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## Chapter 9 Eastern Grampian Mountains

### Introduction

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The eastern Grampian Mountains are considered here as the highland areas to the east of the Tay–Tummel–Truim–Spey through valley (Figure 9.1). This valley separates the western mountain areas, characterized by intense glacial erosion, and the eastern mountain plateau country, where glacial erosion has produced only specific features superimposed on an easily recognizable pre-existing landscape. There are three principal mountain groups in this area, the Gaick Plateau, the Cairngorms and the south-east Grampians around Lochnagar. Each of these is characterized by high-level plateau surfaces, which are most impressively developed in the Cairngorms. These surfaces are widely acknowledged as having formed prior to glaciation (Fleet, 1938; Linton, 1949b, 1959; Sissons, 1967a; Sugden, 1968; Hall, 1983) and carry apparently relict pre-glacial features, such as tors (Linton, 1950a, 1955) and decomposed bedrock (Barrow *et al.*, 1913; Sugden, 1968; Hall and Mellor, 1988).

The presence of these apparent pre-glacial features has resulted in certain authors suggesting that parts of the Cairngorms may never have been glaciated, but such an idea was effectively refuted by Sugden (1968). However, the eastern mountains do demonstrate eloquently the selectivity of glacial erosion, for the plateaux are frequently flanked by spectacular glacial breaches, such as the Lairig Ghru and Glen Tilt, or are bitten into by corries as on Lochnagar and on the northern flanks of the Cairngorms. The form of the corries and glacially eroded rock walls has been studied by Haynes (1968), Sugden (1969) and Dale (1981), the last author demonstrating a lower frequency and amplitude of rock walls in the eastern Grampians than in the western mountain groups. The altitude of the corries and the base of rock walls is also higher in the eastern mountains than the west and this has been related to the precipitation distribution in Scotland (today and, by inference, in the past) by Linton (1959).

With the exception of the landforms of glacial erosion, which have developed during multiple periods of both local and ice-sheet glaciations, the Quaternary history of the eastern Grampians, as presently known, relates only to the Late Devensian and the Holocene. During the Late Devensian ice-sheet glaciation, the western part of the area was covered by ice emanating from the Rannoch Moor area, and erratics of Rannoch granite can be found on the flanks of the Gaick plateau (Barrow *et al.*, 1905, 1913) and into the Truim Valley (Barrow *et al.*, 1913). Ice from the west also carried schistose erratics on to the flanks of the Cairngorms to an altitude of up to c. 840 m OD (Hinzman and Anderson, 1915; Sugden, 1970). Within the principal mountain masses, however, external erratics occur only sporadically, and it is probable that local ice masses developed which were sufficiently powerful to exclude ice from western sources. Erratics from these local areas were carried to the north-east, east or south-east (Sutherland, 1984a).

Throughout most of the valleys of the region there are abundant glaciofluvial landforms and deposits, as in Glen More at the foot of the Cairngorms (Sugden, 1970; Young, 1974), at the mouth of Glen Feshie (Young, 1975a) and along the Dee Valley (Sugden and Clapperton, 1975) (see Muir of Dinnet, Chapter 7). These areas of ice-decay deposits are typically accompanied by sequences of meltwater channels on the adjacent slopes (Sugden, 1968; Young, 1974) and, in places, extensive outwash terraces as in Glen Feshie (Young, 1976; Robertson-Rintoul, 1986b).

The timing of ice-sheet wastage has not been established in detail, but the occurrence of a considerable number of enclosed basins that are known to contain lacustrine sediments deposited during the Lateglacial Interstadial has demonstrated that much of the area was deglaciated prior to 13,000 BP. Important among these sites are those of Loch Etteridge (Sissons and Walker, 1974) and Abernethy Forest (Vasari, 1977; Birks and Mathewes, 1978). The vegetational succession in the eastern Grampians during the Lateglacial Interstadial showed some differentiation between the valleys of the northern and central parts and those of the south-east. After an initial phase in both areas of pioneer grass- and sedge-dominated communities, in the central mountain area there developed a shrub tundra dominated by *Empetrum* with stands of birch and willow (Walker, 1975b; Birks and Mathewes, 1978). In the south-eastern valleys there was a grassland with juniper, dwarf birch and willow and, in more sheltered areas, tree birch (Walker, 1975b, 1977, 1984b;

Lowe and Walker, 1977). Higher-level sites, such as Morrone, reveal a sparser, less differentiated vegetation on the upper slopes with the development of moss heaths and grasslands (Huntley, 1976, 1981).

The Lateglacial Interstadial was terminated by a return to severe climatic conditions during the Loch Lomond Stadial. There was a recrudescence of glaciers in the high valleys and corries and the development of ice-caps on the Gaick Plateau and in the south-east Grampians between Glen Muick and Glen Clova (Figure 9.1) (Sissons, 1972a, 1974b, 1979f; Sissons and Grant, 1972). Although there has been discussion as to the exact extent of these glaciers (Sissons, 1973a; Sugden, 1973a, 1980), many of the landforms which they produced are clear, such as the end moraines in the corries of Lochnagar (Sissons and Grant, 1972; Clapperton, 1986) and the Cairngorms (Sissons, 1979f; Rapson, 1985).

It was probably during the stadial that the large-scale periglacial features that mantle many of the mountain tops received their final form. Most impressive of these features are the boulder sheets and lobes that occur on the granite of the Cairngorms and Lochnagar (King, 1972; Shaw, 1977). Additional periglacial features that formed at this time are the protalus ramparts and rock glaciers found in the Cairngorms (Sissons, 1979f; Ballantyne, 1984; Ballantyne and Kirkbride, 1986; Chattopadhyay, 1984). Enhanced fluvial activity associated with seasonal regimes was probably responsible for terrace development in areas such as Glen Feshie.

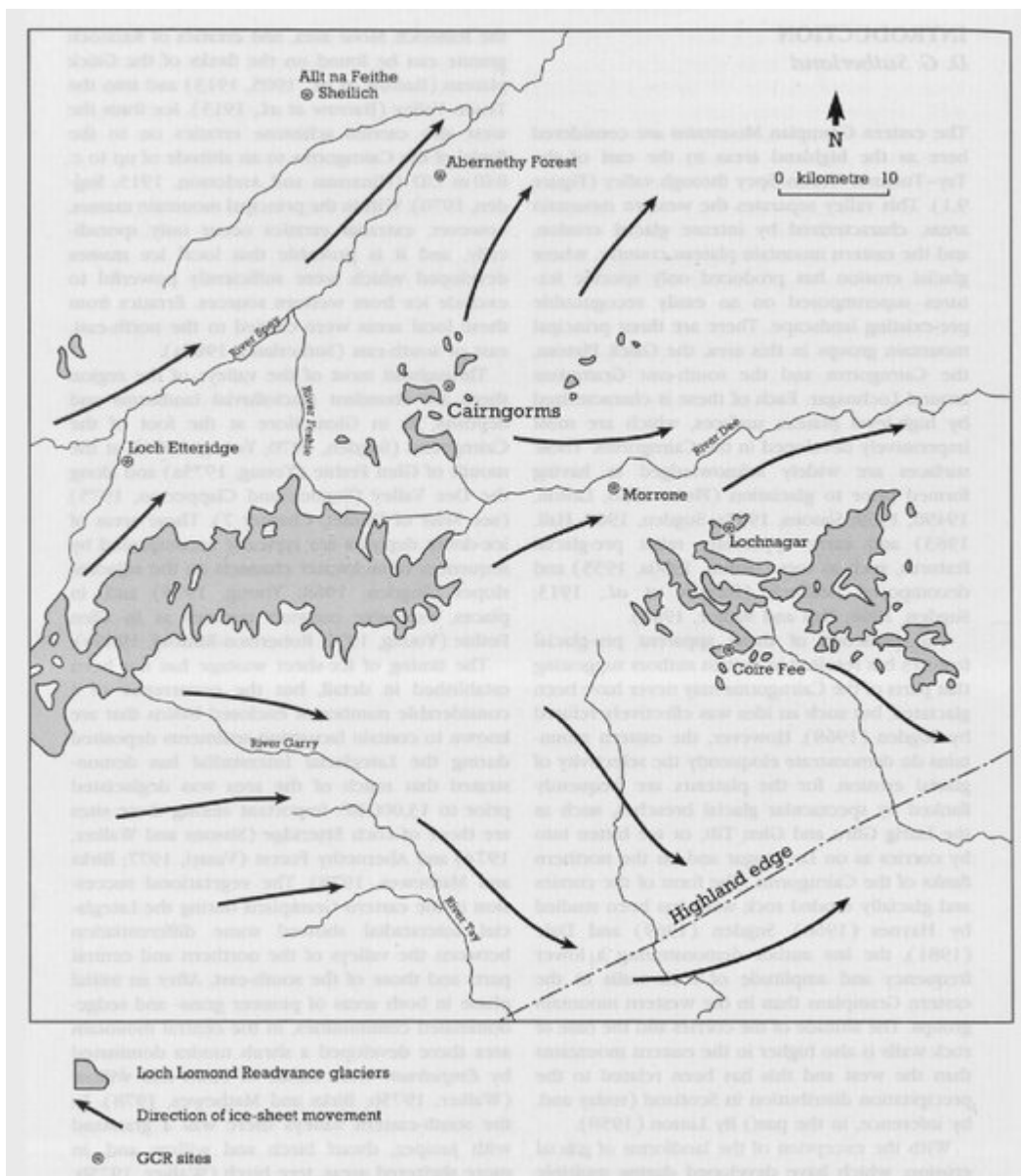
Vegetation at this time was dominated by open-habitat species and there were particularly high *Artemisia* pollen values in the sites investigated in Strathspey such as Abernethy Forest (Birks and Mathewes, 1978). These high values and their contrast with lower values in the valleys of the south-east Grampians (Walker, 1975b), have been interpreted as relating to variations in the snow-cover (Walker, 1975b; MacPherson, 1980), with Strathspey receiving very low precipitation during this period (Birks and Mathewes, 1978). Similar inferences have been made (Sissons and Sutherland, 1976; Sissons, 1980b) on the basis of variations in Loch Lomond Readvance equilibrium line altitudes throughout the region.

Following amelioration of the climate at the end of the Loch Lomond Stadial, the last glaciers melted and vegetation rapidly changed from open habitats through dwarf shrub and scrub communities (including a distinct phase of juniper dominance at around 10,000 BP or slightly later) to birch and hazel woodland in the valleys, with grass and heathland on the upper slopes by about 9,000 BP. Thereafter development of the woodlands again shows significant differences between the southern part of the region, where oak and elm dominated the forests in the valleys, and in the northern area, where pine became the principal tree species during the middle Holocene (see Allt na Feithe Sheilich, Abernethy Forest and the Cairngorms) (Birks, 1975; Birks, 1977).

One interesting aspect of vegetation development is the occurrence today of arctic–alpine species in certain of the mountains. Their presence raises the question of whether they have survived since the Lateglacial in certain favourable refuge habitats, or whether they died out in the early Holocene only to be reintroduced at a later date. The high-level pollen sites at both Coire Fee and Morrone provide direct evidence for the survival of these species throughout the Holocene.

Geomorphological activity has also continued during the Holocene, with small-scale periglacial features, such as turf-banked terraces and lobes, 'ploughing' boulders and patterned ground, forming at high altitudes (Chattopadhyay, 1986; Ballantyne, 1987a), and fluvial activity resulting in the formation of river terraces, debris cones and alluvial fans in the valley bottoms, as in Glen Feshie (Brazier, 1987; Robertson-Rintoul, 1986a, 1986b).

## [References](#)



(Figure 9.1) Location map of the eastern Grampian Mountains. The limits of the Loch Lomond Readvance glaciers are from Sissons (1972a, 1974b, 1979f) and Sissons and Grant (1972).