

Such were undoubtedly the conditions of coal accumulation; but we must be prepared to admit many exceptional cases. Vast areas of bog imply great tracts of water-soaked and inundated ground, filling up with drifted vegetable muck. They also necessitate such casualties as bursting of bogs and the floatage of their semi-fluid contents over large areas, as we find now occasionally occurring in Ireland and in Florida. To such causes we may attribute beds of earthy bitumen and of cannel coal, and possibly the coal containing fish scales which I have described in the Joggins section¹ or the celebrated Jarrow coal in Ireland, recently so well described by Mr. Bolton² in which fossil fishes and batrachians occur imbedded entire in the coal itself, as if they had been overwhelmed and buried in a torrent of vegetable mud. The Jarrow coal is also, over a large part of its area, destitute of an underclay or "seating" as it is called in Ireland, and it thins out in different directions, as if it had been formed in a limited depression of the surface. Such beds constitute the exception which illustrates if it does not prove the rule, by showing how different our ordinary coal beds must have been had they been formed in such special and peculiar ways.

It is further to be observed that while in many places the coal-formation swamps have been elevated into uplands and mountains, in other regions they have been depressed beneath the sea. The island of Cape Breton affords an excellent example of this. It consists of two broad ridges of old Palaeozoic and Pre-Cambrian rocks with a carboniferous depression in the middle, and belts and patches of coal-formation beds around its sides, dipping towards the sea. The soundings show that these coal-formation areas are continuous under the sea with those of Nova Scotia proper on the South and Newfoundland on the North, and that they extend to great distances under the Atlantic to the East and the Gulf of St. Lawrence to the West. Thus we can imagine Cape Breton in the coal-formation period

¹ *Acadian Geology*, pp. 164, 199.

² *Manchester Transactions*, Vol. XXII, Part 16, 1894.