

but supported by strong roots, may have resisted an incursion of the sea.

The high tides of the Bay of Fundy, rising more than 60 feet, are so destructive as to undermine and sweep away continually the whole face of the cliffs, and thus a new crop of erect fossil trees is brought into view every three or four years. They are known to extend over a space between two or three miles from north to south, and more than twice that distance from east to west, being seen in the banks of streams intersecting the coal-field.

In Cape Breton, Mr. Richard Brown has observed in the Sydney coal-field a total thickness of coal-measures, without including the underlying millstone-grit, of 1843 feet, dipping at an angle of 8°. He has published minute details of the whole series, showing at how many different levels erect trees occur, consisting of *Sigillaria*, *Lepidodendron*, *Calamites*, and other genera. In one place eight erect trunks, with roots and rootlets attached to them, were seen at the same level, within a horizontal space 80 feet in length. Beds of coal of various thickness are interstratified. Taking into account forty-one clays filled with roots of *Stigmaria* in their natural position, and eighteen layers of upright trees at other levels, there is, on the whole, clear evidence of at least fifty-nine fossil forests, ranged one above the other, in this coal-field, in the above-mentioned thickness of strata.*

The fossil shells of Cape Breton and those of the Nova Scotia section (p. 378) consisting of *Cypris*, *Unio* (?), *Modiola*, and an annelid probably of the genus *Spirorbis* (see fig. 498), seem to indicate brackish water; but we ought never to be surprised if, in pursuing the same stratum, we should come either to a freshwater or a purely marine deposit; for this will depend upon our taking a direction higher up or lower down the ancient river or delta deposit.

In the strata above described, the association of clays supporting upright trees, with other beds containing marine and brackish-water shells, implies such a repeated change in the same area, from land to sea and from sea to land, that here, if anywhere, we should expect to meet with evidence of the fall of rain on ancient sea-beaches. Accordingly rain-prints were seen by me and Mr. Dawson at various levels, but the most perfect hitherto observed were discovered by Mr. Brown near Sydney in Cape Breton. They consist of very delicate impressions of rain-drops on greenish slates, with several worm-tracks (*a*, *b*, fig. 495), such as usually accompany rain-marks on the recent mud of the Bay of Fundy, and other modern beaches.

The casts of rain-prints, in figs. 496 and 497, project from the under side of two layers, occurring at different levels, the one a sandy shale, resting on the green shale (fig. 495), the other a sandstone presenting a similar warty or blistered surface, on which are also

* Geol. Quart. Journ. vol. ii. p. 393; and vol. vi. p. 115.