

are found in western England and Wales, where the strata claim a thickness exceeding 20,000 feet independently of ash-ejections. The Upper Llandovery and other Upper Silurian beds rest upon the upturned edges of the Lower Llandovery, Caradoc, or other inferior strata. "In one district, between the Longmynd and Wenlock Edge, the base of the Upper Silurian rocks is found within a few miles to pass from the Caradoc group across to the Lower Cambrian rocks." (Geikie, p. 672.)

Another remarkable region of disturbance is that of the northwest Highlands of Scotland, along the chain of mountains between Eriboll and Ullapool. For some distance east of this region, according to the investigations of Hicks, Lapworth, Peach, Horne, and others, the Silurian and Cambrian rocks, which overlie the Archæan, are much plicated, and the plications, on nearing it, become overthrust flexures, often flexure-faulted, with the thrust westward. Then commences over the wide region a series of nearly horizontal thrust-planes of great extent, along which the Archæan and overlying formations are thrust westward, in some places for ten miles.

Besides minor shovings, there are three maximum thrust-planes which overlap so as to carry the formations over one another, pile them to a great thickness, and produce a series of extensive unconformabilities between Archæan, Cambrian, and Lower Silurian terranes; and undisturbed Lower Silurian limestone is often the base of the pile, with Archæan rocks above. The thrust-planes look like planes of bedding, and were long so considered. Under the enormous amount of friction along the lower thrust-plane, the materials at the bottom of the moving mass were sometimes folded over and curved under it as well as abraded or crushed; and, in addition, through the aid of the heat generated, sheets of sericite schist were made along the plane out of the abraded feldspar, and layers of other foliated metamorphic rock out of other material,—the strike of the foliation being more or less parallel with that of the thrust-plane.

In some cases the softer pebbles of a Cambrian conglomerate (made of pebbles of quartz, gneiss, diorite, granite) are drawn out so as to form "thin lenticular bands of mica or hornblende schist flowing round the harder pebbles of quartz-rock"; and at one place Cambrian sandstones have been converted into schists containing mica, and quartzites merge into quartzose sericite schists. The fossiliferous Silurian limestones below the thrust-plane are not generally altered, but in some places have been rendered crystalline. (*Q. J. G. Soc.*, 1884, 1888, the latter giving full references to earlier writers on the subject.)

In northern Ireland, where the Lower Silurian and Cambrian beds have a thickness of more than 7000 feet, there are evidences of metamorphism in portions of the beds, while others still retain their fossils, and mark their Siluro-Cambrian age. The Upper Silurian beds above are undisturbed and unaltered. Geikie states that the crystalline schists of the Scottish Highlands are prolonged over northern Ireland to Galway Bay, which makes the disturbed region 400 miles long.