

A Lens Composed of Multiple Liquid Floats.

BY HORATIO C. POLLOCK.

In the September 29, 1906, issue of the SCIENTIFIC AMERICAN an article, "Liquid Specula for Astronomical Purposes," appeared over the signature of A. W. Nightingale, of Hobart, Tasmania, and its appearance impelled me to make known some of the facts in regard to the discovery of a "parabolic mirror of incomparable precision, with practically no limit as to size," the discovery of Mr. C. H. Hulbert, wireless expert for the military government in Manila. The article in question was recently brought to my attention, and is

friction pulley controls the focus, resulting also in the total absence of vibration. A mirror is used, and a person can sit at the focusing point, and observe directly in the basin. This in a very limited way describes the lens. The public will have the benefit of all the facts concerning the invention as soon as the model reaches Drexel Institute, to which it is to be sent on the next steamer.

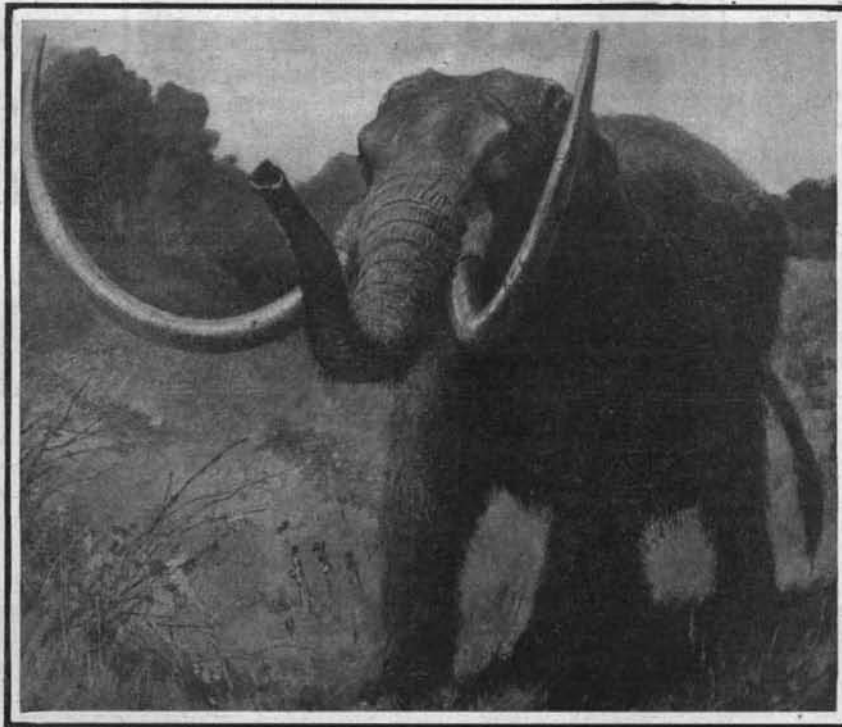
The International Motor Boat Race for the Harmsworth Trophy Won by an American Boat.

A cable dispatch announces that an American motor

boat by Prof. Henry F. Osborn is considered one of the noteworthy achievements of this foremost paleontologist and a memorable contribution to science. The discovery of this celebrated fossil is not recent. After remaining fifty years in almost practical seclusion, more or less, and hidden away from the knowledge and inspection of the general public, now, thanks to the donor and the reconstructive technique of the paleontologist, the world at large is able to study and view this gigantic and record-breaking mastodon skeleton of America. The specimen was arranged so as to be on exhibition in time for the meeting of the International



A Tusk 8 Feet 7 Inches Long.



The Probable Life Appearance of a Mastodon.

Since the drawing was made it has been found that the tusks curved inward. From a drawing by Charles R. Knight.



The Immense Lower Jaw of the Mastodon.

the first intimation I have had that others in the Orient were trying by the use of liquid mirrors to improve the Newtonian telescope.

The use of a multiple, or as I shall term it, the Hulbert liquid float lens, has been directed, not only to test its worth in securing perfect optical performance, but also in studying the heavenly bodies, with results that, aside from the fact that the lens is a success, Mr. Hulbert will say nothing. Enough has been gathered, however, from demonstrations he has made in the presence of friends to convince them that the lens is all he claims for it.

The lens of the multiple floating disk telescope consists, in the major part, of a basin filled with oil (ordinary machine oil) or other liquid of some such consistency, in which revolve, balanced on magnetic center points, a combination of floats; the outer rotated by power transmitted by a finely-woven wire thread, the next inner revolved by frictional momentum; the lens basin, with a reflecting surface of mercury, in the center. The outer edge of the lens parabola is bent over to cut out capillary action on the side of the metal; the gears connected direct; the

boat—Commodore E. J. Schroeder's "Dixie"—won on August 2 the handsome trophy given by Mr. Harmsworth for an annual international motor boat race. The "Dixie" beat her nearest competitor, "Daimler II.," by 1 minute 40 4-5 seconds in a 35-mile race run at Southampton, England. Her time was 1 hour, 15 minutes, 44 3-5 seconds, which corresponds to an average speed of 27.72 miles an hour. The "Dixie" is 39 feet 11 inches long and 5 feet beam. She is fitted with an 8-cylinder Simplex engine rated at 132.72 horse-power. It was expected that several of the fast French boats would compete, but they were ruled out on account of the entries not having been made in time.

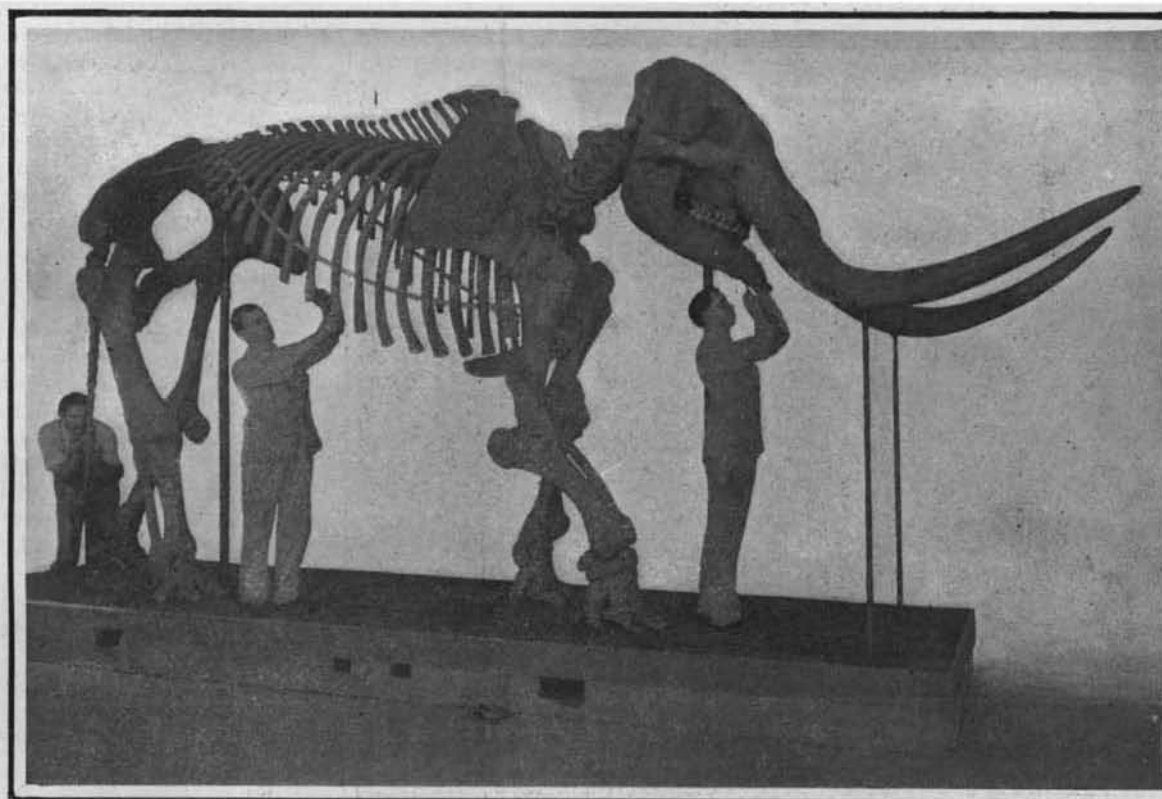
THE GREATEST OF MASTODONS.

BY WALTER L. BEASLEY.

Through the generosity of J. Pierpont Morgan, Esq., the famous Warren mastodon skeleton, the most complete and finest specimen of its kind in the world, has been presented to the American Museum of Natural History. The splendid and accurate remounting and forthcoming exhibition of this rich fossil prize

Congress of Zoologists, to be held in New York the middle of the present month.

Through the courtesy of Prof. Osborn the writer was given special facilities for obtaining the accompanying series of representative photos, together with some data concerning the discovery and other main details of interest connected with this remarkable specimen, for the pages of the SCIENTIFIC AMERICAN. The skeleton measures 14 feet 11 inches from base of tusk to tail, and 9 feet 2 inches in height. The original tusks were incorrectly reported as being over 11 feet, and so described and restored by Dr. Warren. But the correct original length has been very exactly determined by skillful piecing together of the fragments to be 8 feet 7 inches; of this 23 inches of each tusk is inserted in the sockets, and the projecting tusks measure 6 feet 8 inches. Only a portion of the base of tusks and a few of the toes of the fore feet are restored, the remainder being all genuine bone. An idea of the painstaking and laborious attention bestowed upon this specimen can be gleaned from the fact that an entire year was devoted in the Paleontological Laboratory to the preparation and correct adjustment of the skeleton. The skeleton was



The Finishing Touches. A Year's Work Has Been Devoted to the Preparation and Correct Adjustment of the Skeleton.



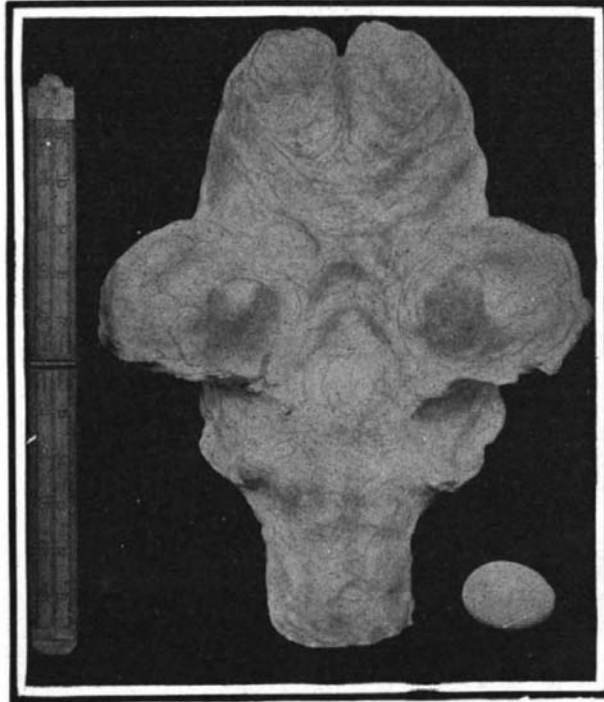
The Network of Scaffolding Necessary in Erecting the Skeleton.

THE GREATEST OF MASTODONS.

completely taken apart and all the bones given an alcoholic immersion, to remove the dark coating that had covered them, so that now they have the original bright red color, just as fresh and perfectly preserved as when first dug up.

The placing in position for experimental purposes to determine the proper poise, etc., of some of the enormous bones, such as the massive six-foot pelvis, fore and hind limbs, weighing from 100 to 500 pounds, was a delicate mechanical task, requiring a high, derrick-like structure, equipped with strong iron chains and pulleys for lifting and sustaining the weighty masses. A view of the mastodon encircled in this network of scaffolding is shown in one of the accompanying photographs. The mounting of the frame in a life-like, walking attitude was a difficult engineering task, which has been most skillfully accomplished by Mr. Adam Herman, chief preparator, and his assistants, Messrs. Lang and Schlosser, under the direction of Prof. Osborn.

Here is a summary of the discovery near Newburg, N. Y.: Ulster and Orange Counties in this State, and the valley west of the Catskills and parallel with the Hudson, for some reason seem to have been a favorite haunt and habitation center of the mastodon. The physical conditions of this section of the country at this Post-Glacial Period, owing to the receding ice sheet, which had left numerous small pools affording a convenient source of water supply, and, moreover, an abundant feeding ground, were thought to have been especially favorable to their existence. This lucky and historic find was come upon by mere chance, in August, 1845, as follows: A Mr. Brewster, a farmer near Newburg, was desirous of obtaining some fertilizing material for his fields. In one of his bottom tracts there had been a small pool of water, about 40 feet in diameter, in the midst of wet, swampy surroundings. This spot, owing to an unusual summer drought, had been left dry, so the farmer determined to use its contents for his desired purpose. Consequently, he set a number of laborers to work with spade and shovel. After digging three or four feet the workmen came to a bed of shell-marl, and the spade struck a hard substance, which was thought at first to be a stone or log. On further excavating, however, it was discovered that it was a portion of a fossil remains, and the spade had first struck the top of the head. On the second day the buried object was excavated, and revealed the remains of a gigantic mastodon. The whole of the skeleton was intact, with all the bones extraordinarily preserved and in place, just as the animal had sunk helplessly in the mire several thousand years before. The position of the limbs indicated that the great beast was making a brave struggle and attempt to extricate his weighty body from the pitfall in which he had been mired. Inside of the ribs was found what was the last meal of the mastodon, a mass of from four to six bushels of twigs and branches, one and one-half inches long, leaves, some sort of vegetable substance, half masticated. The skeleton was temporarily stored in the farmer's barn, and shortly afterward the news of the discovery was spread over the country, and attracted the attention of Dr. John C. Warren, a distinguished professor of anatomy in Harvard University at that time, who, recognizing the immense value and



THE HUGE BRAIN OF THE MASTODON.

For comparison of size a 1 foot rule and a hen's egg are also shown.

importance of the mighty frame as being one of the rare extinct marvels of the past, bought the skeleton. A year afterward he had it mounted, and Sir Charles Lyell and Prof. Louis Agassiz were among some of

the first noted scientists to inspect the skeleton by invitation of Dr. Warren. In 1849 it was placed in a little fireproof structure or museum in Boston. Under this exclusive roof it remained practically hidden and buried from the outside world, as only one day or so in the year were visitors allowed access to this private museum. Here it remained until 1906, when for \$30,000 this and several other specimens composing the "Warren Collection" were acquired by Mr. Morgan. One of the noteworthy features of unusual scientific interest which Prof. Osborn has brought to light is the size and shape of the animal's brain. By cutting into a section of the skull and opening the brain cavity, it was found possible to obtain a plaster cast of the mastodon's enormous brain. The cast was made by Mr. Otto Falkentach of the laboratory staff. The giant undoubtedly possessed considerable cunning, keen instinct, and a high order of brute intelligence. The huge 60-foot and 70-foot Dinosaurs like Diplodocus and Protosaurus, in comparison had incredibly small brains, even less than the size of a tea-cup. The surprising size of the brain which guided this mighty beast is strikingly set forth in comparison with the hen's egg and the one-foot rule, seen in the accompanying photograph. The brain cast is 13½ inches long, 12 inches wide, and 7 inches thick. In life it probably weighed 12 or 15 pounds, and would likely have filled the greater part of a water bucket.

The mastodon is regarded as a species of fossil elephant, but it differs from the true elephant in the structure of the teeth, which resemble those of a more typical mammal, such as the pig, for instance, and also in having a longer head. A striking view of the

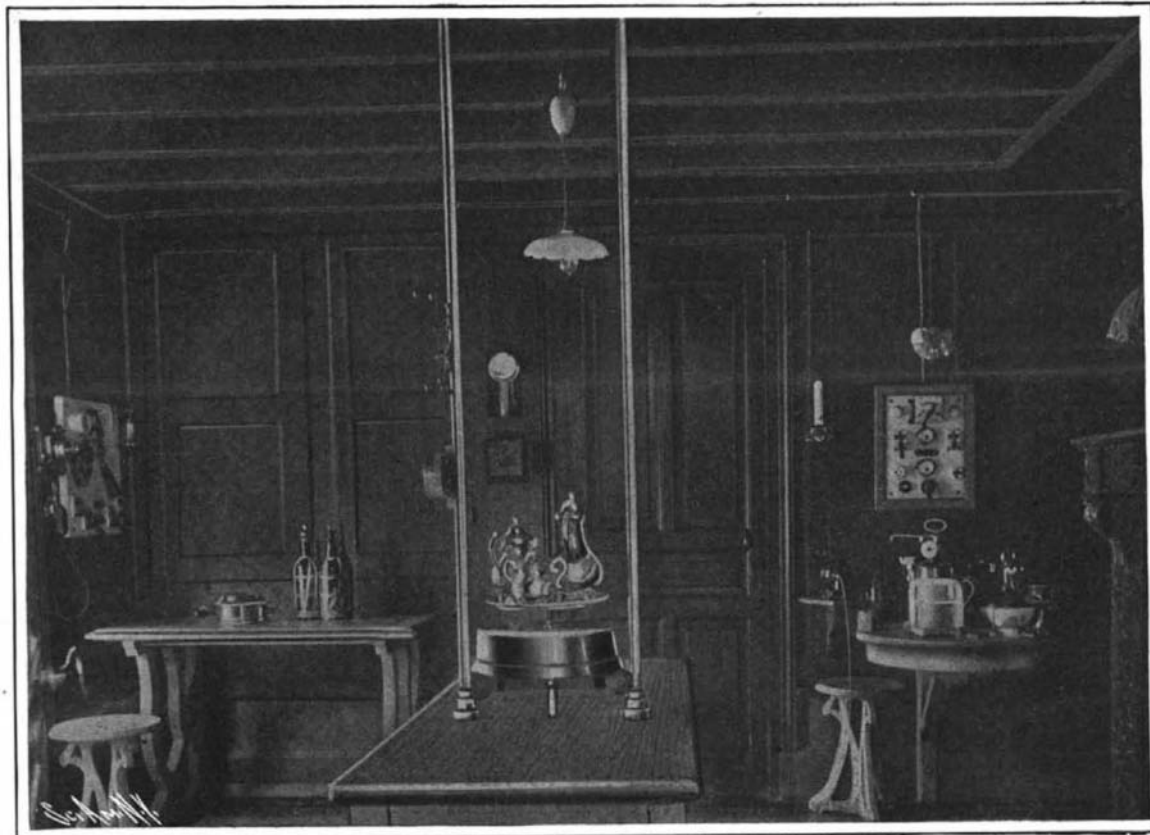
elongated lower jaws, showing the number and shape of the teeth mechanism of the mastodon, is clearly brought out in one of the illustrations.

The mastodons flourished in the latter stage of the world's geological history, and their remains in this country are found in the uppermost layers and deposits of the Pleistocene Age. They lived almost in historic times, only a few thousand years ago. The extinction of the race of mastodons, which were of such enormous size and great strength, and able to endure extremes of heat and cold, is thought not to have been due to climatic conditions alone, but to some mysterious and unknown cause. Prof. Osborn suggests that an insect pest may have caused their disappearance from the face of the earth, as such pests to-day are deadly exterminators of mammals in certain parts of Africa. The probable life appearance of the mastodon is realistically portrayed in the accompanying drawing by Mr. Charles R. Knight. The tusks, however, have been determined to have curved inward instead of outward, since the composition was made.

AN ELECTRIC DINING TABLE.

A gentleman named Knapp has constructed, and occupies, in Troyes, France, a house which he calls the Villa Ferie Electrica, or electric fairy palace, for the reason that servants are almost entirely superseded by electrical machinery. Table service, for example, is accomplished by the following devices:

An electric elevator transports the dishes from the kitchen to the dining room directly above. The dining table is in two parts: a small central table for flowers, fruits, and ornamental pieces and an elliptical annular coun-



KITCHEN, SHOWING ELECTRIC ELEVATOR BY WHICH THE DISHES ARE CARRIED TO THE DINING ROOM ABOVE.



ELECTRIC DINING TABLE, SHOWING WINE COOLER MAKING ITS ROUND.