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## THE LOESS AND THE ANTIQUITY OF MAN.

### B. SHIMEK.

Reports on the antiquity of man in Europe and on both the American continents, contain frequent references to loess, and repeated efforts have been made to establish the antiquity of man on the basis of the relation of human remains and artifacts to supposed loess. Such efforts have been uniformly unsuccessful, and the weakness of these cases has resulted chiefly from the following causes:

1.—In many cases, the human remains and artifacts were removed by laborers or unskilled amateurs, and there are doubts as to the exact nature of the material from which they were obtained.

2.—In other cases, the collectors were competent to judge of the bones, teeth, and artifacts, but not of the deposits in which they were found. Hence definite references to specific horizons in such cases have been unreliable.

3.—Where students of the Pleistocene have been called in to assist in the determination of the horizon, the results have often proved unsatisfactory because of the difference of opinion among such students, and because the rapid progress in the investigation of the Pleistocene has necessitated frequent changes in prevailing opinions.

4.—Perhaps largely because of these difficulties, there has been much superficial, unscientific work done in this connection, and unreliable evidence has been greedily taken up, especially when it supported some pet view or theory.

The antiquity of man has been established in Europe much more definitely than in America, though even there, there has been much difference of opinion as to the age of various remains, the difference arising from the uncertainty as to the age of the horizon in which they were found.

In the European reports, frequent references are made to human remains and artifacts found in loess, but the use of the term has been broad in many cases, and the determination of the character of the materials containing the remains so uncertain in other cases, that it is safe to say that not a single

case of the occurrence of human remains in undoubted, undisturbed loess is known in Europe. In his recent work, Osborn<sup>1</sup> repeatedly refers to loess stations, but in most cases, encloses the term "loess" in quotation marks and does not enter into a discussion of the correctness of the designation.

Not only is there doubt in the cases cited that the material is loess, but in some of the prominent cases cited by this and other writers, there is a great difference in opinion as to the age of the deposit from which the human remains were obtained. Thus Osborn<sup>2</sup> following Werth<sup>3</sup> refers the Heidelberg (or Mauer) man to the Second Interglacial Stage. Schoetensack,<sup>4</sup> who published the original account of the discovery of the lower jaw of this man, referred the sands in which it was found to the First Interglacial Stage. Babor<sup>5</sup> refers it to the Third Glacial Stage, partly on the basis of stratigraphy, but chiefly on account of the character of the mammalian and molluscan faunas. The entire section has also been carelessly included in loess, though the difference in age of the lower sands and the overlying loess has long been recognized.<sup>6</sup>

The human, mammalian, and molluscan remains discussed by the several authors here quoted came from the older sands, and not from the overlying loess or loesslike strata. The age of the Predmost, or Brünn man, discovered at Predmosti, near Brno (Brünn), in Moravia, in 1891, is equally uncertain. Cerny<sup>7</sup> places the remains in the Third Interglacial Stage, while Woldrich<sup>8</sup> considers them postglacial, as do Osborn,<sup>9</sup> Babor,<sup>10</sup> and others. All authors consider the deposit in which the numerous human bones were found as loess, yet in 1883 Makowsky<sup>11</sup> received a skull taken by workmen from a sandy portion of what he also calls loess, at Husovice near Brno (Brünn). This fact, taken in connection with the conclusion reached by the later

<sup>1</sup>Henry Fairfield Osborn, *Men of the Old Stone Age*, 1916.

<sup>2</sup>Loc. cit.

<sup>3</sup>E. Werth, *Globus*, Vol. XCVI, p. 15, 1909.

<sup>4</sup>Otto Schoetensack, *Der Unterkiefer des Homo heidelbergensis aus den Sanden von Mauer bei Heidelberg*, 67 pp., 1908.

<sup>5</sup>J. Babor, *O. stari lidstva: Priroda a Skola*, Vol. VIII, No. 4, 1909.

<sup>6</sup>See E. W. Benecke und E. Cohen, *Geognostische Beschreibung der Umgegend von Heidelberg*, p. 532, et seq., 1881.

<sup>7</sup>Fr. Cerny, *Pravek II*.

<sup>8</sup>*Vseobecna Geologie*, Vol. III, p. 542; 1905.

<sup>9</sup>Loc. cit., p. 23.

<sup>10</sup>Loc. cit., p. 1, footnote.

<sup>11</sup>Alexander Makowsky, *Der Löss von Brünn. Verhandlung. d. nat. Verein in Brünn*, Vol. XXVI, p. 237; 1888.

Bohemian geologists that there is little, if any, true loess in Bohemia, and probably in Moravia also, and the writer's own observations on evidently very similar deposits near Prague, lead to the conclusion that the deposits from which the Brunn skeletons were taken are not loess.

Numerous human bones and artifacts have been found in the vicinity of Prague, and in other parts of Bohemia, and in most cases they have been reported as coming from the loess.

The writer had the privilege of visiting one of these localities with Doctor Babor and others, in 1914. This was the Meilbek (or Mailbek) brickyard at Podbaba near Prague, the sections in which well illustrate the structure of the deposits from which human remains have been obtained in this vicinity.

In 1884, Frie<sup>12</sup> reported a skull which was found in this vicinity in what he called loess, and his opinion of the deposit was generally accepted until quite recently.

One of the sections at Podbaba, in Meilbek's (or Mailbek's) brickyard is represented by Snajdr<sup>13</sup>, who describes two strata of "loess" (in Bohemian called "zlutka" or "spras") separated by a gravelly layer. It is not necessary to describe the section in detail. It is sufficient to say that its horizontal stratification, the variation of the materials composing the several strata from coarse gravel to fine, somewhat loesslike clay, the lack of the ordinary loess texture and structure, and the location of the section, all indicate that there is here no loess, but that the entire deposit is a part of the terraces which are clearly displayed along some of the streams of Bohemia, at three distinct levels. The writer could find no part of the section which could pass for true loess, and found that the Bohemian geologists had recently reached the same conclusion.

The stone implements found in Svobodné Dvory near Kraluv Hradee in Bohemia, seem to have come from strata similar to those of Podbaba, if we may judge from the published descriptions.

Woldrich<sup>14</sup> reported mammalian bones from underlying gravels in this locality, but Snajdr<sup>15</sup> asserts that all the mam-

<sup>12</sup>A. Fritsch, Ueber einem Menschenschädel aus dem Löss von Podbaba bei Prag. Sitzungberichte der böhm. Gesellschaft der Wissenschaften, 1884.

<sup>13</sup>Ludvik Snajdr, Památky nejdavnejšer cinnosti lidske v Ceskem Polabi, tab. I, lower figure, 1909. The description of the section is given on pp. 31-34.

<sup>14</sup>J. N. Woldrich, Loziste mamutih kosti ve Svobodnych Dvorech, 1899.

<sup>15</sup>L. Snajdr, Památky archaeologicke a mistopisne, Vol. XX, No. VII-VIII.

malian bones, with which the artifacts have been associated in this locality have been found in what he designates as "zlutka" (loess). However, his references to the stratum of alluvium separating the two so-called loesses, and to a thin layer of sand on which a skeleton of the mammoth rested, suggest that we have here a deposit similar to that at Podbaba.

Other references of human remains and artifacts to loess in Bohemia are equally uncertain. Under the aeolian hypothesis of the genesis of loess, the preservation of human bones in the loess could not be expected unless artificial burial had taken place, for disintegration would have taken place long before natural burial by slowly accumulating dust could be accomplished. The preservation of artifacts, especially stone implements, would be much more possible, but even here the geological evidence that such implements have been found in true loess is very unsatisfactory or wholly negative for the European stations.

In some of these cases, our estimate of the age of the remains may not be materially affected by the discovery that the deposit in which they occurred is not loess, but even in such cases it is desirable that the nature of the deposit be accurately determined because of the relation which this determination may have on the problems relating to the genesis of true loess. Undoubtedly both aeolian and aqueous deposition were going on at the same time during the several interglacial times, but not in the same places. Aqueous deposition of both fine and coarse material was evidently going on chiefly along streams, and at comparatively low levels, but such deposits are not loess.

No doubt, much of the confusion concerning the loess of Europe has arisen from the various uses of common terms. The term "diluvium" covers the entire Pleistocene, but in the region south of the border of the glacial advance, it applies only to lower alluvial deposits and upper loess or loesslike clays, and in this region these upper strata have been designated sometimes as loess and again simply as diluvium. The terms "lehm" and "loess" have also been variously used. Sometimes they were synonymous, but again the term "loess" was applied to the upper aeolian deposits and the term "lehm" to the lower fluvial deposits of the diluvium. The terms "zlutka" and "spras" in the rather extensive Bohemian literature on the subject, were similarly used, the term "zlutka" corresponding to "lehm" and

the term "spras" to "loess," and they were often synonymous. The varied uses of these terms often leave one in doubt as to their exact meaning in specific cases.

While it may be truly said that the evidence of the antiquity of man in Europe as related to loess is, to say the least, doubtful, it is practically wanting so far as North America is concerned. It is true that in several cases human remains or artifacts have been reported from loess, but in no case has it been shown that the deposit was truly loess. On the contrary, in those cases which have received the greatest attention, it has been conclusively shown that the deposit is not undisturbed loess.

Several careful American students have investigated the problem of the antiquity of man, but chiefly on the somatic side. Among them, Hrdlicka, H. F. Osborn, and MacCurdy have secured valuable results. The geological side of the problem has received less satisfactory attention on the positive side. Unfortunately that portion of the subject which is related to loess was taken by a group of men whose methods have been erratic and unscientific. Among these, Aughey, N. H. Winchell, and G. Frederick Wright were especially active in attempting to prove the age of certain human remains on the basis of the loess.

As late as 1911, Wright<sup>16</sup> repeats the story of what he calls "the best authenticated and most significant cases", namely the "Lansing Man", the Nebraska "Loess" man, and a stone implement found at St. Joseph, Missouri.

It is unnecessary to renew the discussion of the Lansing and Nebraska cases, as the literature on that subject is well known.<sup>17</sup> The former is clearly a case of slumping. Wright calls this an "erroneous opinion" but he does not attempt to explain the presence of blocks of stone in the deposit, which evidently came from ledges higher up on the slope, and which create a condition unknown anywhere in loess.

The case of the Nebraska Loess Man is also well known and its weakness has been shown by the writer in the paper cited in footnote (17). Wright attempts to discredit the writer's work and

<sup>16</sup>G. Frederick Wright, *The Ice Age in North America*, 2d ed., pp. 678-686, 1911.

<sup>17</sup>For a part of the bibliography of the Lansing Man, see the *Bull. Lab. Nat. Hist., State Univ. of Iowa*, Vol. V, p. 327, footnote. For that of the Nebraska "Loess Man" see the writer's paper, *Bull. Geol. Soc. of America*, Vol. 19, p. 254.

conclusions in this case, (p. 685, l. e.), but his chapter on the Loess (pp. 407-421, l. e.) which is largely a compilation of older views (the later views of some of the authors quoted are disregarded, as in the case of Chamberlin), and his occasional discussion of mollusks, demonstrate that he is not in a position to judge accurately of the former, or to pass judgment on the value of the latter as a measure of conditions during the deposition of loess.

In his quotation from Pumpelly, Wright retains the statement that *Vitrina* is not a land-snail! His discussion of the habits of mollusks (p. 421, etc.) also shows a lack of familiarity with the subject.

Wright's charge of bias<sup>18</sup> on the part of the writer, because his studies of the mollusks of the loess have led him to support the aeolian hypothesis, is interesting. Presumably to avoid bias, a man must refrain from getting information on a subject at first hand!

The third of Wright's "best authenticated" cases (pp. 685-686, l. e.), is based on a stone implement which was "found projecting from the face of an old cut for a road" in St. Joseph, Missouri. The description is sufficient to relegate this case to the list of those "not proven." Incidentally it may be noted that the case reported by Witter<sup>19</sup> as a discovery of arrow-heads from the loess of Muscatine is equally doubtful, and was so regarded by Witter before his death.

No new evidence has been presented in any of these cases, nor is there any well-authenticated, undisputed case of the occurrence of human remains or artifacts in original loess that has since come to light. Man probably inhabited much of the region in which loess was being deposited, but as yet, we have no clear evidence of the fact from anything which has been found in the loess. If such evidence should come to light, it may then be necessary to point out other difficulties in the way of using loess as a measure of time.

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<sup>18</sup>L. c., p. 685. Wright has evidently not read the writer's papers carefully.

<sup>19</sup>F. M. Witter, Notice of Arrow Points from the Loess in the City of Muscatine: Proc. Iowa Acad. Science, Vol. I. pt. 2. pp. 66-68; 1892.