In the annexed section (fig. 492), which I examined in July, 1842, the beds from *c* to *i* are seen all dipping the same way, their average inclination being at an angle of 24° S. S. W. The vertical height of the cliffs is from 150 to 200 feet; and between *d* and *g*, in which space I observed seventeen trees in an upright position, or, to speak more correctly, at right angles to the planes of stratification, I counted nineteen seams of coal, varying in thickness from 2 inches to 4 feet. At low tide a fine horizontal section of the same beds is exposed to view on the beach. The thickness of the beds alluded to, between *d* and *g*, is about 2500 feet, the erect trees consisting chiefly of large *Sigillariæ*, occurring at ten distinct levels, one above the other; but Mr. Logan, who afterwards made a more detailed survey of the same line of cliffs, found erect trees at seventeen levels, extending through a vertical thickness of 4515 feet of strata; and he estimated the total thickness of the carboniferous formation, with and without coal, at no less than 14,570 feet, everywhere devoid of marine organic remains.* The usual height of the buried trees seen by me was from 6 to 8 feet; but one trunk was about 25 feet high and 4 feet in diameter, with a considerable bulge at the base. In no instance could I detect any trunk intersecting a layer of coal, however thin; and most of the trees terminated downwards in seams of coal Some few only were based in clay and shale; none of them, except calamites, in sandstone. The erect trees, therefore, appeared in general to have grown on beds of coal. In the underclays *Stigmaria* abounds.

In 1852 Mr. Dawson and the author made a detailed examination of one portion of the strata, 1400 feet thick, where the coal-seams are most frequent, and found evidence of root-bearing soils at sixty-eight different levels. Like the seams of coal which often cover them, these root-beds or old soils are at present the most destructible masses in the whole cliff, the sandstones and laminated shales being harder and more capable of resisting the action of the waves and the weather. Originally the reverse was doubtless true, for in the existing delta of the Mississippi those clays in which the innumerable roots of the deciduous cypress and other swamp trees ramify in all directions are seen to withstand far more effectually the undermining power of the river, or of the sea at the base of the delta, than do beds of loose sand or layers of mud not supporting trees.

This fact may explain why seams of coal have so often escaped denudation, and remain continuous over wide areas, since the tough roots, now turned to coal, which once traversed them, would enable them to resist a current of water, whilst other members of the coal-formation, in their original and unconsolidated state of sand and mud, would be readily removed.

In regard to the plants, they belonged to the same genera, and most of them to the same species, as those met with in the distant coal-fields of Europe. In the sandstone, which filled their interiors, I frequently observed fern-leaves, and sometimes fragments of *Stigmaria*, which had

* Quart. Geol. Journ. vol. ii. p. 177.