

THE ORDOVICIAN IN MAINE.

RUDOLF RUEDEMANN AND EDWARD S. C. SMITH.

ABSTRACT.

The following paper demonstrates the presence of two rather widely separated occurrences of graptolite bearing shales of Normanskill age in the State of Maine and reviews the Paleozoic columnar section for that State.

The occurrence of graptolites in black shales along the banks of the Wissataquoik Stream in central Maine was reported by W. W. Dodge¹ in 1881. These fossils were referred to the "Lower Silurian." Eight years later Dodge revisited the spot and collected "a few additional specimens." In a second paper² published in 1890 he says, "The entire list of determinable forms before me is as follows:

1. *Helicograptus gracilis* Hall (sp.)
2. *Dicellograptus*?
3. *Diplograptus*, n. sp.
4. *Cryptograptus marcidus* Hall (sp.)
5. *Glossigraptus spinulosus* Hall (sp.)
6. Young graptolite

This is clearly a fraction of the Norman's Kill (sic) assemblage of species."

In spite of this very definite statement indicating the occurrence of Ordovician shales in Maine the use of the older terminology "Lower Silurian" obscured the real value of the discovery. Middle Silurian (Niagaran, Wenlock) graptolites are known from several localities in central and northern Maine, and in the course of the junior writer's research in that State it became evident that the Wissataquoik fossils ought to be examined. Dodge's collection, recently made available through the kindness of Doctor Percy F. Raymond was then inaccessible, hence in the summer of 1933 the graptolite bearing black shales were searched out and a collection made which was placed in the hands of the senior writer. His identifications are as follows:

"*Corynoides gracilis* Hopkinson
C. gr. var. *perungulatus* Rued.
Dicellograptus gurleyi Lapworth
Climacograptus modestus Rued.
C. cf. scharenbergi Lapworth
Glyptograptus euglyphus Lapworth"

¹ This Journal, vol. 22, pp. 435-436, 1881.

² This Journal, vol. 40, pp. 153, 1890.

Dodge's original collection has now been studied by the senior writer with the following results:

Corynoides curtus Lapworth
Nemagraptus exilis Lapworth
Dicellograptus sextans Hall
D. cf. smithi Ruedemann
Dicranograptus ramosus Hall
Climacograptus modestus Rued.
Orthograptus calcaratus var. *incisus* Lapworth
Cryptograptus tricornis Carruthers
Glossograptus ciliatus Emmons.

These investigations demonstrate that there is an undoubted Normanskill horizon in the State of Maine, definitely proving the existence of Ordovician strata in that State, where heretofore much sedimentary rock has been loosely termed Cambro-Ordovician without adequate fossil evidence.

Mr. Olaf O. Nylander, the veteran collector and naturalist at Caribou, Maine, has kindly sent to the senior author last fall, another Odovician graptolite fauna, which he discovered one mile east of Haystack Mountain, Castle Hill Township, Aroostook County, Maine. This consists of:

Orthograptus calcaratus var. *acutus* Lapworth
Climacograptus antiquus Lapworth var. *polytheca* nov. sp.
C. eximius Ruedemann
Lasiograptus mucronatus Hall
Glossograptus whitfieldi Hall
Leptobolus walcotti Ruedemann.

Also this fauna is a characteristic Normanskill assemblage, though possibly from a different horizon than that of the Wissatiquoik Stream farther to the south.

In this connection it may be well to review the columnar section of the State of Maine as exemplified by the known fossiliferous horizons. The only identified Cambrian sediments are those of lower Cambrian age, which make up a thick series of metamorphic shales and sandstones exposed for several miles along the Grand Falls of the Penobscot River, in Penobscot County, and for which the name Grand Falls formation is proposed.

There are no recognized middle or upper Cambrian sediments, the next younger series being the shales of Normanskill age mentioned in this paper. No other Ordovician or early Silurian rocks are known, but the rather wide distribution of

middle Silurian, Niagaran, slates and limestones, makes it clear that this was a time of general submergence throughout the State. Niagaran slates carrying characteristic graptolites are found at Seboomook and at Fairfield, Somerset County; Waterville, Kennebec County; Brownville, Piscataquis County; Houlton, Aroostook County and at Quoddy Head, Lubec, Washington County. Limestones of like age occur at North Haven, Knox County; Ripogenus Dam, central Piscataquis County and Flagstaff, Somerset County. The upper Silurian is known only from the Eastport, Washington County, region where the rocks seem to be the equivalent of the Ludlow.

The Devonian is present also over quite large areas in central and northern Maine, chiefly as sandstones like the Moose River and Chapman formations, but with some limestones as those of Square Lake, Aroostook County and Marble Pond, Penobscot County. These are all lower Devonian, Helderbergian, in age. Three important unconformities are thus suggested, one between the lower Cambrian and the lower Ordovician, one between the lower Ordovician and the middle Silurian, and, with the exception of the Eastport area, one between the middle Silurian and the lower Devonian. Only in the latter region is the upper Devonian, Chemung, present, where it rests unconformably upon the upper Silurian.

NEW YORK STATE MUSEUM, ALBANY, N. Y.

UNION COLLEGE, SCHENECTADY, N. Y.