

when lighting is done by electricity and heating by gas the whole aspect of our towns will be changed for the better. We have, however, no wide experience in this country to which to point as an object lesson in such a direction. In the United States gaseous fuel has been much more freely applied, and there are, I understand, instances in which coal has been almost entirely superseded by natural gas. If any of your contributors could say how far this is the case and give some idea of the effect which such a change has produced on the air of the locality and on the aspect of the town in question, a signal service would be rendered and a distinct advance would be made in the direction of banishing the fog demon once and for all.

### THE UTICA SHALE IN STEPHENSON COUNTY, ILLINOIS.

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In the various reports of the Illinois Geological Survey all the strata from the top of the Galena Limestone to the base of the Niagara have been classed together under the term Cincinnati Group. So far as northwestern Illinois is concerned this was probably the only classification possible from the limited data at hand. As a general thing only the upper half of the formation was seen in open section, as this is the only part ever quarried into, and natural sections of Cincinnati strata are rare in this region. But a few do exist in the southern and southwestern parts of Stephenson County, which show the lower strata of the shales, and from an examination of these, together with quarries and railway cuttings, the following section has been prepared:

Generalized section of the Cincinnati Group in Stephenson Co., Illinois.

#### Niagara Limestone.

Light brown, argillaceous, thin-bedded limestone, and white chert. Transition to Niagara, and counted with it. - - - - - 10 ft.

1. Calcareo-argillaceous shales. Buff and gray, with irregular patches of blue. Generally unfossiliferous. - - - - - 50 ft.

2. Light brown, crystalline, dolomite layers, and soft, yellowish shales. Fossils very abundant. - 15 ft.

3. Coarse-grained, calcareo-argillaceous shales. Light brown and red. Dark brown laminated shales alternating with lower layers. No fossils. - 20 ft.

4. Dark brown, argillaceous, finely laminated and very fissile shales. No fossils. - 5 ft.

5. Same as above, except light brown in color. 3 ft.

6. Stratum containing much reddish-brown powdery iron oxide. - - - - - 6 in.

7. Yellow granular shale. - - - - - 8 in.

8. Dark brown shales made up largely of comminuted shells. Fossils. - - - - - 4 ft.

#### Galena Limestone.

Since the remarkable discovery of oil and natural gas in the Trenton limestone of Ohio and Indiana, and the consequent discovery that the Utica shale of the New York section is present in the two states mentioned as a well-marked bed of dark brown shale, the writer has thought it probable that the Utica shale, *in its normal condition*, would be found to make up a part of the Cincinnati strata of northwestern Illinois.

Many of the "mounds" of western and southern Stephenson County are capped with a few feet of Niagara limestone, but the main body of the elevation is made up of the light colored shales or shaly limestones aggregating fifty feet in thickness, and numbered one in the section. This is certainly not Utica, but agrees pretty well in stratigraphic and lithologic conditions with the Hudson River shales, as developed in southern Ohio. The

evidence is still stronger for the Hudson River age of the underlying fifteen feet of light colored shales containing numerous limestone layers, literally covered with fossils, which, so far as I know, are of typical Hudson River species.

The preceding strata are of a generally light color, but in No. 3 dark colors begin to appear. It is probable that wells drilled through the Cincinnati strata in this region would be reported as passing through sixty-five feet of light colored shales, then through twenty feet of gradually darkening beds, and finally about fourteen feet of dark brown shales. This agrees with well-section reports from Ohio, differing, however, in the thickness of the strata.

No. 3 is so coarse-grained as to resemble sandstone, but on dissolving the calcareous matter with acid the grains are found to be composed principally of clay. These gradually grow darker towards the base, and thin strata similar to No. 4 appear, alternating with the red sand-like shales. No. 4 is a very characteristic stratum of non-granular, finely laminated dark brown shale, weathering to a light blue color, and breaking into small flat pieces, as does the Utica shale of the Atlantic slope.

No. 5 is similar in constitution, but is somewhat lighter in color, weathering to buff. The thin stratum containing the bright colored powdery iron oxide appears to be made up largely of dark colored clay, but is not well exposed. The underlying yellow shale is similar to parts of No. 1, containing some irregular patches of blue, and seems out of place among these dark colored shales.

But now we come to the most remarkable of all—a four-foot stratum of dark brown shale, made up largely of fragments of small shells, irregular masses of iron disulphide, small rounded concretions of a slaty color, and dark brown or black mud. Only one variety of shell remains in an unfractured condition, and this is probably some species of *Singula*. These dark shales lie on a series of buff colored shaly limestones, also largely made up of comminuted shells, but which is undoubtedly the upper portion of the Galena Limestone.

The dark brown shales, Nos. 4 and 8 of the section and included lighter colored strata, are apparently stratigraphically and lithologically similar to the Utica shale as developed in Ohio and Indiana, and although this terrane in the latter state has been shown to thin rapidly towards the west, it is considered quite probable that it does not entirely disappear at least as far west as the region under discussion, viz., Stephenson County, Illinois.

While the lower thirteen or fourteen feet of the so-called Cincinnati shales of this region are considered to be truly of Utica age, the succeeding twenty feet of shales, No. 3 of the section, may be transition strata to the Hudson River shales, which certainly have set in in characteristic form by the time the base of No. 2 is reached.

There is evidence tending to show that some of the beds, especially Nos. 7 and 8, thin out and totally disappear in portions of the field, also that the dark brown laminated shales, No. 4, thin out towards the west and south, and perhaps the entire dark colored portion of the series disappears before reaching the Mississippi River. There seems to be an interesting field for future study in this portion of the Mississippi Valley, and some curious problems to solve.

This preliminary note is published in the hope that sections showing the lower portion of the Cincinnati shales in other counties of this and neighboring states will be reported for comparison in order to determine the boundaries of each distinct formation, and the changes which they undergo in passing from one region to another, which is absolutely necessary for the proper understanding of the early Silurian history of what is now northern Illinois.