

one attempts to draw such—how could the line in that case reach on the Salcombe estuary a position, which is considerably to the north of a line drawn due west from Hall Sands?

In connection, also, with the suggestion, that the chloritic rock near the fault-line was a "buffer, checking the northward spread of metamorphism,"¹ I should like to ask, why was this duty neglected by the much larger and more extensive mass near Prawle Point, and that overlooking The Barr?—to the northward of which, in both cases, lie well-marked mica-schists. I might take exception to many other statements, but I should not be justified in thus occupying space, for they are matters of detail, compared with the suggested identification of the two series of rocks. These may have some resemblance to each other—though I should have thought it so superficial as not to mislead any practised observer; but even if there be a vague resemblance, due to their having had the same origin, they cannot, as I have shown, have been manufactured at the same epoch.

VII.—ON SOME OSTRACODA FROM THE MABOU COAL-FIELD, INVERNESS CO., CAPE BRETON (NOVA SCOTIA).

By Prof. T. RUPERT JONES, F.R.S., and J. W. KIRKBY, Esq.

THIRTEEN specimens of black shale, crowded with Ostracoda, besides fish-scales, *Anthracomyæ* (?), and other small fossils, were sent in 1886 by Mr. J. F. Whiteaves, F.G.S., Palæontologist of the Geological Survey of Canada, for examination. They had been collected by Mr. A. H. Foord, F.G.S., of that Survey, in 1881.

In these coal-shales the Ostracoda are very numerous as individuals, but belong apparently to very few species of one genus. They are in a great degree similar to those mentioned in the *Geol. Mag.* Dec. II. Vol. VIII. 1881, p. 95, and Dec. III. Vol. I. 1884, p. 358, etc., as occurring in the black coal-shales of the South Joggins, Nova Scotia.

In the Mabou coal-fields we find:—

1. *Carbonia fabulina*, J. and K., very abundant. It is of rather smaller size than the Scottish forms figured and described in the *Ann. Mag. Nat. Hist.* ser. 5, vol. iv. (1879), p. 31, pl. 2, figs. 1–10. The innumerable minute Ostracoda imbedded throughout the shale seem to be small individuals of *C. fabulina*.

2. Among the foregoing is a variety larger than the Scotch specimens referred to, rather more oblong in outline, and with stronger marginal overlap, and a somewhat coarser punctuation of the surface. It may be termed var. *altilis* (well-nourished).

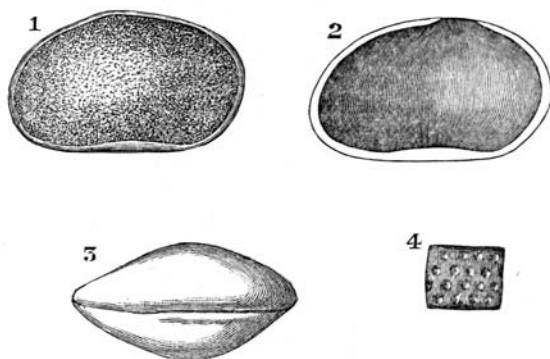
3. *Carbonia* (?) *bairdioides*, J. and K., also occurs, but far less abundantly than *C. fabulina*. The specimens more closely resemble fig. 24, pl. 3, "A. M. N. H." ser. 5, vol. iv. p. 38, than fig. 8, pl. 12 of the *Geol. Mag.*, Dec. III. Vol. I. p. 359.

Carbonia fabulina is abundant in the Upper and the Lower Carboniferous formations of Britain, wherever the conditions had been

¹ Trans. Dev. Assoc. 1888, vol. xx, p. 217.

favourable for the formation of Coal-shales,¹ especially in the Lower Carboniferous series of Scotland. *C. bairdioides* occurs more rarely, but in strata similar to the above, in Scotland and Staffordshire. They both occur at the Joggins, on the shore of the Cumberland Basin, Cumberland Co., Nova Scotia, as noticed above.

The geological features of Inverness County (Cape Breton), Nova Scotia, and the relationships of the strata are described in detail in the Geological and Natural-History Survey of Canada: Report of Progress, 1885; and Reports and Maps of Investigations and Surveys, 1882–83–84; including Report (H) on the Geology of Northern Cape-Breton, by Hugh Fletcher, 1884.



FIGS. 1–4. *Carbonia fabulina*, J. & K. Var. *altalis*, nov.

FIG. 1. Carapace, showing the left valve, overlapped by the other valve at the margin. $\times 25$.

FIG. 2. Inside of the right valve. $\times 25$.

FIG. 3. Dorsal view of the carapace. Not set quite upright, but sloping a little. $\times 25$.

FIG. 4. Punctation of the surface; highly magnified.

The Inverness Coal-field is treated of at p. 53 H; and the Mabou Coal-basin at p. 61 H. This is referred to as belonging to the “Lower Carboniferous” series at p. 53 H and on the Map (No. 14, 1884), accompanying Mr. Fletcher’s Report. At p. 6 of the Report H, however, it is referred to the “Middle Carboniferous,” which consists of “Conglomerate and Coal-measures” in that locality.

The strata containing the specimens under notice are indicated in Mr. Fletcher’s Map (No. 14) as at the place where Mr. Foord collected fossils in 1881, on the shore about one mile and a half south of Cape Mabou,² and about one mile north of the spot marked “Mabou Coal-mines” on the same map.

The “Black Shales” of the Mabou Coal-measures are mentioned in the list of strata at p. 70 H, thus—

“12. Dark-bluish-grey, thin-bedded, calcareo-bituminous shale;

¹ See Quart. Journ. Geol. Soc. vol. xxxv. 1879, pp. 30 and 38; and GEOL. MAG. Dec. III. Vol. I. 1884, p. 360.

² The post-town called “Cape Mabou” is three miles east (inland) of Cape Mabou.

fish scales, teeth, coprolites, and spines, *Cythere*, *Naiadites*, *Spirorbis*.—2 feet.

"13. Dark-bluish-grey, flaggy, concretionary, calcareous rock, with the same fossils.—2 ft. 6 inches." There follow (14-29) other shales and shaley beds, more or less bituminous. At p. 71 H it is stated—"The black shales are those from which an interesting collection of fossils was made by Mr. Foord, of the Geological Survey, in the summer of 1881. In this collection the following forms have been determined by Mr. Whiteaves:—*Naiadites* (*Anthracoptera*) *carbonaria*, Dawson; *N. (Anthracomya) elongata*, Dawson; Entomostraca; *Rhizodus lancifer*, Newberry (scales); *Cœlacanthus* (jugular plates); scales of two genera of Ganoid Fishes; also jaws and teeth of Fishes undetermined."

VIII.—ON THE DISCOVERY OF *TURRILEPAS* IN THE UTICA FORMATION (ORDOVICIAN) OF OTTAWA, CANADA.

By HENRY WOODWARD, LL.D., F.R.S., F.G.S.

MR. AMI'S interesting discovery has already been announced in a letter addressed to Mr. A. H. Foord, F.G.S., published in this MAGAZINE (October, 1888). Mr. Ami now supplies a "Note" on the precise geological position of the beds in which the *Turrilepas* was found. Want of space, however, precludes us from giving the whole of his detailed observations, which are accompanied by a sketch section, here reproduced:—

The following is a summary of Mr. Ami's "Note."

The *Turrilepas* was found in a band of bituminous limestone cropping out on the right bank of the Rideau River, at the Rifle Range, near Ottawa. The precise position of the beds (Lower Utica = about the lower part of the Bala Series),¹ was ascertained by means of their fossil contents, which include an interesting Brachiopod—*Siphonotreta Scotica*, identified and named by the late Dr. T. Davidson, F.R.S.

The calcareous and shaly measures characterizing the Lower Utica in this district, as exposed on the Rideau River, have a south-by-west dip of about 4°, and exhibit a portion of the south-western limb of a low, denuded anticlinal, which, however, affects the physical aspect of the country to a very small extent.

The accompanying sketch is a diagram section of the rocks cropping out at the Rifle Range rapids. The depth of section is about 22 feet.

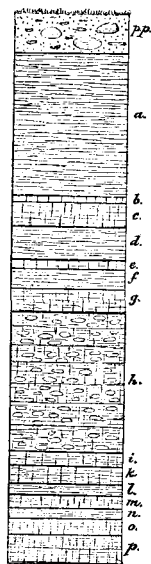


Diagram-section of rocks at Rifle Range near Ottawa.

¹ Mr. Ami regards them as equivalent to the Llandeilo of Craighead, Ayrshire.