
Chapter 14 Scotland: Ordovician of the Midland Valley Terrane

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Introduction

The Midland Valley Terrane shares faunal similarities with the Laurentian Craton but is regarded as a separate Ordovician terrane lying outboard of it. It is composed of Precambrian metamorphic rocks (Bluck, 1984), now covered by Silurian and Upper Palaeozoic sedimentary rocks, and is bounded to the north-west and south-east by 'sub-terrane' of ophiolitic and other rocks that were accreted in Ordovician times (Bluck *et al.*, 1992). The Highland Border Sub-terrane to the north-west is discussed in Chapter 13, with the Grampian Terrane; here we are concerned with the Tyrone–Girvan Subterrane, to the south-east.

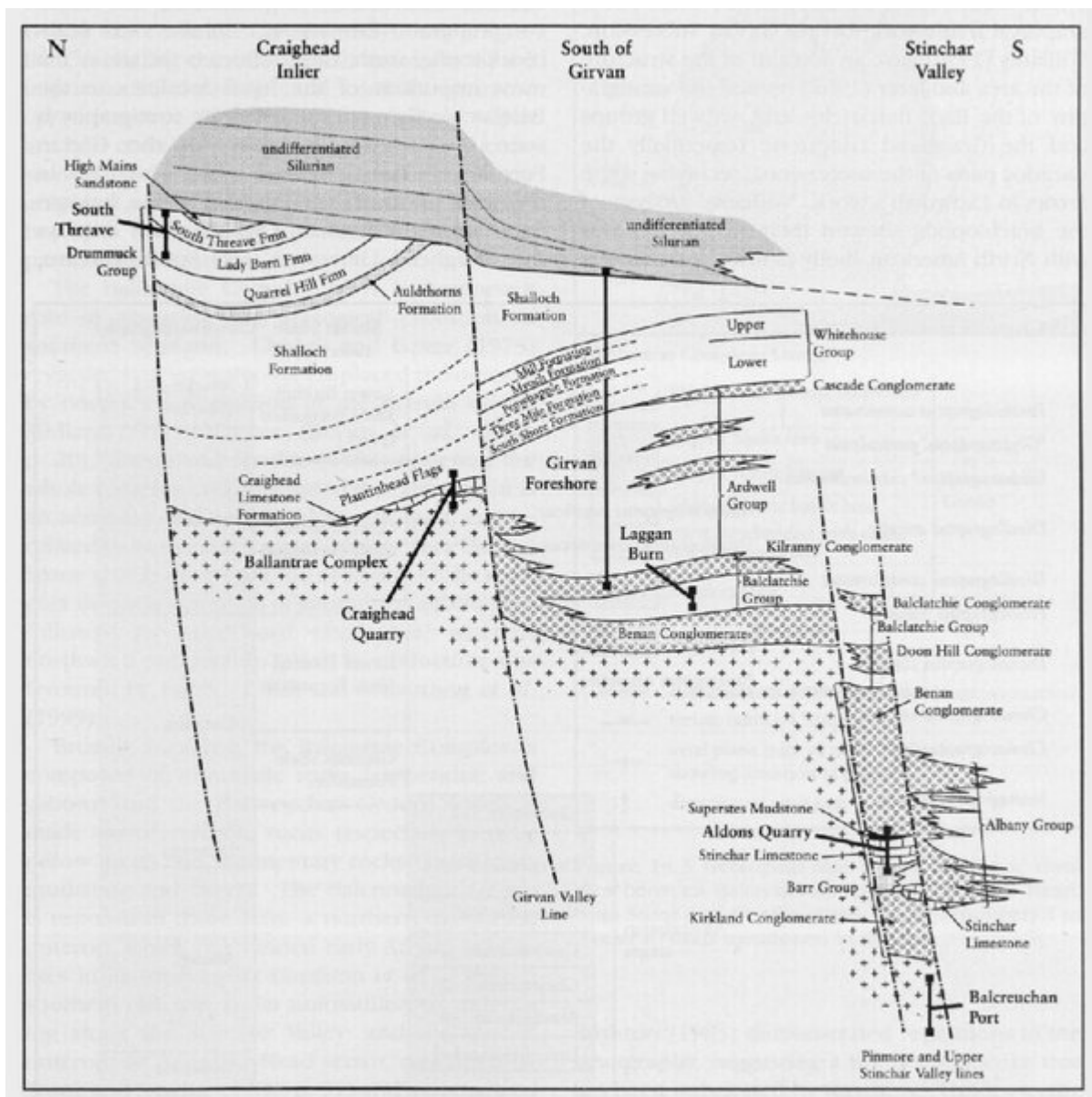
The Ballantrae Complex, which forms the basement of the Lower Palaeozoic sequence in the Girvan area, consists largely of ultramafic rocks, now serpentinite, with basalts and minor sedimentary rocks of Arenig age. While being obducted onto the south-east margin of the Midland Valley Terrane (Stone and Smellie, 1988) during Llanvirn times, this ophiolitic complex was imbricated by thrusting, as shown at the Balcreuchan Port–Bennane Head site (see site report).

Deposition of the famous Girvan cover sequence commenced soon after, in later Llanvirn times, probably in a proximal fore-arc setting (Bluck, 1985). Extensional faults with large downthrows in a south-east direction produced half-grabens. The Ordovician transgresses north-west across this faulted basement, with overstep and great changes of thickness and facies (Figure 14.1).

Lapworth (1882) established the main stratigraphical framework for the Girvan succession. Williams (1959) gave an account of the structure of the area and later (1962) revised the stratigraphy of the Barr, Balclatchie and Ardwell groups and the Craighead Limestone (essentially the Caradoc parts of the succession), rectifying some errors in Lapworth's work. Williams' analysis of the brachiopods showed their strong affinities with North American shelly faunas, and this was confirmed by Tripp's work on trilobites (summarized in Tripp, 1993). Ingham (1978) has extended the study of the stratigraphy northwards, through the Whitehouse Group and Shalloch Formation (upper Caradoc and Ashgill series), and Harper (1982a, b) reviewed the stratigraphy of the Drummuck Group (higher Ashgill Series). There are references to the extensive literature on the Girvan succession under the various site descriptions.

In the southern fault-block, Aldons Quarry displays a part of the Barr Group, notably the Stinchar Limestone, lying between two major conglomeratic formations. In the next fault-block to the north, Laggan Burn is the site of the most important of the fossil localities in the Balclatchie Group. The overlying stratigraphy is seen in the long section on the Girvan Foreshore. The Craighead Inlier, which lies in the block north of the Girvan Valley line, has two famous sites: Craighead Quarry, which displays the Craighead Limestone, and South Threave, where the Lady Burn Starfish Beds are preserved.

[References](#)



(Figure 14.1) Schematic cross-section in the Girvan area to show the stratigraphical and structural relationships across the major south-facing growth faults. The GCR sites are shown in bold type. After Ingham (1992b, fig. 30.5).