Conversion of vegetable substance into coal.—Exposed to the atmosphere, dead vegetation is decomposed into humus, which goes to increase the soil. But sheltered from the atmosphere, exposed to the action of water, especially with an increase of temperature, and under some pressure, it is converted into lignite and coal. An example of this alteration has been observed in the Dorothea mine, Clausthal. Some of the timber in a long-disused level, filled with slate rubbish, and saturated with the mine-water from decomposing pyrites, was found to have a leathery consistence when wet, but, on exposure to the air, hardened to a firm and ordinary brown-coal, with the typical brown color and external fibrous structure, and having the internal fracture of a black glossy pitch-coal.[61] This change must have been produced within less than four centuries—the time since the levels were opened. According to Bischof's determinations the conversion of wood into coal may take place, 1st, by the separation of carbonic acid and carburetted hydrogen; 2d, by the separation of carbonic acid and the formation of water either from oxidation of hydrogen by meteoric oxygen or from the hydrogen and oxygen of the wood; 3d, by the separation of carbonic acid, carburetted hydrogen, and water.[62] The circumstances under which the vegetable matter now forming coal has been accumulated were favorable for this slow transmutation. The carbon-dioxide (choke-damp) of old coal-mines and the carburetted hydrogen (fire-damp, CH_4) given off in such large quantities

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statement of the literature of this subject will be found in a suggestive memoir by C. Doelter and R. Hoernes, Jahrb. Geol. Reichsanstalt, xxv. The dolomite mountains of the Eastern Alps have been well described by Mojsisovics. See account of Triassic system, postea, Book VI.

[61] Hirschwald, Z. Deutsch. Geol. Ges. xxv. p. 364.

[62] Bischof, "Chem. Geol." i. p. 274.