Let us now take a brief survey of the beds of secondary sand and sandstone. The lowest or new red sandstone, appears to have been formed, in an epoch of volcanic action, over a large portion of the present European continent, which broke up the foundation of primary and transition rocks, and scattered their fragments over the bed of an ancient ocean. In many parts we observe a tendency to form beds of porphyry, but the process appears to have been often, more or less, interrupted by disturbing causes; and we observe porphyritic beds, with well defined crystals of felspar, alternating with sandstone of mechanical formation. We may further observe, that in this epoch of disturbance there were long intervals of repose, during which the beds of magnesian limestone and muschel-kalk, were deposited in certain situations.

The operation of mechanical causes is obvious in almost all sandstone rocks, and beds of conglomerate; and the experiments of Sir James Hall prove, that beds of loose sand, if permeated by steam from saline water, at a high temperature, may be agglutinated into sandstone. With respect to beds of clay, their formation, by sedimentary deposition, will not be doubted; but we are not certain that in some instances, the matter may not have been ejected by submarine mud volcanoes, containing the sulphur, iron, and saline matter, in which several of these beds abound.

One of the most interesting circumstances attending the secondary strata is, the convincing evidence they afford, that, at different periods of their formation, the earth had extensive tracts of dry land, either islands or continents; for, though the prevailing character of the secondary strata is that of marine beds, yet we find among them, beds containing, exclusively, fresh-water shells, and also terrestrial and marsh plants, and in almost all the secondary strata, (except chalk,) though the organic remains may be chiefly marine, we find remains of fresh-water animals, or terrestrial plants, which were probably brought by rivers from the land, and floated into the ancient ocean. We have, beside the above evidence, the regular coal strata, 3000 feet or more in thickness, abounding in terrestrial plants. We have, also, a great thickness of fresh-water strata in some part of the oolite formation, and again the Wealden strata, more than a thousand feet in thickness, appear to have been deposited in a fresh-water estuary or river, which would require a large continent of dry land for its formation. Now, it is remarkable, that, in all the above beds, we do not find a single bone of any large mammiferous land quadruped, nor even of the smallest species, except in the anomalous instance of Stonesfield.

To maintain that such bones not having been discovered, is no evidence that they may not exist, appears to me to be making a retrograde step in science. It is true, that "the bottom of the sea has not been dredged," to discover what species of animals have existed in former ages: the geologist, however, can have no need of