STATE OF ILLINOIS
Dwight H. Green, Governor
DEPARTMENT OF REGISTRATION AND EDUCATION
Frank G. Thompson, Director

DIVISION OF THE
STATE GEOLOGICAL SURVEY
M. M. Leighton, Chief
URBANA

REPORT OF INVESTIGATIONS—NO. 112

ROSICLARE-FREDONIA CONTACT IN AND ADJACENT TO HARDIN AND POPE COUNTIES, ILLINOIS

by

Frank E. Tippie


PRINTED BY AUTHORITY OF THE STATE OF ILLINOIS

URBANA, ILLINOIS
1945
ORGANIZATION
STATE OF ILLINOIS
HON. DWIGHT H. GREEN, Governor

DEPARTMENT OF REGISTRATION AND EDUCATION
HON. FRANK G. THOMPSON, Director

BOARD OF NATURAL RESOURCES AND CONSERVATION
HON. FRANK G. THOMPSON, Chairman
NORMAN L. BOWEN, Ph.D., D.Sc., LL.D., Geology
ROGER ADAMS, Ph.D., D.Sc., Chemistry
LOUIS R. ROWSON, C.E., Engineering
CARL G. HARTMAN, Ph.D., Biology
EZRA JACOB KRAUS, Ph.D., D.Sc., Forestry
ARTHUR CUTTS WILLARD, D.Eng., LL.D.
President of the University of Illinois

GEOLOGICAL SURVEY DIVISION
M. M. Leighton, Chief
SCIENTIFIC AND TECHNICAL STAFF OF THE
STATE GEOLOGICAL SURVEY DIVISION
100 Natural Resources Building, Urbana

M. M. LEIGHTON, Ph.D., Chief
ENDY TOWNLEY, M.S., Assistant to the Chief
VELDA A. MILLARD, Junior Asst. to the Chief
HELEN E. McMORRIS, Secretary to the Chief
EFFIE HETHEY, B.S., Geological Assistant

GEOLOGICAL RESOURCES

RALPH E. GRIM, Ph.D., Petrographer and Principal Geologist in Charge

Coal

G. H. CARY, Ph.D., Senior Geologist and Head
R. J. HELPLESTINE, M.S., Mech. Engineer
CHARLES C. BOLEY, M.S., Assoc. Mining Eng.
BRYAN PARKS, M.S., Asst. Geologist
EARL F. TAYLOR, M.S., Asst. Geologist

RALPH F. STREETE, A.M., Asst. Geologist
ROBERT M. KORANKE, M.A., Asst. Geologist
ROBERT W. ELLINGWOOD, B.S., Asst. Geologist
GEORGE M. WILSON, M.S., Asst. Geologist
JACK A. SIMON, B.A., Asst. Geologist
ARNOLD EDDINGS, B.A., Research Assistant

RAYMOND SEYVER, B.S., Research Assistant

JOHN A. HARRISON, B.S., Research Assistant

MARY E. BARNES, B.S., Research Assistant
MARGARET PARKER, B.S., Research Assistant
FLORENE OZELSEL, B.F.A., Technical Assistant

Oil and Gas

A. H. BELL, Ph.D., Geologist and Head
FREDERICK SQUIRES, B.S., Petroleum Engineer
STEWART FOLK, M.S., Assoc. Geologist (on leave)
DAVID H. SWANS, Ph.D., Assoc. Geologist

VIRGINIA KLING, Ph.D., Assoc. Geologist
PAUL G. LUCKHARDT, M.S., Asst. Geologist

WAYNE F. MEENTZ, Asst. Geologist
JAMES S. YOLTON, M.S., Asst. Geologist
MARGARET SANDS, B.S., Research Assistant

Industrial Minerals

J. E. LAMAR, B.S., Geologist and Head
ROBERT M. GROGAN, Ph.D., Assoc. Geologist
ROBERT R. ANDERSON, M.A., Asst. Physicist
ROBERT R. REYNOLDS, M.S., Asst. Geologist

Clay Resources and Clay Mineral Technology

RALPH E. GRIM, Ph.D., Petrographer and Head
RICHARDS A. ROWLAND, Ph.D., Asst. Petrographer (on leave)

WILLIAM A. WHITE, B.S., Research Assistant

Groundwater Geology and Geophysical Exploration

CARL A. BAYS, Ph.D., Geologist and Engineer

ROBERT R. STORM, A.B., Assoc. Geologist

ARNOLD C. MARSON, B.S., Assoc. Geologist (on leave)

MERLYN B. BULHE, M.S., Asst. Geologist
M. W. PULLEN, JR., M.S., Asst. Geologist
CHARLES L. JOHNSON, A.B., Asst. Geologist (on leave)

MARGARET CASTLE, Asst. Geologic Draftsman
ROBERT N. M. URSCH, B.S., Research Assistant

Engineering Geology and Topographic Mapping

GEORGE E. EKELAW, Ph.D., Geologist and Head
RICHARD F. FISHER, M.S., Asst. Geologist

Area Geology and Paleontology

H. B. WILLMAN, Ph.D., Geologist and Head

CHALMER L. COOPER, Ph.D., Geologist
C. LEANDR HORRICK, Ph.D., Assoc. Geologist

MARGARET M. ROBERT ARNOLD, Carl WILLIAM RALPH J. FREDERICK JOHN A. JACK RAYMOND GEORGE ROBERT RALPH R. EARLE G. RALPH NELL M. HETHEY, B.S., Geological Assistant

Subsurface Geology

L. E. WORKMAN, M.S., Geologist and Head
FRANK E. TIPPIE, M.S., Asst. Geologist

PAUL HERBERT, JR., B.S., Asst. Geologist

MARTIN F. MEYER, B.S., Assoc. Geologist

ELIZABETH PRETELLA, A.B., Research Assistant
RUTH E. ROTH, B.S., Research Assistant

Physics

R. J. PEERSOL, Ph.D., Physicist

GEOCHEMISTRY

FRANK H. REED, Ph.D., Chief Chemist (on leave)

CAROL J. ADAMS, B.S., Research Assistant

Coal

G. R. YOHE, Ph.D., Chemist and Head

HERMAN S. LEVINE, B.S., Research Assistant

Industrial Minerals

J. S. MACHIN, Ph.D., Chemist and Head

Fluorspar

G. C. PINGER, Ph.D., Chemist and Head

OREN F. WILLIAMS, B.ENGR., Assoc. Chemist

Chemical Engineering

H. W. JACKMAN, M.S.E., Chemical Engineer and Head

P. W. HANFORD, M.S., Assoc. Chemical Engineer

JAMES C. McCUTCHEON, Research Associate

JAMES H. HANES, B.S., Research Assistant

LIBBY S. MILLER, B.S., Research Assistant

X-ray and Spectrography

W. F. BRADLEY, Ph.D., Chemist and Head

Analytical

O. W. REES, Ph.D., Chemist and Head

L. D. McGIVICKER, B.S., Chemist

HOWARD S. CLARK, A.B., Assoc. Chemist

CAMERON D. LEWIS, M.S., Asst. Chemist

WILLIAM T. ABLE, B.A., Research Assistant

JOHN C. GOGLEY, Research Assistant

ELIZABETH J. EADES, A.B., Research Assistant

MINERAL ECONOMICS

W. H. YOSKUT, Ph.D., Mineral Economist

DOUGLAS F. STEVENS, M.E., Research Associate

NINAHAM, B., Research Assistant

ETHEL M. KING, Research Assistant

LIBRARY

REGINA LEWIS, B.A., B.L.S., Librarian

PUBLICATIONS AND RECORDS

DOROTHY E. ROSE, B.S., Technical Editor

MEREDITH M. CAIRNS, Geologic Draftsman

BEULAH FEATHERSTON, B.F.A., Asst. Geologic Draftsman

WILLIE L. BUSCH, Principal Technical Assistant

LESLIE D. VAUGHAN, Asst. Photographer

* Assistant Chemist in interim of absence of Chief Chemist.

Consultants: Ceramics, Cullen W. Parmelee, M.S., D.S.C., and Ralph K. Hyrsh, B.S., University of Illinois; Mechanical Engineering, Sushio Kono, M.S., University of Illinois

Topographic Mapping in cooperation with the United States Geological Survey.

This report is a contribution of the Subsurface Geology Division.

November 1, 1945
ROSCILARE-FREDONIA CONTACT IN AND ADJACENT TO HARDIN AND POPE COUNTIES, ILLINOIS

FRANK E. TIPPIE
Urbana, Illinois

The presence of a possible unconformity at the top of the Fredonia limestone, which is the lowest member of the Ste. Genevieve formation of the Mississippian system, has been recognized by a number of geologists in the past few years. At a meeting of petroleum geologists in Mattoon, Illinois, in February, 1938, L. E. Workman presented data indicating an unconformity involving structural deformation and erosion at the base of the Rosiclare sandstone in the Clay City-Noble area of Clay and Richland counties. He pointed out that the Rosiclare sandstone thins over structures and that the interval between its base and the top of a distinctly sandy zone in the Fredonia varies considerably, and also suggested that "on consideration of lithology only ... the base of the Rosiclare sandstone ... might well be considered the base of the Chester series." In his study of the Iowa (Lower Mississippian) series, J. N. Payne recognized the same features noted by Workman two years earlier and also called attention to an apparent overlap of Rosiclare sandstone on the underlying Fredonia limestone along the margins of the Illinois basin and the existence of areas of channel-like thinning of the Fredonia limestone in southwestern Illinois.

Recent studies by the writer, including the examination of many diamond-drill cores obtained in testing for fluorspar, in extreme southern Illinois and in the neighboring part of Kentucky have furnished new evidence bearing upon the stratigraphic relations of the upper part of the Ste. Genevieve limestone as that formation is currently recognized. Some disagreement exists among members of the Illinois State Geological Survey regarding the significance of this evidence, so that the writer's conclusions have not been adopted as official by the Survey. However, the data obtained by the writer and his interpretations are presented here because they have an important bearing on, and may stimulate further consideration of, the problem.

The Ste. Genevieve formation is overlain by the Renault formation in Hardin and Pope counties. In southwestern Illinois the Aux Vases sandstone intervenes

1 Read before the Illinois State Academy of Science, DeKalb Meeting, May, 1944.
2 Subsurface Geology Division, Illinois State Geological Survey.
between the Ste. Genevieve and Renault formations, but according to the writer's interpretations, it is not present east of western Johnson County, as shown in the cross section $BB'$ (Fig. 3). Throughout the area covered by this report, the Renault formation may be subdivided on the basis of insoluble residues into five persistent zones, as follows.

<table>
<thead>
<tr>
<th>Zone</th>
<th>Average Thickness (Feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Argillaceous, coarsely silty limestone, total residue content 10 to 58%, 5 to 15% consisting of coarse silt grains</td>
</tr>
<tr>
<td>B</td>
<td>Relatively pure limestone, average residue about 9%, coarse insoluble portion consisting of fine acicular quartz crystals and very fine tubular silt aggregates comprising 1 to 4% of total rock</td>
</tr>
<tr>
<td>C</td>
<td>Finely silty shales with few limestone lenses, 75 to 80% insoluble</td>
</tr>
<tr>
<td>D</td>
<td>Coarsely silty limestone, total residue 8 to 15%, 6 to 10% consisting of coarse silt grains</td>
</tr>
<tr>
<td>E</td>
<td>Cherty limestone, characterized by silicified fossils, 5 to 25% insoluble</td>
</tr>
</tbody>
</table>

In and adjacent to Hardin and Pope counties, Illinois, the Ste. Genevieve formation is divided into three members, the Levias limestone above, the Rosiclare sandstone, and the Fredonia limestone below.

The Levias limestone is readily separable from zone A of the Renault formation by an abrupt change in total residue content in that the Levias averages less than 7 per cent insoluble and the coarse fraction, characterized by very fine silt aggregates, rarely exceeds one per cent of the total rock. The Levias is typically light buff coarse very oolitic limestone containing coarse pink crinoid fragments and becoming sandy in the lower part. The upper few feet are generally buff to light brown more or less oolitic limestone. In most places, the contact between the Levias limestone and the Rosiclare sandstone is gradational, the lower 3 to 5 feet of Levias being more or less sandy. However, in a few diamond-drill cores in Hardin County, a thin conglomerate has been noted in the basal Levias.

The Rosiclare, as typically developed in the area studied, is a very calcareous coarse siltstone grading both laterally and vertically to very fine sandstone or very sandy or silty limestone. The average calcium carbonate content of the Rosiclare member is about 40 per cent and may run as high as 75 per cent. Conglomerates are very common in the middle and lower parts of the Rosiclare. These conglomerates have been recorded in study of cores and of geologic sections encountered in shales in Hardin County. In the Cave in Rock district the basal Rosiclare is, in many places, characterized by green very silty calcareous shale. The contact with the underlying Fredonia is everywhere, so far as known, sharp with an abrupt change from the high silt content of the Rosiclare to the very pure oolitic limestone of the upper Fredonia.

The Fredonia member of the Ste. Genevieve formation, as currently recognized, is readily divisible into three units, an upper limestone, a middle sandstone, and a lower limestone.

---

Fig. 1.—Index map showing lines of cross sections.
Fig. 2.—Geologic cross section AA' of Ste. Genevieve strata.

Fig. 3.—Geologic cross section BB' of Ste. Genevieve strata.
The upper Fredonia is a relatively pure limestone with no silty or sandy zones, shaly zones being developed only locally. The contact of the upper Fredonia and the underlying sandstone is a distinct break from limestone above that is non-sandy, non-glaucous, generally non-oölitic, brown, and very fine-grained, to limestone below that is sandy, glauconitic, oölitic, light gray to greenish, becoming increasingly sandy downward. This break is generally marked in cores by a dark brown shale parting which in many places exceeds 3\(\frac{1}{2}\) inch in thickness. The contact shows unconformity as recognized by the writer at Barrett's quarry on Bissell Bluff, Livingston County, Kentucky.

The middle sandstone member has heretofore been known as a "sub-Rosiclare sandstone."

The writer has suggested the designation "Spar Mountain sandstone," being so named because it crops out on the south slope of Spar Mountain in Secs. 3 and 4, T. 12 S., R. 9 E., Hardin County, about 4 miles northwest of Cave in Rock. It is typically developed at this place as a light gray to greenish calcareous glauconitic sandstone or siltstone grading to very sandy limestone. The best exposure seen by the writer is in the Oxford open-cut in the NE. \(\frac{3}{4}\) Sec. 4, on property formerly owned and operated by the Benzon Fluorspar Company. It varies in thickness from 8 to 15 feet. There is everywhere a sharp break from the Spar Mountain sandstone to the characteristic non-sandy lower Fredonia limestone.

The lower Fredonia is in general a white to light brown relatively pure and more or less oölitic limestone. In many places it is petrolierous. As shown in the cross sections (Figs. 2, 3) it contains at least two thin sandy zones that rarely exceed 2 or 3 feet in thickness, in contrast to the Spar Mountain sandstone which is rarely less than 8 feet thick. A sandy zone about 30 to 40 feet below the Spar Mountain seems to be traceable throughout most of Hardin County, although it was not recognized in some cores in the Rosiclare district. The lower Fredonia limestone is about 125 feet thick and is underlain by the St. Louis limestone. The basal contact is characterized by coarse buff to light brown oölitic or partly crystalline, partly sandy or silty, non-cherty limestone resting on dark brown lithographic to very fine-grained cherty dolomitic limestone of the St. Louis formation.

In the vicinity of Spar Mountain the interval between the base of the Rosiclare sandstone and the top of the Spar Mountain sandstone varies from 55 to 67 feet. Locally the interval is considerably less, but this condition is thought by the writer to be correlative with the presence of fluorspar ore in the upper Fredonia limestone and the thinning of the latter by solution during mineralization and therefore not a depositional feature. The Spar Mountain sandstone in this area averages about 10 feet in thickness and the underlying lower Fredonia limestone is about 120 feet thick.

Ten miles southwest of Spar Mountain, in the vicinity of Rosiclare, the entire thickness of Fredonia limestone averages about 115 feet. Here the upper Fre-

---

donia limestone and the Spar Mountain sandstone seem to be entirely absent, and the Rosiclare sandstone is believed to rest directly on the lower Fredonia limestone. If this interpretation is correct, the magnitude of the unconformity below the Rosiclare sandstone is at least 75 feet.

Seven miles northwest of Rosiclare, in the vicinity of the Empire Mining district in eastern Pope County (test hole 28 on cross section BB'), the interval from the base of the Rosiclare sandstone to the top of the Spar Mountain sandstone is but 25 feet. Farther west the interval ranges from 30 to 50 feet as far as Union County, where there are suggestions that the Rosiclare again rests on the

![Fig. 4.](image)

Fig. 4.—Rosiclare sandstone with 4 1/2 feet of basal shaly part, on Fredonia limestone in Spar Mountain district, SW. 1/4, NE. 1/4, NW. 1/4 Sec. 3, T. 12 S., R. 9 E., Hardin County.

lower Fredonia. The Spar Mountain can be traced throughout Hardin, Pope, and Johnson counties except where the unconformity cuts it out entirely.

In the Spar Mountain district the thickness of the Rosiclare sandstone varies from 22 to 43 feet. The upper Fredonia limestone in this region commonly is correspondingly thinner wherever the Rosiclare is thicker. Variations of this nature occur within distances of only a few hundred feet, suggesting that there is an erosional unconformity between the two units and that wherever it is thickest the Rosiclare sandstone occupies channels cut in the surface of the upper Fredonia limestone.

Where the Rosiclare is locally thicker than average, the lower few feet consist of very shaly glauconitic siltstones. These are interpreted as having been de-
posited in topographic depressions as the Rosiclare sea encroached on the land and before complete inundation and widespread deposition of sandstone took place. Figure 4 shows such a well developed basal shaly zone above the Fredonia limestone and below the massive cross-bedded sandstone more typical of the Rosiclare in the Spar Mountain district.

The cross sections clearly exhibit evidence of pre-Rosiclare structural deformation in Hardin County. Whether this deformation is widespread or not has not yet been determined.

A polished section of a diamond-drill core from Spar Mountain (Fig. 5) shows the following features suggesting an unconformity at the Rosiclare-Fredonia contact: (1) the contact between the formations is sharp and irregular; (2) the upper inch of Fredonia limestone is slightly leached and of lighter color; (3) small discolored solution channels in the Fredonia stop abruptly at the base of the Rosiclare; (4) a thin layer of black clay, possibly residual after leaching of the Fredonia limestone, separates the two formations; and (5) the basal Rosiclare is a conglomerate consisting of pebbles of white oolitic limestone, typical of the Fredonia, in a matrix of greenish siltstone. The pebbles of oolitic limestone are leached and porous and are mostly subrounded though some are angular. Such conglomerates have been noticed by the writer in many diamond-drill cores of the Rosiclare. Conglomerates are relatively common throughout the middle and lower Rosiclare. Leaching of the Fredonia pebbles and of the upper beds of the Fredonia is significant, for such leaching could only take place under sub-aerial conditions.

In contrast to the evidences of considerable erosional unconformity at the base of the Rosiclare sandstone, the break between the Levias limestone and the overlying Chester series does not indicate a comparable unconformity in this region. The maximum thickness of Levias thus far reported in and adjacent to Hardin and Pope counties is 35 feet, and nowhere in these counties is it known to have been entirely removed by pre-Renault erosion.

In Barrett’s quarry on Bissell Bluff, 4½ miles northeast of Smithland, Livingston County, Kentucky, where it is reported7 that the Renault formation rests on Fredonia limestone, examination by the writer reveals at the eastern end of the quarry 6 feet of green shaly siltstone and sandy limestone, very similar in character to the basal Rosiclare. This zone is overlain unconformably by 22 feet of oolitic limestone, which the writer correlates as Levias, and is underlain unconformably by 39 feet of upper Fredonia limestone. The lower contact exhibits at least 3 feet of relief in the eastern half of the quarry. If these correlations are correct, a normal thickness of Levias is present and the amount of pre-Renault erosion here also is negligible.

At a locality in Crittenden County, Kentucky, about 4 miles northwest of Marion, it is reported8 that Renault limestone rests on Rosiclare sandstone. The

---

Contact of Rosiclare sandstone on Fredonia limestone in diamond-drill core from Spar Mountain district, SW. 1/4, SW. 1/4 Sec. 34, T. 11 S., R. 9 E., Hardin County.
### GEOLOGICAL NOTES

**Records Used in Cross Sections**

(See Figures 2 and 3)

<table>
<thead>
<tr>
<th>Map No.</th>
<th>Company and No.</th>
<th>Quarter Section</th>
<th>Township South</th>
<th>Range East</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Barrett's Quarry section, 18-I-14</td>
<td>NW SE 5 13 8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Downey's Bluff section</td>
<td>NE SW 32 12 8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Rosiclare Lead and Fluorspar Mining Co.—D.D.H. Ac. 1</td>
<td>NW SE 29 12 8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Hillside Fluor Spar Mines—D.D.H. 107-D</td>
<td>SE NE 29 12 8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Rosiclare Lead and Fluorspar Mining Co.—D.D.H. Dc. 22</td>
<td>NE NE 20 12 8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Rosiclare Lead and Fluorspar Mining Co.—D.D.H. Ac. 14</td>
<td>SW SW 21 12 8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Rosiclare Lead and Fluorspar Mining Co.—D.D.H. Dc. 15</td>
<td>SE NE 21 12 8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>R. S. Tems et al.—D.D.H. No. 1</td>
<td>SW SE 33 11 9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>R. S. Tems—D.D.H. No. 1</td>
<td>NE NE 33 11 9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Victory Fluorspar Mining Co.—D.D.H. No. 126</td>
<td>SW SW 34 11 9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Victory Fluorspar Mining Co.—D.D.H. No. 117</td>
<td>SE SW 34 11 9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>U. S. Bureau of Mines—D.D.H. No. 25 (Victory)</td>
<td>NW NE 34 11 9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Victory—Crystal—D.D.H. No. 3</td>
<td>SE NW 34 11 9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Victory Fluorspar Co.—D.D.H. No. 55</td>
<td>NW NE 34 11 9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Century Zinc Co.—Wm. Davis No. 17</td>
<td>NW NW 35 11 9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Century Zinc Co.—A. L. Davis No. 1</td>
<td>SE NE 27 11 9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Mahoning Mining Co.—S. Joiner No. 1</td>
<td>SW SW 23 11 9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Mahoning Mining Co.—Hyman No. 4</td>
<td>SE SW 25 11 9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Mahoning Mining Co.—S. E. Oxford No. 3</td>
<td>SW NW 24 11 9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Minerva Oil Co.—Ledbetter No. 10</td>
<td>SE SE 24 11 9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Phillips—Kington Coal Co. No. 1, 1-0-10</td>
<td>SE SE 35 11 1 W.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>Little Egypt Oil and Gas Co.—Bassler No. 1</td>
<td>SW SE 22 12 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>J. Zeppa—Albright No. 1</td>
<td>NW NE 30 11 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>Tunnell Hill Oil Co.—Boner No. 1</td>
<td>SW NW 24 11 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>Hiawatha Oil and Gas Co.—Cavitt No. 1</td>
<td>NE NE 4 11 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>Ohio Oil Co.—Hancock No. 1</td>
<td>NW NW 34 11 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>C. C. Whitlock et al.—Anthis No. 1</td>
<td>NE NW 34 11 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>U. S. Bureau of Mines—D.D.H. No. 34 (Empire Dist.)</td>
<td>SE NW 22 12 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>Thompson et al.—Anderson D.D.H. No. 1</td>
<td>NW NW 34 11 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>Detrick—Orr No. 1, 24-K-19</td>
<td>SE SE 35 11 1 W.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Limestone overlying the Rosiclare was correlated with the Renault because no *Platycrinus penicillus* (Ste. Genevieve index fossil) was found; however, neither have any Renault index fossils been recognized in the lower part of this limestone.\(^9\) Inasmuch as the total insoluble residue content of the lower portion of this limestone is very low and the coarse fraction contains fine silt aggregates, many of them tubular in shape, typical of the Levias in Hardin County, and the residue of the overlying beds check perfectly with zones D and E of the Renault,\(^10\) the writer correlates the lowest 10 feet of limestone with the Levias. If this is correct, there is at this locality, also, no complete removal of the Levias limestone before Renault deposition.

---

\(^9\) A. H. Sutton, personal communication.

Thus, in and adjacent to Hardin and Pope counties, Illinois, the unconformity at the top of the Fredonia limestone is a more important break than is the one at the top of the Levias limestone. If this condition should be true for the whole Illinois basin, as the writer suspects it is from his studies of oil-well cuttings in the basin, it may develop that the base of the Rosiclare sandstone, rather than the base of the Aux Vases sandstone as now recognized, should be considered the base of the Chester series of alternating thin sandstone and limestone-shale formations.