

## SPECIAL ARTICLES

## THE PLEISTOCENE OF THE MISSOURI VALLEY

In the course of his recent field studies for the Iowa Geological Survey in the Missouri Valley in western Iowa and eastern Nebraska, the writer was able to determine the following succession of Pleistocene formations:

1. The oldest drift sheet known in Iowa, to which the names pre-Kansan, sub-Aftonian, Albertan and Jerseyan have been applied, is exposed to a depth of more than fifteen feet, and may be traced along the foot of the bluffs for several miles on both sides of the Missouri near Omaha and Council Bluffs.

The terms pre-Kansan and sub-Aftonian have been applied merely to designate the relative position of this drift sheet. The Albertan deposit is not now regarded as a drift, and moreover neither the Albertan nor the uncertain Jerseyan can be correlated with the sub-Aftonian of Iowa. This drift has now been found in various parts of Iowa, Missouri and Nebraska, and probably in South Dakota, but nowhere does it reach such development as in the region under discussion.

Because of the great extent of this formation, and the fact that it can not be correlated with any named horizon, it is proposed that the name *Nebraskan* be applied to it.

The typical exposures above Florence and in South Omaha in Nebraska, and about four miles above Council Bluffs in Iowa, have been noticed by geologists, but the deposit was referred to the Kansan, or was identified as Carboniferous shale.

The Nebraskan consists of a dark, bluish-black tough joint clay which breaks up into very small blocks upon exposure to the air, and through which are scattered small boulders and pebbles which are also mostly dark in color.

2. Upon the Nebraskan, but sharply separated from it, rests a deposit of Aftonian sands and gravels. This is very commonly exposed on both sides of the river and reaches a thickness of more than 30 feet. In its lower part the gravels are often cemented into conglomerates to a depth of several feet.

Fine exposures of Nebraskan and Aftonian

(the latter consisting of gravels, sands and sometimes silt) occur on both sides of the river, but those which appear along the Chicago Northwestern Railroad between Council Bluffs and Crescent are especially fine.

The Aftonian is the water-bearing stratum, and everywhere springs and seepy places abound at its base.

3. At several points in this region Kansan drift rests unconformably upon the Aftonian. It is the typical bluish Kansan with an abundance of calcium carbonate in streaks, cloudings and concretions.

4. Perhaps more frequently, in the immediate vicinity of Omaha and Council Bluffs, the Aftonian is followed immediately by a deposit of joint clay which frequently shows stratification, and often contains sand and pebbles in its lower part. This is the deposit which the writer designated as the *Loveland*,<sup>1</sup> from the type exposure at Loveland, Iowa. Great deposits of Loveland, often exceeding 30 feet in thickness, occur on both sides of the river.

This formation, which probably belongs to the period of the melting of the Kansan ice, is of especial interest because it has usually been referred to loess, from which it differs in its joint clay texture, usually reddish color, absence of fossils, and frequent occurrence of pebbles and coarse sand-grains in its lower part.

5. Overlying the Loveland, and usually separated from it quite sharply, is a bed of characteristic post-Kansan bluish-gray loess, which is usually fossiliferous. This is displayed at several points near Florence and in South Omaha.

6. Upon the post-Kansan loess lies a bed of later yellow loess, which is also often fossiliferous.

The total thickness of the two loesses in this vicinity does not reach 35 feet at any point observed on the Nebraska side of the river, and its thickness on the Iowa side is much less than has been reported, since the thickness of the Loveland must be deducted.

<sup>1</sup> *Bulletin of the Geological Society of America*, Vol. 20, 1909.

The discovery of the great deposits of Nebraskan, Aftonian and Loveland is especially important. A more complete discussion of these deposits will soon appear.

B. SHIMEK

IOWA CITY, IOWA,  
December 2, 1909

*THE BOSTON MEETING OF THE AMERICAN  
ASSOCIATION FOR THE ADVANCE-  
MENT OF SCIENCE*

*REPORT OF THE GENERAL SECRETARY*

THE sixty-first meeting of the American Association for the Advancement of Science was held in Boston, during convocation week, 1909-10; the first general session was called to order in Huntington Hall at ten o'clock on the morning of Monday, December 27, 1909, by the retiring president, Professor T. C. Chamberlin, who introduced the president of the meeting, President David Starr Jordan. Addresses of welcome were made, on behalf of Massachusetts Institute of Technology by President Richard C. Maclaurin and on behalf of Harvard University by Dean Wallace C. Sabine. President Jordan replied briefly on behalf of the American Association. Announcements were made by the permanent secretary, the general secretary and the local secretary, after which the general session adjourned.

The various sections and the affiliated societies met in their respective halls, according to the published program, the Massachusetts Institute of Technology and Harvard University having placed their lecture halls and laboratories freely at the disposal of the association.

The address of the retiring president of the association, Professor T. C. Chamberlin, was given in Sanders Theater of Harvard University, on the evening of Monday, December 27, the subject being, "A Geologic Forecast of the Future Opportunities of our Race." This address was preceded by an address of welcome to Harvard University by Professor F. W. Putnam, and was followed by a reception given by the corporation of Harvard University to the members of the association and the affiliated societies and their accompanying ladies, in Memorial Hall.

The registered attendance of members of the association was 1,140, the largest in the history of the association. The registration by sections was as follows: A, 106; B, 124; C, 200; D, 36; E, 166; F, 218; G, 132; H, 92; I, 12; K, 50; L, 104. The registration of members of affiliated societies at the association headquarters was only

166. This conveys no meaning with regard to the attendance of affiliated members, as one instance will show; the registration at the headquarters of the American Chemical Society was 558, while only 200 registered as belonging to Section C of the association. No doubt the attendance of other affiliated members was large, and no registration was secured. It seems, therefore, that the attendance of scientific men may have exceeded 2,000.

GENERAL EVENTS

On Tuesday evening, December 28, a public lecture complimentary to the citizens of Boston, was given by Dr. C. W. Stiles, on "The Hookworm Problem in this Country in Reference to Public Health."

On Thursday evening, December 30, under the auspices of the Entomological Society of America, a lecture was given by Dr. John B. Smith on "Insects and Entomologists: Their Relation to the Community at Large."

A reception by the president and corporation of Massachusetts Institute of Technology to the members of the association and affiliated societies and their accompanying ladies was given on the afternoon of Wednesday, December 29.

A reception by President and Mrs. Maclaurin was given to the visiting physicists and their ladies, at their home on the afternoon of Thursday, December 30.

On the afternoon of Friday, December 31, a lecture was given by Dr. Percival Lowell on "The Canali Novæ of Mars."

The business meeting and banquet of the Society of the Sigma Xi were held on the afternoon and evening of Wednesday, December 29.

There were many dinners arranged for groups of members, such as mathematicians and astronomers, physicists, chemists, geologists, zoologists and entomologists, anatomists and physiologists; there were many less formal but very pleasant "smokers" and other gatherings at various hotels and club houses.

ITEMS OF GENERAL INTEREST FROM THE  
PROCEEDINGS OF THE COUNCIL

The council met at nine o'clock in the morning, on Monday, Tuesday, Wednesday, Thursday and Friday, December 27 to 31.

At these meetings 57 new members were elected. A much larger number had been elected quite recently, and should be considered as being elected at the Boston meeting. The membership is now more than 8,000.