## ROYAL SOCIETY OF CANADA

Paradoxides there, while the Olenus fauna was being developed in Europe.

In the article on the distribution of the Cambrian Faunas above referred to, the present writer ventured to suggest that the fauna of the Utica slate was a cold deep-water fauna, swept in upon America from the North Atlantic or on. Since then R. Rudemaun, the talented Assistant Palmontologis of the New York State survey, has found proof of the existence of such a current from the northeast prevailing over northeastern New York in Utica times. This he has demonstrated by observations on the attitude of colonics of graptolites entombed in the Utica shale in that region.

In the present author's article above cited, it was also inferred that the central part of North America was the headquarters of the Olenclus fauna, because it was there represented by a variety of species, whereas in Europe the fauna where it had been found consisted of only a few species, stragglers from the main swarm. The argument in reference to the Paradoxides fauna would imply a reversed current in the time of the Olenellus fauna, viz.: one flowing to the northeast, and carrying with it the migrating young of the Benthos. A possible confirmation of this view is found in the attitude of the entombed shells of the Etcheminian faunas in Cape Breton, especially the Upper fauna.

In the Upper Etcheminian  $f_{\text{Luna}}$  the orientation of its Brachiopods to the northeast is of a very marked character, indicating a current setting to the northeast along the Cambrian shore during the time of the entombment of the Upper Etcheminian fauna.

In the Lower Etcheminian the orientation is more capricious, some beds showing it distinctly and others not at all. But in the fossils of the Upper fauna it is very conspicuous in many of the layers. Sometimes as many as eighty per cent. of the valves are turned in the direction of the current. This would indicate a steady flow of water setting to the northeast during the time of the entombment of the Upper Etcheminian fauna.

It is in accordance with this that the fauna changed suddenly at the beginning of this time, a new set of species, and one new genes appearing among the Brachiopods. There was also a change in the kind of sediment deposited, as hard massive sandstones gave place to more flaggy beds and shales.

It does not seem likely that the phenomenon of orientation to the northeast was due to tidal action, for in the valley where this feature is most noticeable, the beds in which it was observed thicken to the southwest, indicating that the opening of the bay was in that

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