

which the surface is covered with arctic mosses and other plants.<sup>341</sup>

3. Peat-mosses and Bogs.<sup>342</sup>—In temperate and arctic latitudes, marshy vegetation accumulates *in situ* to a depth of sometimes 40 or 50 feet, in what are termed bogs or peat-mosses. In northern Europe and America these vegetable deposits have been largely formed by mosses, especially species of *Sphagnum*, which, growing on hilltops, slopes, and valley-bottoms as a wet spongy fibrous mass, die in their lower parts and send out new fibres above. Some peaty deposits have been formed in lakes, either by the growth of aquatic plants on the bottom, or by the precipitation of decaying vegetation from the layer of matted plant-growth which creeps from shore along the surface of the water.<sup>343</sup> In some cases, peat may possibly have arisen in brackish-water conditions. There are even instances cited of marine peat formed of sea-weeds (*Zostera*, *Fucus*, etc.).<sup>344</sup> Among the Alps, as also in the northern parts of South

<sup>341</sup> See a pamphlet, "Ueber den Humus," by Dr. von Ollech, Berlin, Bodo Grundmann, 1890. It may be well to take note here again of the extensive accumulation of red loam in limestone regions which have long been exposed to atmospheric influences. To what extent vegetation may co-operate in the production of this loam has not been determined. Fuchs believes that the "terra rossa" is only present in dry climates where the amount of humus is small (ante, p. 596, and authorities there cited).

<sup>342</sup> For a general account see T. R. Jones, Proc. Geol. Assoc. vi. 1880, p. 207. On the composition, structure and history of peat-mosses, consult Rennie's "Essays on Peat-moss," Edinburgh, 1810; Steele's "Natural and Agricultural History of Peat-moss," Edinburgh, 1826; Templeton, Trans. Geol. Soc. v. p. 608; H. Schinz-Gessner, "Der Torf," etc., Zurich, 1857; Pokorny Verhand. Geol. Reichsanst. Vienna, 1860; Senft, "Humus-, Marsch-, Torf-, und Limonit-bildungen," Leipzig, 1862; G. Thenius, "Die Torfmoore Oesterreichs," Vienna, 1874; J. Geikie, Trans. Roy. Soc. Edin. xxiv. p. 363. For a list of plants that supply material for the formation of peat, see J. Macculloch's "Western Islands," vol. i.; T. R. Jones, above quoted; J. Früh, "Kritische beiträge zur Kenntniss des Torfes," Jahrb. Geol. Reichsanst. xxxv. 1885, p. 677; and Bull. Soc. Botan. Suisse, i. 1891.

<sup>343</sup> For accounts of matted vegetation covering lakes, see Land and Water, 1876, pp. 180, 282.

<sup>344</sup> J. Macculloch, "System of Geology," 1831, vol. ii. p. 341. Sirodot, Compt. Rend. lxxxvii. 1878, p. 267. Bobierre, Ann. Mines, 7me ser. x. 1876, p. 469.