
Chapter 1 Physical features of the Silurian region of Scotland

The Southern Uplands form the southmost of the three transverse belts into which Scotland is divided in accordance with its topographical features and geological structure. Bounded on the south by the Solway Firth and the Cheviot Hills and on the north by the central lowlands, they stretch as a continuous band of high ground from the North Sea to the Irish Channel.

In the central and eastern districts, the scenery of these pastoral uplands is wonderfully uniform. It may be described as a succession of smooth undulating hills and bleak moorland, which are traversed by a series of deep and narrow valleys, and covered with grass, heath, or occasionally with peat. Indeed it is mainly in the glens draining the highest parts of the plateau that smooth slopes give place to precipitous crags. In the south-western districts, owing to the presence of large masses of granite, the scenery to some extent resembles that of the wilder parts of the Highlands. Rugged hills, crags, and rocky knolls strewn with boulders are the characteristic features of the areas between Criffel and Bengairn, between New Galloway and Cairnsmore of Fleet, and between Loch Dee and Loch Doon. For rugged grandeur, no region in the South of Scotland can compare with the lofty granite plateau which skirts the eastern slope of the Merrick Hills.

A glance at an orographical map of the Southern Uplands shows that the more elevated tracts, ranging from 1000 to 2000 feet in height, extend along the northern and central portions of the tableland, and that only in certain small areas do they exceed this elevation. In the far north-east lie the Lammermuir Hills, from 1500 to 1700 feet high, which, on the north, rise with a steep front from the fertile plain of East Lothian, and on the south, slope gently downwards into the Merse of Berwickshire. Westwards come the Moorfoot Hills with a greater elevation, forming a natural wall on the south-east margin of the Carboniferous basin of Midlothian. Further to the south-west, in the region between Peebles and Moffat, the characteristic features of a lofty tableland, trenched by deep and narrow valleys, are strikingly displayed. Here are to be found the largest relics of the ancient plateau, rising above 2000 feet; the area round Hartfell (2651 feet) and White Coomb (2695 feet) measuring eleven square miles, and that round Broad Law (2723 feet) six square miles. From this mass of high ground some of the larger streams radiate, the Tweed with some of its tributaries, the Annan, and the Moffat Water. In the upland region between the sources of the Clyde and the Nith, where many affluents of these rivers take their rise, the Lowther Hills are the most prominent group, the highest eminence being the Green Lowther (2403 feet).

West of Nithsdale, though there are marked traces of a highly denuded tableland, intersected by a branching system of valleys, the most prominent physical features are those associated with the granite masses and the altered Silurian sediments in contact with the granite. Of the hills formed by eruptive rocks, reference may be made to Criffel (1866 feet) rising with a steep slope from the shores of the Solway, to Cairnsmore of Fleet (2331 feet) near the Sands of Cree, to Cairnsmore of Carsphairn (2612 feet) near the head waters of the Ken. Still more conspicuous are the lofty parallel ridges of the Merrick and Kells Hills running in a north and south direction, on either side of the Loch Dee granite mass. They are composed of Silurian strata altered by the igneous protrusions, which, on the Merrick (2764 feet), form the highest ground in the South of Scotland.

From the slopes of the Merrick Hills and Cairnsmore of Fleet, westwards to the Portpatrick coast line, the ground falls below the level of 1000 feet save on the heights of Beneraird (1435 feet) at the head of Glen App and other localities. This broad expanse of rough moorland is dotted over with lochs and covered with peat-mosses, moraines, and other glacial deposits, interspersed with rocky hills and knolls.

Of the various watersheds in the Southern Uplands, the most important is that which separates the streams flowing southwards into the Solway from those draining north-westwards into the Firth of Clyde and eastwards into the German Ocean. It is noteworthy that, while this watershed crosses the uplands from the Cheviot Hills, along a highly sinuous line, by the sources of the Tweed and Clyde, yet on reaching the basin of the Nith it leaves the Silurian tableland and traverses for a short distance the Carboniferous lowlands near New Cumnock. From this point it curves round the head waters of the Nith and passes along the northern portion of the uplands by Loch Doon to Loch Ryan. It is obvious that this watershed must have been determined at a remote geological period when the Silurian uplands were partly or wholly

buried under younger Palaeozoic rocks.

Of the various river-systems included in the Southern Uplands, one of the largest — the Tweed with its numerous tributaries — flows eastwards into the German Ocean. Here, again, it is interesting to observe that one of its affluents, the Lyne Water, rises on the slopes of the Pentland Hills several miles to the north of the Silurian tableland, and after crossing the Old Red Sandstone plateau at West Linton, enters the uplands near Romanno bridge, and joins the Tweed west of Peebles. The streams draining into the Firth of Clyde are the Clyde, the Doon, the Girvan, and the Stinchar; while those flowing southwards into the Solway Firth include the Esk, the Annan, the Nith, the Dee, the Fleet, the Cree, and the Water of Luce. Many of the latter spring from the heights near the northern margin of the tableland and traverse nearly the whole breadth of the uplands in their southward course. The Nith presents one distinctive feature which is worthy of note, for it rises on the northern slope of the Silurian tableland and flows northwards on to the Carboniferous lowlands near New Cumnock; thence curving round towards the south, it winds its way across the uplands to the Solway.

The valley system just described is indeed a marvellous monument of denudation. It has been carved out of an extensive plateau of Silurian rocks which have been intensely folded and puckered; the drainage system being altogether independent of the curvature of the strata. In the sequel (page 78) it will be shown that, in part at least, it dates back to remote geological periods, for once and again the Silurian rocks have been buried under younger Palaeozoic deposits which have been almost wholly removed, save in the Eastern Lammermuirs, Lauderdale, Nithsdale, Annandale, and the basin of Loch Ryan.

Along the northern margin of the tableland, the Silurian strata are bounded by a powerful fault, traced nearly from sea to sea, which lets down the Old Red Sandstone and Carboniferous rocks of the central lowlands. In the south of Ayrshire, near the source of the Stinchar, this dislocation enters the uplands and descends the Water of Muck and Glen App to Loch Ryan, thence across the Corsewall promontory to the Irish Channel. On the south-east side of the uplands from the Merse of Berwickshire, southwards by the Vale of Teviot and Liddisdale to the shores of the Solway, the Silurian rocks are unconformably overlain by Old Red Sandstone and Carboniferous strata, which dip away from the denuded slopes of the old Palaeozoic land-surface.

In the following chapter we shall endeavour to show that since the days of Hutton and Hall various sections in the Southern Uplands have become classic ground to geologists from the evidence which they furnished in support of the Huttonian theory, and further, that, in the closing decades of the present century, these Silurian rocks have become widely known through the researches of Professor Lapworth, who, by the zonal distribution of the graptolites, supplied a clue to the unravelling of the complicated stratigraphy of the whole region. <ref>The area occupied by the Silurian strata of the Southern Uplands with the associated granite masses, now uncovered by later Palaeozoic rocks, has been estimated by Mr. F. Bosse, of the Geographical Institute, Edinburgh, to be 2584 square miles.</ref>