ART. XXVII.—*Mammut Americanum in Connecticut*; by CHARLES SCHUCHERT. With a note on the Farmington specimen by RICHARD S. LULL.

[Contributions from the Paleontological Laboratory, Peabody Museum, Yale University, New Haven, Conn., U. S. A.]

Introduction.—The unearthing of good mastodon bones anywhere is worth noting, and when a fine skeleton is found, and especially in Connecticut, the discovery is all the more important. In addition, the latest find can be somewhat directly connected with the vanishing of the Wisconsin ice sheet, the last glacial episode of the Pleistocene. During the past century mastodon bones have been discovered in Connecticut but five times, the last one found preserving more of the skeleton than all the previous ones combined. Sooner or later these occurrences will assist in the formulating of a more detailed history of the Glacial Period, a time as yet unravelled and unmarked by the successive faunas and floras that inhabited North America during this age of decidedly changing climatic conditions. As yet we know but little of this life, and consequently the chronology of the Pleistocene in America thus far depends solely upon the physical characters of the deposits and the topography of the period.

Previous finds.—(1) The earliest record of the finding of mastodon bones in Connecticut dates from previous to 1828, when "some remains of the mammoth were found in Sharon," Litchfield county, near the New York State line.* Nothing more is known of this discovery nor of what has become of the bones.

(2) Silliman states that while excavating the Farmington canal in the summer of 1828 there were found near Cheshire "three or four large molar teeth of the mammoth" in gravel but a few feet under ground. Some of the teeth are said to have been much worn and therefore were of an old animal. It appears that all of them except one were broken up at the time of their excavation, and that the remaining tooth was presented to Yale College by Edward Hitchcock (loc. cit.). This is an uncut second lower molar of *Mammut americanum* (Yale Museum catalogue number 11985). The three crowns are well preserved and but little mineralized, as the tooth was found in a more or less dry gravel.

(3) In 1833, while a canal was being dug for the New Britain Knitting Company in New Britain, through a pond which then covered what is now the corner of Elm and Church

* This Journal, xiv, 187, 1828; also xxvii, 166, 1835.

streets, there was found, according to Silliman, a nearly complete dorsal vertebra of a mastodon. The dorsal process was 17 inches long, the centra 5.5 inches in diameter and nearly 3 inches in thickness, while the neural canal was 3.5 by 2.75 inches in height and breadth respectively. The bone had a dark chocolate color and was "not mineralized in the least." It was taken out of mud or clay 3 feet beneath the surface. Associated with the bone were freshwater shells "of the genera *Planorbis*, *Lymnæa*, *Cyclas*, etc., similar to those occupying the waters of the vicinity."*

Doctor Walter L. Barrows, of Trinity College, directs attention, in a letter to the writer, to the "Connecticut Courant" for June 2, 1834, in which there is a statement that Silliman exhibited this bone at a lecture given at Hartford May 27, 1834. From this account is taken the following: "From the perfect condition of the bone thus accidentally discovered, there is reason to believe that a complete skeleton may be recovered in the morass where the specimen in question was found." This bone was presented to Yale College by Elijah H. Burritt, but is evidently no longer in existence.

(4) A second mastodon was discovered in New Britain in September, 1852, and the bones were for many years on exhibition there at the State Normal School. What became of these bones after 1885 is not known. The present information is taken from an account by Hon. David N. Camp,† entitled "Mastodons roamed Connecticut once." While excavating in a soft swampy soil for a pond on land belonging to Mr. William A. Churchill, the workmen came across a considerable portion of a mastodon skeleton, "the thigh bone, humerus, tibia, several of the ribs, and two or three teeth. Some of the bones, on being exposed to the air, crumbled." This locality is now in the city of New Britain back of the Young Women's Christian Association, or near the junction of School and College streets.

(5) Professor Edward Hitchcock got in 1871 a mastodon molar that was taken "out of a muck bed on the farm of Elias Bardwell" in the town of Colerain, which is near the north line of Massachusetts. This was then the first known occurrence of mastodon in that state.‡

The Farmington or Pope mastodon.—Late in August, 1913, Italian workmen, while digging a trench to drain a small up-land swamp on the beautiful estate of the late A. A. Pope, near

* This Journal, xxvii, 165, 1835. Here the locality is given as Berlin, but D. N. Camp, in the article cited, gives it as above described.

† Hartford Times of January 3, 1914. The first statement regarding the 1852 specimen appeared in the same paper, on September 21 of that year.

‡ This Journal, (3), iii, 146, 1872.

Farmington, reported to the superintendent, Mr. Allen B. Cook, the finding in the bog of a "black devil." Mr. Cook, a graduate of the Massachusetts Agricultural College, soon saw the significance of the find and reported the matter to Mrs. Pope, who was much interested in the remarkable discovery and through Attorney Charles T. Brooks brought the information to the writer. The trench at the time of the latter's visit revealed a number of large bones of one of the fore limbs and the back part of the skull, which had unfortunately been greatly damaged before the Italians became aware that they were removing bone and not a prostrate tree.

The exhumation of the skeleton was undertaken by Mr. Hugh Gibb, assisted by three other preparators from Peabody Museum at Yale, and by five Italians. So careful were these "bone diggers" that all the clay immediately around the skeleton was dug out with their hands, as they felt their way through the sticky clay down to and around the bones. The greater part of the skeleton was taken out in two weeks' time. Subsequently it was decided to enlarge the shallow hole and to make of it a water reservoir for the estate, and during this excavation the workmen late in November came upon one of the great tusks, lying alone, 23 feet away from the skull, and in perfect preservation.

The skeleton of the Farmington mastodon consists of all of the essential parts, minus most of the small bones of the feet, a few of the smaller leg bones, most of the caudal vertebrae, and one of the tusks. The greater part of the animal lay together with the bones more or less jumbled, but in the main there was still considerable natural skeletal alignment,—the head at one end and the pelvis less than 10 feet away. Scattered about and often many feet away from the central mass lay single bones of the feet, tail, vertebrae, ribs, and one scapula. The recovered tusk lay farthest away and on a level about 2 feet higher than the main mass of bones, which were in the lowest part of the swamp. Fig. 1, drawn to scale by Professor Lull, shows the general disposition of the bones of the mastodon as they were found.

Geologic position of the Farmington mastodon.—The Farmington skeleton lay in a shallow trough directly on boulder-clay, a thin covering of ground moraine that originally mantled the adjacent hills and valleys alike and was deposited by continental glaciers during Wisconsin time. (See contour map, fig. 2.) The boulder-clay is light blue in color and consists of a decidedly sandy fine mud, with some coarse sand, an abundance of muscovite, and many striated boulders, large and small, mainly of trap with some quartzite and crystalline rocks. That the till was largely derived from the adjacent Triassic

area is attested not only by the sandy blue clay but more especially by the abundance of trap boulders.

The Farmington highlands had not become much covered

FIG. 1.

FIG. 1. Diagram of the Farmington swamp, showing the bones *in situ* and the trench that led to their discovery. Drawn *in absentia*, from descriptions, sketches, and photographs, by Richard S. Lull. Approximate scale 1/8 inch to 1 foot.

A. Original excavation. B. Subsequent excavation in part. 1, femur; 2, pelvis; 3, femur; 4, humerus; 5, left scapula; 6, lower jaw; 7, skull; 8, right scapula; 9, tusk.

with vegetation when the proboscidean under discussion died, for not a trace of organic matter or of oxidized till was found beneath the skeleton, and but very little vegetable matter is seen in the slightly modified or oxidized boulderless clay surround-

FIG. 2.

Topography by Albert H. Bumstead

FIG. 2. Contour map showing the topography of the land where the Pope mastodon was found (+). The sharp ridge is made up of Triassic trap. Drawn by Albert H. Bumstead, through the kindness of Professor Hiram Bingham.

ing the bones, nor was there a trace of the organic matter of the animal left (see fig. 3). Further, there was no permanent lake with an abundance of vegetation formed at this time or later, for no freshwater shells (shell marl) were seen and the clays do not at all effervesce under hydrochloric acid. Carbonate of lime is a good preservative of bones, but in this case there is none present. The animal does not appear to have been mired where it was found; it probably died and lay decomposing in the marsh, where occasional carnivorous or scavenging animals came and dragged about some of the bones, though why one of the tusks should be about 23 feet away from the skull and on higher ground by 2 feet is hard to explain. On the other hand, the body could not have lain thus exposed many years, even in a cold climate, for most of the bones immediately above the till have well-preserved smooth and glossy surfaces. Nevertheless, nearly all of the skeleton of the feet is absent, while some of the other small bones, and especially those of the tail, were so rotten that they could not be lifted and preserved. The absence of these smaller bones may be due either to carnivores or to oxidation, or to both causes. Some of the parts, and especially the pelvis and top of the skull, lay so near the turf that the percolating waters with their humic acids and the penetrating roots of the plants had done considerable damage. It would seem, however, that the skeleton must have soon become buried, and this is suggested by the embedding clay, which is almost unaltered glacial till devoid of all boulders. In other words, the clay of the general ground moraine on either side of the little valley, but more particularly that of the rounded hills to the north, was then being washed from between the boulders into the lower land, rapidly covering the skeleton. These hills are even now covered in abundance with the much oxidized trap erratics, hardly any of which retain the glacial striations, but there is little blue clay here now. We therefore have the phenomenon of the unoxidized clay washed into the swamp or seasonal lake, while the remaining boulders have ever since been exposed to the influences of the weather, the trap boulders being the most altered.

Above the till wherein the mastodon lay follows from 6 to 18 inches of glacial blue boulderless clay that is but slightly modified by some plant remains, largely roots, that have penetrated into it from the swamp above. This is followed by 30 inches of a similar clay, slightly more modified by entombed plants and penetrating roots, but still with an abundance of brilliant muscovite. At the top occurs about 18 inches of stringy turf that is full of water during most of the year, making the swampy ground. In other words, the Farmington

FIG. 3.

FIG. 3. Photograph of the diggings after the skeleton was uncovered. The animal lay on the boulder-clay. Photograph by A. J. Tefft.

mastodon was covered in the course of time by 5 feet of ground, 4 feet of which is modified glacial clay. The animal was therefore buried by the inwash of about 4 feet of glacial clay, since which time about 18 inches of turf has accumulated.

As the skeleton was entombed shortly after the vanishing of the Wisconsin ice sheet in the highlands about Farmington, one gets from the evidence given a hint of the recentness of these two sets of phenomena. The washing of the clay into the depression could have occurred in a few hundred years, and the stringy turf apparently did not take much more time to form. Then, too, the skeleton shows no mineralization nor petrification and is but little discolored to a light brown by the waters of the swamp. Further, the several skeletons found about Newburgh, New York (chiefly the Warren skeleton of the American Museum of Natural History and the Otisville specimen at Yale) look like bones buried but a few hundred years. Both of these mastodons were buried in a shell marl, a preservative of bones, but still not a single shell species of which the marl is composed is extinct, according to the great conchologist Gould (who identified *Limnea galbana*, *Planorbis parvus*, *Valvata tricarinata*, *Ambicula galbana*, and *Cyclas galbana*). The Warren mastodon lay in the marl of a small pond not over 40 feet in diameter, covered by a foot of red moss and 2 feet of peat bog. The entire skeleton lay in articulate position and was so well preserved that it was dug out by inexperienced men in two days. Furthermore, between the ribs lay from 4 to 6 bushels of vegetable food, largely coniferous and much like spruce or hemlock.

Did man and Mammut americanum live together in America?—Can it be that *Mammut americanum* vanished from Connecticut within a thousand or at most a few thousand years and yet was unknown to the North American Indians? If the prehistoric Indians knew and helped to exterminate these animals, and as they were the makers of neolithic implements, why do we not find ivory in their graves?

In this connection it should not be forgotten that John M. Clarke in 1887 dug up at Attica, Wyoming county, New York, bones of *Mammut americanum* associated with pottery and charcoal. Not much of the skeleton was present and the bones lay but 2.5 feet beneath the "natural surface." Associated with them (ribs) were "four small fragments of charcoal" while in another part of the diggings beneath all (4 feet) of the vegetable muck and lying upon "compact laminated clay" "was found a fragment of pottery, and from beneath and around it were taken about thirty fragments of thoroughly burned charcoal. These traces of ancient man were found fully 12 inches further down from the natural surface of the ground

than the deepest of the bones taken from the other [there were two] sink-hole." The pottery indicated a thick coarse vessel about 8 inches across, while the "thoroughly burned" charcoal varied in size "from two inches in diameter down."*

All in all, the evidence appears to show that the Wisconsin ice sheet vanished from Connecticut and New York not many thousands of years ago. Further, the associated human evidence found with or beneath the Attica mastodon bones is a positive hint that should open our minds to the possibility that man was associated in America with *Mammut americanum*. There is still further paleontologic evidence suggesting the existence of man even earlier than the occurrence in New York. Professor Williston states that on a small tributary of the Smoky Hill river in Logan county, Kansas, Mr. Handel T. Martin found beneath but in contact with a right scapula of the extinct *Bison occidentalis* an arrowhead. The bones of the eight animals present and the human implement were not surface finds, but were secured by digging away several feet of the "upland marl," a deposit that originally covered the fossils at least to a depth of 20 feet. In this marl also occurs *Elephas primigenius*, an animal well known to ancient man of western Europe.†

Note on the Farmington specimen; by RICHARD S. LULL.

The Farmington mastodon has not yet been prepared for exhibition, so that two important elements, the skull and pelvis, being still in the plaster of Paris bandages which were put on at the time of exhumation, are unavailable for study. Certain broad generalizations can, however, be made which may be of interest.

The skeleton is that of a fully adult individual, the evidence for which lies in the great size, the fully coössified epiphyses of the vertebræ, and in the facts that the full quota of molars had come into use and that all of their ridges show signs of wear; though, as the more posterior ones have suffered but little in this regard, the animal must have been in the prime of life. I should judge the specimen to have been a male, though the one absolutely diagnostic character, that of the presence of one or two lower tusks as in the great Warren mastodon in the American Museum of Natural History, is lacking. The size again and the great development of the upper tusks are the only present evidences of sex available, though that of the ratio of pelvic aperture to pelvic breadth, larger in the female, may be learned when the element can be studied.

* Forty-first Ann. Rept., N. Y. State Mus. Nat. Hist., 1888, 388-390.

† Amer. Geol., xxx, 313-315, 1902.

The limb bones are relatively slender in proportion to their length in comparison with those of the Warren mastodon or the Otisville specimen mounted at Yale, both of which are exceptionally powerful animals though differing markedly in stature and general appearance. In size, the new skeleton stands almost midway between them; for instance, the ulna of the forearm measures 28 inches in length in the Otisville animal, 31 inches in that of Farmington, and 34 inches in the Warren specimen, and the other measurements which I have been able to compare run in much the same proportion.

The Otisville specimen was not fully mature at the time of its death, as certain of the vertebral epiphyses are still but partially coalesced and the hinder ridges of the teeth show no appreciable signs of wear. As mounted, this specimen, a young male of abundant promise, stands 8 feet 2 inches at the shoulder, with a length of 13 feet 2 inches from the tip of the premaxillary bone to the curve of the tail. The assembled bones of the Connecticut specimen, however, give an estimated shoulder height at least 6 inches greater, though just how the other dimensions would compare one cannot say; but the contrast of bone proportions seems to indicate that those of the entire body would vary as well. The erection of the two skeletons side by side for comparison would thus be of the highest scientific importance.

The tusks of the Otisville mastodon have not been found and little idea of the relative length of this element can be obtained. The size of the tusk socket would indicate a tusk but a half-inch less in circumference than that recently found at Farmington. The latter is 23 inches in greatest girth and measures 8 feet 10 inches on the curve and 6 feet 3 inches between perpendiculars.

There is nothing to indicate that the Farmington mastodon does not belong to the principal Pleistocene species, *Mammot* (*Mastodon*) *americanum*, the known range of whose variations is amply sufficient to account for all of the points of contrast which have been mentioned.