movement, though prolonged, was not continuous, but was marked by pauses, long enough for the silting-up of lagoons and the spread of coal-jungles.<sup>188</sup>

2. The researches of Grand' Eury, Fayol, and others in the small coal-basins of central France have shown that in these regions much vegetable matter was washed down from adjacent land.<sup>184</sup> The coal is irregularly distributed among the strata, and it is associated with beds of coarse detritus and other evidence of torrential action. Numerous trunks of calamododendra, sigillariæ, and other trees imbedded in the sandstones and shales vertically and at all angles of inclination bear witness, like the "snags" of the Mississippi, to the currents that transported them. The basins in which the accumulated detritus and vegetation were entombed seem to have been small, but sometimes comparatively deep lakes lying on the surface of the crystalline rocks that formed an uneven land-surface during the Carboniferous period in the heart of France. But there is evidence, even in these basins, of the growth of coal-plants in situ, and of the gradual subsidence of the alluvial floors on which they took root. Grand' Eury has shown the existence of tree-trunks with their roots in place on many successive levels, and has further ascertained that these trees, as they were enveloped in sediment, pushed out rootlets at higher levels into the silt that gathered round them.

1340

<sup>&</sup>lt;sup>183</sup> See a statement of the oscillation theory as far back as 1849 by M. Virlet

<sup>See a statement of the oscillation theory as far back as 1849 by M. Virlet d'Aoust, Bull. Soc. Geol. France (2) vi. p. 616.
<sup>184</sup> For the detrital origin of coal, see Grand' Eury, Ann. des Mines, 1882
(i.) pp. 99-292; Mem. Soc. Geol. France, 3e ser. iv. 1887; "Geol. of Paléontol. du bassin Houiller du Gard," 1891. Fayol, "Études sur lo Terrain Houiller de Commentry," part 1. Bull. Soc. Industrie Min. ser. 2, vol. xv. and Atlas, 1887. Bull Soc. Geol. France, 3e ser. xvii. 1888; B. Renault, "Flore Fossile de Commentry," Bull. Soc. Hist. Nat. d'Autun, 1891. A. de Lapparent, Rev. Quest. Scien. July, 1892.</sup>