

raised an important objection to the theory of Celsius by pointing out that if the changes were really due to the lowering of the ocean-surface, the diminution should, according to hydrostatic laws, take place quite uniformly, and this was apparently not the case. Playfair therefore attributed the changes to an elevation of the land in consequence of subterranean forces. Leopold von Buch also formed the opinion that the Swedish coasts were rising, but neither in his work in 1807, nor in Karl von Hoff's historical and critical reviews in 1834, was any explanation suggested as to the causes of the movements.

The Stockholm Academy appointed a Commission to inquire into all the evidences, and the reports in 1820 and 1821 entirely corroborated the scientific account of a general extension of large coastal tracts. The upraised mussel-beds near Uddewalla, on the west coast of Sweden, and the raised beaches with marine shells in Norway, had been cited by Buch, Brongniart, and Lyell as proofs of land elevation. Yet the chemist, Professor Jacob Berzelius, in 1835 adhered to the older view; he connected the changes along the coast with sinking of the sea-level in consequence of the cooling of the earth and contraction of the crust. In 1837, Professor Keilhau in Christiania collected all the observations that had been made on coast movement in Norway, and calculated from them that the land had risen 470 to 600 feet since the Diluvial epoch.

A French expedition was sent to Scandinavia and Lapland, and Dr. E. Robert, the geologist attached to it, was enabled to add to Keilhau's summary a number of supplementary observations in Finland and Lapland. It was thus proved that raised beaches and terraces extended throughout all the northern part of Scandinavia. Bravais, another member of the French expedition during a prolonged stay in Finland, followed the remains of former coast-lines between the Alten Fjord and Hammerfest, and in his papers published 1842-43 he described in the Alten Fjord two successive terraces which were not parallel with one another, but converged towards the coast and showed several variations of height at their different parts. This observation was declared by Naumann in his text-book to be incontestable proof that the coast had been elevated. Considerable doubt, however, was thrown upon Bravais's observations a few years later by Robert Chambers