

## DRAINAGE CHANGES IN THE VICINITY OF WOOSTER, OHIO.

KARL VER STEEG,

*Professor of Geology, College of Wooster.*

In a pamphlet\* published by the Ohio Academy of Science, Dr. J. H. Todd has presented a paper, setting forth his theories concerning the preglacial drainage of Wayne and adjacent counties. Results of investigations within recent years by G. W. Conrey, G. Coffey and the author, throw serious doubt on the correctness of Todd's conclusions. In the light of evidence now available it seems desirable to offer an explanation in accord with facts.

For a detailed discussion of the old theory of the preglacial drainage, the writer refers the reader to the original paper by Dr. Todd, mentioned in the previous paragraph. For the benefit of those who are without information concerning the problem it is perhaps expedient to give, as briefly as possible, a general lay-out of the preglacial drainage conditions as put forth by Dr. Todd. (Figure 1).

Todd agrees with others who have studied Ohio, that the preglacial drainage in this region was to the north in the direction of Lake Erie, instead of to the south as at present. He traced the course of a large stream by way of the broad, drift-filled valley which extends from Mansfield to Loudonville and Shreve. From Shreve its course was northeastward to Wooster, in the valley now followed by the Pennsylvania Railroad; this railroad follows the old valley from Mansfield to Wooster. From Wooster the stream, it is believed, flowed across a broad divide to a point near Orrville, from which it followed the old valley now occupied by Little Chippewa Creek, where it took a northwesterly course leaving Wayne County north of Sterling. From that point its channel was northward by way of Chippewa Lake, passing to the east of Medina and farther north into the valley now occupied by the West Branch of the Rocky River. Tributary streams joined

---

\*Todd, J. H. "Some Observations on the Preglacial Drainage of Wayne and Adjacent Counties," Ohio State Academy of Science, Special Papers, No. 3, pp. 46-67, December, 1900.

this main or trunk stream at various places. Todd places considerable importance on the bed rock as a controlling agent, determining the direction of flow; emphasizing the significance

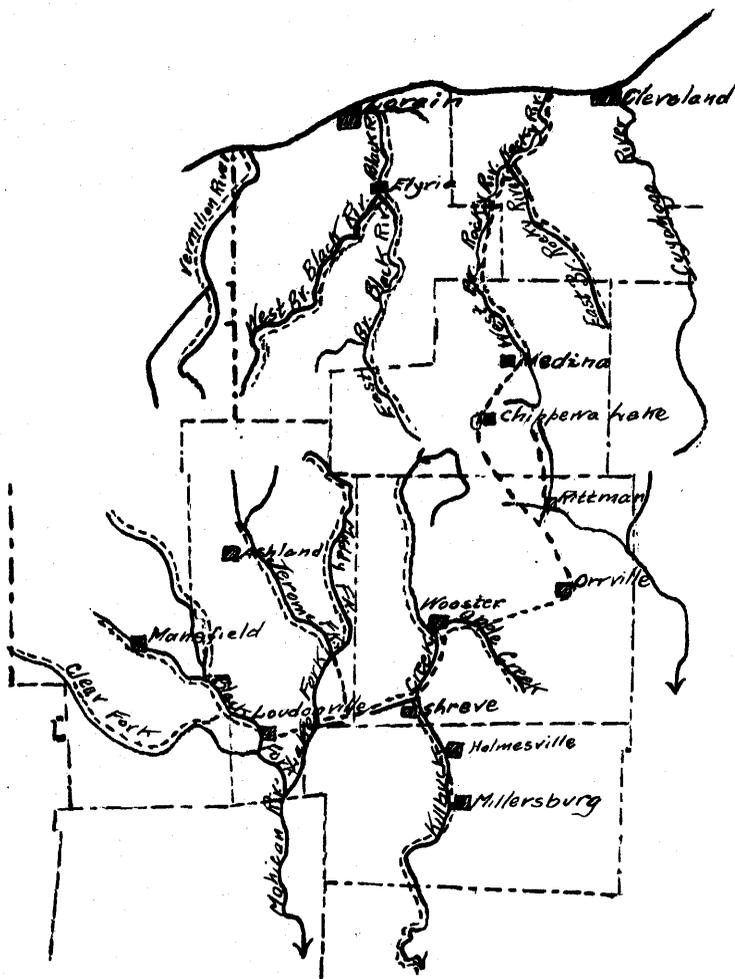


FIG. 1. Sketch map showing present and pre-glacial drainage lines in Wayne and adjacent counties, according to J. H. Todd. Dotted lines indicate pre-glacial drainage.

of the position of the stream between the Waverly-capped hills to the north and west and the Coal Measures to the east and south\*.

\*Ibid., I, pp 46-49.

The course of the stream can be traced to Wooster (Figure 2) where insuperable difficulties are encountered; the broad valley ends abruptly. Todd recognizes this difficulty, for he remarks†, "This brings me to the city of Wooster, and from here to Orrville I have a rough road to travel, but the preglacial water came here, and there was but one way for it to go out, and I must find that way under the high gravel hills between here and Orrville. On the south of Wooster is Madison Hill, on which is located the Ohio Experiment Station with its quarry

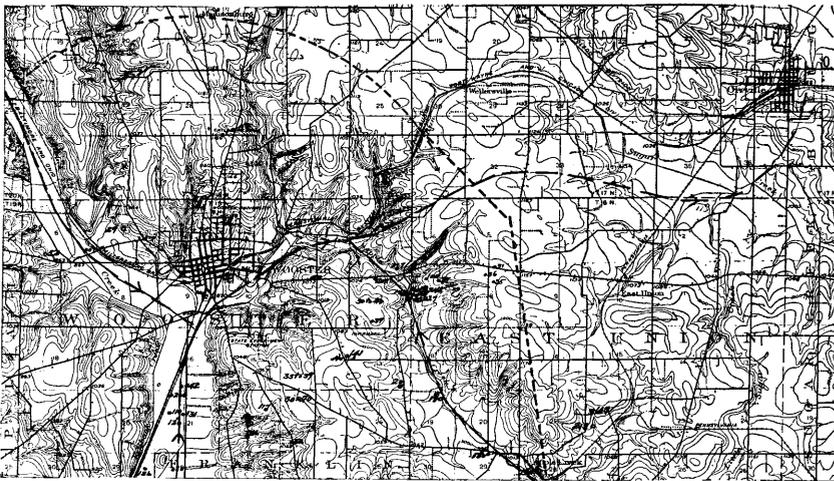


FIG. 2. Pre-glacial drainage lines in the vicinity of Wooster as proposed by Todd. Depth to bed rock obtained from well records are indicated. The heavy dotted line, circumscribed about Wooster, represents bed rock too near the surface for the stream to have passed in that direction.

of elegant Coal Measure sandstone; and  $1\frac{3}{4}$  miles north of it across Apple Creek valley, on a terrace of which is located South and East Wooster, Wooster University is planted on a hill of naked Waverly shale 522 feet above Lake Erie. Madison Hill has about the same elevation, and between them, but near 200 feet below them, sparkles the crystal water of Apple Creek. No drillings have been made in the center of the channel to the rock floor—so its elevation cannot be proven here—but many drillings have been made for water, which is found in white sand at from 95 to 105 feet. One well was drilled to rock on the side of the channel, at the foot of College Hill and showed

†Ibid., I, p. 52.

120 feet to shale; while six furlongs east, across the Apple Creek, at the foot of Madison Hill, rock was found at 45 feet and the channel runs between these two wells."

There is much evidence to support the conclusion that a large preglacial stream did not flow across the divide from Wooster to Orrville. The narrowing channel between Wooster and Madison Hill, as indicated by rock outcrops and well records would seem to exclude all probability that so large a stream flowed to the northeast toward Orrville. There are no differences in the kind of rock or its resistance to erosion which would account for the channel narrowing so greatly here.

If a continuation of the large valley south of Wooster existed beneath the drift between Wooster and Orrville, it would be reasonable to expect a broad sag to indicate its presence. The existence of all the other large preglacial valleys in this section of Ohio are suggested by broad sags. Although not conclusive by any means, the absence of a sag between Wooster and Orrville along the line indicated by Todd as the probable course of the preglacial river, is not in harmony with the theory that a large stream flowed here.

Referring to Todd's course of the stream from Wooster to Orrville as indicated on the map (Figure 2), Conrey remarks\* on page 19, "In an attempt to locate this channel, every ravine on the east side of Apple Creek was examined and found to show rock outcrops except in Section 36, Wayne Township, where Spring Run has cut into a preglacial valley, but the existence of rock outcrops near by, both to the north and south would seem to indicate a channel too narrow for the stream which has been traced past Wooster." "The evidence for a preglacial channel leading to the east through the upland from any point near Honeytown seems negative."

The author has obtained well records and carefully examined the valleys leading into the upland, between Weilersville and Apple Creek Village and found bed rock everywhere so near the surface as to exclude any possibility that the stream crossed here. Likewise, to the north of Wooster the bed rock lies everywhere so near the surface that it is evident that the continuation of the stream was not to the north. The heavy dotted line shown on Figure 2 is so placed to indicate the

---

\*Conrey, G. W. "Geology of Wayne County," Geological Survey of Ohio, Fourth Series, Bulletin 24, 1921.

presence of bed rock too near the surface to allow the passage of the stream. A possible avenue for the escape of the waters has been suggested by way of Apple Creek, to Apple Creek Village, and from there to East Union and Orrville through another old channel. There are several objections to this route. First, as already noted, this valley seems too narrow to have accomodated so large a stream as that indicated by the large valley from Shreve to Wooster. It is apparently the valley of a smaller stream, probably a tributary to the larger stream. The trend of Apple Creek valley is such as to suggest that the trunk stream flowed south instead of east. For a tributary to flow into the main stream at an angle pointing in an upstream direction, (Figure 2) is not normal. Apple Creek valley makes the normal angle such as would be made by a tributary, if the trunk stream flowed in a southwest direction instead of northeast as suggested by Todd. Furthermore, it must be admitted that although possible it does not appear to be a reasonable conclusion to assume that the stream would make such an unnatural bend to the south to get to Orrville. The most significant objection, amounting to proof that the stream did not take this round-a-bout route is revealed by well records obtained by the writer. In Section 7, East Union Township and Section 12, Wooster Township, there are numerous oil wells which extend in a narrow belt, in a northeast-southwest direction across Apple Creek. These wells are so located in the valley and on the upland on both sides, as to make possible a cross-section on the bed rock of the old drift-filled preglacial channel. On the upland in Section 12, Wooster Township, the depth to bed rock is only 30 to 40 feet. Farther east, in the same section, it increases to 133 feet. In the valley, near the stream, one well reveals a depth of only 79 feet to bed rock. In Section 7, East Union Township, the well records going from west to east, are respectively, 118, 160, 198, 227, 245, 75 and 36 feet. These records indicate a considerable distance to bed rock and are understandable when one makes allowance for the glacial drift which is thicker on both sides of the valley, on the sides of the stream, where it has not been removed by stream action. The well-head elevation is the important factor to be taken into account. The depths of 227 and 245 feet are not so impressive when we realize that the well-head elevations are 1020 and 1040 feet A. T., respectively, an altitude much above that of the broad valley south of

Wooster, where the elevation is only 844 feet A. T. The greatest depth to bed rock, obtained in the valley south of Wooster is 206 feet. The altitude of the bed-rock floor is therefore 638 feet A. T. The elevations of Apple Creek valley in Section 7 and 12, East Union and Wooster Townships respectively, range from 940 to 960 feet A. T. When the well-head elevations are taken into account we find that the bed-rock floor here cannot be less than 790 feet A. T. This is 152 feet higher than the bed-rock floor in the broad valley south

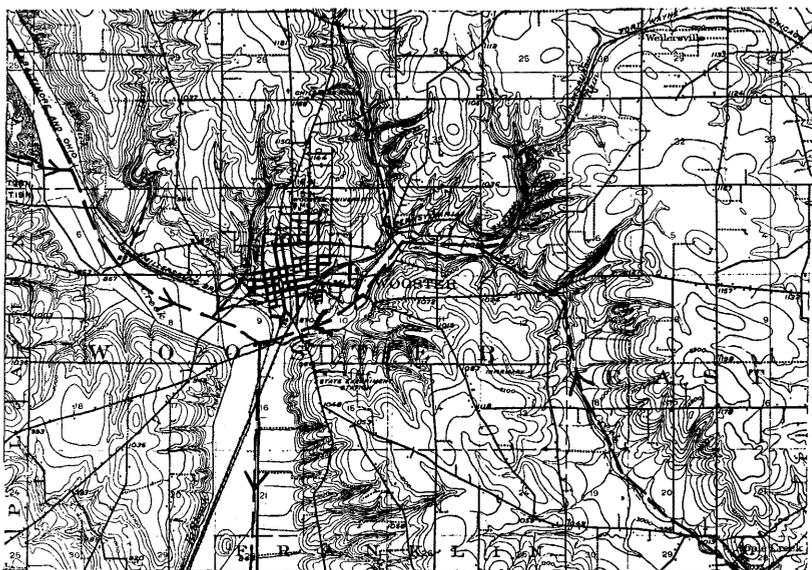


FIG. 3. Pre-glacial drainage lines in the vicinity of Wooster according to the observations of the writer.

of Wooster. Hence it seems impossible that the stream flowed southward by way of the old valley now occupied by Apple Creek.

There is no escape from the conclusion that if the drainage in preglacial time was not north from Wooster and Orrville it must have been south, for that is the only avenue of escape for the waters. The map, (Figure 3) indicates the probable preglacial drainage lines according to the writer's knowledge of the region. It is expected to carry on the investigation still farther with the expectation of offering solutions for the drainage problems to the west and south.