

1930

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Recommended Citation

Curry, H. Donald (1930) "The Fauna of the Chemung Formation of Southwestern New York," *Proceedings of the Iowa Academy of Science*, 37(1), 257-261.

Available at: <https://scholarworks.uni.edu/pias/vol37/iss1/54>

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THE FAUNA OF THE CHEMUNG FORMATION OF SOUTHWESTERN NEW YORK

H. DONALD CURRY *

INTRODUCTION

The Randolph quadrangle is located just north of the Pennsylvania state line in the southern part of Cattaraugus county, in southwestern New York. During the summer of 1929, the writer spent six weeks in the field in the southern part of that quadrangle, and this paper is based upon the work done and the fossils collected at that time.

This part of New York state lies within the Allegheny Plateau Province, and is a maturely dissected plateau of moderate relief and fine texture. It is drained by the Allegheny River, one of the main tributaries of the upper Ohio River. That part of the Randolph quadrangle north of the Allegheny River has been glaciated, while the southern part is driftless. The topography is rugged, consisting of narrow, steep-sloped ridges and youthful valleys. There is about 600 feet of relief. The elevation of the various uplands is similar, giving a remarkably level skyline. Nearly all the southern part of the quadrangle is forested, and in some places it is so thickly covered with brush and timber as to be almost impenetrable.

Owing to the nature of the rocks and the heavy forest cover, outcrops of bedrock are few, and for the most part confined to the cut-banks of streams and to artificial excavations.

Former Paleontological Work in the Area:

James Hall¹ described the larger part of the fauna of the Chemung formation, and made some collections in the vicinity of the area studied by the writer. The Olean quadrangle lies twenty miles to the east, and the fauna carried by the rocks of this region has been worked out by Charles Butts.² The stratigraphy of the Olean quadrangle is comparable with that of the Randolph quadrangle, and the faunas are very similar.

* Introduced by A. C. Tester.

¹ James Hall — Nat. Hist. of N. Y., Paleontology, vols. IV, V, VII, etc.

² Charles Butts — Fossil Faunas of the Olean Quadrangle — Report of the State Paleontologist, N. Y. St. Mus. Bul. no. 69, pp. 990-995 (1903).

STRATIGRAPHY

The Chemung formation is the oldest rock outcropping in this region, and is equivalent to part of the Catskill formation of the central and eastern part of the state.³ The Chemung formation consists of about 600 feet of shales, silts, and fine-grained, micaceous sandstones, with some conglomerate and minor amounts of impure limestones resulting from the accumulation of invertebrate remains. The predominating colors of these sediments are gray, chocolate, and olive-green. In this region the rocks of the Chemung formation do not occur as definite beds or layers, but are, almost without exception, in the form of thin, discontinuous lenses, none of which can be traced for more than a few feet.

Conformably above the Chemung are about 400 feet of thin-bedded shales and sands, with lenses of coarse sandstone, and conglomerate containing flat, discoidal white quartz pebbles. A few of the shales are red in color, but most of the rock is gray, green, or iron-stained. These strata are divided into the Cattaraugus, Oswayo, and Knapp formations, and are doubtfully of Mississippian age.

The pronounced lensing of all these sediments, and the presence of ripple-marks and cross-bedding, indicates that they were deposited in a shallow marine basin, and that the material was re-worked by strong, shifting currents.

The Olean conglomerate lies unconformably above the Oswayo and Knapp formations, and is thought to be Pottsville, or Lower Pennsylvanian in age.

FAUNA

In spite of the adverse environmental conditions suggested by their mode of deposition, the Chemung strata which outcrop in this region contain many very fossiliferous zones. The fauna, while not large in respect to number of species, is a very prolific one; and some of the lenses are composed almost entirely of the remains of invertebrates.

The majority of the fossils collected are in the form of casts, molds and impressions. This mode of preservation obscures the external characters of the organism, but the internal features of the shells are displayed to good advantage. When the rocks are less weathered the shells of the animals are preserved, but in many cases the fossils are unsatisfactory and difficult to recover.

³ George H. Chadwick — The Stratigraphy of the Chemung Group in Western New York — N. Y. St. Mus. Bul. no. 251, 157 (1924).

The predominating species is *Spirifer disjunctus* Sowerby, which is present in large numbers at nearly all stratigraphic horizons in the Chemung, and continues upward in the overlying formations clear to the base of the Olean conglomerate. This species was apparently undergoing very rapid evolution, and includes a large number of variations in size, shape, external markings and internal characteristics, no one of which is consistent enough to warrant distinction as a new species.

A number of these variations occur at any given horizon, but a change can be noticed in types when comparing the different variations found in one exposure with those occurring in another. Those collected in the lowest outcrop in the area are small and rather delicate, some with very numerous, fine plications. The length of the shell is less than the width, the beak and cardinal area low, and the angles prolonged into mucronate ears. Here *Spirifer disjunctus* is equaled in numbers by the *Productellas* and the *Athyrids*.

In the highest exposure of the Chemung from which a good collection could be made, *Spirifer disjunctus* has a wider range of variation than in that discussed above. Some individuals remain which are identical with the stratigraphically lower forms, but new tendencies have been developed in the majority. They are larger, more robust, with a high, arching beak and cardinal area, and less mucronate angles. The plications of these large forms are coarser and less numerous. There may be a slightly elevated muscle-scar, some with frond-like markings, between the dental lamellae; and the latter are long and heavy, extending nearly to the anterior margin in some individuals. Others have developed a plication within the fold, and the extremes of this type are identified with Hall's variety *sulcus*.

One type of *Spirifer disjunctus* found in the Oswayo formation is again much wider than long, and is broadly curved at the anterior margin. The plications are sharp and angular, and there are numerous heavy, concentric growth lines.

Several species of the genus *Productella* are also very numerous, rivalling *Spirifer disjunctus* in the number of individuals at some places. The genus *Camarotoechia* is represented by several species and variations; and, like *Spirifer disjunctus*, was apparently evolving along several different lines, making the specific identification of some individuals difficult and uncertain.

Worms were present in the Chemung sea, and have left their trails in the fine sediments. The *Pelecypods* are represented by

several genera and species, but compared with the Brachiopods, are not abundant. Crinoid stems occur throughout the Chemung, but no complete or identifiable specimens were found. One starfish, a rarity in the Devonian, was collected. The Crustaceans are absent, except for some unidentified Ostracods (?), and the Gastropods and Cephalopods are extremely rare. One well preserved fish scale of an unidentified genus and species was noted.

Butts⁴ lists a number of genera and species from the Chemung of the Olean quadrangle which are not included in the writer's collection. The latter is mainly from three exposures at different horizons in the southern part of the Randolph quadrangle. The stratigraphic range does not include the whole of the Chemung, nor as large a part of the formation as was available for study by Butts, but it is in general representative of the formation.

Faunal List of Chemung

- Vermes gen. and sp.
- Crinoid stems
- Palaester (?) sp.
- Bryozoa gen. and sp.
- Lingula sp.
- Discina (?) sp.
- Oehlertella sp.
- Dalmanella tioga (?) Hall
- Orthotetes chemungensis Conrad
- Chonetes scitulus Hall
- Productella lachrymosa Hall
- P. lachrymosa var. lima Hall
- P. onusta Hall
- P. speciosa Hall
- P. hystricula Hall
- P. sp.
- Camarotoechia contracta Hall
- C. orbicularis Hall
- C. sappho Hall
- C. sp.
- Athyris angelica Hall
- A. polita Hall
- Grammysia communis (?) Hall
- Edmondia philipi (?) Hall
- E. subovata (?) Hall
- Leptodesma mortoni Hall
- L. robustum Hall
- L. sp.
- Mytilarca chemungensis (?) Hall
- Aviculopecten sp.
- Fish scale

⁴ Butts, *op. cit.*, p. 994.

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COMPARISON WITH THE SHEFFIELD OF IOWA

The fauna of the Sheffield formation of Iowa, has been compared with that of the Chemung in the writer's possession, and the two are found to be very similar.