

ART. XXVII.—On the Age of the Glazed and Contorted Slaty Rocks in the vicinity of Schodack Landing, Rensselaer County, N. Y.; by S. W. FORD.

DURING the latter part of the month of May, after a day spent in the study of the Primordial rocks of the town of Stuyvesant, Columbia County, the writer made a hasty examination of the folded slates directly back of the Schodack Landing railroad station, near the Hudson River, and collected therefrom two poorly preserved, but yet decisive specimens of the well-known graptolitic species, *G. pristis*. It occurred to me at the time that the locality was one deserving more extended investigation; but owing to the pressure of other engagements, I was then prevented from entering upon the work. I have since, however, found opportunity to devote considerable time to the exploration of the region, and some of the more important results obtained are herewith communicated.

The slaty rocks back of Schodack Landing station, and their associated beds, occupy all the higher ground to the south as far as the Columbia County line, and are even prolonged a short distance into the town of Stuyvesant in Columbia County. In passing southward through Schodack Landing, they sweep westward as far as the Hudson River railroad track in two conspicuous promontories, and finally disappear altogether, about a hundred yards distant from the Stuyvesant Primordial beds,\* a fault intervening. In these promontories the slates are excellently exposed, and are bent and contorted almost beyond description. They are fossiliferous at several different points, but especially so along the line of the Hudson River railroad, a short distance south of the county line, and about two hundred yards north of the residence of Mr. Patrick McCabe. At this locality there occurs a band of black slates, but slightly altered, which has thus far yielded the following ten species of Graptolites, described and figured on pages 265–274, plates 72–74 of the first volume of the Paleontology of New York, besides two others, probably new or undescribed :

<i>G. pristis</i> ,	<i>G. ramosus</i> ,
<i>G. mucronatus</i> ,	<i>G. scalaris</i> ,
<i>G. sagittarius</i> ,	<i>G. sextans</i> ,
<i>G. tenuis</i> ,	<i>G. furcatus</i> ,
<i>G. bicornis</i> ,	<i>G. gracilis</i> .

\* Directly south of the more southerly promontory, the surface is low or marshy; and, after crossing this, the rocks at one point resemble those of the Hudson River group, although beds clearly of Primordial age occur only a few yards distant. It is possible, therefore, that the two groups have come into contact with each other, but I have not, as yet, been able to fully satisfy myself upon this point.

In addition to the above, I have also obtained from this band the young graptolitic forms figured on plate B of Decade II of the Geological Survey of Canada (1865), figs. 15 and 18. In view of all the evidence, I think there can be no doubt that these slates are the exact equivalents of the Graptolite-bearing beds of the Norman's Kill, near Albany. Stipes of the *G. sagittarius* have been obtained here over a foot in length, and all of the species occur in a remarkably perfect state of preservation.\*

The Norman's Kill slates were assigned by the New York Geological Survey to the horizon of the Hudson River group; and although doubts were subsequently raised by the investigations of the Canadian geologists as to the correctness of this reference, I became satisfied in 1871 and 1872, after an examination of the slates of various other localities on the west side of the Hudson River, that it was, in all probability, the right one. Nevertheless, so long as the graptolitic testimony of the Norman's Kill beds remained unsupported by the evidence of other Hudson River group fossils at that locality, caution appeared to me necessary in pronouncing upon the age of beds characterized by simply one or more of these species of graptolites, and not demonstrably their stratigraphical equivalents, in other places. For instance: in the summer of 1870, I obtained specimens of *Graptolithus pristis*, *G. scalaris*, and a third species which I was unable to determine, from the slates immediately east of the Hudson River at Troy; and later I found good specimens of the first mentioned species in the folded slates between Troy and Lansingburgh, along the line of the Troy and Boston railroad; but I did not consider this as demonstrative evidence of the Hudson River age of the beds, although I now believe them to be of this age, in view of the new facts that have recently come under my observation.

With the discovery of the rich graptolitic locality in the vicinity of Schodack Landing, I at once resolved to institute a careful search for other fossils in the rocks of the neighborhood; and before quitting the field, my researches were rewarded with success. Directly back of Mr. Honstein's blacksmith shop, at Schodack village, there is a bed of limestone, about two feet thick, and, in part, somewhat brecciated in appearance, enclosed in the slates; and about a quarter of a mile from the river, in the bottom of a deep gorge running eastward along the Columbia County line, the same limestone band, similarly situated, is again met with. From the mode of

\* The same or a similar band, abounding in the same species, occurs about a mile south of Castleton, on an east-and-west road connecting with the regular highway from Schodack Landing to that village. It strikes obliquely across the former highway only a few rods from the latter, or just beyond the residence of Mr. Collins.

occurrence of this band, I have no doubt that it is a regular member of the slate formation. It is fossiliferous at both of the points referred to, and has thus far furnished the following species: *Asaphus platycephalus*, *Calymene senaria*, *Orthis testudinaria*, *Orthis lynx*, *Leptaena sericea*, *Strophomena alternata* and the hemispherical variety of *Chaetetes lycoperdon*. None of the species of this locality are distinctive of the Utica slate, and both the limestone and its associated graptolitic slates represent, in my estimation, the Hudson River group. It is possible, however, that the Utica formation will yet be somewhere recognized among the folded and contorted rocks of the region.

In view of what I have recently and for several years past, observed in the field, the following propositions appear to me to rest upon a good strong foundation of facts, and will, I have little doubt, be fully sustained by future research:

1. That the rocks of the Hudson River group skirt the Hudson River quite extensively upon the east in Washington, Rensselaer, Columbia and Dutchess counties, or, at any rate, extensively enough to entitle them to continue to be called the Hudson River group; although the better plan would appear to be to discard altogether that designation, and go back to the old term "Lorraine shales."

2. That a great dislocation, bringing up (at least for a large portion of the distance) the rocks of the Primordial zone upon the east side of the line of fracture, and placing them upon the same level with, or even higher than, the rocks of the Hudson River group upon its western side, runs from western Vermont southward through the western portion of Washington, Rensselaer, Columbia and Dutchess counties; and that this dislocation does not strike across the Hudson River opposite, or so as to pass through Rondout, as some have supposed; but, on the contrary, before crossing, extends on southward beyond Rhine-cliff station, in Dutchess county, for several miles.

3. That this dislocation probably occurred at the close of the Lower Silurian as urged by Professor Dana.

4. That over a considerable part of the territory traversed by this fault, the Primordial rocks wall against those of the Hudson River group unconformably; but that, in the majority of instances where they come together, the older beds have been made to overlap the newer conformably.

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