

CHAPTER XIII.

NEWER PLIOCENE STRATA AND CAVERN DEPOSITS.

Chronological classification of Pleistocene formations, why difficult—Freshwater deposits in valley of Thames—In Norfolk cliffs—In Patagonia—Comparative longevity of species in the mammalia and testacea—Fluvio-marine crag of Norwich—Newer Pliocene strata of Sicily—Limestone of great thickness and elevation—Alternation of marine and volcanic formations—Proofs of slow accumulation—Great geographical changes in Sicily since the living fauna and flora began to exist—Osseous breccias and cavern deposits—Sicily—Kirkdale—Origin of stalactite—Australian cave-breccias—Geographical relationship of the provinces of living vertebrata and those of the fossil species of the Pliocene periods—Extinct struthious birds of New Zealand—Teeth of fossil quadrupeds.

HAVING in the last chapter treated of the boulder formation and its associated freshwater and marine strata as belonging chiefly to the close of the Newer Pliocene period, we may now proceed to other deposits of the same or nearly the same age. It should, however, be stated that it is difficult to draw the line of separation between these modern formations, especially when we are called upon to compare deposits of marine and freshwater origin, or these again with the ossiferous contents of caverns.

If as often as the carcasses of quadrupeds were buried in alluvium during floods, or mired in swamps, or imbedded in lacustrine strata, a stream of lava had descended and preserved the alluvial or freshwater deposits, as frequently happened in Auvergne (see above, p. 80), keeping them free from intermixture with strata subsequently formed, then indeed the task of arranging chronologically the whole series of mammaliferous formations might have been easy, even though many species were common to several successive groups. But when there have been oscillations in the levels of the land, accompanied by the widening and deepening of valleys at more than one period,—when the same surface has sometimes been submerged beneath the sea, after supporting forests and land quadrupeds, and then raised again, and subject during each change of level to sedimentary deposition and partial denudation,—and when the drifting of ice by marine currents or by rivers, during an epoch of intense cold, has for a season interfered with the ordinary mode of transport, or with the geographical range of species, we cannot hope speedily to extricate ourselves from the confusion in which the classification of these Pleistocene formations is involved.

At several points in the valley of the Thames, remnants of ancient fluvial deposits occur, which may differ considerably in age, although the imbedded land and freshwater shells in each are of recent species. At Brentford, for example, the bones of the Siberian Mammoth, or