A Contribution to Madison County Geology

F. A. Brown
A CONTRIBUTION TO MADISON COUNTY GEOLOGY.

BY F. A. BROWN.

There is given below a typical or general section of the Missourian formation in Madison county, as given by Tilton and Bain. It is mainly to the rocks of this stage that reference will be made in the present paper.

| NO. | SECTION | FT. | IN
|-----|---------|-----|--
| 10. | Limestone, yellow, earthy, thin layers, fusilina, anulopora and Productus | 4 | 
| 19. | Shale, dark above, lighter below | 2 | 
| 18. | Alternating calcareous and shaly bands yellowish with Derbyacrasa.—Productus and spirifer planoconvexa | 3 | 
| 17. | Dark shale | 2 | 
| 16. | Ledge of compact limestone | 2 | 
| 15. | Dark blue shale, many crushed Productus | 6 | 
| 14. | Black, very carbonaceous shale | 4 | 
| 13. | Shale, argillaceous above, sandy below | 6 | 
| 12. | Limestone, coarse, divided by shaly partings | 3 | 
| 11. | Shale, dark, in part very carbonaceous with band crowded with Chonetes. In places, the Chonetes are cemented into a band of limestone | 8 | 
| 10. | Blue limestone, very fossiliferous, three bands separated by shale | 3 | 
| 9. | Shale, dark above, lighter below | 2 | 
| 8. | Marly, yellowish shale | 2 | 
| 7. | Yellowish soft limestone becoming harder below | 5 | 
| 6. | Thin layers of limestone shaly partings | 12 | 
| 5. | Black slate and shale | 3 | 
| 4. | Yellowish, earthy, calcareous beds | 4 | 
| 3. | Limestone, with thin alternating bands of shale | 12 | 
| 2. | Black shale | 3 | 
| 1. | Band of limestone | 6 | 

According to the authors of the report on the geology of Madison county, the foregoing constitutes a typical section from the top of the Des Moines stage to and including the base of the Fusilina limestone, which is number 20 of the section: Nos. 6, 7 and 8 of the above are the Winterset limestone. The following section is exposed at the quarries of the stone company at the town of East Peru.

| NO. | SECTION | FT. | IN
|-----|---------|-----|--
| 10. | Yellowish, marly shale, with Derbya and Phillipsa | 3 or more | 
| 9. | Limestone, yellow earthy—Alorisma | 2 | 
| 8. | Shale | 1 | 
| 7. | Limestone, yellowish somewhat sandy | 4 | 
| 6. | Shale, with numerous Chonetes | 10 | 
| 5. | Limestone, bluish with Conchoidal fracture | 10 | 
| 4. | Shale parting | 1 | 
| 3. | Limestone, heavy bedded | 4 | 
| 2. | Shale, with Chonetes and Rhombopora | 1 | 
| 1. | Limestone, bedded from 4 to 12-in. | 6 | 

It seems probable, that number 10 of the quarry section at Peru corresponds with No. 8 of the general section, that Nos. 7, 8 and 9 are the equivalent of No. 7 of the general section, and Nos. 1, 2, 3, 4, 5 and 6 of the Peru quarry section can be correlated with No. 6 of the general section given above.

*Geology of Madison county, in VII Ann. Report In Geol. Surv. (203)*
If this be the case then the limestone at Peru is the equivalent of that found at Winterset (See Geol. Mad. Co. Ia. Geol. Surv. Vol. VII, p. 512). The writer has gone over the ground alone and in company with Mr. Herman Mueller, and he agrees with the writer that the Peru section should be assigned to the Winterset.

Now the top of the uppermost beds exposed in the Reed quarry, which is one-half mile west of the Peru quarry, is about 10 or 12 feet above No. 9 of the Peru quarry section, which is also exposed in Reed quarry.

As neither Mr. Mueller, Mr. T. E. Savage, nor the author have found any Fusulina while examining the Reed quarry beds above No. 9 of the Peru section and since there is thickness of 28 feet of strata between the top of the Winterset limestone and the base of the Fusulina limestone, according to Tilton and Bain, it seems probable that the Fusulina limestone is not exposed at the Reed quarry (See Mad. Geol. Ia. Geol. Surv. Vol. VII, pp. 525-529).

The writer does not hope to offer much that is new concerning the geology of Madison county, but he would call attention to a vein of coal of fair quality eleven inches thick, a short distance below the Earlham limestone (Nos. 3 and 5 of the general section).

Another feature not formerly mentioned is the glacial striations on the ledge in the Peru quarry. The striae run, as near as could be determined with a pocket compass, north 27° west, and a level board laid across the top of the ledge at right angles to the striae would perhaps show some of them to be two or more inches deep in the center and as much as two or three feet in width.

In some places the grinding has been carried on until the surface is almost as smooth as glass, again it is barely perceptible. There is a fair sample of this glacial work in the office of the Iowa Geological Survey at the Capitol.

The glacial deposits at Peru carry a very great number of limestone bowlders varying in size from small ones weighing one or two ounces to large ones weighing as much as two tons. Many of them are rounded and others show marks of glaciation. There are also the usual number of fossils of different kinds in that drift.

The writer has found a small specimen of Rhombopora hardly one-inch long and as large as a small knitting needle, also a Derbya crassa scarcely one-half inch in diameter, which came out of the clay lying directly above the limestone at Peru.

An amethyst crystal one inch long, a specimen of iron ore and a species of favositid coral also were found in the gravel above the clay just mentioned.

Some small fish teeth were picked up from the sands of Middle river west of Winterset, but it may be that they were brought there, by the river from the Cretaceous farther north and west, rather than by the ice.
There is given below a list of fossils found in the Missourian formation in Madison county. Messrs. Tilton and Bain have been followed in so far as they gave the horizon of the fossil mentioned in their report. Thanks are also due to Prof. T. E. Savage and Mr. Herman Mueller, for assistance in identifying fossils in the appended list. The number placed opposite the name corresponds with that of the bed in the typical section and indicates the horizon at which it may be found.

**Protozoa.**
*Fusulina cylindrica.* Meek & Hayden .................................. 20

**Coelenterata.**
*Anoplora* (probably gracilis). Keyes .................................. 10
*Azophyllum rude.* White and St. John .................................. 3
*Chaetetes milleporaceus.* Milne-Edwards and Haim .......................... Des M.
*Lophophyllum profundum.* Milne-Edwards and Haim ..................... X2&X4
*Micella exigua.* White .......................................................... 3
*Syringopora multiformata.* McChesney .................................. 3

**Echinodermata.**
*Archaeocidaris agassizi.* Hall ............................................... 5&X1
*Hydreliaconocirrus mucrospinus.* McChesney ............................. 6
*Ulocrius kansasensis.* Miller & Gurley .................................. 6

**Mollusca.**
*Fistulopora nodulifera.* Meek ............................................... 6
*Rhombopora leptidodendroides.* Meek ...................................... 6
*Septopora biserialis.* Swallow ............................................ 6

**Brachiopoda.**
*Ambocelis plano convexa.* Shumard ..................................... 18
*Chonetes granulifer.* Owen .................................................. 6&7
*Chonetes mesolobus.* Norwood and Pratten ............................... Des M.
*Chonetes parvus.* Shumard .................................................. Des M.
*Chonetes vernalianus.* Norwood and Pratten ............................ 6,9&11
*Derbya bulbosa.* Hall & Clarke ........................................... 11
*Derbya crassa.* Meek and Hayden ........................................ 7&8
*Dielenia bovidens.* Morton .................................................. X2&X4
*Hastelia mormoni.* Marcon .................................................. X2&X4
*Mekella striato-costata.* Cox ............................................. X2
*Productus cora.* D’Orbigny ................................................. 11
*Productus costatus.* Sowerby ................................................ X2&X4
*Productus longispinus.* Sowerby .......................................... X2, X4&11
*Productus muricatus.* Norwood & Pratten ............................... Des M.
*Productus nebraskensis.* Owen ............................................. 6
*Productus punctatus.* Martin ................................................ 6
*Productus semireticulatus.* Martin ....................................... 6
*Pynnea uta.* Marcon .......................................................... X2&X4
*Reticularia perplexa.* McChesney ......................................... 3
*Rhizodoma pecosii.* Marcon ................................................ X2&X4
*Spirifer cameronii.* Morton ................................................ 3,6&11
*Spiriferina kentuckensis.* Shumard .................................... X2&X4
*Seminula argentea.* Shepard ............................................... X2, X4, X3&6

**Mollusca.**
Allorisma subcuculatum. Meek & Hayden .................................. 7
*Aviculapecten occidentalis.* Shumard .................................... 18
*Myalina kansasensis.* Shumard ............................................ 11
*Myalina subquadrati.* Shumard ............................................ 11
*Myalina swallowi.* McChesney ............................................. 11
Gasteropoda.

Bellerophon (probably carbonarius). Cox ........................................ X2&X4
Naticopsis altonensis. McChesney ....................................................... X2&X4
Pleurotomaria carbonaria. Norwood & Pratten ................................... 6
Straparolus catilloides. Conrad ......................................................... X2&X4

Cephalopoda.

Nautilus. Sp. Undt. ................................................................. 2&4
Orthoceras cribrosum. Geinitz .........................................................
Orthoceras rushense. McChesney ..................................................... 2&4

Arthropoda.

Phillipsia major. Shumard .......................................................... 8

The nomenclature of this list is in accordance with Mr. Stuart Wells as used in his "Bibliographic Index of North American Carboniferous Invertebrates". (See Bul. U. S. Geol. Surv. No. 153.)