formed in about 30 years. Near the Lake of Constance, a layer of 3 to 4 feet grew in 24 years. Among the Danish mosses, a period of 250 to 300 years has been required to form a layer 10 feet thick. Much must depend upon the climate, slope, drainage, and soil. Some European peat-mosses are probably of extreme antiquity, having begun to form soon after the surface was freed from the snow and ice of the glacial period. In the lower parts of these mosses, traces of the arctic flora which then overspread so much of the continent are to be met with. In other instances, the mosses are at least as late as Roman times.[347] Change of climate and likewise of drainage may stop the formation of peat, so that shrubs and trees spring up on the firm surface. Along the Flemish coast a layer of peat containing mosses, rushes, and other fresh-water plants underlies four or five feet of clays and sands with marine shells, indicating a subsidence and re-elevation of the country.[348]

Peat-mosses cover many thousand square miles of Europe and North America.[349] About one-seventh of Ireland is covered with bogs, that of Allen alone comprising 238,500 acres, with an average depth of 25 feet. Where lakes are gradually converted into bogs, the marshy vegetation advances from the shores, and sometimes forms a matted treacherous green surface, beneath which the waters of the lake still lie. The decayed vegetable matter from the under part of this crust sinks to the bottom of the water, forming there a fine peaty mud, which slowly grows upward. Eventually, as the spongy covering spreads over the lake, a layer of brown muddy water may be left between the still growing vegetation above and the muddy deposit at the bottom. Heavy rains, by augmenting this intermediate watery layer, sometimes make the centre swell up until the matted skin of moss bursts, and a deluge of black mud pours into the surround-

---

[347] On mosses of Flanders and north of France see H. Debray, Bull. Soc. Geol. France, 3me, ser. ii. p. 46. Ann. Soc. Geol. Nord, 1870–74, p. 19. Lorié, Arch. Mus. Teyler, 2me, ser. iii. part 5, 1890, pp. 423, 439. Below the moors of Oldenburg, Roman coins, weapons and plank-roads are found at a depth of 13 feet and upward (Petermann's Mittheil. 1883, v.). On the Bohemian peat-bogs, F. Sitensky, Archiv Landesdurch-forsch. Böhmen, vi. 1891; on those lying east of the Christiania Fjord, G. E. Stangeland, "Torvmyrer," Norges Geolog. Undersög. 1892; on those of Schleswig-Holstein, R. v. Fischer-Benzon, Abh. Naturwiss. Ver. Hamburg, xi. 1891.

[348] Ann. Mines, 7me, ser. x. p. 468.

[349] For an account of the fresh-water morasses and swamps of the United States see Shaler, 10th Ann. Rep. U. S. Geol. Surv. 1890, p. 255.