BURIED STREAM CHANNELS AT THE BASE OF THE PENNSYLVANIAN SYSTEM IN SOUTHEASTERN OHIO.[1]

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Contents:

Numerous and marked irregularities are present at the top of the Mississippian strata in Ohio. Professor C. F. Lamb finds the surface a series of north-south ridges with alternating depressions in northeastern Ohio.[2] Dr. J. J. Stevenson, collecting the scattered evidence for a wider area has interpreted this surface as the effect of a wide spread subærial erosion.[3]

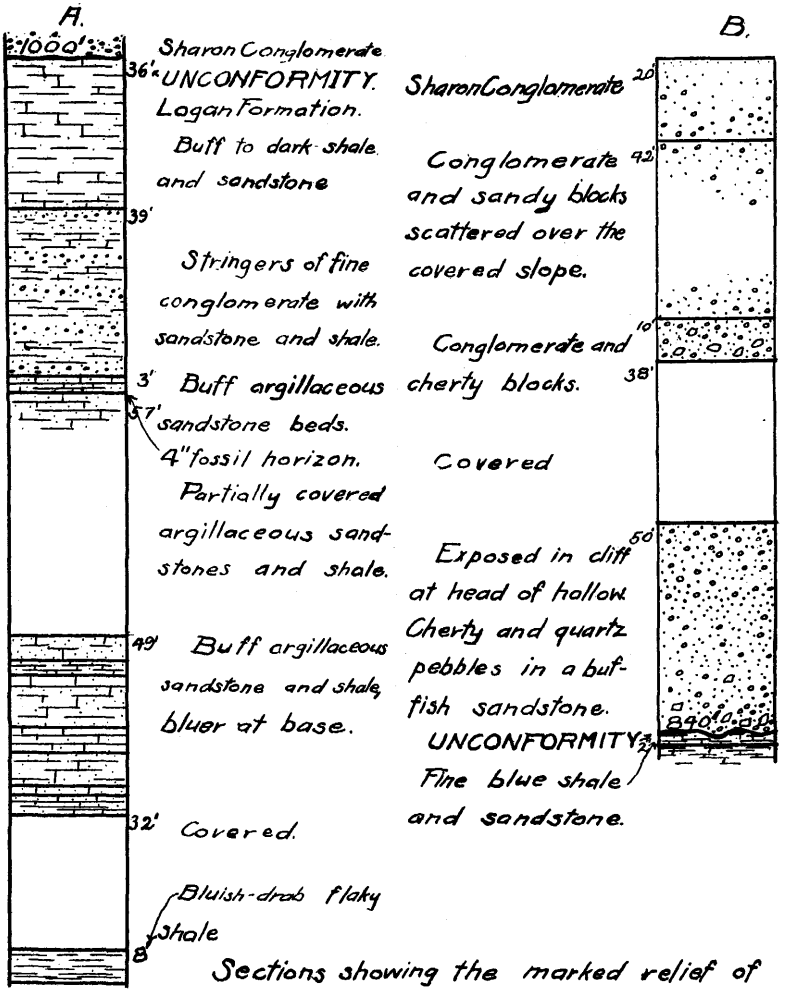
It seems worth while to add some observations made in southeastern Ohio. Over wide areas the contact is very regular; so much so that, were it not for the general difference of the strata above from that below, it might be taken for a bedding plane. Minor irregularities do occur but only by careful search and comparison of elevations can evidence be found of a time break as long as this one appears to have been.

THE CONTACT A LEVEL PLANE AT THE NORTH.

The contact between these two systems is almost a level plane from Newark to Logan, crossing Licking, Perry, and Fairfield Counties. The regularity may be inferred from the fact that in an east-west section of twenty-two miles extending west from White Cottage past Mt. Perry, the base of the Pennsylvanian strata lowers 420 feet to the east and in the twenty-two exposures studied not a single one shows a counter dip. Another section along the National Road from Amsterdam on the west to Gratiot at the east shows a regular eastward inclination of about 19 feet to the mile. If this be extended eastward to where the Waverly goes under in the Licking River at Dillon, it gives a relief of 400 feet in 18½ miles or 21.6 feet to the mile. This inclination approaches the reported dip of the bed rock.

1. Published by permission of the Director of the Ohio Geological Survey.
Partial abstract of the material offered as a Master's thesis at Ohio State University.
2. Jour. of Geol., Vol. 19, p. 104, 1911.
3. Bull. Geol. Soc. of America. Papers in Vol's. 14, 15, 17, and 18.

A.-SECTION AT HEAD OF BIG RUN
B.-SECTION IN HAY HOLLOW ONE MILE NORTH.



Sections showing the marked relief of the erosion plane and the subsequent filling of Sharon Conglomerate.

THE CHANNEL SOUTH OF LOGAN.

South of Logan the regularity is broken by the scar of a buried channel. It extends in an east and southeast direction across the south central part of Falls Township, Hocking County and can be first distinctly seen along a west tributary to Dry Run. After meeting that stream farther east it turns south past the junction with Scott Creek finally burying itself under a continuous blanket of Pennsylvanian rocks one mile north of the village of Ewing. This channel is clearly marked by the filling—a coarse quartz sandstone usually stained a reddish brown by the weathering of the iron cement. Occasional well-rounded quartz pebbles may be found. The depression extends as a distinct channel for a distance of four miles, its width changing from place to place, due both to variations in the original channel and the depth to which the filling has been removed by recent erosion. At one place it is 400 yards; where Scott Creek has cut well down into the filling it is but little over 150 yards wide.

The exact depth was not obtained but from the general level of the basal sandstone beyond the borders of the channel to the lowest exposed rock of the same character is a vertical distance of over 100 feet. At the north a small tributary to Dry Run has cut down to the Waverly almost half way across the channel. Judging from this the bottom is not far below. The elevation is near 779 feet above sea level, while the lowest exposure to the south is below 755 feet, indicating a southward gradient. Just above the junction of Dry Run with Scott Creek buff colored Waverly shales were found in grave diggings; across the road to the west coarse iron-stained sandstone forms the bed of the present stream, giving a relief of 55 feet in little over twice that distance horizontally.

The abrupt curve in its course, the depth of the depression and the steepness of the slopes at the sides are strong evidences of the action of meteoric waters.

THE CHANNEL SOUTH OF BYER.

Another buried valley may be found one mile south of Byer, the station at the junction of the Baltimore and Ohio Southwestern and the Cincinnati, Hamilton and Dayton Railroads. It crosses the present valley of Pigeon Creek where that stream receives the second tributary from the west. The direction is a little south of west or north of east but only along the sides of this valley is the depression distinctly visible. In these outcrops it is a cross-bedded quartz conglomerate enclosed on each side by drab to gray argillaceous shales and sandstones. Surface weathering has worn away the less resistent material thus exposing the coarse conlomerate filling on the east bank of Pigeon Creek. There, in

a small ravine, a wall of conglomerate may be found opposite slopes covered by weathered Waverly. At the head of the ravine the highest Waverly is almost 100 feet above the level of Pigeon Creek where the conglomerate forms the bed of that stream. Across from this ravine layer after layer of horizontal argillaceous shales and sandstones end abruptly against the filling of cross-bedded conglomerate and sandstone. Usually the outer edges of the beds show a slight slumping or bowing downward as if the overlying filling had compressed them after they had been exposed to erosion. The south boundary is less definitely marked but the width is about 200 yards. But a very thin coating and in many places no trace of pebbles may be found outside this channel.

EVIDENCES POINTING TO A CONTINUOUS STREAM SYSTEM.

Such sections seem to imply that the pebbles of the conglomerate were borne largely by strong surging currents restricted within the channels themselves. These currents would most likely be found in a continuous system of channels and although hidden in many places by the overlying Pennsylvanian strata, traces of such a system can be found. At Richland Furnace two miles northeast of the conglomerate outcrops last mentioned the coarse sandstone and basal conglomerate lowers from 812 feet above sea level on the west and 762 on the east to below the 700 feet contour. Pebbly beds may be found below the Baltimore and Ohio Southwestern Railroad at that place, while on either side they rise to the heights mentioned.

West and south traces of this line of conglomerate filling are exposed along Glade Run, and at Canter's Cave three and a half miles soutwest it forms vertical cliffs from which large caverns have been worn by weathering. Such conglomerate walls continue south to Jackson where they form the well-known Jackson Conglomerate area. The conglomerate there becomes more general but its thickness still varies.

Tributaries join this system from the west. A definite and well marked line of conglomerate ledges extends northwest for a distance of over seven miles. The present elevation of the bed of this channel above sea level is as follows:

890 feet at the exposure south of Hay Hollow
840 feet at the head of Hay Hollow
807 feet in the first large hollow west of Big Rock
742 feet at the base of Big Rock
690 feet at the head of Pigeon Creek where the base of the conglomerate goes under.

In all, this gives a relief of 200 feet in less than 6 miles. After allowing for the gentle southeast dip of about 25 feet to the mile a gradient of 30 to 50 feet still remains. This conglomerate is

bounded on the north by a ridge of Waverly which rises as much as 100 feet above the bed of the channel. On the south at Linn Post Office the contact is at an elevation of about 1000 feet above sea level; at the Pike-Jackson County boundary line, 900 feet on the north and 950 feet on the south. The structure sections show the relation and comparative elevation of the contact at Linn and in Hay Hollow one mile north. The whole depression is filled with a quartz conglomerate over a thin bed of cherty breccia in some of the deeper places. This filling rises over the sides of the valley but may form only a thin coating. Within the channel the thickness ranges from 160 feet at the west to 250 feet at the east.

Another tributary is outlined by a line of conglomerate capped hills extending west across Marion, Union and into Scioto Township of Pike County. After turning south across the pre-glacial valley of the Teays River conglomerate ledges rise 80 feet above the valley of Dry Run and 67 feet at the White Gravel Church. Beyond that place the conglomerate thins, a result evidently of a widening of the channel and a lowering of its gradient.