull is lengthened and the animal is much larger.

An Interesting Explanation.

The explanation given of this entire evolution is most interesting, for it embodies the chief principles of all study of evolutionary science. It is not only in the alteration of teeth and toes that the horse changed during the stages of its evolution, but in the considerable increase in the length of the legs, especially of the lower part. The surfaces of the joints have changed, and from being ball and socket joints during the first stages they have become grooved like a pulley wheel, permitting freer motion backward and forward, but little sideways, making the joint very strong. The foot is better adapted now to travel over smooth, regular ground and of little value for striking and grasping.

The increased length of lower leg and foot increases the length of the stride without diminishing the quickness. But the longer lower leg requires additional strength, and this is obtained from the change of the ball and socket joint into a pulley joint. Another increase of strength was obtained by the horse by the consolidation of the two bones of the forearm (ulna and radius) and of the leg (tibia and fibula) into one. Of course as the horse became taller the neck had to be lengthened for it to reach the ground in grazing, and the head too was elongated. The centering of the weight in the middle toe was also intended to increase the speed over smooth ground. The soft-footed animal travels well over uneven ground, but at a loss of speed, because the yielding of the foot means a loss of power. A hard tire on an automobile is "faster" than a pneumatic, though rougher riding. The changes in the character of the teeth of the horse were also an accommodation to altered conditions. Referred to all the modern quadrupeds have diverged from a single type, each becoming adapted to the needs of its special mode of life."

Probable Appearance of the Hyracotherium, an Eocene Ancestor of the Horse with a Four Toes on the Front Foot



Now comes the announcement from Wyoming, where many fossil animals of the oldest period have been discovered, that the archaeologists digging in the Big Sweetwater Divide have found the fossilized skeleton of a gigantic horse, which will upset all accepted theories as to the evolution of this species. It is said this horse stood thirty feet high and was thirty feet long. If this identification of the bones with those of a horse prove true, then all the textbooks will have to be rewritten, and one of the foundation stones of the theory of evolution will be seriously loosened, if not smashed.

Professor Cope of Yale traced all the steps in the evolution of the horse, covering a period of about three million years, showing all the alterations in structure, especially of teeth and feet, the important indices of the alterations due to selection and adaptation of environment, the two leading influences in the process of evolution, as held by Charles Darwin and his successors.

The horse is curiously different from other typical mammals, having only one toe on each foot, and teeth of very complex pattern. All modern writers on this subject state positively, in so many words: "Immense numbers of extinct horses and horse-like creatures have been dug up, and we know quite clearly all the stages leading from living horses back to four-toed and ultimately to five-toed ancestors." (Professor Lankester, a leading British authority.)

Professor W. D. Matthew, Ph. D., associate curator of vertebrate paleontology in the American Museum of Natural History, New York, takes for granted the entire line of evolution of the horse in his published leaflet

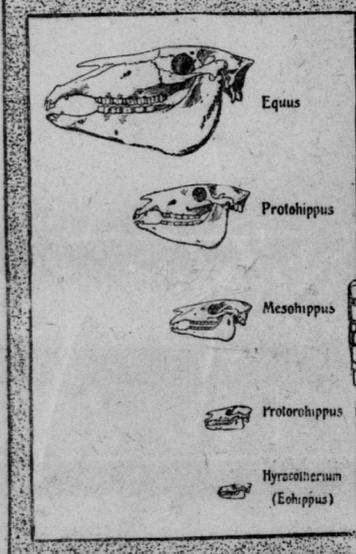
The Three Toed Horse.

The horse has been traced backward to that fossil horse of the Miocene strata which had three well developed toes, each with a hoof resting on the ground. These are known as the mesohippus and anchitherium. Ear than these came a horse-like animal (hyracotherium) with three toes of nearly equal size on the hind foot and four toes on the front foot.

In the Pliocene strata are found in Europe and America remains of the hipparion, which had three toes on each foot, but the side toes were getting small, something like the little toes of the pig and cattle. They did not touch the ground and were evidently in process of disappearing, leading to the

formation in Western United States and characteristic type of horse in each.

A Thoroughbred English Horse



of serving salad without oil as any form of refreshment without wine or cigarettes. It is not a question of temperance, but one of custom and necessity.

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Beautiful indeed was the scenery down the coast of Italy, through the Straits of Messina and south of the Peloponnesian peninsula to Piraeus, that all-important port of Athens, and delightful were the days spent in the Grecian harbor. King George was absent, not having returned from the obsequies of his father, the King of Denmark, but the Queen (ne Grand Duchess Olga of Russia), Crown Prince Constantine and his Crown Princess, the sister of the Kaiser, were in their home palaces, and although the season was Lent and the Court in mourning a special audience for Admiral Sigsbee, his staff and the commanding officers of the division was arranged. On the last day of our stay the Queen, Prince Constantine and his consort, the eldest son of the Crown Prince, and others of the royal entourage visited the Brooklyn, where they enjoyed themselves so heartily that departure was delayed for nearly an hour lest the time of their visit be curtailed.

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When Rear-Admiral Sigsbee showed the flag in foreign waters

WHEN REAR-ADMIRAL SIGSBEE SHOWED THE FLAG IN FOREIGN WATERS

(Continued from Preceding Page.)

"at home," to which fully 400 invitations were issued.

A tea, with dancing, on the flagship, is very well worth while. All the invitations were accepted and more solicited, and beautiful indeed shone the quarters, canopied with canvas and walled with flags of every saluting nation under the sun. Everything possible, even to the huge winch, had been removed from the after deck to give the dancers room. The glistening planks had been strewn with gratings from sperm-candle; Jack had been invited—not ordered, mind you, invited—to dance to the music of the band that was stationed in the bayonet-rimmed stand, which every day appeared as the main hatch leading to the engine-room. On the gun deck below, where is located the admiral's cabin (the largest in the United States Navy), the captain's quarters and those of the executive and navigating officers, refreshments had been provided; estables, including bon-bons and sweet cakes of every known variety, and potatoes running the gamut from champagne to white wine cup of serrated water.

A small entertainment fund is provided by the Navy Department for the use of an admiral and his division, upon whom is imposed such a round of official and social duties as are necessary concomitant with showing the flag in foreign ports. None the less it is true that such a tour is exceedingly expensive to every officer, and especially to the admiral in command, whose entertainments must be far the more pretentious and elaborate. This expense is largely by reason of the inhibition, expressly made when the fund is appropriated, that not one penny thereof must be spent for wines, cigars or cigarettes. Around the Mediterranean littoral one would as soon think

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