

62. *Homalonotus armatus* Hall (rr).
63. *Ceramopora labecula* Hall (rr).
64. *Stropheodonta profunda* Hall (fragment).
65. *Pholidops ovalis* Hall (interior of ventral valve).
66. *Fenistella parvulipora* Hall (rr).
67. *Strophiodonta striata* Hall (rr).
68. *Trematopora echinata* Hall (rr).
69. *Stephanocrinus* (fragment).
70. *Fistulipora maculata* (Hall) (r).
71. *Crania* sp. (rr).

(The relative abundance of species in the above list is indicated by the letters in parentheses, aa indicating very abundant; a, abundant; c, common; r, rare, and rr, very rare.)

In the species *Whitfieldella nitida* no transitional forms were found between the large and small varieties, though a considerable number of specimens of both varieties were obtained.

The form given by Hall as *Lichenalia concentrica* var. *maculata* is here referred to the genus *Fistulipora*, since all the specimens from the present locality in which the maculae are present, also possess mesopore apertures in the interapertural spaces, a character not possessed by *Lichenalia* as defined by Simpson. (See 14th Ann. Rept. State Geologist of N. Y., p. 559.)

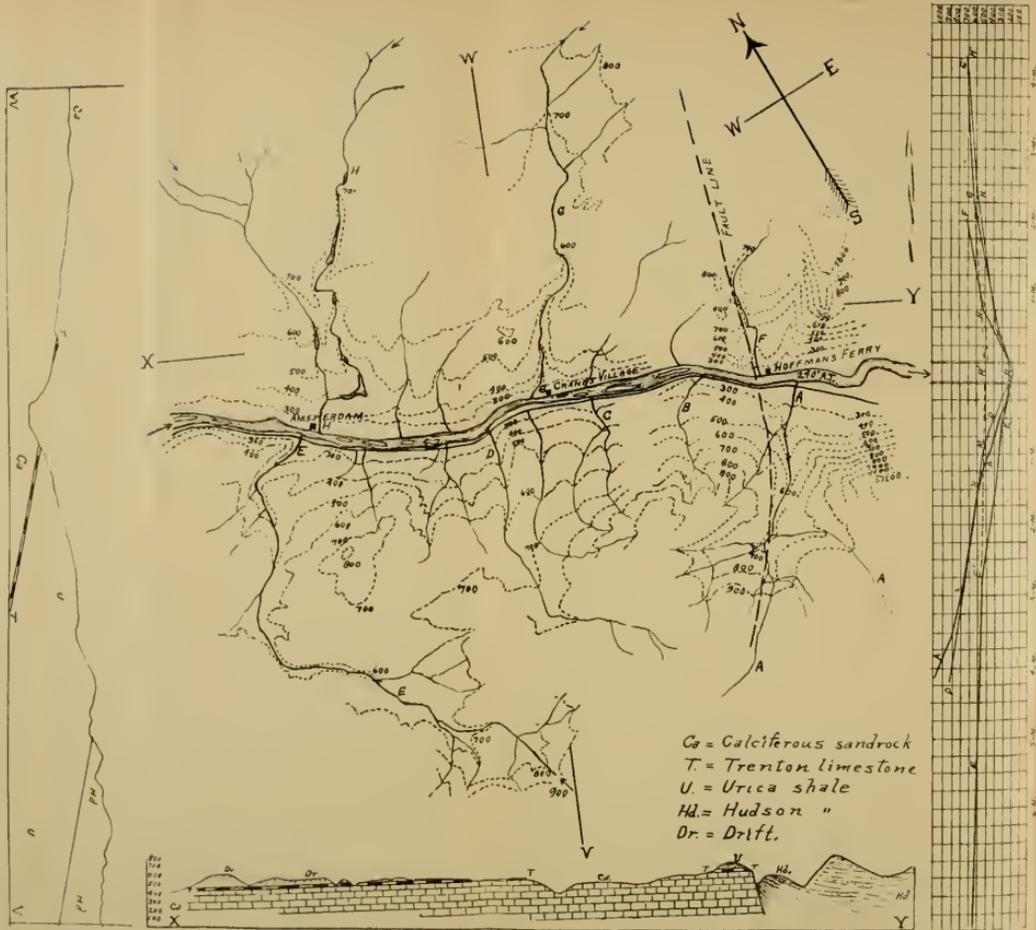
## THE STREAM GRADIENTS OF THE LOWER MOHAWK VALLEY.

BY EDGAR R. CUMINGS.

During a recent study of the area mapped as the Amsterdam (N. Y.) sheet of the U. S. Geological Survey\* the writer was struck by certain peculiarities of the streams of this area emptying into the Mohawk River.

As will be seen by a reference to the accompanying map, practically all of these streams have a relatively flat gradient throughout their upper courses. The streams A, D and F have not cut through the glacial till that forms the beds of their lower courses, while all the streams A, D, E, F, G, H, flow over rock beds in their upper courses.

\*The results of this study dealing with the stratigraphy and paleontology of the Lower Silurian formation will be published as a part of Bulletin No. 32 of the New York State Museum.



In all cases the upper courses are more mature, both as regards slope of the bed and with regard to steepness of banks and presence of waterfalls, etc.

The profiles to the right of the map are accurately drawn to scale from the data of the U. S. Topographic sheet. It will be seen that there is a remarkable uniformity in one particular, namely, the points (M, N) where the prolongations of the upper slopes intersect. A line coinciding with  $xy$ , the upper slopes of A and D, meets the prolongation of a line coinciding with  $EE'$ ; the upper course of E, at M, and a line coinciding with the upper course of F ( $FN$ ) meets the line coinciding with the upper courses of G and H ( $GG'$ ,  $HH'$ ) at N (nearly).

This state of affairs is not due to structure, for, as will be seen by the geologic sections ( $XY$  and  $WV$ ), the formations and structure encountered by the several streams vary to a marked degree. G and H flow over hard, arenaceous limestone (Calceiferous and Trenton in part); F flows over the soft Utica shale; A flows over the even more yielding Hudson shales, and D and E over Utica. A and F are determined by a fault line. The lower courses, where not in glacial drift (F, D and A), are in limestone (G and H) and Utica shale (E).

There are three possible explanations of the peculiarity in question. (1) These mature upper gradients represent a period of base-leveling and subsequent elevation which has rejuvenated the streams, allowing them to re-excavate their beds; (2) the Mohawk Valley was plowed out to a depth of 240 to 260 feet by the Mohawk Valley glacier\*; (3) the water of the Mohawk was dammed back to a level of 240 to 260 feet above the present river level for a length of time sufficient for the streams in question to mature.

Of these possible explanations the first is the more probable inasmuch as the stream, E, is manifestly preglacial and has been modified in its upper course to some extent by drift, nevertheless the upper gradient of this stream conforms distinctly to a river at a level of 500 feet (A. T.), instead of at a level of 240 feet as in the present Mohawk River. We must, therefore, believe that this stream reached grade before it was interfered with by the presence of the glacier.

As for the hypothesis of a plowing out of the Mohawk Valley, this seems hardly probable in view of the fact that the Hoffmans Ferry fault

\*See Dana, A. J. S. (2) Vol. 35, pp. 243-249; Brigham, Bull. Geol. Soc. Amer., Vol. 9, pp. 183-210; Chamberlain, U. S. G. S. Third Ann. Rep., pp. 360-365.

offers a substantial barrier of hard limestone to such an amount of erosion on the part of the glacier. Furthermore, the gradients of the lower courses of some of the streams, at least, such as A, F and D, where the streams are still flowing through till must have been formed prior to the presence of the glacier since they are partly plugged with glacial debris. It seems likely, then, on the whole, that these streams had cut to grade not long prior to the glacial epoch and were rejuvenated together with the entire Mohawk system by the elevation which preceded or accompanied the glacial epoch.

### SKULL OF FOSSIL BISON.

By W. G. MIDDLETON AND JOSEPH MOORE.

Let it be said here, by way of introduction, that Mr. Middleton, of the Vincennes High School, as some members of the Academy will remember, obtained and reported to the late meeting the above-named specimen, reporting it as probably *Bison latifrons*, Leidy. Mr. Middleton gave his report verbally to the Academy, and has recently been in poor health, so that he has not been able to give it further study and write it up for publication. He, therefore, requests me (J. M.), since the specimen has been sent to Earlham College, to forward measurements, photographs and whatever notes may seem proper.

This cranium was found in 1896, a few miles from the city of Vincennes, Indiana, by a Mr. Brower. It was some six feet below the surface, partly unearthed by the caving in of the bank of a deep ditch.

It will be noted that what appears to be the horns are but the horn cores—processes of the frontal bones for the support of horns long since decayed. The horns, if restored, would add, say a foot to each projection.

	Ft.	In.
Distance from tip to tip of horn cores, direct line.....	3	0 *
Circumference of horn cores near base.....	1	0
From tip to tip of horn cores, line of outer curves.....	3	9
Width of forehead between horns.....	1	3
Greatest width from outer to outer of orbit borders.....	1	2½
Least width of forehead (between eyes and horns).....	1	½
Length of face from occipital crest to anterior of nasals..	1	9

\* This measurement supposes an inch, more or less, to be restored to the tip of the right horn core, which has been broken off. Measurement as it appears in the cut is 35 inches.