

where 120 beds are superposed on one another, exclusive of a great many which are less than a foot in thickness; the coal beds at Johnstone, in Scotland, and those in the Creuzot, in Burgundy, are some of them, respectively, thirty and fifty feet in thickness,* while in the forests of our temperate zones, the carbon contained in the trees growing over a certain area would hardly suffice, in the space of a hundred years, to cover it with more than a stratum of seven French lines in thickness.† Near the mouth of the Mississippi, and in the "wood hills" of the Siberian Polar Sea, described by Admiral Wrangel, the vast number of trunks of trees accumulated by river and sea water currents affords a striking instance of the enormous quantities of drift-wood which must have favored the formation of carboniferous depositions in the inland waters and insular bays. There can be no doubt that these beds owe a considerable portion of the substances of which they consist to grasses, small branching shrubs, and cryptogamic plants.

The association of palms and Coniferæ, which we have indicated as being characteristic of the coal formations, is discoverable throughout almost all formations to the tertiary period. In the present condition of the world, these genera

fire, but that it has more probably been produced in the moist way by the action of sulphuric acid, is strikingly demonstrated by the excellent observation made by Göppert (Karsten, *Archiv für Mineralogie*, bd. xviii., s. 530), on the conversion of a fragment of amber-tree into black coal. The coal and the unaltered amber lay side by side. Regarding the part which the lower forms of vegetation may have had in the formation of coal beds, see Link, in the *Abhandl. der Berliner Akademie der Wissenschaften*, 1838, s. 38.

* [The actual total thickness of the different beds in England varies considerably in different districts, but appears to amount in the Lancashire coal field to as much as 150 feet.—Ansted's *Ancient World*, p. 78. For an enumeration of the thickness of coal measures in America and the Old Continent, see Mantell's *Wonders of Geology*, vol. ii., p. 69.]—Tr.

† See the accurate labors of Chevandier, in the *Comptes Rendus de l'Académie des Sciences*, 1844, t. xviii., Part i., p. 285. In comparing this bed of carbon, seven lines in thickness, with beds of coal, we must not omit to consider the enormous pressure to which the latter have been subjected from superimposed rock, and which manifests itself in the flattened form of the stems of the trees found in these subterranean regions. "The so-called *wood-hills* discovered in 1806 by Sirowatskoi, on the south coast of the island of New Siberia, consist, according to Hedenström, of horizontal strata of sandstone, alternating with bituminous trunks of trees, forming a mound thirty fathoms in height; at the summit the stems were in a vertical position. The bed of drift-wood is visible at five wersts' distance."—See Wrangel, *Reise längs der Nordküste von Siberien, in den Jahren 1820-24*, th. i., s. 102.