Natural Environment Research Council

Institute of Geological Sciences

Mineral Reconnaissance Programme Report

A report prepared for the Department of Industry

D. Ostle
Programme Manager
Institute of Geological Sciences
Keyworth,
Nottingham NG12 5GG

No. 37

Compilation of stratabound mineralisation in the Scottish Caledonides

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Compilation of stratabound mineralisation in the Scottish Caledonides

G. S. Johnstone,BSc, MIMM, FRSE
M. J. Gallagher, PhD, MIMM

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3 Molybdenite mineralisation in Precambrian rocks near Lairg, Scotland

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35 Geophysical investigation of chromite-bearing ultrabasic rocks in the Baltasound–Hagdale area, Unst, Shetland Islands

36 An appraisal of the VLF ground resistivity technique as an aid to mineral exploration

37 Compilation of stratabound mineralisation in the Scottish Caledonides

The Institute of Geological Sciences was formed by the incorporation of the Geological Survey of Great Britain and the Geological Museum with Overseas Geological Surveys and is a constituent body of the Natural Environment Research Council

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INTRODUCTION

This report is a compilation of information on stratabound mineralisation in the Caledonian terrain of Scotland.

The location of the deposits and their host-rock lithologies are shown on the accompanying 1:1 million scale map. The deposits are classified according to their chemical composition and estimated size by the use of symbols.

The mineral deposit tables include aspects of host-rock lithology, metamorphic grade of the deposit, size and shape of the deposit and chemical data.

A bibliography is also included of work published on the stratabound mineralisation of the Scottish Caledonides.

The work forms part of the United Kingdom contribution to the International Geological Correlation Programme Project 60, "Correlation of Caledonian Stratabound Sulphides". This contribution commenced in 1974 and is presently centred on a programme of mineral reconnaissance being undertaken by the Institute of Geological Sciences for the Department of Industry. Since 1977 the topic of stratabound mineralisation has been formally established as one of the six main projects of the programme.

Similar compilations have been prepared or are in the process of assembly for other segments of the fragmented Caledonian - Appalachian orogenic belt in the following countries: Norway, Sweden, East Greenland, Ireland, Canada and USA.

Copies of the report can be obtained by writing to M. J. Gallagher at

Institute of Geological Sciences
Murchison House
West Mains Road
EDINBURGH
EH9 3LA
United Kingdom

GEOLOGICAL BASE OF THE MINERAL DEPOSIT MAP

The base for the 1:1 million scale mineral deposit map included in this report is Sheet 1 of the 1:625,000 scale Geological Map of Great Britain (Institute of Geological Sciences, 1979). The Map Sheet numbers listed in the Mineral Deposit Table are the 1:63,360/ 1:50,000 scale geological maps of the Institute of Geological Sciences.

A revised version of this map will form part of a UK map to be produced at a later date.

It is also intended that the UK map should be amalgamated with the Ireland map.

MINERAL DEPOSIT TABLES

Most of the deposits listed in the tables (nos. 1-7) occur in the Dalradian rocks of the Scottish Highlands. None are present producers but deposits 1 and 5 have significant economic potential. In the case of the Aberfeldy deposit (no.5) the main potential is for stratabound baryte although it also represents a significant occurrence of stratabound zinc and lead. Reference to the literature indexed in the tables to the accompanying bibliography will illustrate that the deposits all occur in the Dalradian (late Proterozoic to Cambro-Ordovician) metamorphic rocks of the Scottish Highlands. Low-grade base metal mineralisation is developed in a pyrite-rich horizon of the Middle Dalradian (no.6) and higher grade deposits are found (nos. 2, 3 and 4) in associated metasedimentary rocks. The Vidlin deposit (no.1) occurs in older Dalradian host-rocks including amphibolite believed to represent basic igneous rocks. Deposit no.5 (Aberfeldy) is notable for the presence of banded baryte-rocks as well as stratabound sphalerite and galena. The mineralisation occurs over a 7 km section of the strike of a Middle Dalradian formation characterised by graphitic schist which is therefore regarded as a key lithology for future exploration (see map).

The Penkiln mineralisation (no.7) is developed in Ordovician black shales of the Southern Uplands but further work will be required to determine the role of igneous activity in the formation of the deposit.

Explanatory notes to the tables follow :

(1) Past or present producer

P: past producer

-: non-producer.

(2) References

Numbers refer to the accompanying bibliography

(3) Mode of aggregation

M: massive

D: disseminated.

(4) Main Fe-sulphide (± oxide)

Py: pyrite

Po: pyrrhotine

Mt: magnetite

Where not underlined the sulphide occurs in subordinate amounts

(5) Analytical base

d: mean of a restricted number of samples

e: single or only a few analyses (hand specimens).

Mineral Deposit Table: United Kingdom (Scotland)
(1:1 million map)

No.	Name of Deposit	Map Sheet	Tectonic unit or position	Age	General host-rock lithology	Metamorphic grade	Shape	Size	Past or present producer	References
1	Vidlin	128	Allochthon	Late Precambrian	Amphibolite	Amphibolite facies	Lenses	50,000-1m	-	11
2	McPhun's Cairn	37	Allochthon (Tay Nappe)	Late Precambrian to early Cambrian	Calcareous mica-schist	Greenschist facies	Lens	<50,000	-	22
3	Meall Mor	28-29	Allochthon (Tay Nappe)	Late Precambrian to early Cambrian	Quartzite	Greenschist facies	Lens	<50,000	P	23
4	Coille Bhraghad	37	Allochthon (Tay Nappe)	Late Precambrian to early Cambrian	Calcareous phyllite	Greenschist facies	Lens	<50,000	P	6, 26
5	Aberfeldy	55	Allochthon (Tay Nappe)	Late Precambrian to early Cambrian	Graphitic schist	Amphibolite facies	Banded lenses:	>1m	-	3, 4, 8, 18, 24
6	Loch Tay	46-47	Allochthon (Tay Nappe)	Late Precambrian to early Cambrian	Calcareous mica-schist	Greenschist facies	Dissemin-ations	<50,000	-	20, 21
7	Penkiln Burn	8	Allochthon	Caradocian	Silicified black shale	Lower Greenschist facies locally hornfelsed	Dissemin-ations	<50,000	-	17

Mineral Deposit Table: United Kingdon (Scotland)
(1:1 million map)

No.	Name of Deposit	Mode of aggr. M/D	Main Fe-sulphide (+ oxide)	Grade in wt. % S	Cu	Zn	Pb	in ppm Au	Ag	Other element of spec.int.	Cu:Zn:Pb prop.	Analytical base	Comments
1	Vidlin	M/D	Po		0.72	0.55	0.03				56:42:2	d	
2	McPhun's Cairn	M	Py Po		0.04	7.5	2.1	0.75	6	0.07% As	0:78:22	e	
3	Meall Mor	D	Py		0.58	0.013	0.006		4		94:4:2	d	
4	Coille Bhraghad	D	Po Py							Ni			
5	Aberfeldy	D	Py Po Mt		0.008	1.19	0.44		c.4	Ba	0:73:27	d	Baryte-rock, quartz-celsian rock and barian muscovite schist common
6	Loch Tay	D	Py		0.012	0.021	0.002				[42:47:11]	d	
7	Penkiln	D	Py Po		0.03	0.06	0.15		c.4		14:33:53	d	

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COMPILATION OF STRATABOUND SULPHIDE DEPOSITS
IN
THE UNITED KINGDOM CALEDONIDES
U K IGCP/CCSS PROJECT Edinburgh, 1979

Similar maps at the scale of 1:1 million exist for the following countries, contact persons are indicated

Sweden (M B Stephens, Geological Survey of Sweden, Uppsala)
Norway (A Bjørlykke, Geological Survey of Norway, Trondheim)
Greenland (M Stendal, University of Copenhagen, Copenhagen)
Ireland (Geological Survey of Ireland, Dublin)
Canada (D F Sangster, Geological Survey of Canada, Ottawa)
U S A (J Gair, US Geological Survey, Reston)

MINERALISATION
COMPOSITION, SIZE

	<50 000	50 000 -1m.t.
Cu-dominant >70% Cu	⊙	
Cu-Zn < 15% Pb, < 70% Cu, < 70% Zn		◯
Zn-dominant >70% Zn	⊡	⊡
Pb-Zn < 15% Cu, < 70% Pb, < 70% Zn	▽	
Fe-sulphides only (ΣCu + Pb + Zn < S/40)	◇	

IDENTIFICATION NUMBER
The number beside each deposit refers to its position in the complementary mineral deposit tables

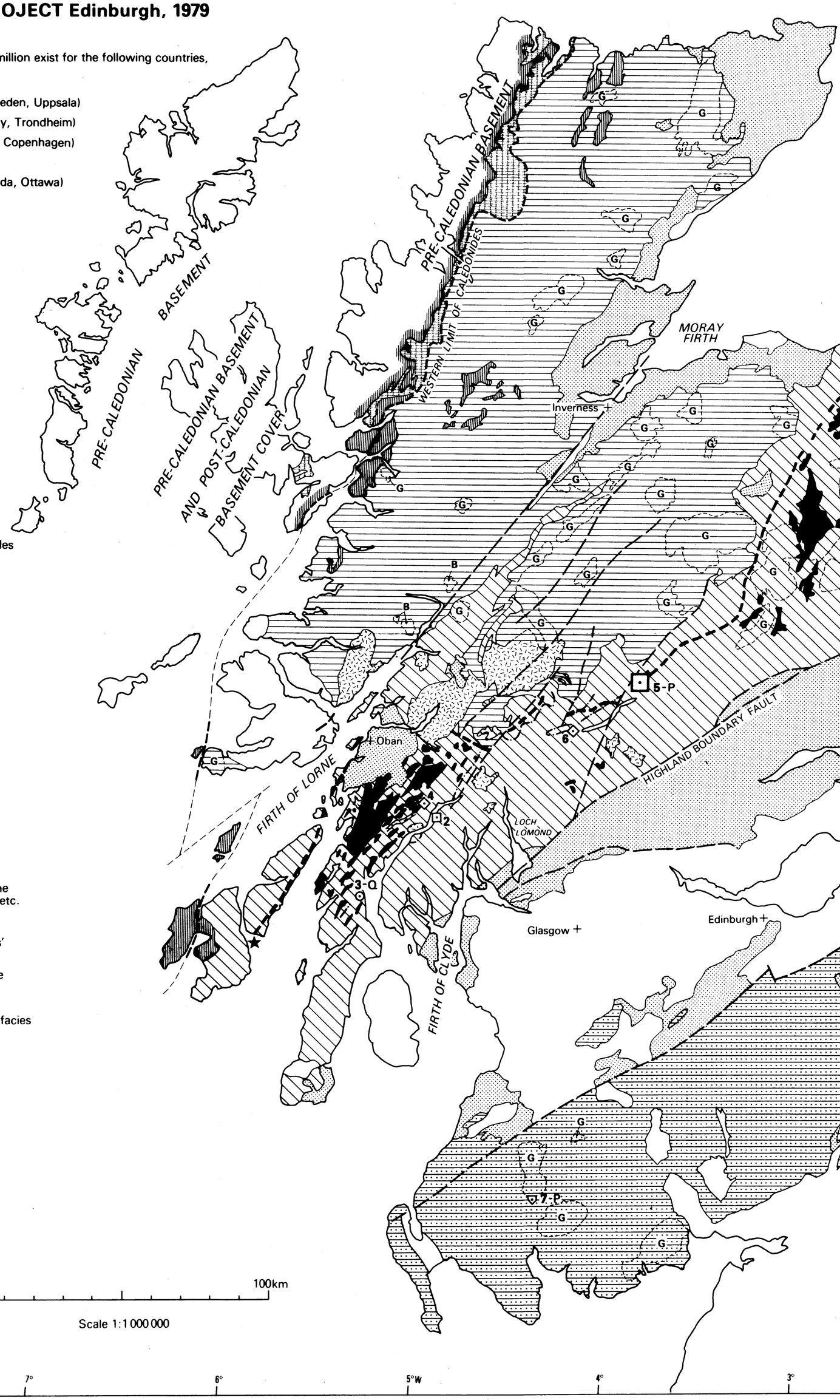
HOST ROCK
B = Basic (mafic) -dominated volcanite
Q = Quartzite
P = Graphitic schist, black shale
Deposits without a letter occur in undifferentiated metasediment (eg calcareous mica schist)

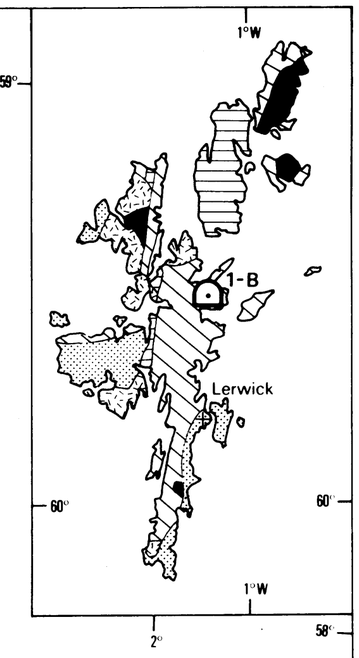
GEOLOGY

- Post-Caledonian rocks
- Devonian sediments and lavas
- Caledonian acid intrusive rocks
- Caledonian intrusives shown in outline (G) (B) — G ... Granites, etc. B ... Gabbros, etc.
- Caledonian 'epidiorites and ophiolites'
- Cambro-Ordovician carbonate-arenite on Pre-Caledonian Basement
- Ordovician-Silurian greywacke-shale facies within Caledonides
- 'Caledonian schists': Dalradian; Moine
- Pre-Caledonian Basement
- Moine Thrust
- Fault
- Pyrite horizon

KEY LITHOLOGY
★ Graphitic schist

0 100km
Scale 1:1 000 000





9° 8° 7° 6° 5°W 4° 3° 2°
57° N
56°
55