

### HUMAN REMAINS FROM THE PLEISTOCENE OF FLORIDA

IN a paper recently issued the writer has given an account of the occurrence at Vero on the Atlantic coast in central-eastern Florida, of fossil human remains in association with extinct vertebrates.<sup>1</sup> Human remains have been found at this locality in two separate strata which differ in age, the one being superimposed upon the other. The older of these two beds is unmistakably of Pleistocene age, and it is from this bed that the new material now to be described has been obtained. By this new evidence, as well as by that previously given, it is definitely established that man was present in America in association with a Pleistocene vertebrate fauna. Of the mammalian species of this fauna a few, including chiefly small inconspicuous animals, have persisted to the present time, while the larger animals, including the elephant, mastodon, camel, horse, bison, tapir and sloth have suffered extinction. With the exception of bison, which are native to North America, and horses which have been reintroduced from Europe and canids which are common to the old and the new world, the nearest existing relatives of these extinct species are now found in Central and South America, in Asia or in Africa.

The vertebrate fossils at Vero are found chiefly in an old stream bed and were discovered as a result of the construction of a drainage canal which extends from the coast some miles inland. The canal was made in 1913 and a number of vertebrate fossils, which had been thrown out by the dredge while excavating through the stream valley, were obtained at that time. Human bones, however, were not found until two years later, October, 1915, the first bones obtained having been exposed as the result of the lateral caving of the canal bank. A second discovery of human remains was made in April, 1916, and a third in June, 1916. The present paper relates to the latest of these discoveries, the earlier finds having been described in the publication to which reference has been made.

<sup>1</sup> *Amer. Jour. Sci.* (4), XLIII, pp. 1-18, July, 1916.

At the time of the discovery of the vertebrate fossils at Vero, the writer suggested to those who were collecting there the importance of keeping a close watch for associated human remains. The subsequent discoveries are to be credited very largely to the patience and persistence of Messrs. Frank Ayers and Isaac M. Weills, to whose careful observations at this locality during the past three years are due chiefly the important results that have been obtained.

A section through the stream bed at Vero is indicated in the accompanying text-figure. Number 1 of the section represents a marine shell marl which underlies a large area in eastern and southern Florida and is known from its invertebrate fauna to be of Pleistocene age.<sup>2</sup> Number 2 of the section consists of cross-bedded sand which at the top grades into a fresh-water marl, the whole stratum having an average thickness of from three to five feet. Vertebrate and fresh-water invertebrate fossils occur throughout this bed from the cross-bedded sands at the base to the marl rock at the top. The sand includes also partially decayed wood, and in places muck and plant fragments. It is from this bed that the human and other vertebrate fossils here described, as well as a part of those previously described, were taken. Number 3 of the section represents an alluvial deposit consisting largely of loose sand and muck which in places grades into a fresh-water marl. The average thickness of this later bed is about two feet, although in places it reaches a maximum of five or six feet.

Between the marine marl, number 1 of the section, and the sand and marl stratum holding human and other vertebrate fossils, number 2 of the section, there exists no persistent well-marked break in deposition. There is, however, a change from marine to fresh-water conditions, and accompanying this change one

<sup>2</sup> To this extensive deposit of marine shell marl bordering the Atlantic coast, the writer in 1912 applied the term Anastasia formation, this name having been selected because of the fact that the shell marl was first quarried and described on Anastasia Island near St. Augustine, where it is known as "Coquina." (*Fla. Geol. Surv. Fourth Annual Report*, p. 18, 1912.)

finds evidence of stream action, materials from the land having been washed in and deposited in channels in the marine shell marl. On the other hand, there are places in the section where the sand and shell beds of the marine deposits dove-tail into the succeeding fresh-water deposits in such a way as to indicate continuous deposition. It is probable that the fresh-water deposit indicated by number 2 of this section, represents at this locality the closing phase of the marine marl formation, the change to fresh-water conditions having been brought about by a slight shifting of the strand-line.

Between this older formation and the alluvial bed which follows, number 3 of the section, there is, on the other hand, an abrupt well-marked persistent break, the top surface of the stratum represented by number 2 being extremely irregular. The alluvial bed, the initial phase of which is represented by pronounced stream action, conforms to the irregularities of the older formation. In this later bed, number 3 of the section, is found human skeletal remains, bone implements, pottery, arrow-heads and ornaments.

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The first skeletal remains of man found at Vero, an account of which has previously been given, were from the bone-bearing bed represented by number 2 of the section and were taken from the south bank of the canal at the locality indicated by *a* in the accompanying text-figure. The additional human bones to which the present paper relates were found in place while excavating in the south bank of the canal at the locality indicated by *b*. At the spot where the human bones were found, owing to stream-wash previous to the deposition of the overlying deposit, the fresh-water stratum, number 2 of the section, is only about 18 inches thick. The human bones were found in this sand, about 10 inches above the base. The overlying alluvial beds are stratified and as usual conform to the irregularities of the underlying formation. The human bones at this place were found and removed by the writer, in the presence and with the assistance of Isaac M. Weills and Frank

Ayers. The first bone found was a right astragalus; the second bone taken in place was the right external cuneiform, which lay at the same level and about six inches from the astragalus. About twelve inches farther back in the bank was found a piece from the right pubes and a part of the left ilium including that part of the bone which shows the articular surface for the sacrum. In the same stratum and at the same locality Mr. Frank Ayers found in place a thin sharp-edged flint which evidently is a spawl from the manufacture of some kind of a flint implement. Upon sifting the sand in which these bones were imbedded there was obtained two phalanges, a section from a limb bone and some other human bone fragments. In these siftings there was found also a small flint, worked on one side, two small spawls, and a piece of a bone implement.

Vertebrate fossils in immediate association with the human bones, found in place in this stratum, number 2 of the section, include the following: *Odocoileus* sp., left scapula; *Elephas columbi*, tooth fragments; *Equus* sp., part of a tooth; *Tapirus haysii?*, part of a tooth, and *Didelphis virginiana*, part of a lower jaw. From the siftings the following additional species have been obtained: *Sylvilagus* sp., teeth and part of lower jaw; *Chlamytherium septentrionalis*, dermal plates; *Dasyppus* sp., dermal plate; *Sigmodon* sp., teeth; *Neofiber alleni*, teeth; and *Cryptotis floridana*, lower jaw; as well as bones representing birds, reptiles, batrachians and fishes. Of these fossils the scapula of the deer was found within a few inches of the human astragalus and at the same level, while the other specimens were found near by, none of those listed being more than five feet from the human bones. From the same stratum, ten feet farther west, was obtained, upon passing the sand through a sieve, a small bone implement and a small flint which represents either a spawl or a very small flint tool. The vertebrate fossils found at this place include the following: *Odocoileus* sp., teeth; *Equus* sp., foot bone; *Dasyppus?* sp., dermal plate; *Didelphis virginiana*, tooth; *Elephas columbi*, parts of teeth;

*Chlamytherium septentrionalis*, foot bone; and *Sylvilagus* sp., teeth. Among additional mammalian species known to pertain to this horizon are the following, all of which have been found in place in the canal bank in stratum number 2 of the section at Vero; *Megalonyx jeffersonii*, *Mammot americanum*, *Vulpes pennsylvanicus*?, *Equus leidyi*, *Equus complicatus*, *Smilodon* sp., *Procyon* sp., *Canis* sp. nov. and a peccary. Of these fossils the first three species listed were found with or near the first human skeleton obtained at Vero. Other species found at this locality and referred provisionally to this horizon include the following: *Equus littoralis*, *Hydrochoerus* sp., and a camel.



FIG. 1. Section showing strata exposed in the canal bank at Vero. Horizontal scale, 1 inch equals 50 feet; vertical scale, 1 inch equals 15 feet. The break in the sketch indicates the entrance of a lateral canal. Human skeletal remains are found at *a*, at *b* and at *c* and *c'*. The human remains at *c* and *c'* lie at or very near the contact line between 2 and 3. Those at *a* and *b* lie in the stratum represented by number 2 of the section.

If the bones representing these animals were found only in fragments and lay near the base of the bed, they possibly would be under suspicion of having washed into the deposit from an older formation. The bones, however, are distributed throughout the stratum from base to top. Moreover, the next older beds at this locality are marine and contain few land fossils. Of proboscidian remains there have been found in place in this stratum complete teeth and parts of tusks so fragile that they can be removed intact only with difficulty, while of the wolf, *Canis* sp., a nearly complete and fragile skull has been secured. Fossils of this character can not possibly represent reworked material. The species known to pertain to this horizon afford conclusive evidence of the Pleistocene age of the formation.

The appearance and degree of mineralization of the human bones is the same as that of the associated fossils. In addition the

overlying deposits at this new locality are laminated and consist of alternating layers of sand and muck which could not have been dug through without affording evidence of having been disturbed. The possibility of the human remains representing a recent burial is thus excluded.

The conclusions that may be safely drawn from the data thus far obtained by this work in Florida may be stated as follows: Man was present in America in association with a mammalian vertebrate fauna that is universally recognized as being of Pleistocene age. With regard to culture, the men of the particular stage of the Pleistocene to which this paper relates were then making flint implements, a

fact fully established by the discovery in place in the Pleistocene bed of a spawl from such an implement. They probably were also making bone implements, two of which have been obtained from screenings from the Pleistocene deposit. They apparently also had acquired the custom or art of engraving on bone, this conclusion being supported by the discovery in place in the Pleistocene bed of bones and of a proboscidian tusk having markings which seemingly were made by tools. Further support of this fact is derived from the presence in the formation of small flints obtained from screenings which may have served as tools for this purpose.

The human remains and the associated fossils are more fully described in a report soon to be issued by the Florida State Geological Survey.

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