

Price, Robert J. (1983): *Scotland's Environment during the Last 30,000 Years*, Edinburgh, Scottish Academic Press, xii + 224 p. maps, diagr., index, biblio., 41,50\$

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This book by Price is an attempt to synthesise the large volume of high quality quaternary research accomplished in Scotland over the last 20 years by geomorphologists, pedologists, palynologists, archaeologists and others. In this sense it updates Sissons' 1967 publication entitled *The Evolution of Scotland's Scenery*. It should perhaps be mentioned at the outset that Price's constant references to Sissons' recent work reveal that the latter remains one of the most active researchers on the Scottish quaternary scene.

Price's text is very systematically constructed to take the reader through the evolution of the Scottish environment prior to, during and since the late Devensian (Wisconsinian) glacial stage. In his introduction in Chapter 1, he gives credit to the old masters of Scottish glacial geology — Agassiz, the Geikie Brothers and Jamieson, and sets Scotland into the framework of overall late Quaternary climatic changes in the north eastern Atlantic region, as deduced mainly from information from deep sea cores. Chapter 2 depicts the Scottish environment prior to the development of the late Devensian ice sheet, putting emphasis on ^{14}C dates, pollen analysis and macro-fossil finds at a number of interesting buried soil and peat

localities and from a few high level raised beaches. Chapter 3 discusses the nature and the chronology of the growth and eventual wastage of the late Devensian ice sheet in Scotland. Chapter 4 describes the late glacial period between 14,000 and 10,000 BP — characterised by a warm late glacial interstadial phase and a subsequent return to the Loch Lomond glacial stade (the latter roughly contemporaneous with the well known younger Dryas tundra phase in pollen sequences). Chapter 5 covers the early post-glacial period from 10,000 to 5000 BP and puts an emphasis on the many detailed reconstructions of changes in relative sea levels associated with local glacio-isostatic uplift and with eustatic changes resulting from the melting of the Scandinavian and Laurentian ice sheets. Reconstruction of the forest cover of Scotland on the basis of palynological data is also discussed in this chapter. Chapter 6 then deals with natural and anthropic changes wrought to the Scottish landscape since 5000 BP, although in a somewhat summary manner. The book concludes in Chapter 7 with a useful summary of the main points raised in the previous chapters.

In each of the chapters of this book Price excites the readers' interest by referring to controversial questions. A few examples merit comment. In dealing with the Scottish environment prior to the late Devensian glaciation, Price discusses the possibility that re-interpretation may be needed for a number of sites showing buried organic layers previously attributed to the Ipswichian interglacial stage. The possibility that some of these buried organics may be attributable to a mid Devensian interstadial phase is very real. On the basis of the available ^{14}C dates Price is able to state that the late Devensian ice sheet developed rapidly, a little after 27,000 BP, to eventually overwhelm most, but perhaps not all, of Scotland. Price indicates that the evidence on glacial limits cannot yet conclusively prove ice cover in north eastern and northernmost Scotland, nor as yet definitive contact between the Scottish and the Scandinavian ice sheets. In this context, the cause of the divergence of ice sheet flow lines towards the north east, along the east coast of Scotland, previously attributed to impingement against the Scandinavian ice, remains a mystery. In discussing the subsequent Loch Lomond glacial stade Price does not in this reader's opinion justify (with ^{14}C evidence) his conclusive statement that all glacier ice had disappeared prior to the formation of the Loch Lomond glaciers. Also Price's explanation of the enigma of tiny glaciers in one of the most important massifs in the Highlands — the Cairngorm Mountains — in terms of increasing continentality towards the north

and east of Scotland requires further validation.

In discussing Holocene relative sea level changes Price describes the excellent detailed levelling and coring of ancient shorelines and deposits done by an army of Scottish researchers; particular mention being made of the key research carried out in the Forth, Tay and Solway estuaries. Such work has permitted detailed reconstructions of a major centre of glacial uplift in the western Highlands, of postglacial shoreline regression and the subsequent Flandrian transgression around the Scottish coast.

Finally, in the chapter on the last 5000 years BP, Price summarises the interesting work palynostratigraphy and sediment yield rates in lakes. This work sheds fresh light on the changes in the Holocene forest cover of Scotland, and particularly on the sequence of events, anthropic and natural, which have led to the dramatic deforestation of the country.

Aesthetically the book is attractively laid out, the prose style is very readable, and the text is well illustrated with numerous diagrams and plates. An excellent bibliography is furnished at the end of the text. I counted very few textual errors, all of a minor nature, except for one on page 25, which described planktonic foraminifera larger than 149 μm .

To summarise, this book by Price is an excellent statement on the recent progress made in *Scottish quaternary studies* and should readily find a place in the library of Quaternary researchers particularly those working on the correlation of *glacial events* and on *sea level changes* around the margins of the North Atlantic.

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