land, in a deposit at least as old as these shales; whereas the system in Scotland has hitherto failed to yield any trace of the vertebrata. But though not yet prepared to demonstrate that fishes swam in this corner of the ancient Scoto-Silurian ocean over the argillaceous shales, these must have been traversed by many a restless mollusc and crustacean, — the one-chambered bellerophon, and the many-chambered orthoceratites, — by Calymene, Cheirurus, and Phacops, with their nicely-adjusted armor of many joints, and by the massive Illænus, with its double buckler. With this upper formation of the Lower Silurian division, deposition in the earlier Palæozoic period seems to have ceased in this district. Farther to the south, however, on the shores of the Solway, the shales, in a somewhat altered form, pass into the lower beds of the Upper Silurian, and exhibit some of its characteristic fossils. And with these the Old Grauwacke record, as a record of life and death, abruptly closes in Scotland, and a chapter of purely physical revolution begins, — a chapter perplexed by passages of doubtful meaning, and by many different readings, but which tells, in every page, of widely-extended convulsion and upheaval, and of the operations of deeply-seated forces of a power incalculably great.

During the ages of either the Upper Silurian or the inferior Old Red Sandstone, the deposits of the Lower Grauwacke division in Scotland seem to have been the subject of enormous lateral pressure, which raised their strata into many folds and ridges over wide districts, and, as there is reason to believe, elevated them above the sea level. Sir Roderick Murchison reckoned in the neighborhood of Girvan from five to six axial lines in a section of less than eight miles; and on the east coast, in the instances made so famous by Sir James Hall, axial lines are, as I have already had occasion to state, still more numerous. Nay, the great difficulty which lies in the way of determining the true place of the older rocks of our southern