THE NEW MOTOR CHAIR.

The new motor carriage here shown is termed the "morette," and was one of the novelties at the last British Automobile Exhibition. As here shown, it is built to carry one person up to 12 miles an hour. The double morette can carry two persons side by side and a higher-powered motor is then used.

The morette is started from the seat by the lever *B*, shown, is steered by the tiller handle, and has a footbrake acting simultaneously on the back wheel tires. The engine (which contacts with the front wheel tire), and all the paraphernalia pertaining thereto, is disposed in an eminently neat fashion within the front frame. The basket body is wide and comfortable, and is strengthened throughout with iron stays. The single morette is designed to carry one person at a speed up to 12 miles an hour. A double carriage is also made, with, of course, a higher-powered engine to attain the same results. The prices of the two designs are respectively 50 and 70 guineas. The frame is very strongly made with 1⅛-inch steel tubes, and fully braced and strengthened to meet all strains, particular attention having been paid to the attachments at ball head and rear axle—the vital points. The metal work is finished in any color, and nicely set off with aluminium-enameled panels. With regard to the question of vibration, either from the engine or the road, elaborate precautions have been taken to insure the comfort of the rider, and render him or her immune from this undesirable accompaniment of his pleasure. The body of the carriage is isolated from the frame, being cradled between luxuriant C springs, while a padding of vulcanized sheet rubber has been inserted where the engine rests on the frame. Additional, there is the vibration-absorbing quality of the tires, the well-known Swain tire being recommended as standard. On the single morette, tandem non-slipping tires are fitted to the back wheels, and a plain motor cycle tire to the front wheel, the latter being also safeguarded within by the fitting of a self-sealing air chamber. In the double morette, motor cycle tires are fitted all round. The wheels are 26-inch back and 28-inch front. Coming now to the more mechanical, and certainly most vital, point of the propulsion medium, the morette engine will be found to be one of the most efficient on the market, while, as we have remarked above, it is automatic in every action, requiring no expert knowledge to manipulate it. It is a two-cylinder valveless motor. The flywheel, which is plainly shown in the illustration, carries on its inner side a rubber-covered driving pulley, which is in frictional contact with the tread of the front tire. The engine is carried on a bracket behind, and attached to the crown of the front fork, the latter being more than sufficiently strong. The engine is carefully balanced upon both sides of the front wheel. It is lubricated upon the chop feed principle, the oil being atomized as it is carried into the engine with the petrol mixture.

The cylinder of the engine when in action is inclined slightly upward. The well-known F. N. carbureter of the latest type is fitted, and this is placed where the most even temperature is insured. The petrol tank holds a supply sufficient for 70 miles' actual use. The catalytic system of ignition has been successfully introduced here. The great advantage of this system is that the electric spark is only required for the first explosion, the subsequent firing being automatic. Thus a very diminutive battery suffices for an indefinite length of time, and unsightly wiring is entirely eliminated. As we remarked above, the engine is started from the seat by the operator pulling the lever, *B*, shown in the illustration. This lever operates through free wheel clutches on both rear wheels. At each pull the carriage is impelled forward a certain distance, until ultimately the engine takes up the running. The driving-pulley being in frictional contact with the front wheel, is rotated by this motion, and the engine started. The standard powers of the engines are 1½ horse power for the single carriage and 2½ horse power for the double morette. This is calculated to be sufficient for all general purposes, and will take the morette up the steepest hills in the country, always provided the passenger alights on these occasions, retaining control, of course, while walking, on the tiller handle. The object is not so much to provide a high-power vehicle as one of moderate capabilities, which insures comfort and safety. A 2½ horse power engine will at the same time be fitted to the single morette if desired. The entire control is by the tiller handle, the grip of which actuates the current by rotation. The position of the handle, as shown in our illustration, is the normal one, and represents the engine properly adjusted in running contact with the front tire. By raising the handle the engine pulley is freed from driving contact, while by depressing it the engine may be slowed or stopped if desired. Thus the speed and the brake are controlled by one hand, while the double-action foot brakes on the back wheels are an additional emergency safeguard. It will be conceded that the morette is distinctly a forward step in the provision of a practical motor carriage for the million. With automatic carburetion and ignition, and instantaneous control of the engine and brakes by practically the same motion, the acme of simplicity is attained; and it would seem almost an impossibility for a mistake of any kind to occur.

A MOTOR CHAIR.

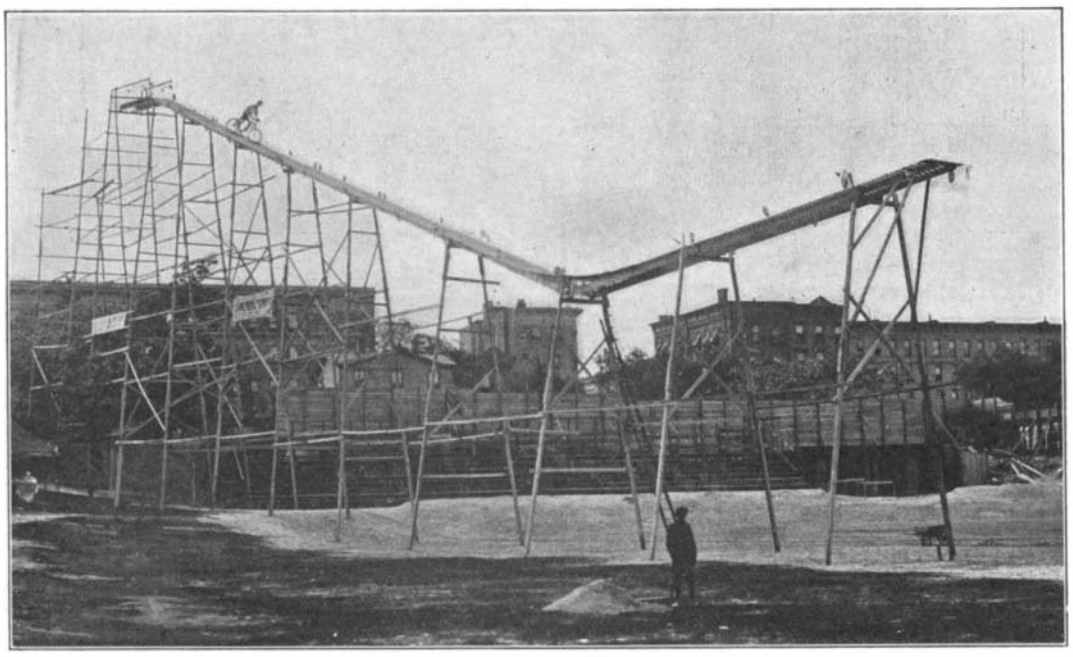
A DARING FEAT IN THE AMUSEMENT LINE.

Danger has always a great fascination for the peoples of all countries, especially where it is possible to be a passive participant. To "loops," "whirls," "aerial spirals" and other similar amusements we must now add one where the *deus ex machina* is reduced to its lowest terms; a simple incline, a fraction of a curve, and a platform a few feet long—that is all. It is noble in its simplicity. It is appalling to think of any wheelman who has the temerity to ride down an incline nearly one hundred feet high and after traversing a few feet of almost horizontal planking, detaches himself from his wheel and dives 105 feet through the air to a shallow tank. Yet this is done almost daily by Mr. A. M. Schreyer, and our staff photographer has succeeded in catching a picture of him in midair at a ride given specially for the Scientific American staff in New York.

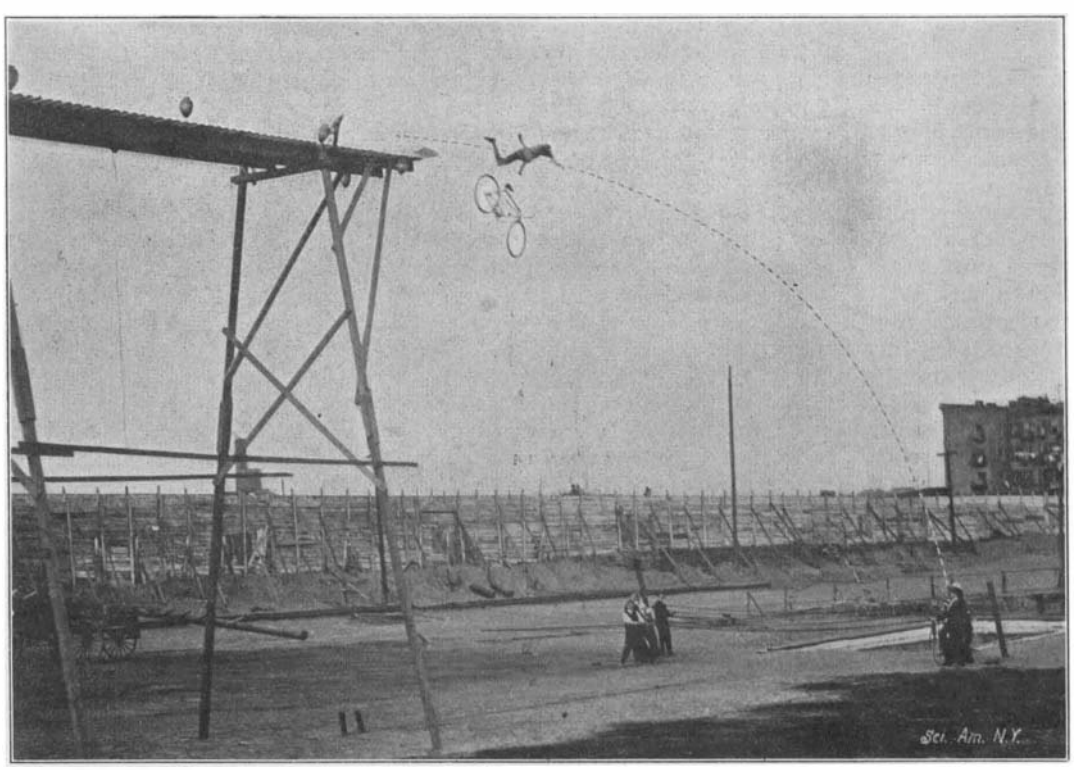
The chute is a light wooden structure measuring 98 feet in height at its top and 35 feet high at the lower end, or what in this instance might be called the "jumping off place." The total length of the structure is 215 feet. The floor of the raceway is formed of slats placed three inches apart. A stripe of black paint indicates the center of the path. There is a slight curve at the lower end of the incline and this curve in turn gives way to a nearly horizontal pathway which is slightly tilted. The dive begins about 20 feet from the end of this section. The pool of water is 78 feet away and is 38 feet long, 8 feet wide and 4 feet deep.

It would seem at first sight that, if this feat could be successfully performed, it could be repeated every day with as much precision as riding a loop, but this performance is one in which the conditions are constantly changing, and in which psychology plays an important part.

Before riding Mr. Schreyer gives himself half an hour of quiet and then mounts the lower end of the pathway. Here he studies the position of a flag beyond the pool, which is adjusted to meet various conditions of wind. He then mounts to the top where his helper holds his wheel. He carefully observes every feature of the landscape, cheers himself up, and when he feels his nerve is at its best he releases himself and pedals down the incline at railroad speed. He holds his wheel to a painted stripe and looks out for a mark a little way beyond the curve which designates the spot



A. M. Schreyer One-third down the Incline of the Chute.



A. M. Schreyer Making a Sensational Dive from a Chute. Path Traversed in Flight is 105 Feet.

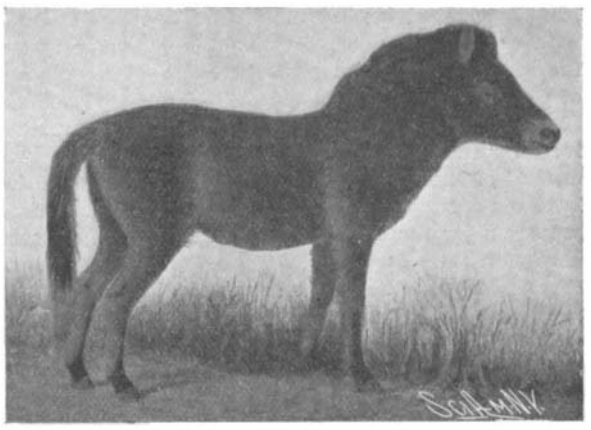
A DARING FEAT IN THE AMUSEMENT LINE.

where he springs from the wheel. When he reaches the mark on the pathway he reverses his wheel instantly, and by a supreme effort he raises himself over the handle bars and hurls himself forward to the pool, never taking his eyes off the little flag. His dive really begins from the pedals and handle bars of his machine. He sails through the air, his body twisted and temporarily deformed, he swings himself around and gracefully descends into the tank amid the applause of thousands. The wheel drops near the tank and is usually caught by men with a rope. The sensation from the time the dive actually begins is beyond description. He laughs and sometimes talks to the men while in midair, although as we are dealing with minute fractions of a second the word is liable to be chopped off rather suddenly. Mr. Schreyer will probably have very few followers, and they can rest assured that in New York at least the police look askance at such dangerous feats. Mr. Schreyer often carries a bucket of red fire and the effect is weird in the extreme. His present weight is 148½ pounds; the bicycle weighs 24½ pounds, and the average length of the entire trip is 3½ seconds. Perhaps some of our mathematical readers will like to calculate the possible speeds at various points. The journey is made so quickly that the eye cannot see him leave the wheel. Few persons possess the requisite nerve and the marvelous rapidity of thought which it requires for an athletic act of this kind.

EVOLUTION OF THE HORSE.

BY WALTER L. BEASLEY.

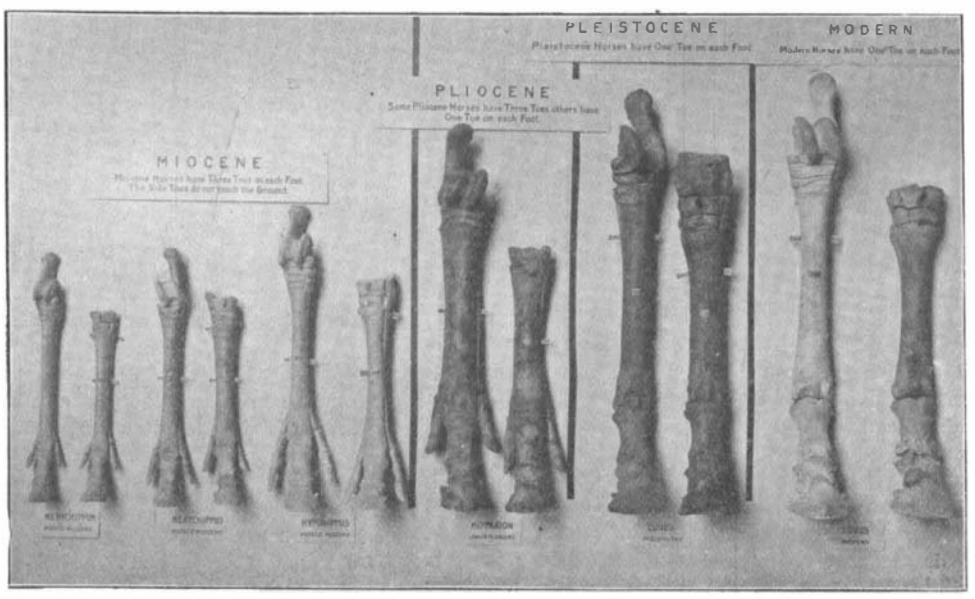
Among the recent features prepared by the Paleontological Department of the American Museum of Natural History under the supervision of Prof. Henry F. Osborn, the curator, is a remarkable exhibit depicting the ancestry and evolution of the horse. The blue-ribbon high-stepper of to-day is authentically traced back three million years or more. At this remote time he was about the size of a fox, only sixteen inches high, having four and five toes, with which he scampered over the marshes and shores of primeval earth. This noteworthy exhibit, the only one of its kind in America or elsewhere, is due to the Hon. William C. Whitney, through whose generosity a special expedition for the search of fossil horses was equipped and has been kept in the field for the past two seasons. The material gathered during this period, including some previously obtained by the Museum, together with a series of fine water-color paintings by Charles R. Knight, of wild asses, zebras, quaggas, etc., complete the display. The development of the horse is said to be one of the finest examples in existence illustrating the doctrine of evolution by means of natural selection and the adaptation of an animal to its peculiar environment. Several specially-trained and experienced investigators have carried on the field explorations, notably Mr. J. W. Gidley, who has made many successful finds of fossil horse remains on previous expeditions, and Mr. Barnum Brown. The crowning discovery of last season's expedition was made by Mr. Gidley near the end of a six weeks' search, when he uncovered the remains of a small herd of fossil three-toed horses, having skulls, numerous fore and hind limbs in perfect state of preservation, from which a complete skeleton has been constructed. These were found in a section known as the Niobrara beds in South Dakota. The difference between the skeleton restored from this find and the domestic horse of to-day is chiefly in proportions. The skeleton represents an animal with



THE WILD HORSE OF ASIA. THE LAST LIVING ANCESTOR OF THE MODERN HORSE.

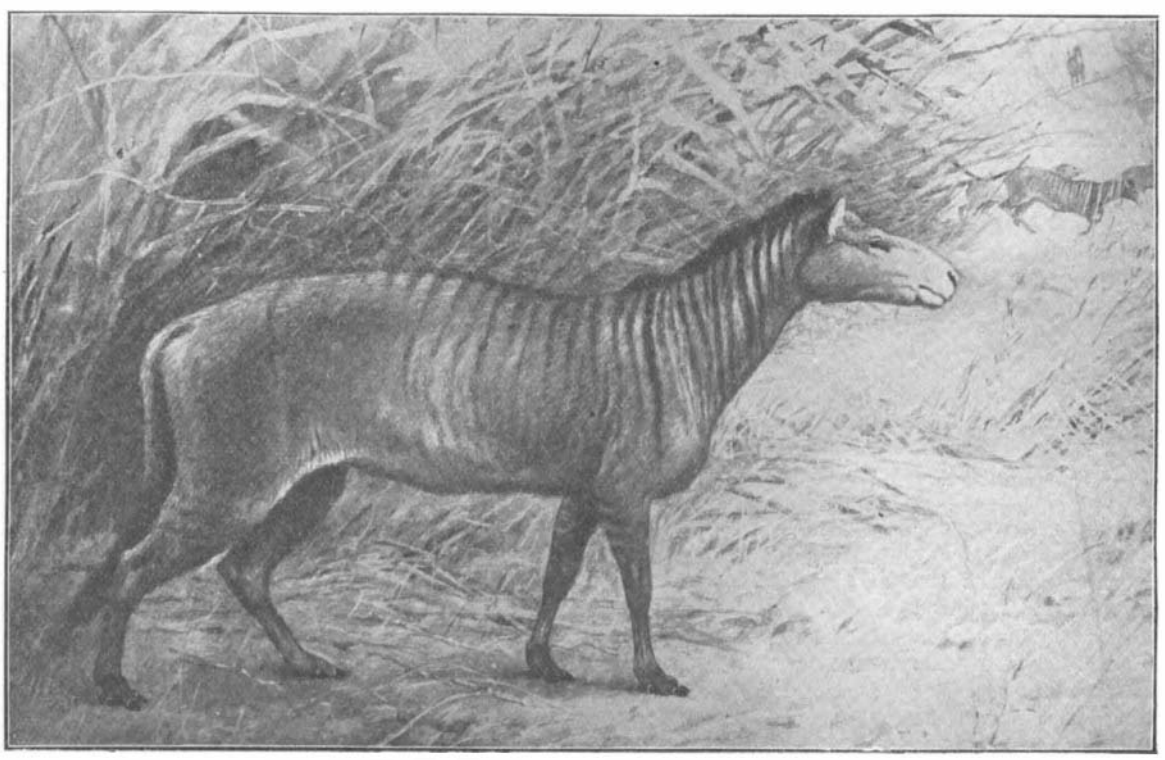
head about the size of a large draught-horse, but with the height of body and length of limb of an ordinary Western pony, and with a length of body very similar to that of the zebra. While extinct horse remains have been found in various parts of the world, the most complete and best-known series comes from the western part of our continent, which, during the Tertiary Period and Age of Mammals, was a great Lake Basin. After being drained off, this vast tract turned partly into an immense arid and desert region known to-day as the Bad Lands, or Equus Beds. The scattered remains of the skeletons are now found petrified and imbedded in the great sandstone and clay rock formations, which are gradually being worn away by the rain and the wind. Thus has been preserved a record of the successive species of the horse which once inhabited this Lake Region. The earliest recognized ancestor of the horse family is Eohippus, found in the Wasatch beds of Wyoming and New Mexico. He was about the size of a small fox, with four complete toes on the forefoot, and three on the hindfoot. He was fitted for swamps, and had simple, monkey-like teeth, and not at all like the complicated grinders of the horse of the present day. There is reason to believe that the still more remote ancestors of this and all other mammals had five toes on each foot, as in the forefoot of the earliest known stage is found a splint-bone, or small rudiment representing a missing digit or thumb. The accompanying illustration clearly shows the life history and origin of the horse in the various successive developments of the feet, and is arranged according to geological periods. Those found in the lowest strata of the Eocene Age, representing the earliest stage of evolution, are placed first, while the most recent ones, found in the uppermost strata of the Pleistocene, represent the final stage of evolution of the race, and are placed last. Viewing the specimens in the order of the age of the strata in which they were found, they show a regularly progressive change from the most ancient to the most recent times. In several of the first stages there are four complete toes on the fore, and three on the hindfoot. A new feature is observed in the Epihippus, that of the central toe of each foot is becoming much larger than the side toes. In the next descent an important stage is reached, that of the Oligocene, out of which was evolved Mesohippus, the first three-toed horse. The middle toe is now much larger than the side toes, which bear very little of the weight of the animal, which is now about the size of a sheep. Miocene comes next in line with Hypohippus, equaling in size a Shetland pony. Hipparion of the Pliocene time follows. This genus is much like Protohippus, but larger, and the feet are still three-toed. The climax stage of the evolution of the horse was evolved in the Pleistocene Age of Man. In this stage, that of the modern horse, the side toes have entirely disappeared, and are indicated by splints on the fore and hindfoot. No trace remains on the forefoot of the little nodules which, in his diminutive ancestors, represented the fifth digit. The evolution of the horse, adapting it to live on the dry plains, is said to have gone hand in hand with the evolution of the plains themselves. At the commencement of the Age of Mammals, the western part of North America was not high above the sea-level. This low elevation would favor the growth of dense forests, to which condition of life the animals of the beginning of the Mammalian period must have adapted themselves. During the Tertiary period the continent was steadily rising above the ocean level, and becoming colder and drier. This change restricted and thinned the forests and brought about open grassy plains. The ancient forest animals

Development from Five Toes to Three Toes.



Development from the Miocene Three-toed Horse to the Modern One-toed Horse.

THE EVOLUTION OF THE MODERN SINGLE-TOED HORSE FROM THE PREHISTORIC FIVE-TOED HORSE.



THE FIRST PRIMITIVE FOUR-TOED HORSE. SIXTEEN INCHES HIGH. FROM A PAINTING BY CHARLES R. KNIGHT.