

but nearer the higher mass of the Chilean Andes they are found at 1000, and near Valparaiso at 1300 feet. That some of these ancient sea-margins belong to the human period was shown by Mr. Darwin's discovery of shells with bones of birds, ears of maize, plaited reeds and cotton thread, in one of the terraces opposite Callao at a height of 85 feet.²¹³ Raised beaches occur in New Zealand, and indicate a greater change of level in the southern than in the northern part of the country.²¹⁴ It should be observed that this increased rise of the terraces poleward occurs both in the northern and southern hemispheres, and is one of the chief facts insisted upon by those who would explain the terraces by displacements of the sea rather than of the land.

Human Records and Traditions.—In countries which have been long settled by a human population, it is sometimes possible to prove, or at least to render probable, the fact of recent change of level by reference to tradition, to local names, and to works of human construction. Piers and harbors, if now found to stand above the upper limit of high-water, furnish indeed indisputable evidence of a rise of land or fall of sea-level since their erection. Numerous proofs of a recent change of level in the coast of the Arctic Ocean from Spitzbergen eastward have been observed. The Finnish coast is reported to have risen 6 feet 4 inches in 127 years.²¹⁵ At Spitzbergen itself, besides its raised beaches, bearing witness to previous elevations, small islands which existed two hundred years ago are now joined to larger portions of land. At Novaja Zemlja, where six raised beaches were found by Nordenskiöld, the highest being 600 feet above sea-level,²¹⁶ there seems to have been a rising of the sea-bottom to the extent of 100 feet or more since the Dutch expedition of 1594. On the north coast of Siberia the island of Diomida, observed in 1760 by Chalaourof to the east of Cape Sviatoj, was found by Wrangel sixty years afterward to have been united to the mainland.²¹⁷ From marks made on the coast in the middle

²¹³ "Geological Observations," chap. x. See Geol. Mag. 1877, p. 28.

²¹⁴ Haast's "Geology of Canterbury," 1879, p. 366.

²¹⁵ Nature, xxvi. p. 231.

²¹⁶ Ibid. xv. p. 123.

²¹⁷ Grad, Bull. Soc. Geol. France, 3d ser. ii. p. 348. Traces of oscillations of level within historic times have been observed in the Netherlands, Flanders and Upper Italy. Bull. Soc. Geol. France, 2d ser. xix. p. 556; 3d ser. ii. pp. 46, 222; Ann. Soc. Geol. Nord. v. p. 218. For alleged changes of level in the estuary of the Garonne, see Artigues, Act. Soc. Linn. Bordeaux, xxxi. (1876), p. 287, and Delfortrie, ib. xxxii. p. 79.