

this submerged land-surface, sand and silt containing estuarine shells have generally been deposited, whence we may infer that, in the submergence, the valleys first became estuaries, and then sea-bays. If now, in the course of ages, a series of such submerged forests should be formed one over the other, and if, finally, they should, by upheaval of the sea-bottom, be once more laid dry, so as to be capable of examination by boring, well-sinking, or otherwise, they would prove a former long-continued depression, with intervals of rest. These intervals would be marked by the buried forests, and the progress of depression by the strata of sand and mud lying between them. In short, the evidence would be strictly on a parallel with that furnished by a succession of raised beaches as to a former protracted intermittent elevation.

Along the coasts of Holland and the north of France, submerged beds of peat have been regarded as proofs of submergence during historic times. The amount of change varies considerably in different places, and here and there can hardly be appreciated. The sinking during the 350 years preceding 1850 is estimated to have amounted in the polders of Groningen to a mean annual rate of 8 millimetres.<sup>219</sup> In the north of France numerous examples of submerged forests have been observed. In 1846, in digging the harbor of St. Servan, near St. Malo, a Gaulish cemetery containing ornaments and coins, and resting on a still more ancient prehistoric cemetery, was met with at a level of 6 metres below the level of high tide, so that the submergence must have been at least to that extent.<sup>220</sup>

Coral-islands.—Evidence of widespread depression, over the area of the Pacific and Indian Oceans, has been adduced from the structure and growth of coral-reefs and islands. Mr. Darwin, many years ago, stated his belief that, as the reef-building corals do not live at depths of more than 20 to 30 fathoms, and yet their reefs rise out of deep water, the sites on which they have formed these structures must have subsided, the rate of subsidence being

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p. 447. *Geol. Mag.* vi. p. 76; vii. p. 64; iii. 2d ser. p. 491; vi. pp. 80, 251. Mr. D. Pidgeon has argued in favor of the submerged forest of Torbay having been formed without subsidence of the land. *Quart. Journ. Geol. Soc.* xli. (1885), p. 9. See also W. Shone, *op. cit.* xlviii (1892), p. 96.

<sup>219</sup> Lorie, *Archives du Musee Teyler*, ser. ii. vol. iii. Part 5 (1890), p. 421.

<sup>220</sup> Lorie, *ibid.* p. 438, and papers cited postea, p. 494. But see Suess, "*Antlitz der Erde*," ii. p. 547.