The Lewisian Geology of Gairloch, NW Scotland

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R. G. PARK

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Preface

For more than five decades, the Lewisian complex of NW Scotland has been a training ground for British geologists, particularly structural and metamorphic geologists, and a testbed for new models and methods of investigation of the deep crust. Successive generations of geochronological techniques were first used in deciphering the complex history of this region. Yet, despite its popularity with British geologists, and its world-wide reputation as the most intensively studied piece of Precambrian crust, there are no modern Geological Survey sheet memoirs for any part of the mainland Lewisian; the famous, and impressively detailed, NW Highlands memoir of 1907 still stands after nearly a century as the best descriptive account available covering all aspects of Lewisian geology of the mainland outcrops. In contrast, the Outer Hebrides Lewisian is well served by an excellent modern memoir, although the accompanying map, at a scale of 1 : 100 000, is insufficiently detailed to give a clear picture of the complexity of the more structurally interesting parts of that region.

This situation contrasts with the vast amount of published information about specific aspects of Lewisian geology – structural, metamorphic, igneous and geochronological studies, tectonic overviews, and so on. The combination of detailed, large-scale, geological map and accompanying descriptive memoir is a valuable basis for subsequent specialized studies, and the present memoir is an attempt to redress a deficiency by providing a large-scale coloured map (1 : 20 000) of one of the most critical and interesting parts of the Lewisian outcrop, sufficiently detailed to allow the relationships between the various rock types and the complex structures to be clearly displayed, together with a descriptive account covering the different aspects of the Lewisian geology.

The Gairloch area, together with neighbouring Loch Maree, is the only part of the mainland Lewisian outcrop where Palaeoproterozoic supracrustal rocks and their relationships to the Archaean basement can be studied. Partly for this reason, it has been the subject of a considerable amount of research, spanning a period of more than forty years; it is readily accessible and frequently visited. The Lewisian crust represents a relatively small detached fragment of the Laurentian continent, yet it occupies a key position in the reconstructed jigsaw of a supercontinent made up of Laurentia, Siberia and Baltica, which existed at the end of the early Proterozoic period. The significance of Gairloch in this reconstruction lies in the Palaeoproterozoic rocks of the Loch Maree Group, representing an amalgamation of oceanic, trench, and arc assemblages with continental basement, which help to integrate Scotland into a Palaeoproterozoic collisional orogen stretching from the Torngat belt of Labrador through South Greenland and linking up with the Lapland-Kola belt of Scandinavia.

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My research in the Gairloch area has spanned a period of over forty years, during this time many friends, colleagues and research students have helped me in a number of different ways. I am particularly indebted to Don Bowes at Glasgow University, who initially propelled me into the Lewisian and sustained me in the early years of my PhD work by his boundless enthusiasm, and John Tarney whose friendship and influence have been very important to me over many years, but especially, in prompting my rethink of the tectonic interpretation of the Loch Maree Group. The memoir itself has benefited from rigorous and helpful reviews by John Mendum, Clark Friend and Rob Strachan, and from the careful attention of the Book Editor, Bob Holdsworth. Any remaining deficiencies are solely my responsibility. Finally I would like to thank my wife who has accompanied me during much of my fieldwork in the last few years and who has borne my neglect during the writing up with equanimity.

R.G. Park, March, 2002.