covery has since been extended to all the coal-fields of Europe and America, and it is a perfectly conclusive fact as regards the origin of coal. Each of these "underclays," as they are called, must, in fact, have been a soil on which grew, in the first instance, Sigillariæ and other trees having stigmaria-roots. Thus, the growth of a forest of *Sigillariæ* was the first step toward the accumulation of a bed of coal. More than this, in some of the coarser and more impure coals, where there has been sufficient earthy matter to separate and preserve impressions of vegetable forms, we can see that the mass of the coal is made up of flattened *Sigillariæ*, mixed with vege-

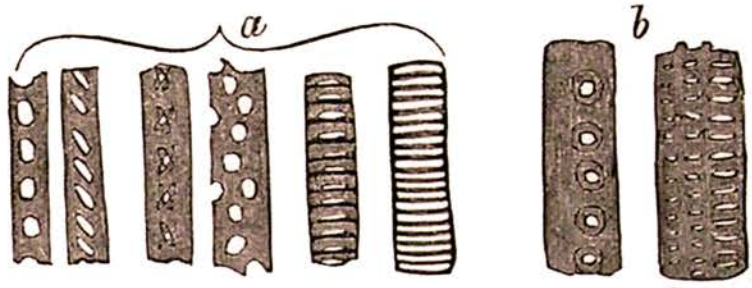

FIG. 40.—Vegetable tissues from coal. *a*, *Sigillaria* and *Cordaites*. *b*, *Calamodendron*.

table *débris* of all kinds, including sometimes vast quantities of lepidodendroid spores, and the microscopic study of the coal gives similar results (Fig. 40). Further, on the surfaces of many coals, and penetrating the shales or sandstones which form their roofs, we find erect stumps of sigillaria and other trees, showing that the accumulation of the coal terminated as it had begun, by a forest-growth. I introduce here a section of a few of the numerous beds of coal exposed in the cliffs of the South Joggins, in Nova Scotia, in illustration of these facts. We can thus see how in the slowly subsiding areas of the coal-swamps successive beds of coal were accumulated, alternating with beds of sandstone and shale (Figs. 41, 42). For other details of this kind I must refer to papers mentioned in the sequel.