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NEBRASKA GEOLOGICAL SURVEY

ERWIN HINCKLEY BARBOUR, STATE GEOLOGIST

VOLUME II
PART 6

EVIDENCE OF LOESS MAN IN
NEBRASKA

BY
ERWIN HINCKLEY BARBOUR

Scientific Contribution
Geological fund of Hon. Charles H. Morrill



LINCOLN, NEB.
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1907.

EVIDENCE OF LOESS MAN IN NEBRASKA

BY ERWIN HINCKLEY BARBOUR

Unconsciously or otherwise an investigator is often influenced to see that which seems confirmatory rather than that which is contradictory to his conceptions and beliefs.

But in conducting the search for evidence of human remains in the pleistocene the writer has striven against this psychological tendency and has aimed to be severely critical and exact.

After continued investigation he stands ready to give notice of the occurrence of human remains in the loess, and unhesitatingly and unconditionally announces his belief in the discovery of Nebraska Loess Man.

Mention of this fact has already been made in a preliminary report of the Nebraska Geological survey, Vol. II, part 5, pages 319-327, recently published. Such importance attaches to the discovery as to warrant a paper devoted to the geological facts connected therewith.

PHYSIOGRAPHIC FEATURES

North of Omaha for a number of miles the topographic features are bold and abrupt for a prairie country, due to the proximity

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Fig 1. A scene in the Missouri river valley looking north. Long's hill, a hill of loess, rises 150 feet above the immediate valley. Gilder's mound is directly under the point o.

of the Missouri river. It is but a few years since that river was intrenching its banks and cutting precipitous bluffs in the vicinity

of Florence. The bold river wall is dissected by numerous tributary streams and thus are formed many rugged hills having a relief of 150 to 200 feet.

The steep slopes are grown over with second-growth timber, the first crop having been cut for use in the construction of the Union Pacific railway.

On all sides many and even extensive landslides are in evidence and must be reckoned with in all field work.

In October, 1906, Mr. Robert F. Gilder, of Omaha, who for several years has been investigating the region around Omaha and

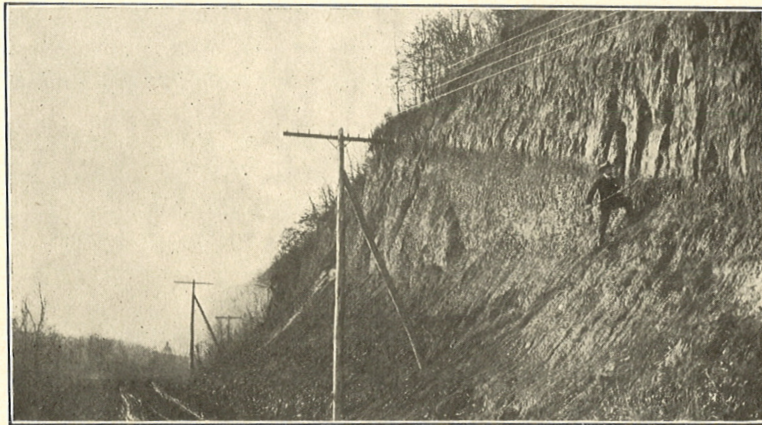


Fig. 2. A section south of Pries lake near Long's hill. The roadway is just at the top of the carboniferous. The student's head is at the top of the Kansan drift, which attains a thickness of forty feet at the telegraph pole.

Above the drift lies loess of varying thickness showing characteristic columnar structure. Valley of the Missouri river to the left. Neg. 2-30-11-06.

Council Bluffs, opened a mound on the Missouri river front ten miles north of Omaha or three miles north of Florence, Douglas county, Nebraska, which yielded unique remains.

From Florence north to Long's hill there is a continuous section along the roadside for about three miles, and from the base of Long's hill to the summit, on which Gilder's mound is situated, there is an unbroken section, hence the geology of the place is well exposed, and being simple is easily interpreted.

The public highway, which is about forty feet above the river level, is just upon the carboniferous, and its dark carbonaceous shales constitute a distinct geological feature. Upon the shale rests an average of ten to fifteen feet of glacial drift containing Sioux quartzite and granitic boulders. Upon the drift comes 150 feet of bright buff loess such as is conspicuous in and around Omaha and Council Bluffs.

A road leads from the base to the summit of Long's hill by a rather steep grade, and incident to the wear of travel and guttering by rain the road bed has been lowered rapidly and runs in a sort of canyon with inclosing walls ten to twelve feet high, constituting a section from base to top. It is a hill of erosion, and no discoverable land slip has complicated its simple geology. The

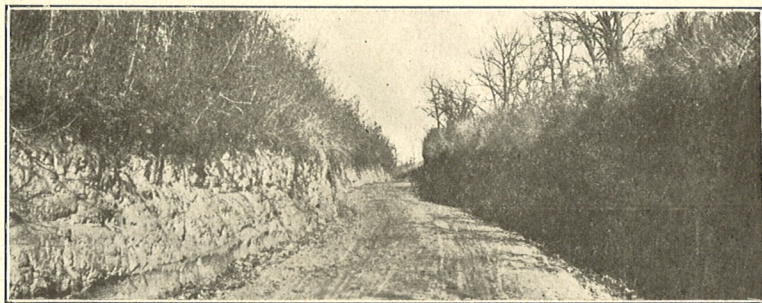


Fig. 3. The road runs between loess walls from base to summit of Long's hill, thus making a continuous section to Gilder's mound. Negative No. 7-30-11-06, Geological Expedition of Hon. Charles Morrill, 1906.

summit of the hill, as measured by a surveying aneroid, is 200 feet above the river level and about 150 above the valley out of which it rises. The hill is conical, and its apex would naturally be chosen by the mound builder as a slightly spot for burial. Further than this there is no discoverable relation between certain human remains found in the upper layer and those in the lower.

Here in October were found two mound builder skulls, and below them parts of eight skulls and many bones of a still more primitive type. The writer at once joined the discoverer, Mr. Gilder, in a critical investigation of the place, continuing work from time to time to December 2nd, 1906.

Two of the skulls found at this spot are mound builders' in all probability. Together with them was the skull of a young child differing from the others in color, texture, and thinness of skull wall. It is presumably that of a modern Indian buried intrusively in the sepulchre of predecessors. These were found in the upper layer readily discernible as a mixture of black soil and light buff subsoil such as would result from digging and burying. This layer has a thickness of two and a half feet. Below



Fig. 4. A snap shot photograph of Mr. Robert F. Gilder taken unawares in the east trench of his mound on Long's hill, ten miles north of Omaha. Negative No. 3-8-11-06, Hon. Charles H. Morrill's collection of Geological Photographs, the University of Nebraska.

it was a distinct undisturbed layer of unmistakable loess, and in it to a depth of twelve feet were many fragments of human bones, loess shells, and stray angular pebbles.

In brief the conclusion is that, in the case of the upper bone layer there was burial, in the lower deposition. Those in the loess doubtless antedate the hill itself, while those in the upper layer are subsequent to it. That archaic burial could have taken place in loess without detection is altogether improbable. Of

necessity there would result a mixture of black with light soil and a breaking up of the lithologic structure, which certainly would be detected. The loess structure and color is perfectly preserved, and there are present the vertical lime tubes, concretions and shells characteristic of the loess precisely as is customary. Out of the evidence at hand the writer concludes that the bones of this layer are strictly synchronous with the loess formation in which they occur, in substantiation of which comes the fragmental nature of all bones, their water-worn condition, their wide range of distribution, and disassociation of parts.

One would scarcely think of such conditions being possible in the

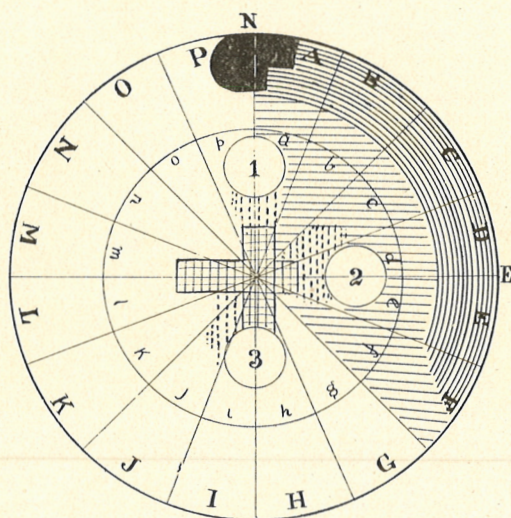


Fig. 5. Ground plan of excavation at Gilder's mound. Cross lines represent Mr. Gilder's original cross trenches; the broken lines extensions made November 8; 1, 2, 3, shafts sunk November 16, to a depth of 8 feet; horizontal lines, excavations November 29 to December 1, average depth, 6 feet; concentric lines, depth of 8 to 9 feet; black area, depth $12\frac{1}{2}$ feet; the inner circle, which is the mound, is 18 feet in diameter; the outer one 30 feet.

case of human burial, besides it is improbable that a primitive race would dig graves to the depth of twelve feet. Should a people without tools and appliances perform such an improbable feat, would they bury water-worn fragments, and would they scatter

them so widely as not to exceed five or six bits to the cubic yard? How could they replace the earth in the grave in such order and regularity that there would be perfect gradation of structure and color from soil to subsoil? Evidence of pleistocene man in America has been accumulating for years, and the verification of his existence has been expected. This may in fact be the verification.



Fig. 6. Mandible of a youth found in section j, near 3, at a depth of $4\frac{1}{2}$ feet. The teeth seem to have been lost in the process of deposition. Specimen No. 3-8-11-06, the Gilder collection, the University of Nebraska. Negative No. 18-3-1-07, the Morrill collection of Geological Photographs.

Respecting the antiquity of the remains the chief evidence paleontologically must be derived from the skulls, which seem to be of the Neanderthal type. Evidences from other skeletal parts are subject to error owing to the wide range of variation in human bones. The association of loess fossils is significant, and when even a remnant of any extinct species is found it will be final.

No sign of stratification, which would be valuable evidence, can be reported.

HISTORY AND METHOD OF INVESTIGATION

Early in November the writer extended Mr. Gilder's transverse trenches, and quickly discovered that one set of skulls found in the upper layer had been buried, while a second set lower down had not. This discovery seemed important and extreme care was exercised in all succeeding work.

Human bones, scattered, water-worn, fragmentary, and unrelated, were found on this occasion in natural undisturbed loess at all levels down to six feet.

The set of bones and fragments then collected is catalogued in the State Museum, the University of Nebraska, under No. 8-11-06.

The most interesting single bit was the left half of a frontal bone secured at a depth of four to five feet. Later, at a distance



Fig. 7. Water-worn fragment of human bone found in undisturbed loess at a depth of 4 to 5 feet at A, see Fig. 5.

of five feet, the other half was dug up, and the two parts fit, completing an interesting frontal. At a depth of five feet was dug out a scapula which differs from the average form.

The acromion is not deflected, but in line with the spine, which is strong, broad and continuous without constriction to the internal scapular border. A jaw which was found in undisturbed loess at a depth of four feet was that of a youth. The crowns of the teeth were scarcely worn, so old age cannot be assigned as the reason for the absence of all the teeth save molars No. 2 and 3 in the right half and No. 2 in the left. See Fig. 6

Just as the teeth of any water-soaked skull or jaw drop out readily, so it seems to have been with this one.

The teeth must have been lost in the process of deposition, for we must pronounce this deposition and not burial.

The above mentioned frontal, scapula, and jaw, being the first material found in the loess, may be subject to error in observation but they at least served to stimulate accuracy in succeeding work.

The number of pieces in this set would have been greater had their relation to the loess been discovered a little earlier. As it is a number of bones from this layer were included



Fig. 8. Fragment of right lower jaw, with condyle, angle and region of symphysis weathered off, the remaining molar but lightly worn. Found outside of the mound in sector A, see Fig. 5, at a depth of $4\frac{1}{2}$ feet. Specimen No. 4-1-12-06, the Gilder collection, the University of Nebraska. Negative No. 4-1-12-06, the Morrill collection of Geological Photographs.

unwittingly in lot No. 7-11-06, and for the sake of accuracy will be left out of account. We will reckon only with those bones which are strictly authentic.

A week later work was resumed, the writer being accompanied

As each fragment was unearthed a block of the matrix was preserved and as far as possible each fragment was preserved in position in the block.



Fig. 10. A water-worn fragment of a lower jaw, imbedded in a block of loess, anterior half with teeth weathered off, found in sector D, see Fig. 5, Specimen No. 1-12-06, the Gilder collection. Negative No. 17-3-1-07, the Morrill collection of Geological Photographs.

This set of bones is numbered 16-11-06 in the catalogue of the University Museum. There are but twenty fragments in this lot, for while it is true that the shafts were sunk to a depth of eight feet, and while bone chips were found at all levels, they were widely

by Mr. Robert F. Gilder and Dr. George E. Condra. All surface material was carefully removed, and three wide shafts were sunk on the northern, eastern, and southern points of the mound. Each shovelful of earth was scrutinized and all bone fragments carefully saved and recorded. In all some twenty bits were found as follows: a fragment from the base of a skull showing the internal occipital protuberance and crest, the superior and inferior cerebellar fossae, and half of the foramen magnum,



Fig. 9. Fragment of a lower jaw, with 4 teeth, anterior and posterior parts weathered off, found in sector B, see Fig. 5, near the circumference, at a depth of $4\frac{1}{2}$ feet, in undisturbed loess. Specimen No. 3-1-12-06, the Gilder collection, the University of Nebraska. Negative No. 3-1-12-06, the Morrill collection of Geological Photographs.

fragments of ribs, limb bones, scapula, and sacrum, a nearly complete clavicle, calcaneum, three complete vertebrae, and two metatarsals.

Some of the parts mentioned are but slivers of human bones, others fragments two or three inches long.

Some were badly etched by water, others gnawed by rodents.

for exhibition in connection with the bones. The writer was accompanied in this work by Dr. George E. Condra, by Edwin Davis and Paul Butler, members of the Morrill Geological Expedition of 1906, and as time would permit, by Mr. Gilder.

Systematic work was continued for three consecutive days.



Fig. 12. Fragments of Nebraska Loess Man, from shafts. 1, 2, 3, natural size. See ground plan, Fig. 5.

- 1, Metatarsal 3, depth $4\frac{1}{2}$ feet, at shaft No. 3.
- 2, Phalanx, depth $6\frac{1}{2}$ feet, shaft 2.
- 3, Fragment of rib, depth $5\frac{1}{2}$ feet, shaft 1.
- 4, Phalanx, depth 7 feet, shaft 1.
- 5, Fragment of skull, depth $5\frac{1}{2}$ feet, shaft 1.
- 6, Fragment of rib, depth $5\frac{1}{2}$ feet, shaft 1.
- 7, Fragment of rib, depth $6\frac{1}{2}$ feet, shaft 1.
- 8, 9, 10, Fragments of skull, depth $5\frac{1}{2}$ feet, shaft 1.
- 11, Distal end of rib etched, depth 8 feet, shaft 1.

Fragments of human bones, scattered and unrelated, were found throughout this quadrant at all levels even to a depth of eleven and a half feet.

It was plainly demonstrated that the segment outside of the

scattered and few in number. Among the fragments may be mentioned five or six bits of skull, as many bits of rib, the angle of a jaw, metatarsal No. 3, and two phalanges. With them were bits of the shell *Anodonta*, *Succinea avara*, and several angular pebbles.

Belief that these bones are fossil and synchronous with the loess is strengthened to conviction as work progresses and increasing diligence and accuracy in observation must be exercised. Accordingly when work was again resumed a few days later a circle thirty feet in diameter was described concentrically about the



Fig. 11. Etched fragment of a skull, the pieces of which were scattered over an area 5 by 5 feet, at a depth of 4 to 5 feet.

mound, which has a diameter of 18 feet. The northeast quadrant of the circle was divided into sectors of twenty-two and a half degrees each and lettered. This quadrant was excavated to an average depth of six feet, and its periphery to an average depth of eight to nine feet, and a shaft was sunk twelve feet on the north point.

From one face of this wall an unbroken twelve-foot prism including soil and loess was cut and securely boxed and shipped

mound was quite as rich in bone fragments as that within, and it cannot be maintained that the fragments throughout the loess are necessarily related to the bones in the mound.

The relation of the two sets of bones may be viewed as purely accidental. In but a single instance were several bones found together, namely, three ribs, three or four limb bones, and an



Fig. 13 Skull 8 of Nebraska Loess Man, side view, reduced approximately one-half, and reversed to face left. The tinted outline is that of a European skull. The antero-posterior diameter of skull 8 is 181 mm. Found by C. S. Huntington, 1894, on Long's hill in loess at a depth of $4\frac{1}{2}$ to 5 feet. Specimen No. 3-1-07. Negative No. 30-29-1-07.

astragalus found in proximity. Probably two hundred fragments were exhumed on this occasion, and the set is numbered 1-12-06.

It should be noted that few whole bones were found excepting a few phalanges. Instead they are bone chips and splinters with an occasional section from a limb bone, and many of the

fragments are pitted or etched. Out of this set the following fragments seem of especial interest: half of a jaw with a solitary molar, the condyle, angle and symphysis weathered off, see Fig. 8; fragments of two other unrelated jaws, see Figs. 9, 10, and the



Fig. 14 Top view of the above reduced approximately one-half, and reversed. Negative No. 31-26-1-07. Hon. Charles H. Morrill's collection of geological photographs, The University of Nebraska.

bony palate with the two back molars in place. To those who have collected in the bad lands or in the Loup Fork beds this is strikingly like the conditions there where the deposits are known to be aqueous, as the human-bone bed under consideration is assumed to have been.

By far the most interesting and instructive single specimen found at this time was a skull completely disarticulate, broken, and scattered over a space five by five feet. The skull wall measures as much as nine millimeters or three-eighths of an inch in

thickness. This was taken out in blocks, and, while the reconstruction of a nearly complete skull seems possible, no attempt will be made to remove the bits from their original position, the



Fig. 15 Frontal bone of the above skull, natural size, showing thick protruding brows and retreating forehead without frontal eminences. Negative No. 32-26-1-07 Hon. Charles H. Morrill's collection of geological photographs, University of Nebraska.

intention being to keep everything in such condition as to facilitate the detection of inaccuracies and errors.

The evidence in the case is greatly strengthened by the harmony of testimony from anatomy and geology. The anatomical arguments can be but briefly presented here, since the present paper is concerned with the presentation of geological facts, and a prospective paper dealing with anatomical facts is in preparation.

Suffice it is to say that the skulls are of the Neanderthal type with thick protruding brows, low forehead devoid of frontal eminences, large parietal eminences, narrow temples, thick skull walls, and small brain capacity.

They are higher in the human scale than Neanderthal man, but lower than the mound builder. They resemble the man of Spy.

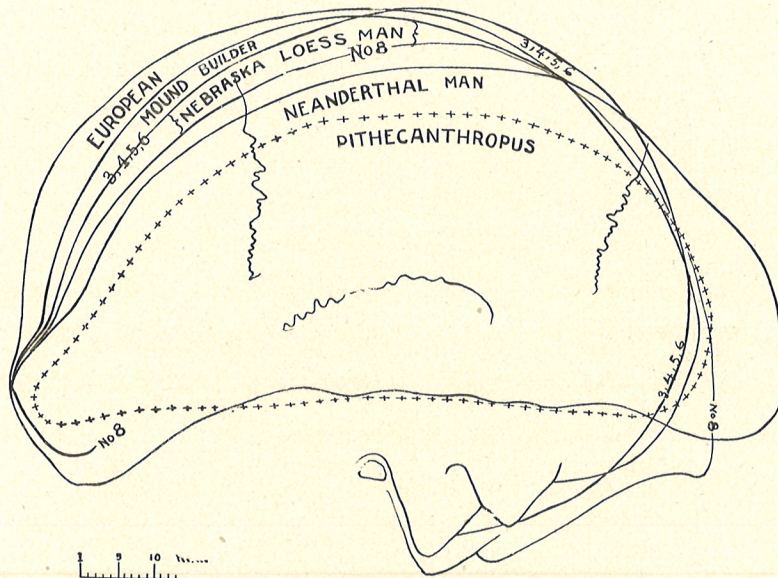


Fig. 16. Outline of various skulls for comparison.

Nos. 3, 4, 5, and 6, a composite outline of the skulls numbered correspondingly.

No. 8 is an outline of the most primitive skull in the collection.

Viewed from above, No. 8 scarcely varies in size from Pithecanthropus.

Drawn from casts and specimens in the museum of the University of Nebraska. One-half natural size.

Measurements: Skull 6, (No. 6-1-11-06) Antero-posterior diameter 181 mm., transverse diameter 145 mm., maximum frontal diameter 114 mm., minimum frontal 93. Owing to the broken condition of the right side the circumference can only be estimated. It is not far from 500 mm., and the height of the skull approxi-

mated for the same reason measures about 125 mm. The cephalic index calculated on the basis of these data is 79. After the mass of fragmentary material has been completely assorted, it is hoped that some skulls may be completed, in which event exact measurements will be possible.

Skull 8 (No. 3-1-07). Skull 8 scarcely varies in size and shape from *Pithecanthropus erectus*, Antero-posterior diameter 181 mm., transverse diameter 142 mm., maximum frontal diameter 112 mm., minimum frontal diameter 90mm., circumference 500 mm., height of skull 137 mm., cephalic index 78.5 mm.

The foregoing account of work begun is not to be misconstrued as work completed. Investigation must and will be continued for months to come in order to get at the whole truth. The end to be attained is worth the energy to be expended, since everything pertaining to our own species concerns every man.

AGE OF THE SUPPOSED LOESS MAN

The present paper concerns itself simply with the announcement of human remains found in undisturbed loess. Owing to the many factors to be reckoned with the question of age can be discussed intelligently only after continued study. The chief point is that human remains have been found in the loess, as the writer unhesitatingly announces. This, if a fact, as believed, carries man in America back to glacial times. Whether this is the very oldest or newest loess seems a secondary consideration. The loess here is not leached of lime salts, but is actively effervescent at all levels, arguing for recency of deposition.

All recognize the chronological diversity in the loess formation, and whether Long's hill is in the main loess body as the writer believes, or in a much more recent one does not materially affect the relation of the bones to some stage of glaciation, the precise glacial or interglacial age being as yet undetermined. It does not seem to be a secondary loess deposit.

The loess in question rests on Kansan drift, and though as young as the later Wisconsin sheet, or younger even, it is nevertheless old.

In several places adjacent to Gilder's mound exposures of human bones in supposed loess are already known, and investigation promises to extend the present known limits of the supposed human bone bed.

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