

# Non-metallic minerals, Geology and man, Northern Highlands of Scotland

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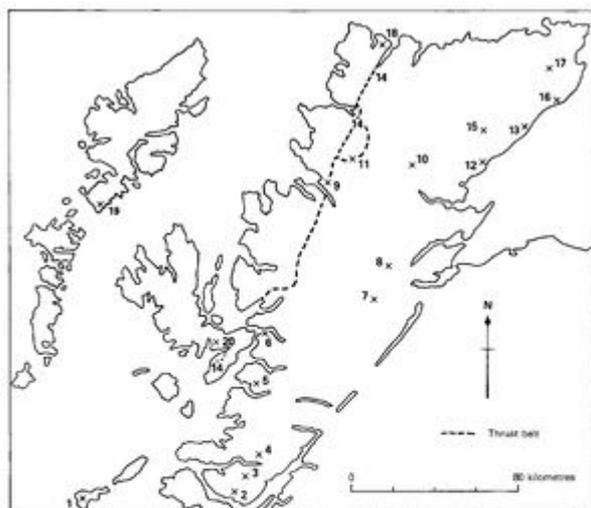
Johnstone, G S and Mykura, W. 1989. British regional geology: Northern Highlands of Scotland. Fourth edition. Keyworth, Nottingham: British Geological Survey.

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## Non-metallic minerals



**Pb/Zn:** Strontium 3 Lurg 7 Struy 17 Achanarras

**Fe/Ti:** Tiree 11 Borralan

**Mo-U-Au:** 10 Grudie (Mo) 13 Ousdale (U) 15 Strath of Kildonan (Au)

**K-feldspar:** 18 Ceannabeinne 14 Potassic shales (generalised along the thrust belt)

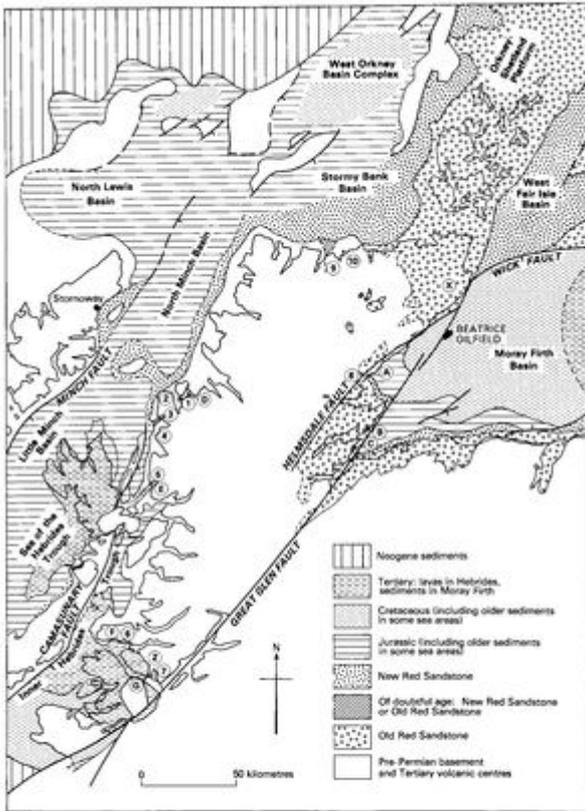
**Mica:** 5 Knoydart 8 Scarnell

**Others:** Glass sand 2 Loch Aline 12 Brora; Barytes 4 Strontium, 16 Ijyster;

Talc 6 Ardintoul; *Delonite tumescens* 9 Ullapool, 20 Torrin; Coal 12 Brora;

Apatite 11 Borralan; Anorthosite 19 Rodal; Brick clay 12 Brora

Main mineral localities in the Northern Highlands. P915506.



New Red Sandstone outliers: 1 Gruinard Bay-Isle of Ewe 2 Cama Mor, Rubha Reidh peninsula 3 Big Sand, Gairloch 4 Red Point 5 Applecross 6 Ardnamurchan 7 Morvern 8 Dunrobin, Golspie 9 Outliers around Tongue 10 Kirtomy Outliers  
 Jurassic outliers: A Golspie-Helmsdale B Balintore C Ethie D Gruinard Bay E Applecross F Ardnamurchan G Morvern  
 Cretaceous outliers: Z Loch Aline and Morvern Cretaceous erratic: X Leavad (Caitliness)

Mesozoic basins in the seas around Northern Scotland. P915496.

These can conveniently be considered in three categories, namely minerals which occur as concentrates or require concentration before use, those which can be used directly in bulk, and other non-metallic minerals. (P915506)

## Mineral concentrates

### Potassic shales

In the early 1960s it was discovered that certain parts of the Fucoïd Beds of the North-West Highlands (see p.44) are abnormally rich in potash. It was recognised that the potash would be a useful fertiliser if an economic way of extraction could be devised. Although beneficiation from the silicate mineral was difficult, a satisfactory method was worked out resulting in a concentrate of potassium salts with the additional by-product of cement clinker. Estimated costs of extraction and transport were, however, too high for the product to compete economically with potash from the Yorkshire evaporite field. The shales are not only potassic, however, but also dolomitic and locally contain a small percentage of phosphates. The crushed material is being used in bulk, without treatment, as a raw fertiliser.

### Ceramic feldspar

Granite pegmatites in South Harris (Northton and Roneval) were briefly worked during the last war

as a source of ceramic feldspar. Other pegmatites, notably those near Beinn Ceannabeinne (near Durness) have since been investigated for this purpose and many other potash-feldspar bearing pegmatites might also be considered. Alkali feldspar from the syenites of the Alkaline Suite (p.102), potentially a greater and more easily worked resource, has proved unsatisfactory because of the high proportion of iron-containing minerals present in these rocks.

## **Mica**

Coarse book-mica (muscovite) was specifically sought during the Second World War as material for electrical insulation purposes, and the micabearing pegmatites of the migmatite belt of the Northern Highlands proved of major interest. Two important, if small, mines were operated, one in Knoydart in Wester Ross and one at Scatwell near Strathpeffer. It is unlikely that the Scottish mica could compete with imported material under normal conditions.

More recently the rocks of the Loch Shiel Migmatite Complex were investigated to assess their potential as a source of flake or ground muscovite mica, obtainable by working bulk mica-schist within the complex. While the quantity of material available was considerable in places, various commercial specifications which existed at the time (purity, colour) could not be met. If, as is possible, those specifications should change, or if other uses should be found for the material, then large reserves would exist.

## **Barytes**

Barytes is a common gangue mineral in the lead-bearing veins which are found sporadically in the Northern Highlands. Only at Roy Geo, near Lybster in Caithness, has a vein (cutting Old Red Sandstone) been specifically worked for the mineral. Increase in demand for barytes as a constituent of heavy drilling muds in the North Sea oil industry has resulted in trial abstraction from the former lead-zinc vein workings at Strontian.

## **Apatite (calcium phosphate)**

This occurs in concentrations in the layered complex of Loch Borrallan (p.103) but trial bores in the drift-covered parts of the complex have not yet been encouraging enough to promote exploitation.

## **Bulk minerals**

### **Coal, oil shale and oil**

Coal and oil shale of Jurassic age are found in the Brora area of Sutherland, where the Brora Coal (p.150) was worked intermittently from 1598. This seam is on average 1 m thick. It has a high ash and sulphur content, but was used locally as a domestic fuel, in the local brickworks and as fuel in power stations. Although ample reserves still exist, production ceased in 1974. A thin bituminous shale underlying the coal contains subeconomic quantities of oil.

The nearest commercial offshore oil field to the Scottish Mainland, the Beatrice Field, lies 50 km east of Helmsdale ([P915496](#)). Its main reservoir rocks are of Middle Jurassic (Upper Callovian) age with lesser reservoirs in the Toarcian- Bajocian (Linsley and others, 1980). No oil or gas has been found in the onshore Jurassic rocks of Sutherland. *Limestone and dolomite*

The Durness Limestone (p.47) consists of interbanded beds of dolomite and calcite rock (limestone) but, although the overall quantity is great, the economic potential of any area depends on whether either dolomite or calcite-limestone exists in workable quantities without dilution by the other.

Several areas suitable for abstraction have been studied. At the present time the main workings are for dolomite for agricultural and general purposes near Ullapool, and for general purposes at Torrinn, in Skye.

### **Hard-rock aggregate, etc.**

Hard-rock for concrete and other aggregate is available within a short distance of any likely construction work almost anywhere in the Northern Highlands except, perhaps, in parts of Caithness. Limited demand, however, means that there are few large quarries, although the potential for coastal superquarries, whose product would be exported, is considerable. At the time of writing (1987) development work is being carried out on one such site in the Strontian granite, at Glensanda, close to the north-west shore of Loch Linnhe, facing the island of Lismore. Quartzite, some of high quality, is available if required from the extensive Cambrian outcrops in the north-west part of the region, and from Scaraben in Caithness.

### **Sand and gravel aggregate**

Sand and gravel suitable for concrete aggregate is found in many of the major valleys of the Northern Highlands, mainly in the form of fluvio-glacial outwash. Extensive deposits are found in the lower reaches of the major eastward-flowing valleys, but the material is less abundant in the westward-flowing valleys; it commonly occurs in terraces or deltas around the heads of the sea-lochs. A brief assessment of the extent, thickness and composition of the deposits is given in the following issues of the IGS Report Series: *The sand and gravel resources of the Strathclyde Region* (1977), and *The Sand and Gravel Resources of the Highland Region* (1978). These do not include assessments of the grade or the exact quantities available.

### **Glass-sand**

A soft, white sandstone of Cretaceous age (p.161) at Loch Aline, Morvern, has been worked for many years as a source of glass-sand. The deposit has extensive reserves and is extremely pure, containing >99.7% SiO<sub>2</sub> (Humphries, 1961). It has proved suitable for the manufacture of high-grade optical glass, but is at the present mainly worked as a glass sand for general purposes.

A soft white partly silicified Middle Jurassic Sandstone crops out in Clynelish Quarry, just west of Brora. It has been suggested that part of this deposit might be suitable for glass making.

## **Other non-metallic minerals**

### **Talc-rock**

*Talc rock* of high purity was mined from the Lewisian gneiss at Ardintoul, near Glenelg. *Shell sand* is available for local purposes from various westfacing stretches of coastal sand or 'machair', and also in the northern and north-eastern bays from Durness to Wick. *Brick clay* is found in the Middle Jurassic Brora Argillaceous Series at Brora. *Anorthosite*, used to make whiterock powder, has been quarried at Rodel, Harris. Peat is extensively developed throughout the Northern Highlands and many bogs especially in the northern part of the mainland and in the Outer Isles have immense reserves (Second Report of the Scottish Peat Committee, 1962). Detailed studies of the peat deposits have been made by the Macaulay Institute for Soil Research, Craigiebuckler, Aberdeen.

## **[Selected bibliography](#)**

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