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EXHUMED ORDOVICIAN HILL NEAR JOLIET

BY

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Exhumed Ordovician Hill Near Joliet[1]

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If the bedrock map of the Joliet-Wilmington area[2] be examined, it is seen that the eastward-dipping Richmond strata crop out in a belt about 5 miles wide extending along the east flank of the LaSalle anticline from the north-northwest to the head of the Illinois River. With the exception noted below the belt here ends abruptly[3] due to overlap by Pennsylvanian strata. Presumably a pre-Pennsylvanian bedrock surface map[4] would show this belt extending about due south from here to the SE. Livingston-NW. Ford County boundary.[3] The exception referred to above is the narrow belt of Richmond strata outcropping in the Kankakee valley (and tributaries Forked and Horse Creeks) from Warner Bridge at the Will-Kankakee County boundary[5] to a point two or three miles below Wilmington. The bedrock surface contour map[6] makes it reasonably certain that this patch of Richmond owes its appearance to a trough-like low altitude belt and is of no structural significance.[7]

Quite different is the explanation for the crescentic-outlined mass of Richmond strata projecting northeast from the main belt from near Channahon towards Joliet. The southwest prong and the north flank of this Richmond crescent owe their existence to a strip having a low altitude of bedrock surface, but just west of the center of the northeast prong Richmond limestone reaches an altitude of above 580 feet in the northern part of Channahon Mound (center sec. 3, T. 34 N., R. 9 E.) while the altitude of the water surface in the DesPlaines River one mile east of here is but 505 feet. In short, this part of the area is an exhumed Richmond hill. It is surrounded on three sides by Silurian beds at lower altitudes. The southwest boundary is at least in part a fault contact with dips up to 25° on the downthrow (southwest) side in basal Edgewood strata. In fact, the drop-off on this side is so fast that a half mile west of Millsdale is found an outlier of Waukesha[8] dolomite, miles west of the main belt of strata of this age.

More interesting however is the Ordovician-Silurian contact on the opposite (Joliet) side of this old hill. Fig. 1 is a view looking north in the Santa Fe R. R. cut near the middle of the west side of the SE. ¼ SE. ¼, sec. 35, T. 35 N., R. 9 E., on the southeast side of the DesPlaines River. It shows a bank about 8 feet high with southwest to the left, northeast to the right. The pronounced line indicated by arrows dipping down gently to the right running through the center of the figure is the Richmond-Edgewood contact, which here seems to be nearly a plane surface dipping 10° to N. 75° E. The bedding of the Silurian (lower Edgewood) shaly dolomite is

[1] Published by permission of the Chief, Illinois State Geological Survey.
[2] Illinois State Geol. Survey, Bull. 51, p. 22, 1925.
[3] Contrary to the Geologic Map of the United States, U. S. Geol. Survey, 1932.
[4] Compare A. I. Levorsen in Bull. Amer. Assn. Petr. Geol., *15* (2), Pl. I, 1931.
[5] Athy, L. F., Herscher Quadrangle. Ill. State Geol. Survey, Bull. 55, 1928.
[6] Fisher, D. Jerome, Wilmington Quadrangle. Ill. State Geol. Survey Ms.
[7] Compare map by D. Jerome Fisher in Bull. 55, p. 77.
[8] Age determination by L. E. Workman of the Illinois State Geol. Survey based on the study of insoluble residues.

parallel to this contact. Below this angular unconformity the Ordovician (upper Richmond) shale carrying 2-inch argillaceous dolomite layers spaced 8 to 12 inches apart dips in about the same direction at an approximate 5° angle.[9]

Because the two sets of strata appear to have approximately the same strike, it is possible to assume that but one epoch of diastrophism is represented by considering that the basal Edgewood beds were laid down on a gently sloping (5°) hill surface of horizontal Richmond strata with a 5°

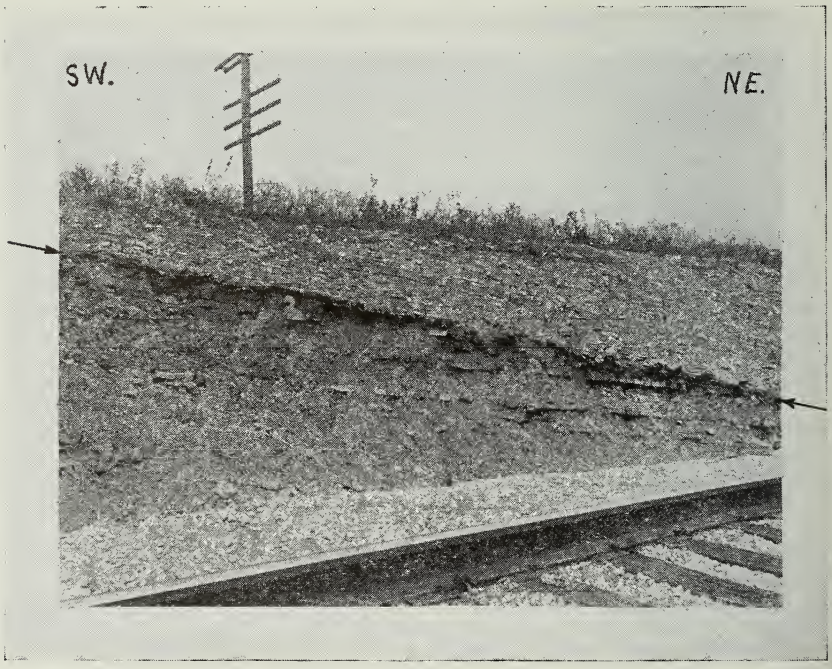

Fig. 1.—Looking north at the Ordovician-Silurian contact, four miles southwest of Joliet.

depositional dip and that later (Permo-Carboniferous?) all were tilted[10] an additional 5° to give the present attitudes. If in the future more detailed field work with better exposures shows that the strike of the two sets of beds is not the same, then it will be necessary to assume either two epochs of diastrophism or else that the Richmond shales were not horizontal as originally deposited here.

The writer has observed upper Ordovician and lower Silurian strata in northeastern and north- and south-western Illinois and adjacent areas over a period of nearly 20 years and has never before found what may be called an unequivocal surface of contact where argillaceous Edgewood beds rest on

[9] The plane of the section strikes N. 52° E. and the dip of the contact line in this plane is just over 9°. Laying a protractor on Fig. 1 so that the line marking the contact plane reads 9°, the dip of the Richmond appears to be but 2°. This effect is due to foreshortening since the camera was not pointed perpendicular to the plane of the section.

[10] Walking 750 feet northeast along the tracks one crosses the trough of a syncline and the crest of an anticline, so that the "tilting" concept applies only to a very limited area as shown in Fig. 1.

Richmond shale carrying dolomite layers. Not only does this exposure establish the lithological differences marking that contact in northeastern Illinois, but it may be extended into the other areas mentioned, because associated with this contact is a phosphate-nodule-bearing horizon. This horizon, which is very widespread, marks the uppermost Richmond beds remaining in any area, but does not mark a stratigraphic horizon. Lenses of this nodule-rock occur stratigraphically both above and below the uppermost Richmond dolomite layer shown in Fig. 1 in the left and central portions respectively. At different places these nodules are found in shale, in siltstone, or in limestone, but they have never been noted except at the top of the Richmond. They are considered to be of residual origin, similar to that of many of the well-known phosphate deposits of the southeastern part of the United States.

The conclusions reached in the present paper are to be regarded as preliminary and tentative and are subject to modification in connection with further detailed studies now in progress.