

The nearest analogy to these conditions is probably furnished by cypress swamps¹⁸² or the mangrove swamps alluded to already (p. 806), where masses of arborescent vegetation, with their roots spreading in salt water among marine organisms, grow out into the sea as a belt or fringe on low shores, and form a matted soil which adds to the breadth of the land. The coal-growths no doubt also flourished in salt water; for such shells as *Aviculopecten* and *Goniatites* are found lying on the coal or in the shales attached to it. Each coal-seam represents the accumulated growth of a period which was limited either by the exhaustion of the soil underneath the vegetation (as may be indicated by the composition of the fire-clays), or by the rate of the intermittent subsidence that affected the whole area of coal-growths. Though the vegetation in these coal-fields may have grown as a whole *in situ*, there may also have been considerable transport of loose leaves, branches, trunks, etc., after storms, and also during times of more rapid subsidence. From the fact that a succession of coal-seams, each representing a former surface of terrestrial vegetation, can be seen in a single coal-field extending through a vertical thickness of 10,000 feet or more, it is clear that the strata of such a field must have been laid down during prolonged and extensive subsidence. It has been assumed that, besides depression, movements in an upward direction were needful to bring the submerged surfaces once more up within the limits of plant growth. But this would involve a prolonged and almost inconceivable see-saw oscillation; and the assumption is really unnecessary if we suppose that the downward

¹⁸² For an account of the submerged lands of the Mississippi, see Lyell's "Second Visit to the United States," chap. xxxiii.