THE AMERICAN MAMMOTH (ELEPHAS PRIMIGENIUS).

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By the term American mammoth we do not intend to indicate a difference between the remarkable fossil remains which we here exhibit and those so long notable as the Siberian mammoth. It is simply to point out that in America the fossil remains of mammoths—so called conventionally—have been found, and more particularly to announce the fact that an extraordinary "find" has lately been made, which well nigh amounts to a first discovery of the species, so far as anything like an adequate amount of remains had hitherto been found on this continent. Teeth and small fragments of the bones of elephants have been found at various times, and in widely separated regions of this country. Now we have the skeleton, its several parts so nearly entire as to warrant their artificial articulation as a complete mounting. For this we are indebted to Dr. Edmund Andrews, president of the Chicago Academy of Sciences.

Through the kindly offices of Dr. Andrews and Dr. Velie, I am able to present a complete account and drawing of this valuable and well nigh unique example of one of the greatest of fossil mammals.

Dr. Andrews had learned some years since of the existence of this series of bones, and kept in view the purpose of possessing them. The enormous price which such an unusual "find" naturally suggested was finally reduced to a reasonable amount, when the Doctor arranged to purchase the bones and to present them to the Chicago Academy. The result is that that institution possesses the second example of the great creature, which also possesses the advantage for science of being from a widely distant locality—even from another continent.

Members of the "Mastodon Club" assisted Dr. Andrews in bearing the expense.

The remains of this mammoth were discovered in the spring of 1878, in the southwest part of Spokan County, in Washington Territory. The country is a rolling prairie, about 2,000 feet above the sea, extending from the Rocky Mountains to the Cascade Range. The immediate locality where the bones were discovered is on Hangman's Creek, which runs into the Spokan River, a tributary of the Columbia. So near the surface were these remains, they were first exposed through the operation of ditching the land for agricultural purposes. Remains of four mammoths were here disinterred in a marshy hollow, which is formed by a spring oozing from a black mud—the frequently seen conditions attending the remains of the mastodon.

A very perfect skeleton of a smaller animal, described by one who saw it as "the bones of a horse," was found in close contact with the mammoths. The same conditions which apparently existed when the elephants here perished now occasionally cause the fatal miring of cattle.

Besides the remains of four elephants, there was found a pelvis of a fœtal proboscidian, which probably perished with its own.

Some of the measurements taken from the more perfect skeleton are as follows: Length of tusks, 9 ft. 10 in.; circumference of tusk at base, 21 in.; length of molars in mandible, 10 in.; length of lower jaw, or mandible, 22 in.; height of pelvis, 34 in.; breadth of pelvis, 62 in.; length of humerus, 45 in.

The height of this elephant's skeleton, as now mounted, is given as 13 ft.; and the measurement of the Siberian example at St. Petersburg is also given in the Chicago Academy's bulletin as 9 ft. 3 in.

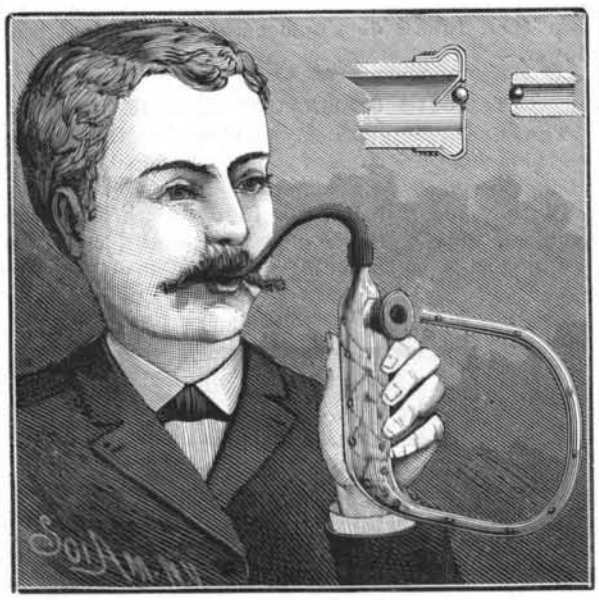
The present example is mounted with the limbs too much in a line, which gives greater height; but, allowing for the loss of certain integuments which in life contribute materially to give height, this creature must have been something over 12 ft. in height, if not quite 13. Jumbo's height is given at 11 ft. 2 in.

In a very exhaustive treatise on the elephant race, called the "Ivory King," Chas. Scribner's Sons publishers, some reliable figures are given, which determine the extreme measurements of the largest elephants known.

Some measurements are there given of the notable Hauser elephant, in the Medical College of Chicago. It is the Indian species, which does not reach the great height of the African one, though the present example in the skeleton seems to present the same dimensions in height as that of Jumbo—11 ft. 2 in.

An African elephant measured by Thomas Baines, F.R.G.S., was in height, at shoulder, 10 ft. and 9 in., and 12 ft. at the highest portion of the dorsal region. These figures are very exceptional. Elephants of 8 ft. are large, and no examples are on record exceeding in dimensions those we have mentioned.

Great discrepancy exists in the statements of the size of the tusks of elephants. The largest example we have seen is that of the Messrs. Grote & Co., of 14th Street, New York. It stands at their door as a sign,



EXPERIMENTAL ILLUSTRATION OF THE INJECTOR.

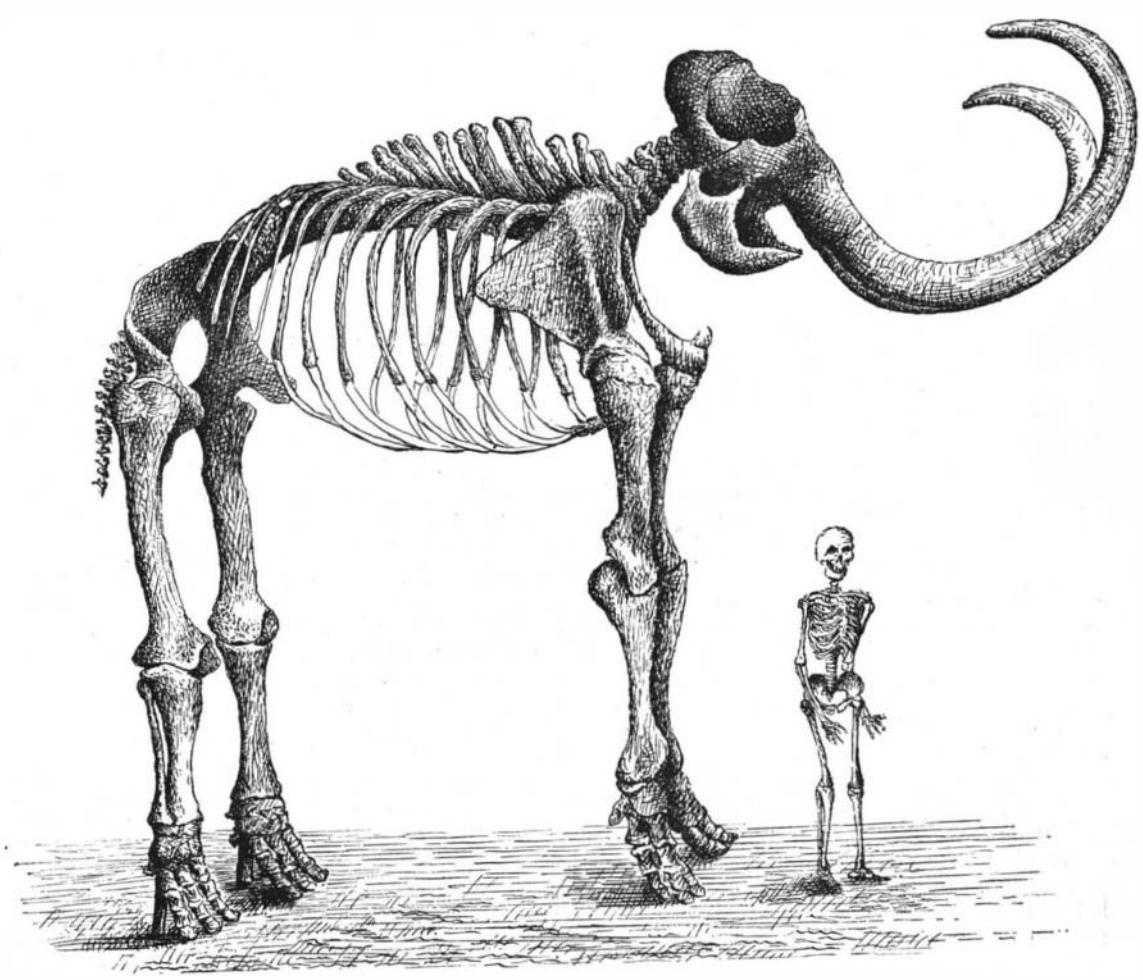
and is from the African species. Its length on the outside curve is 8 ft. 11 in.; the diameter at base is 6½ in.; its weight, 184 pounds.

The Messrs. Totans & Schmidt, of Fulton Street, have a superb pair, the largest being but 5 in. shorter than the latter. These are extraordinary examples.

It will be noticed that the mastodon and fossil elephants' tusks are not much longer, but they have a wide divergence and curve upward (though one example is recorded as measuring 12 ft. 6 in.), which gives them a peculiar or unusual aspect.

The forearm, or humerus, of the subject of our text is given as 45 in. in length. The extraordinary dimensions of this skeleton may be appreciated by noting the relative difference between it and the adult human which stands in front.

Dana, the geologist, states that this species of



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"ancient elephant was over twice the weight of the largest modern elephant, and nearly a third larger. The body was covered by a reddish wool and long black hair. One of the tusks measured 12 ft. 6 in. in length. It was curved nearly into a circle, though a little obliquely. . . . At the mouth of the Lena one of these animals was found which measured 16 ft. 4 in. in length, exclusive of the tusks. Its height was 9 ft. 4 in. It retained the wool on its hide, and was so perfectly preserved in the ice that its flesh was eaten by wolves or dogs."

EXPERIMENTAL ILLUSTRATION OF THE INJECTOR.

T. O'CONOR SLOANE, PH.D.

The injector used for feeding boilers with water has puzzled many who could not see in it anything but the analogue of the impossible feat of blowing into one's own mouth. The principle on which it works is, however, quite simple. By the condensation of steam issuing from a boiler, and by its mechanical action, a high velocity is imparted to a jet of water. The momentum thus developed is sufficient to drive the water into the same boiler against a pressure equal to or exceeding that of the actuating steam. The principle can be carried still further. Steam from a boiler at low pressure can be made to force water into a boiler at high pressure.

The apparatus illustrated in the cut shows the principle of momentum applied to a great extent, as in the steam injector. A strong pressure of air is maintained in a receptacle representing a boiler. A small injector tube is provided for a blast of air which escapes from the reservoir. The blast is made to operate as a feeder, driving lead shot into the reservoir against any pressure that can be maintained within it.

The apparatus as shown is made of glass. The large reservoir represents a boiler. This should be an inch in diameter and four or five inches long. At its top it is provided with a reduced nozzle, to which an India rubber tube can be attached. The pressure is produced within it by blowing into this tube.

From its bottom a tube is carried outward, then curving upward with a very smooth curve, and finally is retracted so as to point horizontally toward the upper portion of the larger tube. This injector tube must be of strong or heavy glass, and its inner surface must be true and free from irregularities. It may be of such size as to receive B B drop shot. This size will require a good deal of air to keep the apparatus working, and a smaller size is nearly as effective and less exhausting to the experimenter. A tube $\frac{1}{16}$ inch in diameter is sufficiently large. The shot fitting it, though but half the diameter of B B shot, will work perfectly. Near the top of the large tube and directly opposite the open end of the injector tube a neck projects laterally from a point below the shoulder. This should be half an inch or more in diameter. It is provided with a valve. A disk of soft leather, such as a piece of a kid glove, is stretched over the opening of this neck. A little above its center a small hole is made, about twice the diameter of the shot it is proposed to use. Underneath the kid a flap of India rubber cloth or packing is secured, forming the clapper of a valve. The India rubber cloth must have some thickness, so as to be stiff and preserve its shape under the bombardment it is to be subjected to. The hole in the leather, representing the valve opening, must be directly opposite the end of the small glass tube. The leather and India rubber are tied over the neck, as shown in the section.

Half a dozen pellets of shot are dropped into the apparatus. They must first be poured or rolled through the outlet tube to see that they move with perfect freedom. If they show the least disposition to stick or catch in the tube, smaller ones must be used. If all is right, the apparatus is held as shown in the illustration, and the experimenter blows into the apparatus as hard as possible.

The only outlet for the air is the small eduction tube. The air rushes out of this, carrying the shot with it. They pass through it with accelerated velocity, and acquire a very high speed before leaving. As they are driven out of the open end they impinge upon the valve, and, forcing it open against the air pressure, drop into the reservoir. They fall down to its bottom, flying around its walls in spiral paths, only to be again and again expelled through the outlet tube. The noise made as they strike against the tense rubber valve is very peculiar. The rapidly repeated sounds resemble the discharge of a miniature Gatling gun. If all is rightly arranged, the operation can be kept up indefinitely, or as long as the experimenter can supply