

In the northern part of the Lake District a great anticlinal fold takes place. The Skiddaw slates arch over and are succeeded by the base of the volcanic series above described. But before more than a small portion of that series has appeared, the whole Silurian area is overlapped unconformably by the Carboniferous Limestone. It is necessary to cross the broad plains of Cumberland and the south of Dumfriesshire before Silurian rocks are again met with. In this intervening tract, a synclinal fold must lie, for in the south of Scotland a broad tract of Upper Silurian strata is now known to form the greater part of the pastoral uplands which stretch from the Irish Sea to the North Sea. Its northern limit, where it rests conformably upon and passes down into the Caradoc group, extends from a little south of Port Patrick northeastward to near Dunbar. The strata throughout this region have been thrown into innumerable folds which are often reversed. The result of this disturbance has been to compress the rocks into highly inclined positions, and to keep the same group at the surface over a great breadth of ground, so that in spite of their steep angles of dip the strata are made to occupy as much space on the map as if they were almost flat. Here and there, where the anticlines are more pronounced and denudation has proceeded far enough, long boat-shaped inliers of Lower Silurian rocks have been laid bare underneath the upper series of formations. In this way the Llandeilo volcanic group can be traced by occasional exposures for some 90 miles to the northeastward from the Ayrshire coast where it is most largely developed. By far the larger part of the Uplands is formed of rocks which, from the researches of Prof. Lapworth among their graptolitic contents, are now known to be the general equivalents of the Llandovery group. Wenlock and Ludlow rocks occur on both sides of the Uplands. Toward the northeast the general lithological characters of the Upper Silurian are comparatively uniform—thick masses of graywacke and shale, with pebbly layers and well-marked bands of graptolitic black shale. This uniformity is accompanied by a corresponding monotony in the organic remains, which consist almost wholly of graptolites, confined for the most part to the zones of black shale, in which they are thickly crowded. But toward the southwest in Carrick (Ayrshire) there is a much greater diversity of sedimentation, thick masses of conglomerate, limestone and calcareous shale being conspicuous. In that district accordingly there is so marked a contrast in the abundance and variety of the