

NOTE ON THE OCCURRENCE OF FUSULINAS IN  
THE PENNSYLVANIAN ROCKS OF ILLINOIS.

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1. *Brief résumé of literature:*

Probably the earliest reference to Fusulinas in the Pennsylvanian of Illinois is found in the reports prepared under the direction of A. H. Worthen. These record a large form, now known as *Fusulina secalica*, Say, in the rocks outcropping along Embarrass River in Cumberland County. There are references also to another and smaller fusulina called *Fusulina ventricosa*, *cylindrica*, var. but now known as *Girtyina ventricosa*, which was found in the limestone cap rock over No. 6 coal in Fulton County, in St. Clair County, and other districts farther south.

Udden reported Fusulinas from two zones in the rocks of the Peoria quadrangle. The lower of these was the limestone capping No. 6 coal and the other was the marl at the base of the Lonsdale limestone about 100 feet higher. The fossil in the lower zone was called *Fusulina secalica*, Say, and its abundance was noted. The Fusulina of the upper stratum was also listed as *Fusulina secalica*, Say, but with a parenthetical note suggesting an easily recognized distinction between the forms.

Two forms in similar relations were reported from the Belleville-Breese area. Here the zones were but half as far apart (50 feet), and the distinction between the Fusulinas was apparent. The upper was doubtfully referred to *Fusulina secalica*, Say, with a statement that it was a long, slender type, "quite different from the form of *Fusulina* found in the roof limestone over the Herrin coal".

The later references to Fusulinas in Illinois are in large part records of new occurrences of the *Fusulina* of the No. 6 horizon which were referred without particular investigation to the *Girtyina ventricosa* type.

2. *Matherville section:*

During the field work last fall in preparation for a report on the coal resources of District III, *Fusulinas* were obtained from the cap rock of what was reported as No. 1 coal in the Pottsville series.

The section at Matherville where the *Fusulina* limestone is well exposed includes about forty feet of sandstone and sandy shale, with purer shale on top. Below is a dark, massive, argillaceous bed several feet thick, known to the miners as the "blue rock". Below this is the two foot, dark, argillaceous limestone which carries *Fusulinas* and which caps the coal of the region. Beneath the coal, which is here only 30 inches thick, is a sandy shale which grades to sandstone in less than a yard. Locally there are variations from this section. In southern Mercer County a second limestone and lower coal appear along Pope Creek. In eastern Rock Island County the upper sandy beds include layers and lenses of flint. In places the limestone cap thins out as though removed by erosion prior to the deposition of the overlying beds. A still more common variation is the presence of a few inches to several feet of shale between the coal and the limestone cap.

Disregarding these variations this same section appears in much of the adjoining area. Thus at the Alden Mine at Matherville, at the mines at Cable and Sherrard, at outcrops on Camp Creek in northern Mercer County, and along the Mississippi bluffs west of Andalusia, are found the blue rock, the *Fusulina* cap rock, and the coal.

Eastward the *Fusulina* limestone is found at Coal Valley and both north and west of Geneseo. Following the margin of the Pennsylvanian area southward the *Fusulina* limestone and associated beds are found in Warren, Knox, Fulton, and McDonough counties.

The *Fusulinas* appear to be restricted to the limestone overlying the coal, but are by no means uniformly distributed through even this thin stratum. They are most abundant in the lower part of the bed, although rarely found in the basal six inches.

These are similar to the typical *Girtyina ventricosa* (Meek, von Staff) but are slightly smaller on the average. Considerable variation in size suggests the presence of more than one type, but all variations have been found in one bed. The noteworthy feature in this district is the apparent restriction of these Fusulinas to a single zone in the geologic section.

3. *Other occurrences in the margin of the Eastern Interior Basin:*

Besides the localities noted previously, lying in north-western Illinois, Fusulinas have been found farther south near Camp Point in Adams County. The limestone here is an argillaceous rock, similar to that farther north, and the Fusulinas apparently are of the same variety as those in the Rock Island district, and these are tentatively referred to the *Girtyina ventricosa* type.

In southern Illinois, Fusulinas have been found in the limestone over what has been called No. 2 coal on Big Muddy River south of Murphysboro in Jackson County. Apparently the same type of rock and the same type of Fusulina appear here as along the western margin of the State.

On the eastern margin of the field very little work has been done, although Fusulinas have been found in a dark, argillaceous limestone overlying what appears to be No. 6 coal of the Illinois section on the Wabash near Perrysville and Cayuga in Fountain County. These occurrences suggest a continuity of this limestone throughout the Coal Basin.

4. *Occurrences in the interior of the Illinois Coal Basin:*

Recent examination of the core from Shelby County has shown Fusulinas at two distinct horizons. *Girtyina ventricosa* appears at its normal position in the limestone over No. 6 coal, and another form resembling it but of different proportions and a suggestion of different interior structure is found in a more coarsely crystalline and purer limestone. This stratum lies 530 feet over the No. 6 cap rock and is tentatively correlated with the New Haven limestone of White County.

Core from Hamilton County also shows two zones of *Fusulinas* which are here but 20 feet apart. These have not been carefully studied and the relations are not positively determined. The upper of the two limestones has been called the No. 6 cap rock. In the southwestern part of Montgomery County along Piasa Creek there have been obtained samples of *Fusulina* distinctly different from those of the No. 6 limestone. It is a long, relatively slender type which appears comparable to those reported from Belleville and from Peoria.

5. *Inferences as to distribution:*

1. It appears that no *Fusulinas* are found below the McLeansboro or possibly upper Carbondale beds.

2. There is at least one zone of *Fusulina* like *Girtyina ventricosa* lying distinctly above it near what has been called No. 8 coal. To this zone are referred tentatively the upper *Fusulinas* of Peoria, Belleville, and Shelby County, and those found on Piasa Creek.

3. There is but one zone yet noted of the true *Fusulina* represented by *Fusulina secalica* occurring high up in the McLeansboro series in Cumberland County. The true *Girtyina ventricosa* is to be restricted to the cap rock of No. 6 coal and to have a very wide distribution over the Eastern Interior Coal Basin.

6. *Implications as to correlation:*

1. There is no evidence to indicate that *Girtyina ventricosa* may not be retained as an index fossil for the cap limestone of No. 6 coal.

2. On this basis the margin of the Eastern Interior Basin is marked by McLeansboro beds rather than Pottsville and lower Carbondale.

3. This indicates a very extensive overlap of Late Pennsylvanian beds over the Pottsville and early Carbondale areas of deposition. This modification applies equally to Illinois, the Des Moines section in Muscatine and Scott counties of Iowa, and western Indiana.

4. These features involve a reconstruction of structures where these have been based on the accepted correlation of coals. This is especially true near the margin of the basin where the correlation is less certain.

5. It appears probable that further search will reveal new zones of Fusulinas and that therefore the utility of these fossils as stratigraphic guides should be seriously questioned.