

of mineral charcoal prepared in this way are often very beautiful microscopic objects under high powers ; and this material of the coal is nothing else than little blocks of rotten wood and fibrous bark, broken up and scattered over the surface of the forming coal bed. All these materials, it must be observed, have been so compressed that the fragments of decayed wood have been flattened into films, the vegetable mould consolidated into a stony mass, and trunks of great trees converted by enormous pressure into laminae of shining coal, a tenth of an inch in thickness, so that the whole material has been reduced to perhaps one-hundredth of its original volume.

Restoring the mass in imagination to its original state, what do we find ? A congeries of prostrate trunks with their interstices filled with vegetable muck or mould, and occasional surfaces where rotten wood, disintegrated into fragments, was washed about in local floods or rain storms, and thus thrown over the surface. Lyell seems very nearly to have hit the mark when he regarded the conditions of the great dismal swamp of Virginia as representing those of a nascent coal field. We have only to realize in the coal period the existence of a dense vegetation very different from that of modern Virginia, of a humid and mild climate, and of a vast extension of low swampy plains, to restore the exact conditions of the coal swamps.

But how does this correspond with the facts observed in mines and sections ? To the late Sir William Logan is due the merit of observing that in South Wales the underclays or beds of indurated clay and earth underlying the coal seams are usually filled with the long cylindrical rootlets and branching roots of a curious plant, very common in the coal formation, the *Stigmaria*. He afterwards showed that the same fact occurs in the very numerous coal beds exposed in the fine section cut by the tides of the Bay of Fundy, in the coal rocks of Nova Scotia. In that district I have myself followed up