

A CHANGE OF DRAINAGE OF RACCOON CREEK, PARKE COUNTY, INDIANA.¹

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The area to be discussed includes most of Parke County, Indiana, and the northern tier of townships of Vigo County, Indiana. The villages of Rockville, Rosedale, Montezuma and Mecca are within the drainage area and the city of Terre Haute is only 10 miles south of the southern boundary.

Geologically, this area is in the region of Pennsylvanian Age, within the borders of the Illinois Glacial Invasion, and crossed by the Wisconsin Drift Sheet.

From the viewpoint of physiography, the region has been placed by Fenneman² in the Central Lowland Province of the United States and in the Till Plains Section. According to the more detailed physiographic divisions outlined by Malott³ this territory includes parts of three separate divisions. The northern half of the district—that covered by the Wisconsin Drift Sheet—is a part of the Tipton Till Plain. The extreme southwestern part of the district forms the northern tip of the Crawford Upland, the region of the Mansfield Sandstone outcrop. Finally, the southern and western part is in the Wabash Lowland.

Topography.—In topographical forms the Tipton Till Plain, characteristic of central Indiana, is beginning to lose its usual appearance here, because of the nearness to the Wabash and its major tributaries. However, the Plain stands out flat and plateau-like between the stream valleys, and the northern part of this region usually gives the appearance of a rolling-plain prairie, lying from 600 to 650 feet above sea level.

The Wabash River and Raccoon Creek have a number of terraces. These terraces are not usually wide but some very productive farms are located upon them. Their elevation varies from 540 to 560 feet.

The Wabash River is about 450 feet in elevation at low water level. Its valley is higher, of course, and very wide in many places. Raccoon Creek cuts through to about 480 feet at Mecca.

Thus we have three rather distinct levels in the region: the prairie level, the terrace level and the flood plain.

Geologic Problems.—There are several geologic problems of interest in this region. I will merely mention a few of them in passing, leaving full discussion for one problem only.

An interesting structural irregularity is found near Coxville, known as the Coxville Channel or Coxville Carboniferous River. This 80-foot

¹Taken from the author's treatise "A Geologic and Physiographic Study of the Region in the Vicinity of Raccoon Creek and the Wabash River, lying principally in Parke County, Indiana", being a thesis presented to the Department of Geology, Indiana University, as a partial fulfillment of the requirements for the degree of Master of Arts.

²Fenneman, N. M., "The Physiographic Divisions of the United States", *Annals Assoc. Amer. Geog.*, Vol. 6, 1917, pp. 19-98.

³Malott, C. A., "The Physiography of Indiana", *Handbook of Indiana Geology*, pp. 66-94.

thickness of sandstone has been frequently mentioned by Ashley⁴ and others, with the idea that it represents a region of embayment and filling in of Post-Allegheny sandstone—probably Merom—in the Coal III horizon. Logan, however, assisted by the writer and others, traced smut bands corresponding in elevation to Coal III and IIIa across the entire surface of the cliff. This would indicate, of course, merely an area of non-deposition of Coal III.

A careful study of the maps in the illustrations will show an irregularity in the South Prong of Little Raccoon Creek in the extreme northeastern part of this district. My data would indicate that in preglacial times this small stream drained directly into Troutman's Branch and thence into Big Raccoon Creek. More well drillings are necessary, however, to establish this absolutely.

The middle course of Big Raccoon Creek is blocked by a very definite butte near Mansfield, forming a cul-de-sac which has been studied and described by Dryer.⁵ The indications here are that the Raccoon was a large tributary of the Wabash in preglacial times—"comparable only to the present day White River".

These problems are interesting and worth further attention, but cannot be discussed more fully here. The most important physiographic problem of the region may be briefly stated as follows:

Why does Raccoon Creek, flowing normally in a southwesterly direction (until it is within 12 miles of the Wabash), forsake its wide valley, which continues to the Wabash, and flow north for ten miles through a narrow valley which has been carved in bed rock?

We will attempt to answer this question.

Lower Raccoon Creek.—In its lower course Raccoon Creek flows through the shales and sandstones of the coal measures. From Mansfield it flows in a general southwesterly direction to the range line. The valley is regular—averaging about one-half a mile wide with bluffs 60 to 80 feet high. Just south of Bridgeton the valley widens and there is a pronounced terrace sloping gently from the bluffs to the valley level but very flat nearest the stream. It averages about 540 feet elevation—20 feet above the flood plain. The stream below Bridgeton has many meanders and is constantly changing its course. This was especially true this spring (1922) after the heavy rains.

South of the range line the valley continues to widen to a width of two or three miles and merges with the valley of the Wabash just south of Atherton. In this lower course the prairie level is reduced and the valley sides are cut down to a much smoother slope. The divide between Raccoon Creek and Otter Creek below Rosedale is composed of wind driven sand. There are a great many dunes stretching across the valley in sections 9 and 16 of T 13 N, R 8 W. These dunes are only 15 to 20 feet high but are persistent throughout the valley. All along the valley there is a great abundance of sand and the merging of the Raccoon and the Wabash valleys gives an excellent opportunity for action by the west and southwest winds.

⁴ Ashley, G. H., "The Coal Deposits of Indiana", Ind. Dept. Geol., 23d Ann. Rept., 1898, p. 300.

⁵ Dryer, C. R., "Wabash Studies", Ind. Acad. Sci., 1921, pp. 199-212.

Just east of Rosedale in section 26, T 14 N, R 8 W, there is an unusual amount of peat and bog, indicating recent laking. In the memory of people now living this region has been constantly covered with several inches of water.

Between this sand dune divide and the turn in Raccoon Creek the land is very flat and sandy. There are some artificial drainage ditches dug through the region by the land owners. The largest one of these, the Cox Dredge Ditch, follows, in my opinion, the ancient channel of Raccoon Creek. It starts at the C. and E. I. R. R. tracks in section 2, T 13 N, R 8 W, and flows southwest for about five miles into a small branch of Otter Creek. It has not been a successful business venture because the sand dunes have repeatedly clogged it and it has been subject to excessive filling in the spring. After passing the divide indicated, however, its grade increases and it becomes a fair-sized stream at its entrance into Otter Creek.

Raccoon Creek, as I have indicated, does not follow the valley but turns west in section 28, T 14 N, R 7 W, and, after a slight jog to the south near the range line, turns abruptly north in section 36, T 14 N, R 8 W—one mile east of Rosedale. From this point it flows northwest for about ten miles, through Coxville, Mecca and Armiesburg, and then west into the Wabash one mile south of Montezuma. It is joined in section 23, T 14 N, R 8 W, by Little Raccoon, in section 16 by Iron's Creek and in section 7, T 15 N, R 8 W, near Armiesburg, by Leatherwood Creek—all coming from the northeast.

Between Coxville and Armiesburg the valley varies from one-fourth to three-fourths of a mile wide. There is some outcropping along the hillside and a few bank coal mines on the west side. The valley is regular except that there are two definite terraces—one on the west side on which the village of Mecca stands and another on the east side just north of Mecca. These terraces are about 25 feet above the valley floor and are each approximately one mile long. The narrowest part of the valley is above Mecca in section 17. Another very narrow place is just below Coxville in section 22. Either of these places might have been saddles, or low places in the divide, over which the drainage was drawn. The gap in the Wabash bluff through which the Raccoon-Leatherwood stream passes is over a mile wide and is blocked by the Montezuma terrace. Raccoon valley, however, before it meets Leatherwood, is only a quarter of a mile wide. The cut through the terrace at Armiesburg is only about 750 feet wide.

Clearly, the Raccoon once flowed directly southwest into the Wabash below the south tip of Atherton Island. Just what caused the deflection can probably never be fully determined. I will give several theories in brief.

Dryer⁶ believes that there was once—probably in Illinoian times—an ice dam stretching across the lower valley. The entire valley was laked and finally the water found its way across a saddle at Coxville into a tributary of Leatherwood Creek. This ice dam would also account for the Bridgeton terrace. He indicates that at some time during the

⁶ *Loc. cit.*

glacial age the Wabash waters may have found their way through this valley and Atherton Island was truly insular. He says that "during the climax and retreat of the Wisconsin Ice Sheet, the valleys of the Wabash and its tributaries were aggraded to the present terrace level. For a time the present mouth of the Raccoon was blocked by ice and the stream flowed over the terrace directly to the Wabash. By final withdrawal of the ice margin from the Shelbyville moraine the northern outlet was left a little lower than the Rosedale divide, and the present conditions came into existence".

Geographers are agreed that the region drained by Raccoon Creek was uncovered by the Wisconsin Ice Sheet while the present mouth of Raccoon Creek near Montezuma was still covered with ice. The Wisconsin Ice Sheet came in lobes, following the valleys in the main, until a great enough thickness was attained to override the divides. As the ice melted and receded to the north, it probably reformed into its original lobes. Thus the river was blocked after the valley was freed. McBeth⁷ advances strong argument to prove that the whole melting of the Wisconsin Sheet was from east to west.

It is evident, therefore, that Raccoon Creek must have followed its southwesterly course during the time of the Wisconsin Ice Sheet. It follows that the present deflection of the stream to the north is Post-Wisconsin.

It would seem probable, however, that there was a valley formed before the deflection of the stream. The present sand dune divide would not force the creek over a very high saddle. This valley might have been formed in any of a number of ways. I will indicate a few of them.

During the waning of the Wisconsin Ice Sheet it is possible that a stream found its way out along the margin of the ice into Raccoon Creek. Such a stream would carry a load sufficient to build up a very level plain between the ice and Raccoon Creek.

It is possible, as Dryer suggests, that some of the Wabash waters at one time found their way through this channel. The present width and depth of gravels would not indicate much more than overflowing back water, however.

It is possible, of course, that the original cause of deflection was an ice dam—as previously suggested. I do not believe, however, that it is necessary to explain the Bridgeton terrace by this dam. The Bridgeton terrace might well be considered as a part of the Terre Haute terrace and explained as glacial outwash with it.

Lastly, it is possible that the divide between a north-flowing branch of Leatherwood Creek and a south-flowing branch of Raccoon Creek was low enough that the waters of Raccoon Creek were forced over it, as the valley filled with sand, in Post-Wisconsin times. This would occur gradually, of course, probably for years only at the time of high water, until a permanent channel was effected.

I have given these theories in the order of their probability, in

⁷ McBeth, W. A., "Development of the Wabash Drainage System and the Recession of the Ice Sheet in Indiana", *Proc. Ind. Acad. Sci.*, 1910, pp. 184-192.

my own judgment. The marginal stream theory seems reasonable to me, while the last mentioned theory occurs only as a possibility.⁸

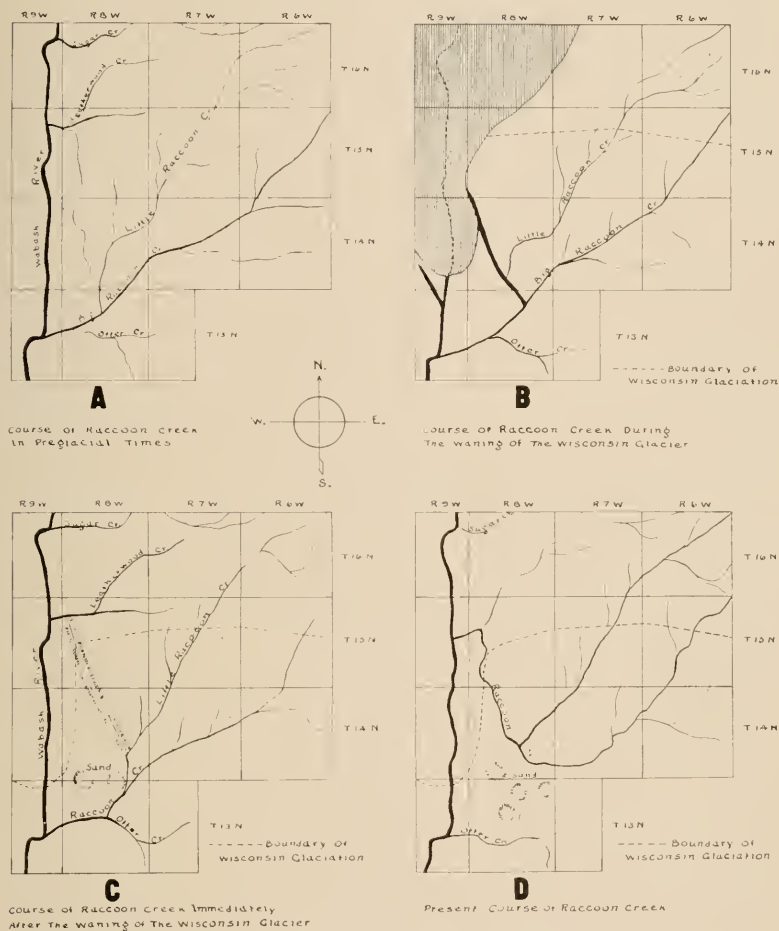


Fig. 1. A—the course of Raccoon Creek in pre-glacial times; B—the course of Raccoon Creek during the waning of the Wisconsin Glacier, with the boundary of Wisconsin Glaciation; C—the course of Raccoon Creek immediately after the waning of the Wisconsin Glacier; D—the present course of Raccoon Creek, with sand deposits indicated.

As already indicated, I believe that the immediate cause of the change of drainage in Post-Wisconsin times lies in the sand dune topography of the region. The two valleys are filled with sand and

⁸ Since presenting this paper I have received the suggestion from Mr. W. M. Tucker of Indiana University that this region might be similar to Scioto River district in southern Ohio, which has been described in a folio of the U. S. Geol. Survey. In that case we must presume that during the glacial period the Wabash built up a terrace of sufficient size, in itself, to bar the entrance of the minor stream.

there is a strong sweep of wind from the southwest—five or six miles without interruption. At present the dunes are from 15 to 20 feet high and rather firmly established. Before vegetation was abundant there must have been very ready movement of the sand. Weather records at the Terre Haute station tend to verify our statements as to the wind direction.

Sand deposits have been previously mentioned in this region. McBeth⁹ has a pamphlet on the sand deposits of Vigo County. Shannon¹⁰ mentions this district as one of the five areas of sand deposition in the state. I have not found any previous suggestion, however, that the dune topography has affected the drainage in any way.

There is a well record worth attention just south of the present turn in Raccoon Creek. Bits of driftwood and vegetation were found at a depth of 88 feet in connection with loose gravel and silt. This "made land" would, of course, indicate recent filling.

Summary.—It would seem, therefore, that Raccoon Creek was once a rather large river flowing southwest across Indiana into the Wabash just above the present site of Terre Haute (figure 1). During glacial times a valley was formed parallel to the Wabash, either (1) by the escape of a glacial stream along the edge of the ice while the Wabash was still covered, (2) by overflow waters of the Wabash, (3) by the ice damming of Raccoon Creek, or (4) by the lowering of the divide between Leatherwood and Raccoon creeks. Of course the valley might have been formed in two or more of these ways.

In Post-Wisconsin times the Raccoon has been turned into this valley by the filling of its course by wind blown sand. The channel is now obliterated by sand and loess deposits.

⁹ McBeth, W. A., "Loess and Sand Deposits in Vigo County", Proc. Ind. Acad. Sci., 1915, pp. 185-188.

¹⁰ Shannon, C. W., "The Sand Areas of Indiana", Proc. Ind. Acad. Sci., 1911, pp. 197-210.