

SCOTLAND

NOTES ON SOME SCOTTISH
MINERAL LOCALITIES
visited in July 1957

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SCOT

BATHGATE DISTRICT, LINLITHGOWSHIRE.

13/7/57.

Quarry near Cairnpapple. Gallabraes Limest. qu., 989708

An old quarry 150 yds SSW of the Knock Hill, near Cairnpapple, off the west side of the road.

Brown, very fossiliferous limestone - several strata. In one place very vughiferous, with calcite and dolomite xls associated with a soft black hydrocarbon; also occasional specks of galena and chalcopyrite.

13/7/57.

Hilderstone Mine. → 990715

Two very small overgrown dumps 50 yds east off the road, SE of Cairnpapple. There are larger, barren dumps further east, derived from a large quarry. (Tartarven Limest. qu.)

On the dumps: baryte and calcite with galena. One or two pieces of rock have a slight deposit of erythrite. Very disappointing.

BREADALBANE? PERTHSHIRE.

15/7/57.

Creag Mhor.

North-east slopes of Creag Mhor, Glen Lochay. Garnetiferous schists in places. One large piece of massive white quartz with much rutile; long reddish-brown needles penetrating the quartz and associated with flakes of chlorite.

15/7/57.

Corrycharmaig.

A trial $\frac{3}{4}$ ml WSW of Corrycharmaig, north-east slopes of Creag Mhor, Glen Lochay. There is an east-west saddle or shallow corrie, with low crags on the north and south sides. The trial is at the western end of the north~~ward~~ bounding crag, i.e. facing south and easily missed when going up from Corrycharmaig.

A small cave has been blasted out, and a filled-in hole in front of it can be seen, together with a dump of blasted-out material. Massive chromite in patches and strings in a compact fine-grained dark-green rock. The chromite is shiny black, massive, feebly magnetic.

↓
really chromian magnetite,
contains 30% Cr_2O_3 (anal.
GR, 1959).

TYNDRUM, PERTSHIRE

The locality is adequately described in Spec. Rep. Min. Resources 17 (Geological Survey 1921), and references are made here to a map of the veins given there (Fig. 14).

19/7/57.

Beinn Odhar Level.

Exposed sloping metamorphic rocks with numerous veins of quartz, sometimes containing galena and blende. Extensive dumps on sloping ground: quartz with galena and light-brown blende; much iron-staining.

The level goes in about 20 ft, and there is what appears to be a filled-in shaft half way in.

20/7/57.

Crom Allt.

Several exposures of the vein in the stream: quartz with intergrown massive galena + brown blende + some chalcopryrite.

20/7/57.

Main Dumps.

Enormous dumps up the mountain-side. Below there are remains of mills and the slimes dumps. Rock is exposed, especially in the upper part, where two of the several levels are open. The uppermost level can be entered easily, continues straight for a long distance, and is roughly of this shape:



Much galena and light-brown blende everywhere on the dump; chalcopyrite less common, whilst alteration products other than iron-staining very scarce. The matrix is quartz, but there is some baryte and calcite on the lower part of the dump.

Two specimens carrying pitchblende were found on the lower part of the dump (just below what looks like new dumps of light-coloured small stuff). The pitchblende forms a black crust on dirty-coloured calcite, and is in part ~~botryoidal~~ botryoidal and in part "hacked", i.e. formed round ~~mineral~~ a platy mineral which has been almost entirely removed (probably calcite). It is clearly a late introduction into the vein. There are traces of an apparently fibrous yellow ~~mineral~~ non-fluorescent mineral on the surface of the pitchblende; this may be kasolite (see Proceedings Min.Soc. for November 1956).

ARROCHAR, ARGYLLSHIRE.

23/7/57.

The Cobbler.

Centre peak, The Cobbler, Arrochar, Argyllshire. Some of the patches of white massive quartz which are very abundant in the schists contain ilmenite. This mineral occurs in very irregular veinlets about $\frac{1}{2}$ - 2 mm thick, sometimes smoothly curved. It is steel-grey and non-magnetic, and seems to be associated with fairly coarse flaky chlorite.

Russel, Min. Mag. 24, 307 (1936).

Fluorite from Aberdeenshire and Banffshire.

(1) Fluorite is rare in Scotland, except from 66aigmuschat quarry, Gourock, Renfrewshire.

(2) Abergairn lead mine, Glen Gairn, Ballater, Aberdeenshire;
= Corrybeg mine of Heddle.

About 1 ml NW of Ballater, opened 1820 to 1830. A.R. got specimens from old dump and from blocks built into a wall.

The vein consists of:

quartz, + pale green steatitic stuff, + schist with pyrite
schieferspar;

bluish-grey-green to purplish blue fluor + small xls
of galena and yellow blende;

very thin ~~layer~~ band of deep violet fluor;

ivory-coloured xline granular orthoclase;

calcite into which slender prisms of orthoclase project.

The bluish-grey-green to greyish-blue fluor exhibits brilliant phosphorescence on heating, first green, then sky-blue, finally violet; the amber-yellow fluor is non-phosphorescent; none is fluorescent.

Pyromorphite & erythrite found in traces. The dolomite recorded in Heddle is probably orthoclase.

(3) Creag an t-Seabhaig, north side of the Pass of Ballater.

Fluor recorded by Robert Jameson in 1804. = Ballater House of Greg and Lettsom, and "near Monaltrie House and the Pass of Ballater" of Heddle.

Specimens got from very large blocks fallen from a large vein high up on the cliff-like granite face of Creag an t-Seabhaig overlooking the road on the north side of the Pass. Exact position of the vein could not be determined

Crystalline, comby quartz + fluor + included bits of granite. Small spots of galena rarely in fluor. Fluor is banded, with xls in vughs. Remarkably brilliant and persistent phospho-

rescence on heating; fluorescence exceedingly feeble.

- (4) In the wood about 1600 yds a little east of north of Creag an t-Seabhaig, a trail on small galena/fluor-bearing vein. Probably Jameson's actual locality; "Old Lead Mine" on 6-inch map.
- (5) Tomnakiest upper granite quarry, Cambus O'May, Ballater. Fluor rarely as thin, finely crystalline deep greyish-lavender crust ~~on~~ minute pale yellowish cubes on joint-faces of pink granite.
- (6) Neil's granite quarry, Rinabaich, Ballater. Vertical joint-faces of fine-grained pink granite are sometimes thickly encrusted with 2-mm dark purple-drab cubes of fluor.

The following are localities given in Heddle:

- (7) Coilacrieach, Ballater. Violet fluor in bed of yellow metamorphic limestone above this place. A.R. found none.
- (8) Crathie limestone quarry, Creag a Chamhain, Crathie, Aberdeenshire. Fluor rarely as violet xline patches, + garnet and wollastonite. Heddle's specimen in Edinburgh museum. A.R. found none; the quarry has been abandoned for many years.
- (9) Muir limestone quarry,
- (10) Midstrath limestone quarry, Aboyne, Aberdeenshire. Similar occurrences. A.R. found none; both quarries abandoned, the first very overgrown, the second full of water.

- (11) Na tri Chaochain, river Avon between Tomintoul and Inchrory, Banffshire. Fluor first recorded by Prof. James Nicol in 1855. Stream, $5\frac{1}{2}$ mls south of Tomintoul on the Inchrory road, about 400 yds from the west bank of Avon. Photograph of the locality is shown.

Large masses of unique fluor/ quartz/ schist breccia; dark coloured octahedra; and other forms.

Heddle mentions pale green cubes, 10-inch side !

Non-fluorescent; phosphoresce on heating.

- (12) Maisley limestone quarry, Keith, Banffshire.

Fluor known here before 1858, purple octahedra + stibnite in grey limestone. A specimen of massive foliated stibnite is in the Edinburgh museum.

Very overgrown; A.R. found no trace of stibnite or fluor.

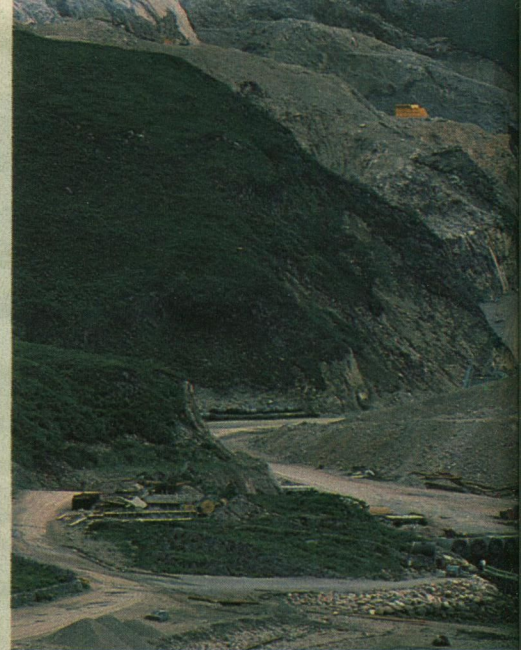
VANISHING SCOTLAND

The deep, scarring drainage furrows across the barren landscape of the Isle of Mull signal the arrival of yet another unnecessary conifer plantation: the Englishman's favourite tax avoidance scheme has truly taken root in Scotland. Elsewhere north of the border mineral mines and quarries blight areas of outstanding natural beauty and barely a voice is raised in protest. Geoffrey Lean reports on the despoiling of the North. Photographs by Alain Le Garsmeur





Dying trees in unsuitable terrain in the Flow Country; some 50,000 acres are afforested.



The Glensanda superquarry by Loch Linnhe;



Damage from skiing in the Cairngorms. Companies are hoping to extend the sports areas. Hill tracks, like this one in Argyllshire, can cau



The further north you go in this strange elongated island of ours, the grander the landscape becomes – and the less determined the people are to preserve it. Threaten to erect a single housing estate in the unspectacular Home Counties and all hell breaks loose. A minister has only to hint that national planning controls may be relaxed and he precipitates a major political crisis, as last month's parliamentary uproar, sparked off by *Observer* disclosures, showed. The stoutest knights of the shires go weak at the knees at the thought of their greener constituents handing over well-cushioned seats to the Alliance, and ministers who forget this rapidly find themselves on the carpet at Number 10.

Go up to the Peak District or the 24 Yorkshire Dales and already the

picture is changing. Here, conservationists struggle, with mixed success, to stop ugly quarries scarring the beautiful hills. Travel across the border to Scotland and the physical, political and psychological landscape changes further. And by the time you get to the Highlands and Islands it has been transformed beyond all recognition.

Tens of thousands of acres of unique landscape and wildlife habitat in Caithness and Sutherland are being planted with dull conifer forests to help a handful of rich English avoid income tax. Near Oban, part of an entire mountain is being blasted away and shipped to Texas, the first of a series of superquarries planned for the Scottish coast. And vital wildlife sites from Islay to the Cairngorms are at risk from threats as diverse as

skiing and whisky-making. Yet only a few protests have been raised, and even then they have rarely reached Westminster ears.

This really is a mirror image of the South-East. While Green Belt politicians are anxious to appear more concerned with conservation than their opponents, Highland representatives find that it often pays to withstand environmental pressures. And the pressures are much weaker anyway. London may be full of competing environmental groups jostling for newspaper column inches, lobbying MPs and sending delegations up the leisurely lifts of the Department of the Environment's ghastly tower block. In Scotland they are few and far between – and visiting ones get a rough reception. Eighteen months ago David Bellamy and

Jonathon Porritt – the rough and the smooth of TV environmentalism – were chased off the island of Islay for daring to suggest that local whisky-makers could produce just as delicious malts without tearing up the wintering ground of endangered wild geese. Two years before, Sir Laurens van der Post – personal guru to both Mrs Thatcher and Prince Charles – had held a Wilderness Congress in Inverness, provoking much local resentment.

Now a new, unlikely, campaigner has ventured on to the scene – Neil Jamieson, a middle-aged expatriate Scot and PR consultant from the fringes of Covent Garden, who founded his Scottish Scenic Trust two years ago. No one could be further from the archetypal Greenie. He wears a pinstripe suit, and one



owners are trying to 'minimise visual impact'.



The now defunct Howard Doris oil-platform yard on Loch Kishorn, a National Scenic Area.



serious erosion as well as scarring the landscape.



The works and lagoons of the Strontian mine blight a mountainside near Loch Sunart.

suspects that should a stray hair untidily sprout on his bald head it would be uprooted like a daisy from a bowling green. He has a way of calling his countrymen 'the locals', much as district commissioners once referred to 'the natives', that can't go down too well in Pitlochry, and can work up as much indignation over the trivial as the disgraceful, over a single badly-sited cottage as over a huge industrial scar on the landscape. Yet he has begun to succeed in raising the profile of Scottish environmentalism – not least in Edinburgh and Whitehall.

It is a job that needs doing. Bodies like the World Wildlife Fund, which has long tussled with the Scottish question, are backing him; apart from anything else, the WWF gave him a grant to hire a helicopter so that the pictures on these pages could be

taken. As Dr Chris Tydeman says from the WWF's offices in garden-bound Godalming: 'The wildness of Scotland is being nibbled away, but there is still time to save it. Down here it is too late for 95 per cent of the countryside.'

The greatest single threat to the Scottish landscape comes from trees – not honest-to-goodness native Scots pines, but vast plantations of monotonous imported sitka spruce that march across the landscape in tight formation like an invading army of green bottle-brushes. Tens of thousands of acres are planted each year. The official rationale dates from the First World War, when Britain found itself strategically short of wood. The Forestry Commission was founded in 1919 to make sure that it never happened again, but nobody

now pretends that the spruce submerging Scotland are vital for trench-props come World War III. The forestry industry attempts to justify its activities by talking of reducing the import bill for timber, but the real driving force behind the trees is the taxman.

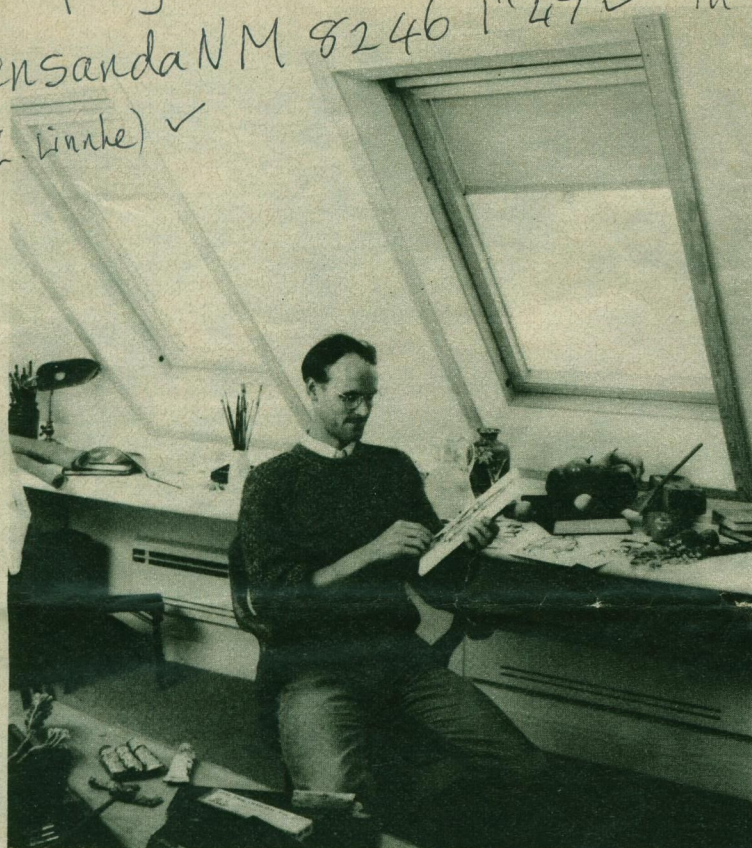
Pop stars, sportsmen, businessmen and television personalities take advantage of huge tax concessions given by the Government for afforestation. Specialised companies help them do it. One such, Fountain Forestry, has planted some 20,000 acres of the Flow Country in Caithness and Sutherland, the breeding ground of 70 per cent of Britain's rare greenshanks, and plans to afforest about 13,000 acres more. The practice, condemned last year by Parliament's National Audit Office,

continues apace. It provides some employment, yet the real, wealthy, beneficiaries are rarely Scottish.

Opencast mining does more spectacular damage but over much more limited areas. The mine belonging to Strontian Minerals Ltd at Loch Sunart on the west coast and Dresser Industries' mine at Aberfeldy, 60 miles due east, are licensed to produce 30,000 tonnes of barytes a year apiece. But perhaps the most dramatic sight of all is the giant Glensanda mine on the shores of Loch Linnhe, destined to be one of the largest quarries in the world. A whole 1,500ft mountainside of pink granite, stretching half a mile inland, will be excavated and shipped overseas in giant bulk carriers, each over 500ft long. Seven loads have already departed, five to Texas, one to 137

Aberfeldy NN 85 48 1" 48 ✓
 Lensanda NM 82 46 1" 47 ✓
 (L. Linke) ✓

3 part of
 in same gran at Strontian (W part)



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The Aberfeldy mine in the Perthshire mountains, owned by a US company, Dresser, exploits a 'world-class' deposit of barytes

the Bahamas and one to Hamburg. Eventually seven million tonnes a year will be excavated and, says Foster Yeoman, the mining company, four-fifths of it will be shipped to South-East England; whether the South-East is any less foreign to Highlanders than Texas is another question.

Visiting Glensanda can be difficult; it is miles from the nearest road. When the helicopter carrying photographer Alain Le Garsmeur landed, two security men scampered up the hill to find out what he was doing. Later, the owner, John Yeomans (who has since died), complained with mock seriousness to the *Glasgow Herald*: 'I felt a bit like Princess Diana in a bathing suit,' and then added that if he could have borrowed a rifle, 'I'd have parted his hair for him.'

The quarry is being worked to minimise the inevitable environmental damage; the stone is dropped down inside the mountain through a shaft and carried along on a mile-long underground conveyor to the processing plant. 'We have had to meet very strict environmental requirements, quite properly, because of the location's natural beauty,' says the company.

In the Cairngorms, one of the most important wildlife areas in Europe, it is skiers who are doing the damage, destroying vegetation as they slide over the snow and causing erosion. Years ago environmentalists won a victory by preventing an extension of the skiing area into the Northern Corries, now a Site of Special Scientific Interest, but planning permission has now been granted to allow the erection of snow fences there and environmentalists fear that this will prove to be the start of greater development.

And on Islay, the fate of Duich Moss, the home of about 1,000 rare Greenland white-fronted geese protected by an EEC directive, is still un-

certain. Scottish Malt Distillers Ltd were given permission by George Younger, then Scottish Secretary, to drain the bog for peat to add the distinctive taste to their Islay whisky - but the EEC threatened to take the Government to the European Court in Luxembourg.

Neil Jamieson says, with some justification, 'Scotland's scenery and wildlife are being damaged on a scale and in ways that would be impossible today in England and most other advanced nations.' But then the Scots, with an equal degree of justification, do not see themselves as other nations. The Provost of Inverness, Alan Sellar, greeted Sir Laurens van der Post's Wilderness Congress in 1983 with the terse words: 'We do not see Scotland as a wilderness but as an undeveloped country.'

Tacitus quotes the Pictish chieftain Clacagus, the first Highlander ever recorded in literature, on the Roman armies: 'They make a desert and they call it peace.' Many native Scots suspect modern conservationists of similar intentions. It is not surprising. The Highlands are sparsely populated, partly because of their bitter history; people have left either because the land could not sustain them, or because they were forcibly cleared out to make way for sheep or grouse, or to destroy the clan system. In 1801, 20 per cent of Scotland's inhabitants lived in the Highlands; now only 5 per cent do. They want development that will keep people in the hills and glens, and even attract a few back.

Most conservationists, including Neil Jamieson, would agree. But he points out that forestry and mining employ relatively few people compared to tourism, which provides 100,000 jobs in Scotland. And this, he says, depends on the scenery. Which is more than can be said for Godalming. ☐

2

SCOTLAND

Expedition of 3-18 July
1964

G.Ryback and G.Saville

- (1) Coatesgate roadstone quarry (NT/064053; 1" 68), near Moffat, Dumfriess-shire. (working)

Lower part does not appear to have been worked since visit of Sept. 1962, and the dump which then had good garnet has been largely removed. Everything is covered with a layer of grey dust. Only traces of garnet and platy haematite remain. Some calcite (2 in. cleavages).

Upper part more or less barren; extended since visit of Sept. 1962. Much green epidote "staining", and a little microcrystalline epidote with minute garnets.

- (2) Long Cleuch mine dumps (NT/921170; 1" 68), Leadhills, Lanarks.

A line of dumps on west side of Long Cleuch, near the road. Two overgrown; one with quartz, traces of chalcopryrite and malachite. A dump further NW, above the viaduct and near the stream bed, has plenty of dark-brown gozzan with chalcopryrite altering into "copper pitch", radiating acicular malachite, and blue chrysocolla; also quartz and calcite.

- (3) Wanlockhead mine (NT/864135; 1" 68; 6" Dumfries 7NW), Wanlockhead, Dumfriess-shire.

The mine is closed, plant and headgear dismantled, and shaft securely covered over (there is a subsidence a few yards away).

On the old dumps ("oxidised dump", loc.45), good botryoidal hemimorphite; traces linarite; green Cu secondaries; and pyromorphite. Several good specimens of pale-green waxy botryoidal crusts of "abnormal pyromorphite" (e.g. I/R. S.78, v_{max} 1060, 982, 937).

On the new dumps (loc.18), still plenty of good quartz; calcite; dolomite; and massive blende and chalcopryrite.

- (4) Whyte's Cleuch (NT/870138 - 873141; 1" 68; 6" Dumfries 7NW), Wanlockhead, Dumfriess-shire.

Loc.35: as in 1955 and 1956. One specimen of "abnormal pyromorphite" (I/R. S.79, v_{max} 1070, 990, 935), pale green waxy botryoidal crust. One specimen of pale blue soft massive chrysocolla (I/R. S.80).

Locs.21 and 22: as in 1955-56.

Loc.60. [new loc.no.], a dump on Wilson's vein at head of ~~Wanlockhead~~ Whyte's Cleuch. Much quartz; calcite; haematite; galena; pyromorphite; some Cu secondaries.

Loc.61. [new loc.no.], a dump on Crawford's vein, above loc.60. Quartz, calcite, some haematite, some Cu secondaries, galena, a little cerussite.

Loc.62. [new loc.no.], the lowest two dumps of Belton Grain vein at head of Whyte's Cleuch, below locs. 21 and 22, and very similar to them. Good botryoidal haematite.

On the east side, towards the head of Whyte's Cleuch, where 6" O.S. map marks a "Level", an old level recently exposed. Timbered entrance section partly collapsed but enterable and fairly safe. Level goes in approx. east, soon turns left parallel to the cleuch; dry at first, a little water seen further in.

- (5) Belton Grain vein (NT/8713; 1" 68; 6" Dumfries 7NW), Wanlock Dod, Wanlockhead, Dumfriess-shire.

Locs 19 and 20 disappointing as regards specimens, but unchanged since 1955-56.

- (6) Leadhills side of Wanlock Dod (NT/8713 - 8814; 1" 68; 6" Lanark 49NE), Leadhills, Lanarkshire.

Locs 23 and 24, as in 1955-56. At loc.24, a 1-cm. specimen ~~min~~ consisting of granular-massive linarite with small vughs containing tiny xls of caledonite.

~~Level~~ Level going in west under the road (cf. 1955-56) is ineffectively boarded up, still enterable.

- (7) Knipes antimony mine (NS/658105; 1" 67), near New Cumnock, Ayrshire.

Approached from the north by following Garepool Burn and skirting the marshy ground at its head. The mine is on the slope of Hare Hill, facing one coming up from Garepool Burn. It consists of several small dumps, two of them not grassed over - the lower is largely barren weathered granite, the upper mainly ore and quartz.

On the ore dump, large lumps of massive stibnite associated with quartz, ?bindheimite, and fairly frequent dark brick-red powdery kermesite. Occasional vughs have free stibnite xls up to $\frac{1}{2}$ -cm long. Specimens of quartz with embedded blades of stibnite are not common.

Between the two dumps there is an adit, almost completely blocked at the entrance by a collapse.

At 657116, remains of a peculiar water-wheel contraption presumably nothing to do with mining, perhaps something to do with water-supply (but this ~~is~~ a remarkably odd place for it; it is too inaccessible to ~~mm~~ have been a mill).

- (8) Mauchline (NS/42-52; 1" 67), Ayrshire.

Greg and Lettsom (1858) record native Cu in NRS near the railway tunnel; the only tunnel nearby shown on 1" map is that at 4828. No exposures seen when driving on the road which passes over this tunnel at approx. 482287.

- (9) Boylestone quarry (NS/492597; 1" 60), Barrhead, Renfrewshire.
Narrow entrance leads to large quarry. Not working, but overburden above the main face and the quarry floors being cleared for future working.

The single high quarry face shows no signs of recent blasting. Northern half of quarry floor is some 15 ft higher than southern half. At northern end of quarry, large mounds of partly overgrown clay said by a native to have come from the excavations for the Clyde tunnel.

On the upper floor: very large to small boulders of brownish-grey cavernous friable rock with abundant good prehnite (i) in crusts, usually $\frac{1}{2}$ cm thick, transparent to semi-transparent pale greenish-yellow to almost colourless, mamillated with distinctly crystalline surface; (ii) in globular aggregates (globules usually 1" across or less) with a less crystalline surface and a deeper greenish-yellow colour; also various intermediate forms. Associated with calcite (clear colourless crystals, often sharp scalenohedra or "sceptre-crystals"), native copper (thin films and thicker embedded "sprigs", partly altered into cuprite and chrysocolla), and chrysocolla (spots embedded in or on prehnite). Clear calcite xls occasionally have embedded native copper. No definite malachite seen.

On the lower floor: some boulders similar to those on the upper floor; also barren basalt, amygdaloidal. In the low (? 10 ft) face opposite the main face of the quarry, i.e. the approx. eastern wall ~~forming~~ of the pit forming the lower floor, a distinct nearly horizontal band of grey prehnite-bearing friable rock. This rock differs from that making up the boulders mentioned above by being more compact and of a different shade of grey, and by having smaller cavities and less copper; the prehnite here forms smaller, paler aggregates.

There remains some uncertainty as to the exact origin of the large boulders. No rock of that type can be seen in situ in the quarry face, nor where the overburden has been cleared above it; the boulders are found on the edge and overlying the large pile of barren boulders immediately under the main face on the upper floor, and have the appearance of having been dumped there.

The heaps of crushed stone at the entrance to the quarry also contain good prehnite.

Native copper, cuprite, chrysocolla and malachite have been reported previously (Houston, 1912).

(10) Roadstone quarry at NH/453406 (1" 27), between Craigdhu and Oldtown of Aigas, Aigas Forest, Inverness-shire (Disused).

A fairly large, recently abandoned quarry on N side of main road. Gneiss-like rock with veins of coarse pegmatite, finer pegmatite, and pure quartz. Pegmatite veins contain good mica, grains of red garnet up to 3 mm across, and black ? tourmaline. Occasional embedded hexagonal crystals of pale-green apatite, largest 2 mm across (I/R.S.90; fluoresces weakly yellow in short- λ U/V).

No signs of quarries can be seen from the road near Struy Bridge (NH/4040, 1" 27) (cf. Heddle, 1901: beryl, tourmaline, etc. from "Struy Bridge quarry" and from "the quarry south of Struy Bridge").

- (11) Loch na Mèine workings (NH/376380; 1"27; 6" Inverness Struy lead mines, Struy Forest, Inverness-shire (disused).

Cf. Russell's description (1946). The chimney still stands; overgrown trenches, shaft-pits and dumps. The moor is being drained for afforestation; the drainage channels skirt round the mine-workings, and have uncovered some fresh dump material.

Approached from Strath Glass (approx. 394386) up steep hill-side, then across moor past Loch na Meine, on a miserable cold, windy, rainy day. This made examination of specimens on the dumps difficult. Collected a large amount of matrix with galena and pyromorphite. A preliminary laboratory examination has revealed quartz, baryte, tiny xls of cerussite, green pyromorphite, tiny (less than $\frac{1}{2}$ mm) pointed xls of wulfenite, galena, blende.

It may be better to ascend to the mine from Strathfarrar (e.g. across bridges at 353394 or 378402), if the "white" Strathfarrar road is drivable.

On the way up, passed dumps of trial on the "first burn north of Allt Tigh Cumhaig" (AR, 1946); not examined.

- (12) Rogie roadstone quarry. (NH/445579; 1"27). Contin, Ross and Cromarty (working).

Large quarry on SW side of road A832. Gneiss and schist with coarse pegmatite veins and pure quartz veins; occasional thin calcite veinlets.

Pegmatite has large (1-2") plates of dark-brown to colourless mica; colourless quartz; large pale-pink to colourless feldspar; small grains of red garnet; and xls of pale-green apatite (I/R.S.97; embedded and full of cleavage largest 8 x 10 mm; some of the smaller xls, e.g. 1 x 4 mm, are nearly clear hexagonal embedded xls; weak yellow fluorescence in short- λ U/V).

Thin veinlets of pale-khaki xls of epidote (I/R.S.98) in quartz. Patches of pyrite, pyrrhotite, and fine-grained chlorite.

- (13) Road cutting at NH/127835 (1"20). Dundonnell, Lochbroom, Ross and Cromarty.

The A832 is being widened at a number of places. Extensive roadcuttings on west side of road at approx. 127835 have, on joints in a quartz rock, layers of black compact micaceous haematite with, occasionally, coarse micaceous haematite; ~~many~~ small patches of massive chalcopyrite embedded in the quartz.

- (14) "Upper reaches of An Leth-allt (NG/92; 1"26). Ross and Cromarty

Clifford (1959) records bright-green chromian mica from small ankerite-quartz outcrops. Ascended An Leth-allt for about $1\frac{1}{2}$ mls, and turned back owing to foul weather; the loc. is obviously further up the burn.

- (15) Glenelg district (NG/81-82; 1" 26 and 35), Inverness-shire.

Toured the coast-road from Glenelg south to Arnisdale, examining roadside exposures; nothing of interest found. No limestone exposures seen. Drove up Gleann Beag a little past Balvraid; no conveniently accessible exposures of rock. Roadside cliffs at 808206, Biod Bàn, on road to Kylerhea Ferry: nothing of interest.

- (16) Road cutting at NG/898200 (1" 26 and 35), Ratagan Forest, Glenelg district, Inverness-shire.

Cutting on a Forestry Commission road at its junction with the Shiel Bridge - Glenelg road, near the Ross border. Red granite-like rock with quartz veins containing specks of galena (cleavages up to 3 mm across), chalcopyrite, and ?? molybdenite.

- (17) Quarry at NG/963148 (1" 35), near Achnangart, Glenshiel, Ross and Cromarty (Working).

Large quarry in igneous rock on SW side of A87 (probably opened to provide stone for the extensive road-widening works in Glenshiel). Quartz veins with epidote (I/R.S.103) in pale-pistaccio-green striated intergrown prisms (1 x 5 mm); and traces of pyrite, pyrrhotite, and black platy ?haematite.

- (18) Road cutting at NH/585366 (1" 28), Creag Dhearg, Loch Ness, Inverness-shire.

On A82, near northern end of Loch Ness. In the low section of a long mm line of cuttings, near a small stream, at 585366, joints in the rock have asbestiform unidentified silicates:

(i) dull-green fibrous matted, tending to radiating and parallel aggregates; up to 2 mm fibres (I/R.S.106, ?contaminated with quartz);

(ii) Greyish-blue fibrous, parallel aggregates and crusts; up to $1\frac{1}{2}$ mm fibres (I/R.S.107, somewhat similar to that of Transvaal crocidolite).

- (19) Abriachan (NH/5535; 1"28), Loch Ness, Inverness-shire.

Heddle (1901) records large sphene xls in boulders of hornblende-gneiss.

The flat to sloping ground NE of Abriachan farm (which is at 553356) is now a very young fir plantation. Many boulders a foot or so across are exposed in the drainage trenches; several of these broken up, but nothing of interest found. South of the farm are fields, pasture land, and a small lake.

- (20) Torvean quarries (NH/646433; 1" 28), Torvaine, near Inverness, Inverness-shire (Working).

Large gravel quarry just off the main A82 road; of no interest.

- (21) Clachmaharry (NH/6446; 1" 28), near Inverness, Inverness-shire.

Heddle (1901) records celestine from a quarry in Old Red

Sandstone conglomerate. No signs of a quarry seen from the main A9 road; the area is built up¹.

- (22) Masonhaugh sandstone quarry (NJ/125691-128691; 1" 29; 2½" NJ16), near Burghead, Morayshire (Disused).

On the coast. Barren sandstone.

- (23) Greenbrae quarry (approx. NJ/138692; 1" 29; 2½" NJ16), near Hopeman, Morayshire (Working).

On the coast. Barren sandstone, with occasional rusty nodules of sand grains cemented by pyrite.

Cf. Dunham (1952, p.125): microscopic examination of sandstone from Greenbrae quarry and other nearby locs has revealed considerable percentages of fluorite in certain patches of the rock.

- (24) Sandstone quarry at approx. NJ/163702 (1" 29; 2½" NJ16), near Hopeman, Morayshire (Working).

On the coast. Barren sandstone.

- (25) Stotfield Beach (approx. NJ/227709; 1" 29; 2½" NJ26), Lossiemouth, Morayshire.

Examined a small outcrop of rock at the eastern extremity of the public beach. A sort of very tough quartzized conglomerate with vughs lined with quartz xls. Patches of galena (with cleavages up to 1 cm across), but no secondary minerals except a few patches of barren "limonite".

Much of the beach is covered with boulders and pebbles of similar material, and there are small outcrops of sandstone with galena-bearing veins on the sandy beach, being rapidly covered by the tide at the time of the visit.

- (26) Quarry at NJ/231704 (1" 29; 2½" NJ26), Lossiemouth, Morayshire (Disused).

Small sandstone quarry in the middle of the town. Buff sandstone with approx. E-W yellow baryte veins, with cockscomb xls (1 cm across) lining a central cleft. Also a patch of grey sandstone with a small pocket of colourless 1-mm cubes of fluorite on the quarry face.

- (27) Hill of Spynie quarry (round NJ/222657; 1" 29; 2½" NJ26), near Elgin, Morayshire.

Examined the part of the quarry nearest the road, in a small wood. Fairly large; faces show no signs of recent blasting.

There are large dumps of crushed whinstone-like rock, graded according to size and transported here from an unknown locality. The quarry appears to be used by a firm of building contractors merely to store this rock. On these dumps, various non-xline green silicates; also good pyrite, in well-formed ½-mm pyritohedra and larger (up to 3 mm) intergrown pyritohedra and octahedra.

The sandstone of the quarry itself is barren.

- (28) Quarry Wood (NJ/16; 1" 29; 2½" NJ16), near Elgin, Morayshire.

Three small to medium-sized abandoned sandstone quarries, shown on 2½" map at 1763, in the woods. Overgrown. Barren sandstone.

- (29) Quarries round NJ/167632 (1" 29; 2½" NJ16), Newtonroad, near Elgin, Morayshire (Abandoned).

Probably Newton quarry of Heddle (1901; baryte; ?baryto-celestine), and possibly the celestine locality "near Elgin" of Heddle (1901).

Old and very overgrown complex of fairly large quarries, hidden in a wood not far from main road. Barren sandstone.

- (30) Road cutting at NJ/483446 (1" 30), Cairnie, near Huntly, Aberdeenshire.

Partly overgrown isolated cutting on SW side of main A96 road, just west of the small road to Sinsharnie. Presumably Stewart's (1950) almandine and sillimanite locality.

Vertically-banded gneiss with dark mica and much quartz. Quartz lenses contain abundant red garnet (I/R.S.116): aggregates of 1-mm quartz and garnet grains, apparently pseudo after large garnet xls; crystal faces up to 2 cm across are seen, dissolved away in patches and replaced by granular quartz and a little mica; clear pieces of garnet are rare and small.

In places the gneiss has embedded prisms, up to 4 x 2 x 15 mm, of a greenish-white soft mineral with fibrous parting (I/R.S.115 suggests something like illite; perhaps pseudomorphs after the sillimanite mentioned by Stewart).

- (31) Bin Wood quarry (NJ/494429; 1"30), near Huntly, Aberdeenshire. (Working)

Large quarry on NE side of main A96 road, 3 mls NW of Huntly. The quarry itself is reached by driving up a short, steep quarry road flanked by a tramway. A very brief visit; unable to examine the quarry in any detail, but many specimens collected the identification of which is held up by lack of infra-red standards. Results of a preliminary examination of the specimens follows.

(i) Prehnite (I/R.S.120), crust composed of aggregated sheaves of ½-mm colourless clear xls; up to 5 x 20 mm embedded
(ii) Pyrrhotite, massive patches; up to 5 x 20 mm embedded in white compact fibrous radiating silicate (I/R.S.110; not wollastonite; perhaps an amphibole or pectolite), with large xls of white feldspar (I/R.S.117) and prisms of black tourmaline (I/R.S.119).

(iii) Apatite (I/R.S.113), green prisms up to 1 mm x 8 mm, embedded in, mostly, white feldspar.

(iv) Zeolite (I/R.S.118, laumontite group), crumbly specimens consisting of veinlets of intergrown white opaque slightly pearly xls in a matrix of green-brown granular olivine or pyroxene rock.

(v) Brown to reddish-brown mica in sheets up to 1 x 4 in., in quartz-rich pegmatite.

(vi) Zeolite (I/R.S.109, near thomsonite), hard white porcellanous veins.

- (32) Quarries at about NJ/83₅10₅ ($\frac{1}{4}$ -in. map), near Tyrebagger, Aberdeenshire (Abandoned).

Old water-filled quarries in barren granite.

- (33) Aboyne, (NO/49-59, 1" 39, 42), Aberdeenshire.

~~Hardham (1900) and~~ Geol. Surv. Wartime Pamphlet No.13, Area VI, gives positions of Deecastle quarry and Corntulloch quarry (both in NO/4497). No signs of either quarry seen from the road.

6" Aberdeen 91

- (34) Pass of Ballater (NO/371971; 1" 39, 42), Ballater, Aberdeenshire.

Cf. Russell (1936). Granite boulders and smaller stones below the cliffs of Creag an t'Seabhaig have massive green and purple fluorite; also dark-purple microcrystalline and occasional small colourless cubes.

Patches of pegmatite, very coarse, with large xls of milky quartz on joints. One boulder of granite with beryl (I/R.S.123) forming a mass several inches across of pale-green semiopaque very fractured intergrown prisms up to 2 x 1 cm., with quartz and feldspar.

The scree below the cliffs, by the roadside, is being intermittently worked as a ~~granite~~ rubble quarry.

- (35) Abergairn lead mine (NO/355974; 1" 39, 42; 6" Aberdeen 91), Glen Gairn, Aberdeenshire (Abandoned).

Cf. Russell (1936). Partly overgrown dumps near the farmhouse of Abergairn, with traces of filled-in workings. Green and purple uncrystallised fluor, light-brown blende, quartz; galena very rare; no pyromorphite seen.

- (36) Dalnabo quarry (NO/303007; 1" 38, 39), Glen Gairn, Aberdeenshire. (Disused).

Just inside the woods, and approached by a track through the woods starting from the main B972 road about $\frac{1}{3}$ ml. east of Dalnabo farm (which is at 303₀10₅, not named on 1" map), opposite a sort of lay-by.

An old quarry. Specimens, especially large masses of brown idocrase with cinnamonstone, collected in situ or from the large and small blocks lying about everywhere.

Brown idocrase (I/R.M.16), in masses up to a foot across, in rough xls up to 6" long, and in better-formed xls up to about 1 cm. With abundant cinnamon-coloured garnet (I/R.M.17),

- (43) Alva mines (approx. NS/893990; 1" 55), Silver Glen, Alva, Clackmannanshire.

Walked Well over 1 ml. up Silver Glen, but saw no trace of the old mines or dumps.

- (44) Quarry near Jamie Wright's Well (NS/615803; 1" 60), Campsie Fells, Stirlingshire. (Abandoned).

Old quarry on the roadside just south of the Well. Amygdaloidal basalt. Some calcite; vughs lined with quartz xls on "thick" crusts of agate; crusts of botryoidal to globular brown "limonite". No good zeolites.

- (45) Quarry near High Craigton (NS/525770; 1" 60), Kilpatrick Hills Dunbartonshire (Working).

Active, but apparently closed for holidays of the day visited. Amygdaloidal basalt with good zeolites:

1) Good flesh-pink sheafy xls of either heulandite or stilbite (I/R.M.14), with large cleavage masses of colourless calcite.

2) White, partly iron-stained, opaque to partly transparent xls up to 2 cm across, of analcime (I/R.M.42)

3) Bunches up to 2 cm long of lustrous colourless (partly iron-stained) ~~needles~~ prisms of a zeolite (I/R.M.53, not natrolite), in vughs.

4) Compact radiating aggregates of colourless to oily-greenish-yellow prisms of the same zeolite (I/R.M.54), embedded in fine-grained black basalt.

5) Friable ?decomposed amygdaloidal basalt with cavities lined with very brittle white opaque stubby prisms of a zeolite

- (46) Quarry around NS/408637 (1" 60), Kilbarchan, near Johnstone, Renfrewshire. (Working).

A very large quarry. Basalt with calcite and some coal, but no interesting minerals.

- (47) Quarry around NS/427614 (1" 60), Craigenfeoch, near Johnstone, Renfrewshire (Working).

An enormously extensive roadmetal quarry with big crushing plant, etc; actively quarried. Quartz; very good grey agate; cream-coloured rhombs of ankerite or dolomite (I/R.M.26). Coal and clay seams in some of the quarry faces. Veins of tough white compact fibrous to columnar pectolite (I/R.M.24) in good specimens up to several inches across; but no good zeolites.

NC 7061

Reule

NIG

Achnapearain, Sutherland. ~~fine xls~~
Clack and Eoin, nr Betty Hill, 1 w garnet etc
To S of Naver Brook in white qtz

Ross Fannich - In bed of stream in Allt a Choire Mhoir. Thick brown xls
Small Shath. Ailnack, on W side of stream 2 ml from mouth
Persh Hills boundary SE side of Glen Telt ^{prismatic} xls in chlorite ass w Qtz v's cutting mica sch. I

on An Sgarsoch, in qtz

Mid Hill W from Killin w Qtz, chl.

N side of Creag Mhor - "

Corrycharraig, Glen Lochay w graphochromite in hyal qtz

Creag na Caillich, summit e foot of cliffs w Qtz, chl, sphene

Nr Crianlarich in massive white horny qtz xls 4 x 3/4" formerly.

S of Loch Tummel, w. chlorite "similarly".

SE slopes of Beinn Heasgarnich, nr summit, w chlor, actin etc

On The cobbles @ SE foot of Gt Tower, xised, w ilm chlor

NW slopes of Ben lne rare

Ben Lochain, E slopes

Beinn Bheula, twins w ilm, chlor in rock rents @ summit

Glen Finart - in Qtz v's on N side, w fiber tourm

Banff

Bright red xls in white line limestone inland from Redh. the NIG
w brist & pale green talc NJ 5767

In 1st qtz @ the balloch betw Glens Buckie & Nochtly w pyrth, act, etc
NJ 31

Manganite

Aberd

Formerly at Laverock Braes nr "Grandholm" (Granam) N5/Persley
w Ba, well xld all NIG

~~At Carr Beg Pt M~~

Be, apat, 148
 felsp. 64-70
 azur. 125
 mica 92
 garn 92
 tourmal (10k)
 rose qtz 96/7
 kyan 98-9
 Hex in 84
 epid

Azurite

Shet Main'd Hillswick Gravaesum, on kyanite (?)

Ork Viera, Ronsay, in Bav. in flogst, small xls w mal gal, hemi etc.

Seth On s cliff of Quinoy, in Torr s't

Ross NW of Loch Garbhaidh

Penth Taymouth Park, in old q'y, w mal, cupy. Nr Grandtully w. chalcoc e mal

Lothians Above Tordoff, Pentland Hills in quartz in Lr Carb. s't.

Kirkcud Barlocco, nr house Orroland w mal in a Ba v.

Thorp xls in face of this cliff

Topaz

Sutherland Beinn Laoghal, nr foot of precipice of Sgor a'Chonars-aite, in granit peg v's in "syenite". w small xls bright green amazon w. alb tourmal magnet.

Banff

In the cliff above Loch Avon on its E side, in druses in gran, ass w brown e black cairng.

Loose in an old stream course of the Avon of a fine blue e the size of a fist. e nearby in 'pale blue 3-4" masses w. rolled cairng's, o'd e Be.

Aberd

Beinn a' Bhuid', from masses of rock which have fallen from the E cliff nr the mouth of the small cairn (big xls some > 1 lb even ~ 8 lb); clear or pale Only assoc. is rock xl at this side of the gran. range.

Argyll
Bute

Macrihanish Bay, Kintyre. Small xls in loose gran blocks. Arran clear xls in coarse xline gran of Glen Shant; Brodick Bay on shore in loose blocks of fine-gr. gran, clear e pale yell. w. blue beryl.

Beryl

Invern

Stru Bdg Q'y pale yell-green → 3" thick in gran vein in gneiss w garn, tourmal, yellow musc, o'clase.

Hebrid

Chiapaval Harris in the gt.v. w green musc, blue o'd, rose qtz, graph gran.

Banff

Cairng. on E slopes. formerly in corrug. xls e in blue-green masses, also apple green, transparent.

Aberd's

Loch Hon rarely small xls embedd in xls of cairng
 Rubislaw Q, coarse yellow opaque xls → 1 ft! w apat, tourmal garn, oligocl, microcl, muscov.
 Pitfoddels Q, pale emer-green, transp.

Supplement

Beryl (cont) Aberdeens Pass of Ballater, small yellow xls w musc, ^{microcl.} zircon;

In a rock nr Black Dog Rock nr Belvelvie w. white biotite (?), nrly clss. In a v. similar rock nr Keig Bridge. In gneiss in rly cutting betw. Ellon & Old Deer

Kincardines

Torry, opposite Ab'deen on shore, in rough yell xls in tourm etc.

Mount Balltock, diversg xls in gran.

At the Green Burn, nr the burn; near the North Esk.

Pexthys

Arrom

Kinloch Rannoch

Nr. Brodick, blue xls $\rightarrow$ 1" in fine-gr gran. green shamb, in xline gran, w. topaz

Garn, precious

Argyll

Nr summit of Ben Resipol, nr Strontian on NE side, transp. & lively red, w. o'clase & muscov.

Inverness

Struy B'ge, from a granite belt in gneiss, red, w. tourm, bl, green musc. & pink o'cl.

Garn
cont

Ross-sh

(nodular qtz)

Strathpeffer, rly cutting nr. Glensgairch, in qtz. sonet's includ'g zirc. ass w. musc. tourm, zir, apat; pink & brown $\rightarrow$ 5" black-occl green

Loch Garve ^{brown} from gran. veins nr the Black Water, on its S bank. On N side of L.G., brill red w muscov, agalmat.

In qly $\frac{1}{2}$ ml N of Achnasheen w. zirc.
Clunie Inn Hills N of:- pink in micac-gneiss.
(listed) $\rightarrow$ Hills S of:-

Almond

Inverness

glen Urquhart, nr Free Church of Milton, ass. with biot & including zircon. etc.

of about Supplement

Banff

Knock Hill 4 ml NE of Grange Stn, remarkable xls

(Loyal?)

Zirc Suther. Beinn Laoghal in gran. vers. on qtz, v. rarely, as
w amaz, topaz, tourm. Dark brown.
Ben Hope E of An Gorm-loch in granular qtz-schist
as w rose-mica; in ruby red, transparent xls (Hertzite)
Ross Head of Kelt graad, Kiltearn, Loch Glass in gran. blocks
Garve area || w garn, muscov. In gran belt cutting gneiss
in glensgarich, w musc, gar, apat, tourm, ^{usually embedded in} garnets
Achnasheen, embedd in garnets in gneiss
qly 1/2 ml N of the hotel. Mam Ratanagan;
Loch Duich, v. minute clear xls in red "syenite"
Hebrides Lewis Brann a' Bharra 1/2 ml N of Balaban,
in gran. belt, pink transp, adamant xls w
polymignite (?) in blue albite

Inverness || Glen Urquhart, Milton, nr the Free Church, minute
blue-black xls embedd in garnet in edenite
& white biotite
Loch a' Bhruthaich. Struy Bge, in feldspar
Argyll Loch Sunart, Strontian, in "syenite", w sphene
Fife Elie Ness, in agglom, v rare, yell-brown,
Kirkcubright in Burn of Palnure W of Cairnsmuir in
gran boulder

Kyam (Suppl) } best = Glen Effock bright blue fine xls in qtz
Atholl Bonhard in green clova
Head of Water of Saughs. Loch Brandy,
Loch Lee. Bulg.
In belt of m'orph rock from 2ml E of Mildden to Milton of
Clova & Loch Brandy (Forfarsh?)
= Angus

Sket

Kyam

Inverm Glen Urquhart, above Milton, on E side of rd to 1st q's, in large isol
xls & shaly eggs in gneiss
Strathpey:- Nr Dulnacraig, to the SW of the 1st q, & in gneiss
Nr Achnagonalin, Grantown.
Squirr a' Choire-bheithre, L. Nevis — NG 8951
Hebrid..

Perth Ben Vannoch, summit in qtz-belt w garnet in mica gneiss
Banff Sandend Bay at Garrison Pt in qtz v in brt sch. w h'ble & muscov. Portsoy, in
qtz v's in mica sch. Botriphrie...

Aberd Ardnamurchan Q betw Keith & Huntly. Loch Etchacan
Pinard Banchory
Perth W side of Carn Liath. Glen Telt, in a qtz v. . . .

Forfar In outcrops nr Milton, W of Turret, S of M. Battock - large foliated masses
of blue & yellow xls. Tarfside, Garlet Hill W side of w chlorite xls & used
Glen clova on hill slopes below L. Brandy in highly metam rocks
and w. qtz, musc, tourmaline.

Epri Gel Glenelg, Inverness

Nedde Sket..

Ross In a hill ridge 1 1/2 mi SE of Loch na Sgataig, betw Loch na Skeallag &
1. Fewa, in h'ble gneiss - v. fine xls $\rightarrow \frac{5}{8}$ " wide. NW 8533
Craig na Fearn; Poolwe, in gneiss; "Glen Logan" in gneiss, & the
W slopes of Lurg Mhor NH 0639
Inverm Glenelg, x-bed in v's, S of Ellanreoch. Nr L. Spey. Nr h. Ashie
Argyll Glen Coe - An Bodach w. with amble. Mball Bhalach, N of Kingshorne,
on NE should 300' below summit, well x-bed, in granite gneiss...
Banff 3rd gran V E of Portsoy
Aberd Kincaid... Perth... Sket... Edinb... Arrom...
Kircudb Cassencarse gran fly, large dark green xls, in red gran.

Nr. L. Scavaig Glamaig, x-bed in
cav. in ign. SE slopes of
Squirr Deary, xls in cav. in gabbro, w
white bruch. natrol. In v's perth
vein-pregn on S slopes of Squir nan Gillean
& on Druin nan Rannh. in cav.
1. Scriclain, nr Kill is more in cav. than
in trap sedily filled w. s. dec. Gannoch
in trap sedily filled w. s. dec. Ben More
at head nan Damh

Hebrid..

Sket.. Mull.
In a hill ridge 1 1/2 mi SE of Loch na Sgataig, betw Loch na Skeallag &
1. Fewa, in h'ble gneiss - v. fine xls $\rightarrow \frac{5}{8}$ " wide. NW 8533
Craig na Fearn; Poolwe, in gneiss; "Glen Logan" in gneiss, & the
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on NE should 300' below summit, well x-bed, in granite gneiss...
Banff 3rd gran V E of Portsoy
Aberd Kincaid... Perth... Sket... Edinb... Arrom...
Kircudb Cassencarse gran fly, large dark green xls, in red gran.

Rose Qk

Hebrides

Aberd

Clava, in 3 v ll^l v's - most W nr Badenshore Moss
of glenlaff Hill - v wide, bleached @ surface
No 2 on S side of the rise betw Earlseat Hill &
Peat Hill. No 3 is on NE slope of Earlseat,
Mt Keen & Earlseat being in line.

On Craigenfell Hill of Cushnie, a ~~thin~~ N-Sv. betw
Sockaugh and Taplo'North.

Loose & Black Middens, glencuie, & banded w. white
on N side of glen Kindie in line of these v's or to E
In the stacks of glen Carvie 1/2 way up.

rarely nr the lst of Tilleghilly. In gneiss, as
at Poolewe, glen Logan, & Rona

Cairng

~~Blairgrogan~~

South

N cliff of Ben Loyal & peg boulder
on Ben Bhreac. Nr summit of Quing, or E side.

Hebr
Banff
Aberd

On N Rona, in pegs

Cairng & adj^y hills w o'd, bl, blue topz. Red of Aron

Sleipne Hill Q, 3 mi S of Peterhead → 6x3" d. term xls.
w o'd, ylb, rarely muscov.

Murdoch's Cairn &
Other q's in red gran S of The Bulters of Buchan
occas in v large xls, ass @ M's Cairn w alb, F, talc,
epid lepidomelan. At Black Hill & q's to S

Aulbleam, Dees-side, capped w. white. In gran-v's
@ head of Queel Burn & on foot of hill betw Blairglass
& Red Burns. Nr summit of Bennachie.

On slopes & corners of Ben a Mhain, jet black, & in
E cliffs of Beinn a Bhuid w blue & clear topaz, &
rarely, ameth. Tillyfourie, w chloite.

Craigton Q, Hill of Fare.

Forfarsh

Argylls

Montrose, @ The Blue Hole, Usan in agate druses in ORS,
Kintyre:- Ballivonline Hill 1/2 mi N of Campbelltown w Ca
- Balligrogan in Lo Carb trap.

Fife

Renf (Gourock) ~~Argyll~~ Bute-Arran

Actin Sket
Suther
Inver

{ Glen Urquhart ✓ ½ ml NW of Urq. Hotel, w albite. e at
Milton, in 1st q's. Thick yellow xls w graph; margarodite
greenlg, s of Eilan Reoch ✓
Strathspey - Ordban, near Loch an Eilean rarely, magnif ^(pictured) clusters
NH 9518

Hebrides
Aberd

Crathie, Glen Gairn & Foresterhill q's
In 1st @ halloch betw Glens Bucket & Nochtly w pyrth, pyr See Rutile

Kincardine

Estie 1st q'y. fine xls in ~~Sahlite~~ [?] w sphene etc

Penth

Glen Tilt - asbestiform

Argyll

Glencoe, long radiating xls w andal @ junction of the Col w. *v[?]
Knappdale - @ Cu mine W of Erins.

Kirkcub.

Ameth

Set'd

NW 1969

Ross

Fannich, 1000' up S slope of Meallan Rairigidh, brilliant colour

Inver

L. Morar. In the corrie cor of Lurg Mhor, w egg-size garn xls

"Loch Morar, in glen Oban the E of 2 streams from Ben Streape,
in xls 1" thick".

Aberd

Cliff of Beinn a Ghruid

S side of Brindy Hill, S of Premnay

Kinross

Long gallery in vughs a trap.

Forfar

Montrose @ Scudby Ness. Usan. Lanan Bay r'ly cutting

Craig cutting.

Fife

Nr Newburgh. Heather Hills, Luthrie ...

Argyle

Killelan Hill nr summit, S of Campbelltn. 2 @ Wigle. Large, fine spec's

Shirley

Nr rd Campie Hill - Finty; Cathcart Castle.

Highland

Middle

Perth

Ayr

Catburn, Largs. Kaim Hill, 400' up W side, w. blue chat. ced.

Bute

Arar

Barrow

Kirkcaldy

Lot's wife etc.

Musc

L. Garre

S of Black Water outlet - in gran vein. Pale green

Big xls -

pls w garnet

head of Glen Shiel [ie nr Clunie Inn?]

Nr foot of Loch Glass

in boulders w garn, zinc → 10" plates

NH 51-72

Glen Garich

ry cutting rose → 15" xls !! w garn, tour, zinc

Inver

Q'y line S of Stray Bog.

MAIL Harris:

~~Wase~~ 377 Moonstone
369 } Reg minerals
498 }
499 Reg (Sletherval)

MA 14 369

O. V. Knowl R Dearmley

Nature (1959) 183 255-6

Reg of S. Harris, Outer Heb's.

Kasolite, u'phane, etc. etc...

MA 13 under.

MM 31 lxiv, 797.

3rd supp list

Kasol w pitchbl.

Tyndrum, Perthsh

RK Harrison

Min Soc nra. 1956, 95

MM 1957 31 lxiv.

MA 13, 503

Reg of S. Harris
& Sound of Harris.
(Inverness)

19224 Serpentin
etc. etc.

Also ? xenodite

"near phosphouranylite"

5/79.

Sphene w h' blonde
Arrochar

Much mica schist w

In gree by path

The Cobbler Ben Arthur (Ilmenite
loc)
N 8 L. Comond. L'Lon

pyrite cubes.
to h'eler station.

UMIST



TO

DATE

FROM

EXTENSION

SUBJECT

(phone also p 713)
↑

Old Dance p 239
Rutile ... at Criclarich, at Craig Calteach near
Killin, and on Benygloe; in Donegal Co, Ireland.

Laz r 432
Laz l 798

Wavell. High Deon Q

Tremol. Pall-na-Longe (?)
Downing's, Co Donegal (?)
Zeophyl Arensburg Eifel
Actinofalk

Kyle of Lochalsh, Ross & Cromarty
vent by road cutting.
in gneiss, on W side of
A890 $\frac{1}{2}$ ml N of its junction
w the A87 (on route to
Strome Ferry)
just below car-park.

c ~ NG 84.9? 27p?

Remaining pages
of "Scotland, 1964
(GR+GS)", at last!

Erratum, loc. 36:
NJ/ (not NO/...)

→ RB

(48) Roadworks at NS/513020 (1" 67), near Glenmuck House, Ayrshire.

Road improvement works on A713, 3 mls SE of Dalmellington. Grey greywacke with pink calcite, small crystals of dolomite or ankerite (I/R.M.26), and a few small pyrite xls sitting on them.

(49) Talnotry mine (NX/478705 ?; 1" 73), Palnure Burn, Minigaff, Kirkcudbrightshire.

This area is now heavily forested and almost impenetrable. Struggled through the forest to the Palnure Burn at 476700 and went up to the edge of the granite (marked by cataracts).

At 480702, near the burn, low dumps of rock impregnated with quartz, fine-grained pyrite, fine-grained ?arsenopyrite, and occasional pyrrhotite. Also ?traces of collapsed levels, and a rusty 5-ft T-shaped piece of mine-gear of some sort.

Forced a way up a small stream (running 477703-480707, along which the Geol. Surv. 1" map marks a vein - ? the wickel "vein"). Half-way up there is a cave-like excavation in the slope above the stream, and a dump, but no trace of sulphide-bearing diorite. At the head of this stream, before the main road is reached again, is a waterfall.

(50) Pibble mine (NX/⁵²⁶⁶⁰⁵ 526605; 1" 73), Kirkmabreck, Kirkcudbrightshire.

On an open hillside of rough pasture, reached by a track which is drivable a short way beyond Mark Farm [506606]. Three sets of dumps, all old and weathered.

Lower dumps, with small ruins and a wide open shaft 30 ft deep, water at bottom. Calcite (good lenticular xls), brown massive carbonate, quartz, chalcopyrite, some chrysocolla and Cu staining.

Middle dumps, by ruined engine-house half collapsed into a shaft. Similar, but richer in the secondary minerals. Also galena, traces of linarite, and some "cobalt bloom".

Upper dumps; open level with 1-2 ft water. Much Cu-stained gozzan and shale. Quartz, calcite, galena, blende, chalcopyrite, pyrite, malachite, chrysocolla, traces of pyromorphite and cerussite, traces of blue weathered azurite (or ?linarite). Aurichalcite, one specimen with compact patches up to 3 mm across of pale-bluish ~~hmm~~ radiating blades.

Linarite, cerussite, malachite, hemimorphite, pyromorphite, chrysocolla, dudgeonite [var. of annabergite] and niccolite have been recorded (Hedde, 1889; 1901).

- (51) Lauchentyre mine [NX/558571; 1" 73], Anwoth, Kirkcudbrightshire.

In a field; a single dump of soft grey shale, round a shaft; almost completely overgrown. A little material exposed at bottom of dump has quartz, calcite, chalcopyrite and copper staining. Unpromising.

Malachite, chrysocolla, pyromorphite, wulfenite (Heddle, 1901); calamine, cerussite (Hall, 1868); aurichalcite (a Heddle specimen in S.M.C.) have been found previously.

- (52) King's Laggan mine [NX/562579; 1" 73], Anwoth, Kirkcudbright.

Next to the house of King's Laggan. A filled-in shaft and large dumps at about 561578. Similar to Lauchentyre, but more Cu staining. No good specimens.

More material up the small stream behind the house, including exposure of a small gozzany Cu-stained vein.

Malachite, chrysocolla, pyromorphite and allophane are known from here (Heddle, 1901).

English localities visited on return journey

- (53) Shap Granite quarry [NY/5508; 1" 83], Shap Fells, Westmorland. (working).

Collected much pyrite, sometimes with radiating blades of bismuthinite up to 1" long, and a couple of specimens of molybdenite, all on joints in coarse adamellite.

- (54) Engine vein workings [SJ/860775; 1" 101], Alderley Edge, Cheshire.

Examined all the readily accessible parts closely for plancheite (one specimen found by AWGK in Sept. 1963 - priv. comm.); nothing found.

Demolished part of the big isolated bollard in the shallow SE part of the cutting - nothing except heavy impregnations of azurite and malachite.

In one of the shallow, partly leaf-filled pits beyond the NW end of the gash, dug up a large chunk of hard sandstone with a large patch of microcrystalline azurite on a joint.

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Index of localities by counties

Aberdeen	30, 31, 32, 33, 34, 35, 36, 38
Angus	41
Ayr	7, 8, 48
Banff	37
Clackmannan	42, 43
Dumfries	1, 3, 4, 5,
Dumbarton	45
Inverness	10, 11, 15, 16, 18, 19, 20, 21
Kirkeudbright . . .	49, 50, 51, 52
Larark	2, 6
Moray	22, 23, 24, 25, 26, 27, 28, 29
Perth	39, 40
Renfrew	9, 46, 47
Ross and Cromarty .	12, 13, 14, 17
Stirling	44
Westmorland	53
Cheshire	54



ENJOYING A SPOT OF PEACE AND QUIET
BY LOCH NESS.

Dear all,

I am just in transit
between Lock Horn and
Midhurst to look for 12"
Rica pyrametites. I have had
some success with the
limestones around the glauco-
gona, they would stand a
lot of work on them. The
area between Strome Ferry and
Dorrie was a dead loss,
I have looked at many Paps
between Burnisdale, Kirkcaldy
Horn, and Kirkcaldy & with
I found two with 2" x 4" school
+ violet garnet + small green x 70%
see you soon
Pate

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Mr. Mr. Braichwood
90 MOSS LANE
SALE
CHESHIRE

Russ Soc Newsletter

21

Perthshire Weekend 21st to 22nd July 1990

Saturday: About 15 members turned up on yet another fine day. Nick Butcher (well known to many of our Midland members) welcomed us to Foss Mine and then we drove up to the mine workings in his and Alistair Ling's landrovers. The drive was very impressive! - not for the faint-hearted. At the mine Nick outlined the geology of the deposit and the way it is being worked. We then went out into the opencut where the mineralisation is very well exposed. Baryte with celsian and a range of sulphides could all be seen in the context of the original beds and subsequent folding.

After lunch we inspected some of the outcrop exposures in the area and turned up some rutile and celsian crystals. Somewhat weary and dehydrated we drove back down the track in the afternoon. In the evening we overloaded the local hostelry with demands for food and drink but eventually got served after appointing Roy as expediter. Our thanks go to Nick for a very interesting day. It was good to see he is thriving in the frozen North!

On Sunday we started off at Lochan na Lairige. The heavily folded schists here have been injected with quartz and carbonates and these carry minor sulphides, particularly pyrite, and rutile. Examples of most of these were found. We then moved on to Corriecarmaig to examine the outcrop of ultrabasic rocks that occurs there. The outcrop consists of serpentine and a talccarbonate rock which is extremely slippery to walk on. Minerals in the outcrop include chromite, chrome-spinel, talc, crystallised chlorite, chrysotile and a rhombohedral carbonate which could be dolomite or magnesite. All were relatively easy to find and some provided interesting and attractive intergrowths.

To the best of my knowledge this was the first time the Society visited the Highlands and it will not be the last. Thanks go to Brian for organising this really interesting weekend.

T F R

Molybd.

E Tulloch Scotl.

ME Conyby, Loch Creran

(Not in atlas)
Nor on 1" 46

NM 9442

Old
Dana 6

(1920)

Tulloch 93 J4

1" 43

Easter Tulloch Kincardine

769717

43

1" 46

Cinnabar, small solid
xline lumps!! Also Au
Panned from Chapel Burn
eg Feb '97

nr Stronachie, Kinross,
Perth & Kinross District

AT NO 072 095

1" 55

* p10
Kennedy WQ et al

G.S.G.B Wartime Pamph 34
(1943) cont mica in Scot part(ii)

Lambert (1959)

Tr. Roy Soc Edin 63, 553.
(Not. v useful).

↓
Pg at 798961 Mica mine,
Tom an Nebel, Kroyd.



Ardarie, Ar Stronkhan

N side of L. Sunart 630 yds N 20° E of
 Ardarie ca 4 ml W of Stronk. On NE
 margin of small patch of peat ~ 700' OD
 Mica in Qtz sch NS Peg 30 yds. x 6 ft
 Mica pocket. books to 12" ^{but} closely crowded.

Dalilea L. Shiel Inverness

N side of L. Shiel 1 3/8 ml N 34° E of Dalilea House
 Midway between top of Ceann Loch Nachdrach
 & Lochan a' Mhuilinn ~ 900' OD. ~ 3/4 ml from
 old track from Austinscroft to Kinlochmoidart
 Ferry ridge. "Ruby" muscov. (ie clear) For at least 25 yds
 Books (flat) → 12" in Qtz-mica peg.

Austinscroft ~ 1/2 ml W 20° N of Dalilea House
 ~ 300 y E of Austinscroft ~ 125' OD. in woods
 100 yd N of road. 4-5' wide muscov. peg
 white, for ~ 50'. w. cream albite, Qtz
 Books → 8"

Diollaid W of Glenfinnan Inverness

~2000' OD betw L. Eilt & L. Shiel, mid
betw Diollaid Mhor & Diollaid Bheag, 5½ ml
W of ~~Glenfinnan~~ Glenfinnan & 2½ ml W 2505
of E end of L. Eilt

White qtz-ab. peg ~12' wide. irreg outcrop
boulders → 8" x 4" thick. Others (smaller)
in area.

L. Neviz Knayd.

1100 yds S 12° E of Summit (2454 ft) of
Sgurr Coire nan gobhar & nr. end of ridge
300 yd S 30° E of small loch in Coir'an Lochain
~1800' OD.

Coars. x-line mica gn/sch heavily impreg. w.
Vening & boulders of v qtz-rich peg w
boulders of white mica → 2' diam. w kemp
→ 12"

Carn Fearna, nr Garve

2 ml E of Garve Rly Stn @ S outlet of
small lochan 350 yds E of 350 yds

E 15° N of trig point 1408' on
Carn Fearna, @ 1250' OD.

Musc peg → 25' wide, clear mica &
barren shale qtz. At least 80 yds,

E 15° N. Books → 8 x 2".

Glensgaich

~ 3 mls E of Garve Rly St. on hillside

1 ml W 25° N of Glensgaich cottage

1300 yds S 20° E of summit (1705 ft)

of Carn Gorm, at 1200' OD

2 Deposits

① S

pelopar, (microd. perthite) e qtz, a little
mica. Books → 8" 75' x 50 yds.

② ~ 150 yds NNE of ①

mica books → 6-8"

garnet-qtz

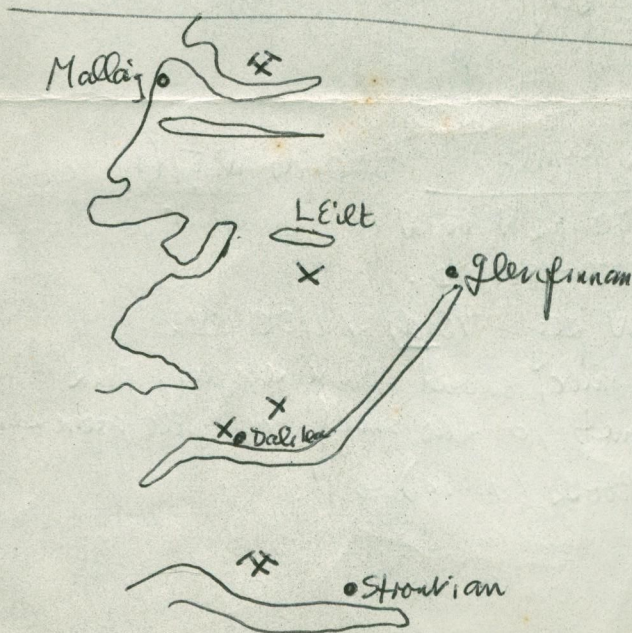
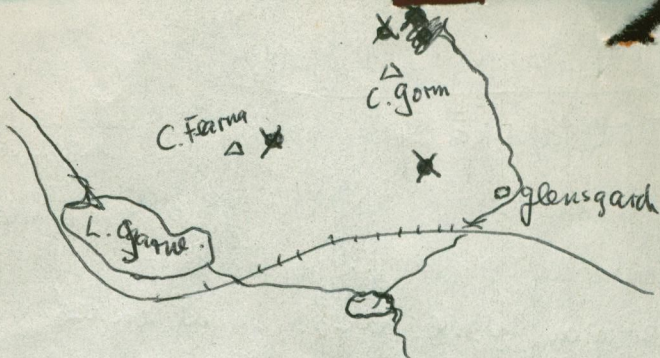
Corn Gorm (1) Garve

700 yd NNE of Summit, $3\frac{1}{2}$ ml ENE of Garve
@ 1650' OD $3\frac{1}{2}$ ml NW by N of Auchterneed St.

Coarse peg EW ~ 100 yds. x 20-50'
Qtz-mica, white feldsp. small euhed
garnets & prisms of black tourm,
rare beryl. Musc & biot (books $\rightarrow$ 15")
Books $\rightarrow$ 8"
clear

Corn Gorm (2) 300 yds W of (1), &
500 yds N by W of Summit;
1750-1800' OD.

EW peg 70 yds x 400 yds.
Qtz-musc, suband white feldspar, pink
garnets, a few small xls pale green beryl
Books (musc) $\rightarrow$ 1'.



1" map 67

New Cumnock:

Certainly not worth slogging up to
the Kniperes Sb mine 657105.

There are a few old Pb mines all
around, but I have no exact positions,
data, or interest!

If for any reason you do go
through New Cumnock, you might
have a look at some of the colliery
 dumps, e.g. those by side of B741
road going SW from New Cumnock to

Dalmeilington. Hall (1868) records
willerite (+ graphite) from Ayrshire
coalfield, & when we passed here in
'64 some of the dumps ~~to~~ looked as
if they had ironstone nodules, though
we didn't stop.

Muirkirk baryte district not
worth bothering about.

1" map 68.

Nothing much here, apart from Leadhills-Wanlockhead. Coatesgate + Craighead quarries you know about.

Cumberhead lead mine at 744328, in the baryte area NW of Leadhills, looks pretty unapproachable on 1" map! Doesn't sound very interesting.

[N.B. if you assign any new loc. No's in L.-W. area, note that I have added a couple of new No's in 1964 - see my notes]

1" map 69.

Glendinning mine - see enclosed cards
(on loan).

ABERDOUR, Fife, Scotland.

GOAT Q'y - harlotome (BMS coll No. 1991)

1" 45

NM

ARDNAMURCHAN,

Scotland.

IGS (1961) Scotl: The Tert. Volc. District
p118 Sapphires abundant in xenoliths
at GLEBE HILL, near Kilchoan.
(NM 48 64)

1" 66

ARRAN, Isle of.

Scotland

BMS Newsl. (1999), 52, 6. R. Starkey →

BMS Coll:

GLEN SANNOX MINE (NS 00 45) Epidote.
THUNDERGAY BEACH (~NR 87 46) Stilbite; quartz
LOIRE NANI CEUM (~NR 97 45) Feldspar.

AUCHENSTILLOCH, nr Lesmahagow, Lan.

82M/2583 Lower-Mid Jurassic (ie
"Saxonian") haematite deposition
in haematite-baryte veins at
POCKMUIR BURN.

Pockmuir Burn, Auch

BAIL HILL, Sanguhar, Dumf e galloway

20 May: Bail Hill, Sanguhar, Dumfries & Galloway [Grid Ref: NS 760 143].

At 5am three hardy, or was it foolhardy, souls arose to visit the cattle and augite locality of Bail Hill.

Amongst the aforementioned cattle, who looked upon us as some sort of strange biped in the early morning rain, we investigated various outcrops where some nice augite crystals up to half an inch were collected. It was then back to our lodgings and breakfast.

1" 72

NX08, 18, 19

BALLANTRAE - LENDALFOOT

Scot.

P. Stone et al (1986). 87M/2296.

2 main
u' mafic
units

In Ballantrae complex, SW Scot. Cu-Ni mineralis'n. Stream sed ex N unit have high Cr values. One outcrop of one-grade chromite (<90% chromite) in a serpentised dunite matrix, adjacent to N faulted margin of the N body.

"10 mile" GS map 1 shows the 2 u' mafic bodies to the N & E of Ballantrae^(S) & Lendalfoot(N) in grid squares NX 18 & 19 & 08.

BALMEADOWSIDE, Fife. Scotland

4/74

P. Marroney of Wear Port ^{St Andrews} Gems, 1 runs
on agate digging at
Balmeadowside

BALMERINO

Fife.

NO 35 24
Scotland

BWB 9/4/74

Beach W of village:-

Much rounded quartz. Bits of
agate, jasper, carnelian, pale amethyst.

BALLATER, Grampian, Scotland.

Rothwell & Mason (1992) UKJMM II 30-40.

ABERGAIN M., [NO 357 973] wulfenite,
orange bipyr. to 1mm in ~~Ray~~ Mus Scot coll;
thin yell. tab. xls w. orthoclase on fluorite
and quartz [Ident vis., R. Starkey, R. Reekie]

GAIRNSHIEL BRIDGE [NJ 293 010],
Wulfenite, cless → buff bipyr. in complex
zinnwaldite granite/greisen. Ident XRD,
[Neikie, 1990].

PASS OF BALLATER [NO 368 972], wulfenite.
in seams on N side [Ident vis. R. Starkey]

BALLATER

Scot

(II)

Lenderside Burn [N] 343 196]

Where andalusite can be found by looking in the streambed. After about an hour small amounts had been collected. The author collected a large hand sized specimen and no other andalusite could be found. It can be very localised in its distribution and might need a hard winter and a lot of rain to wash more of the burn banking away to expose more andalusite.

The last site of the weekend was at the Pass of Ballater [N] 368 972]

We all made our way to the Pass of Ballater and on to the scree slopes to hopefully find bertrandite and beryl. After searching for about 5 minutes Ian and the author both found pegmatite boulders that contained large quartz veins. Which after breaking open were found to contain bertrandite and smoky quartz crystals. After further exploration at the top of the scree slopes no other pegmatite boulders could be found. The were empty pockets the granite that may at one time have contained smoky quartz; these may be destroyed by the rock climbers for convenient handholds or collected many years ago by mineralogists.



Pic 9: Group Searching for Beryl and Bertrandite in the Pass of Ballater.

After a long day the group made there way back to the B&B and to dinner at a local hotel. Our thanks must go to Ian Dossett for organising another great long weekend of mineral collecting.

(GAIRNSHIEL BRIDGE), Ballater (III)

Kemp Meekle found wulfenite among the
unusual Sn-W assemblage.

BISHOPTON, Renfrews, Scotland

Classic loc for greenockite xls in volcs
w. prehnite

J. Faithfull & N Hubbard (2001) J. Russ Soc. 7 [2] 94-5

Clavite ass w greenockite as creamy-
white crusts on greenock & botry crusts on
nearby prehnite. Fluor bright orange (uv, SW)

Traces pyrite, chalcopyr, bornite, galena.

BOYLESTONE Q'y; Barrhead, Renfrews.

RSWB, JRK, TS^{RMCD} 4/66 5 29-30 Vg prehnite;
calcite; analcime; ? natrolite; native
copper; chrysocolla; thin films
? epidote

J. Clark (1975-6) Also found native silver.
Augite, large, fissured deep green x/s

1" map 60.

Baylestone quarry at NS/492597, $\frac{1}{2}$ ml NW
of Barrhead station.

Again, other quarries in the area
are worth visiting. We have already
tried, further north,

Quarry ~ 408636, near Kilbarchan;

Quarry ~ 427617, near Craigenpeoch.

See my 1964 notes.

BROOMHALL LIME Q's Fifehire.

Sowethy?

Millerite in limestone

1" 38, 41, Tourist; 1:50,000 36, 43 NH 90, NJ 00, NN 99, NO 00;
CAIRNGORMS, Aberdeens; Banffs; Inverness (I)

TMH (1868) Invernessh. Beryl, Rock xl, topaz.
Inch, Aviemore. Sphere in "syenite".
Strath Spey. Asbestos
Aberdeens [Cairngorm. as Invernessh]. Banffs - Samie
Braemar:- Beryl, topaz, glen gairden: prehnite
in 1st q^{rs}, glen Muick, fluor in granite.
Invercauld: beryl, Lochnagar Mt.: Topaz
scapolite, Monaltrie: Fluor, galena.

GeL (1858) Topaz - on E side of Lochnagar Mt. nr Balmoral
[Lochnagar Mt No 2585]. Small xls on Ben Aven
[Ben Avon NJ 1402]. E side of Loch Aven [NJ 0203]

G & L (1858) Beryl: with topaz, nr Braemar in alluv of the
Don & Dee, Cairngorm.
Felspar, Cairngorm, with rock xl.
Rock xl. "E side of L. Avon - light colour, clear;
W side - dark brown"

Heddlie Topaz:- Banffs; incliff above E side of L. Avon
in druses in gran., ass. w. brown & black cairngorm.
Loose in an old stream course of the Avon, of a
fine blue & size of a fist, & nearby in pale blue
3-4" masses w. rolled cairngorms, orthoclase & beryl.
Aberd: Beinn a' Bhuid, from masses of rock which
have fallen from the E cliff nr the mouth

CAIRNGORMS (II)

of the small cairn (big xls., some $> 11b$, even $\approx 81c$)
colourless or pale - only assoc. is rock xl at
this side of the gran. range.

Beryl:- Banff: On E slopes of Cairngorm,
formerly in corrug xls & in blue-green
masses, also apple-green, transparent.
Loch Avon, rarely, minute xls
embedded in cairngorm.

Kyanite: Strathspey, nr Dulcanbridge, to the SW
of the 1st quarry, & in gneiss near
Achnagonalin, Grantown.

Cairngorm quartz:- Cairngorm, Banff, & adjoining
hills, w. orthoclase, beryl, blue topaz.
Loose in bed of R. Avon.

Akerd: Cairngorm qtz on slopes & corners of Ben a'Mhain,

jet black, & in E cliffs of Beinn a Bhuid with
blue & colourless topaz, & rarely amethyst.

Actinolite, Ordban, near Loch an Eitean, rarely
but in magnif. clusters [stellate, pictured] ✓

Genthelvite and bertrandite from the Cairngorm Mountains, Scotland

* By W. C. MORGAN, M.Sc., F.G.S.

Department of Geology, The University, Newcastle upon Tyne

[Taken as read 12 January 1967]

Summary. A zinc-rich helvine (genthelvite) has been found with bertrandite in miarolitic cavities in adamellite at Coire an Lochain in the Cairngorm Mountains. The genthelvite occurs as green or brown tetrahedral crystals of sp. gr 3.58 ± 0.01 . It is isotropic, n 1.742 ± 0.003 , a 8.133 ± 0.005 Å. Bertrandite crystals are pale brown with sp. gr. 2.60 ± 0.01 ; biaxial negative with $2V$ 75° , and α 1.590 , β 1.603 , γ 1.613 , all ± 0.003 .

GENTHELVITE $[\text{Zn}_4(\text{Be}_3\text{Si}_3\text{O}_{12})\text{S}]$ and bertrandite $[\text{Be}_4(\text{OH})_2\text{Si}_2\text{O}_7]$ have been collected by the writer from the cliffs of Coire an Lochain, $1\frac{3}{4}$ miles WSW. of Cairn Gorm. In view of the extreme rarity of crystals of genthelvite, and the fact that the only previous records of both minerals in the British Isles are from Cornwall, it is felt that the occurrence is worth reporting. Beryl is not uncommon in the Cairngorm granite pluton and small crystals of blue-green beryl have been found in Coire an Lochain, but not in association with genthelvite or bertrandite.

Genthelvite

Previous discoveries. Three crystals of genthelvite, the zinc-rich end-member of the helvine group, all from cavities in pegmatite, have been discovered in El Paso County, Colorado. The original specimen was described by Genth (1892), the others by Glass and Adams (1953), and Scott (1957). A notable amount of genthelvite, not as visible crystals, has been recorded by von Knorring and Dyson (1959) from an albite vein and nearby pegmatite in the Jos-Bukuru complex of Northern Nigeria. Eskova (1957) has described irregular segregations and Vasil'ev (1961) xenomorphs from pegmatites in the Kola Peninsula. Tetrahedra of genthelvite have been recorded by Oftedal and Saebo (1963) from three localities in Norway. One is an old specimen the locality of which is uncertain; the others are from nepheline-syenite pegmatites. The only previous occurrence in Great Britain, in an unusual paragenesis,

was described by Kingsbury (1961) from a calc-silicate rock near the Bodmin Moor granite in Cornwall.

The Cairngorm granite of Coire an Lochain can be classed as a mica-poor adamellite. Numerous miarolitic cavities are present and in a number of these crystals of genthelvite were found. The small cavities are lined with pegmatitic material from which project idiomorphic crystals of cairngorm or rock crystal together with microcline, microperthite, and oligoclase. The cairngorm crystals are peculiar in that they are frequently distorted and have tapering prism faces gradually merging into pyramids. Many cavities are partly filled with kaolin, fine rock fragments, and crystals derived from decomposition of their walls. Genthelvite crystals were found loose in this debris as individuals and groups often partly embedded in quartz and feldspar. Other specimens were obtained from material extracted from cavity walls. One cavity contained irregular masses of fine-grained chlorite coating both quartz and feldspar and occasionally enclosing genthelvite. Bertrandite crystals, usually emplaced on genthelvite but occasionally on quartz, are less common and were only discovered in one cavity.

The genthelvite crystals, which vary in size up to 1.3 cm, are combinations of unequally developed positive and negative tetrahedra. One large and dull tetrahedron with irregular faces due to parallel growth, is modified by a less-developed, smooth, and lustrous tetrahedron. Smaller crystals tend to be more perfect and free from parallel growth. The superficial colour is a yellow-brown but fractured surfaces are dark green. One small crystal is translucent pale green; part of another translucent red-brown. Deeply weathered specimens from a collapsed cavity are brown with an incomplete red-brown outer zone. The mineral is brittle, has a vitreous lustre, a hardness greater than 6, and a specific gravity of 3.58 ± 0.01 . It is colourless in thin section, transparent, isotropic with refractive index $n 1.742 \pm 0.003$.

New X-ray diffraction data are given in table I. A discrepancy exists between the d -spacings and unit cell parameter given here and the data of von Knorring and Dyson (1959). This is explained by the fact that those workers used an erroneous camera constant (O. von Knorring, personal communication) to calculate their d -spacings, but did not derive their unit cell from these; their unit cell of $8.12 \text{ \AA}$ thus agrees with their chemical analysis but bears no relation to the d -spacings they list.

A chemical analysis by A. A. Moss gave SiO_2 30.8, BeO 14.2, FeO 9.9, MnO 5.8 ZnO 37.0, S 5.1, sum (less O for S) 100.2. On a basis of 26

oxygen plus sulphur, this gives a formula $\text{Be}_{6.51}\text{Zn}_{5.21}\text{Fe}_{1.58}^{2+}\text{Mn}_{0.94}\text{Si}_{5.88}\text{O}_{24.18}\text{S}_{1.82}$. The beryllium content is notably high. In comparison with the original genthelvite of similar paragenesis from Colorado, the present one is poorer in zinc and richer in manganese and iron.

TABLE I. X-ray diffraction data for genthelvite from Cairn Gorm. 11.46 cm diameter camera, $\text{Cu-K}\alpha$ radiation, Ni filter. Relative intensities determined from a diffractometer trace. $a = 8.133 \pm 0.005 \text{ \AA}$

<i>hkl</i>	<i>d</i>	<i>I</i>	<i>hkl</i>	<i>d</i>	<i>I</i>
200	4.07 Å	3	630, 542	1.213 Å	1
210	3.64	9	631	1.199	1
211	3.32	100	444	1.174	1
220	2.872	5	710, 550, 543	1.150	2
310	2.574	22	720, 641	1.117	2
222	2.350	8	721, 633, 552	1.107	11
320	2.254	4	730	1.069	3
321	2.172	32	650, 643	1.041	2
400	2.031	5	732, 651	1.032	6
411, 330	1.913	63	811, 741, 554	1.001	8
420	1.821	11	820, 644	0.987	2
421	1.775	3	821, 742	0.982	1
332	1.733	3	653	0.972	1
422	1.660	15	822, 660	0.959	2
510, 431	1.594	6	831, 750, 743	0.946	3
520, 432	1.511	3	662	0.933	3
521	1.485	13	752	0.922	3
440	1.438	17	840	0.910	2
530, 433	1.396	13	910, 833	0.898	3
600, 442	1.355	14	842	0.887	3
611, 532	1.319	10	921, 761, 655	0.877	3
620	1.286	3	664	0.868	2
541	1.256	14	930, 851, 754	0.857	7
622	1.226	2	844	0.830	3

Bertrandite

The bertrandite crystals attain a maximum length of 3 mm, are tabular parallel to {001} and elongated in the direction of the *a*-axis. The forms determined by goniometry are {100}, {010} and {001} with occasional narrow faces belonging to {110}, {130}, and {011}. Some crystals show simple twins on {011}. Good cleavage is parallel to {110}, {010}, and {001}. The mineral is transparent, pale brown in colour, and has a vitreous lustre except for {001} on which it is pearly. It has a specific gravity of 2.60 ± 0.01 and a hardness between 6 and 7. The indices of refraction are α 1.590, β 1.603, and γ 1.613, all ± 0.003 ; $2V_{\alpha}$ 75°. An X-ray powder photograph taken of one of the specimens confirmed the identification of the mineral as bertrandite.

Other British records of bertrandite are those from Cornwall by Bowman (1911), Russell (1913), and Phemister (1940).

Specimens of genthelvite and bertrandite have been deposited in the Mineralogy Department of the British Museum (Natural History).

Acknowledgements. I wish to thank Dr. A. A. Moss of the Department of Mineralogy, British Museum (Natural History), who undertook the chemical analysis of the genthelvite. Dr. M. H. Battey and Dr. W. R. Dearman kindly read the manuscript.

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[Manuscript received 8 June 1966]

CASTLETOWN M., Lochgilphead, Strathclyde
Scotland.

R. Starkey & N. Hubbard (1998) J. Russ. S. 1, 38-39

Castletown M - a small cu mine in Dalradd.
metam's on E side of L. Gilp ~ 140 m W of
Ballimore. ~~Vein~~ Vein outcrops on shore at
NR 874 846; massive white quartz ~ 2 m
wide NE-SW for ~ 10 m, with anilite, Ca_4S_7 ,
Botallackite felted masses $\rightarrow 30 \times 20 \text{ mm}$, xls $\rightarrow 3 \times$
0.5 mm! w goeth + haem; clinoatac. botry crusts
& xls. (1R); connellite spher $\rightarrow 0.1 \text{ mm}$.

J Russ Soc (2001) 7[2] 93. N Hubbard &
D. Green "Vesignite from Castletown
mine..."

Vesignite, yell-green sphenulites in the
qtz-sulphide veinstone; ass w. malachite
& connellite, also clinoatac, dickite &
haematite.

WHEN YOU ARE!

ERTY SERVICES

⁵⁵
CHAPEL BURN, nr Stronachire, NO 072 095
Kinross, Scot

J I Wilton (2/97) Riv Comm, A colleague
of Simon Ingram, panning Chapel
Burn at NO 072 095 (1"05.55)
for gold, has recently found some
small ~~lumps~~ lumps of cinnabar (JIW
given a small xline-looking rounded
lump nearly 1mm across, "panned 2/97")

1" 4942 1:50,000 44

NO 3-5, 7

Glen CLOVA area, Angus (Forfars).

NO 3273 "Milton of Clova"

Heddlle

Kyanite in belt of metam. from 2 ml E of Mildden to Milton of Clova & L. Brandy.

"Mildden Lodge"
NO 5478
"Milddens"
NO 5450

Best from glen Effock ^{NO 478} - bright blue fine xls in quartz. Atton & Bonhard in Glen Clova.

Head of Water of Saughs. L. Brandy L. Lee. Bulg. In outliers nr. Mildden, W of Turret, S of Mt. Baltock, in large foliated masses of blue & yellow xls.

"Tarffside"
NO 4979

Tarffside, on W side of Garlet Hill, ~~the~~ w. x-lised chlorite.

On hill slopes below L. Brandy in highly metam. rocks, ass. w. qtz, muscov, tourmaline

COATSGATE Q'y, Moffat,

After breakfast we left for Coatsgate Quarry, Moffat, where we were met by Mr S. Lough, the Quarry Manager, who had kindly given us permission to enter his quarry and to collect wherever and for as long as we liked, UTOPIA! All we had to do was to close the gate on the way out.

There are two levels to the quarry: the top bench and the pit. Access to the latter is via a ramp. At present they are working a quartz-dolerite intrusion into the local greywacke. It is in the contact zone where the interesting mineralisation occurs.

The following minerals were collected and identified visually: specular hematite, micaceous hematite, magnetite, pyrite, calcite, chabazite (pink and colourless) in a variety of forms, actinolite, tremolite, quartz, andradite (yellow through to cinnamon brown), chalcocite (rare), unknown copper secondary and montmorillonite? The andradite varied in size from 1-2mm. Some had fibrous inclusions.

RSWB

Andradites
coll in 1962 'Ardb
analysed. Almost
pure Ca, Fe garnet
(~1990)

R. Starkey (1991)
BMSN'l 31

RSN(1996) 28

CREAG REIDH RAINEACH

Ross e Cromar

GMus, donation (1967) J. McA. Hart. garnet &
pyroxene in eclogite from N side of C.R.R.

OS G222 NOT IN

DUNASKIN GLEN,

Ayrshire

GMus, donation (1967) M. d'Archimbaud.

Monchiquite with large apatite xenocryst

OS Gazz - X

Rockhunting Sites

AGATES OF FIFE AND BEYOND

The following localities are all situated on private land and it must be stressed that permission needs to be obtained from the individual farmer. If permission is not obtained, and if these sites become full of mine-shafts, the farmers will obviously not want to see agate hunters back again. So anybody visiting these sites please, please keep the site tidy and fill in all excavations prior to leaving.

1. Binn Hill

One mile from the A.90 near Bein Inn on the Binn Farm. Large quantities of agate are found on the south slopes of Binn Hill in a gully and in the sides of the gully. The predominant type is grey, some of the grey having fine white banding with the occasional carnelian red and amethyst geode. Some of the agates from this locality have, during the years, washed down into the Binn Burn.

Burn on a steep hill which has been well dug over in the past. The agates from this site are very well marked and mostly uncracked. Carnelian agates predominate, most of which have a slimy green skin; some go through white with small inclusions of red similar to Indian Bloodstone in effect. Some pink/grey with very fine banding in some cases being almost chatoyant are also found occasionally. Eye agates are sometimes found. This particular site was known to the father of Scottish agate hunters, the great Dr Heddle.

Map reference: 07751250.

3. Glen Vale Farm

Below the Glen Burn near the sections of recently felled forestry. A few mixed agates were found in the light after an unsuccessful and very tiring search of West Lomond.

Map reference: 1750 0620

4. Alva Glen

On the path beside the west side of Alva Burn. Quartz, geodes and green band agates in decaying lava.

Map reference: 88259850

in Glen, (1973) 5 [1] p.8.

Anon Gems, (1973)

1. Binn Hill

One mile from the A.90 near Bein Inn on the Binn Farm. Large quantities of agate are found on the south slopes of Binn Hill in a gulley and in the sides of the gulley. The predominant type is grey, some of the grey having fine white banding with the occasional carnelian red and amethyst geode. Some of the agates from this locality have, during the years, washed down into the Binn Burn.

Map reference: 17151365.

2. Path of Condie

On the Mains of Struie Farm agates occur on the east side of the Chaple

Below the Glen Burn near three sections of recently felled forestry. A few mixed agates were found in failing light after an unsuccessful and ve tiring search of West Lomond.
Map reference: 1750 0620

4. Alva Glen

On the path beside the west side of Alva Burn. Quartz, geodes and grey band agates in decaying lava.
Map reference: 88259850

5. Glenduckie Hill

Agates are found on a forestry access road, these are predominantly grey the occasional one is banded and the rare one has a red inclusion.
Map reference: 28251930

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GAMRIE BAY, Banffshire, Scotland

van ~~Panhuys~~ Panhuys-Sigler et al (1996) Scott J.

Geol 32 [2] 127-32. Roscoelite in cones

of reduction spots in Lower ORS
outcropping at Gamrie Bay, Moray Firth.

Finely x'd as cement & replacing plagiocl.
in the s'stone.

1" 27, 20, 21. 1:50,000 28, 20, 21 NH 3-5, 5-6

Loch GARVE area, Ross & Cromarty (I)

$\frac{1}{2}$ mi S of Diebidale Lodge: - cassit + magnet lenses in garn-ab gneiss

Summ Min Res Crofer Co's (1969) Coarse book - mica
worked 1943-4 @ Little Scatwell from pegmatite
Map: - Felspar at garve; & at Little Scatwell w. mica
Glensgaich - gemmy garnet.
Near garve - beryl.

Hedde: "Precious" garnet: Strathpeffer - railway cutting
nr Glensgaich, in quartz, sometimes including
zircon, also w. muscovite; tourmaline, black
occas. green; zircon, apatite. garnets are
pink & brown $\rightarrow$ 5' in nodular quartz ve
Loch Garve: - brown garnet from granite

veins [ie pegs] nr the Black Water, on its S bank.

On N. side of Loch Garve, brilliant red, with muscovite, agalmatolite. Both zircon, in

quarry $\frac{1}{2}$ ml N of Achnasheen [to W, ~ NH 1658]

Zircon:- In granite belt cutting gneiss in Glensgaic w. muscov, garnet, apatite, tourmaline. Usually embedded in garnets. Embedd. in garnets in

gneiss in q'y $\frac{1}{2}$ ml N of Hotel at Achnasheen

Muscovite - ~~black~~ pale green xls w. garnet in granite vein [peg] S of Black Water Outlet, L. gar. Glensgaich railway cutting rose-mica xls $\rightarrow$ 15" [w. garnet, tourmaline, zircon].

Fannich: Stream bedrock of Allt a Choire Mhoir - rutile, thick brown xls; 1000' up S slope of Meallam Rairigidh - amethyst, brilliant colour.

L. Glass. Muscovite, big xls, near foot of L. Glass
Zircon - in gran. blocks w. garn, muscov - Head of Allt Grad, Kiltarn

Gairn Shiel [N] 293 010

On arrival we all eventually found the way back the same locality as in May 2003. But some other collectors had been before us and had left a large hole and not back filled it, we need the cooperation of the landowners to allow us to follow our hobby, so please back fill a hole that has been dug, even if it was already there.

64
b
The vein which was exposed last year was further dug into by Ian Dossett and Steve Plant who started to expose the wall rock of the vein that was found to contain molybdenite, cosalite, acanthite, stolzite, tungstite and molybdenite ore. Small amounts of niobium wolframite were also found but not of the same quantity as last year. By this time it was getting late and we needed to get to the hotel in Ballater, at the last minute Steve Plant remembered a good site for molybdenite near by. So as the others left for the hotel and dinner, Ian, Steve, Phil and myself made our way to the highest point in Gairn Shiel; and found quartz boulders containing some rather good samples of molybdenite which were collected by Ian and Steve. Fluorite was also found in the rocks just below the top of the hill. Collecting just below the crest of the hill and being windy blew dust into your eyes while digging into dry earth made collecting a bit of a nuisance. We were all having a good time collecting, but it was now about 19:15 hours and dinner was at Eight. So we had to stop and make our way back to the cars and make our way to the hotel and dinner, the restaurant only being next door to the Bed and Breakfast what luck not to far to walk!

Our thanks must go to Mr. Simon Blacket of Invercauld Estate for granting us access to the land for collecting.

Loch GARVE area, Rosse Cromarty (II)

R.P. McIntosh, J Russ Soc (2001) 7 [2] 71-74. Mention
of mica-mining. locs. (on p 73)

Saturday 5th June

Glenbuckat: Craig Wood

The first site of the day was Craig Wood looking for boulders containing Hornblende crystals up to 10cms. Boulders were found at the edges of the wood, it appears they were tipped there when tree-felling operations were taking place and therefore making it easier for us to find. Very large hornblende crystals were observed as seen in the picture with Ian Dossett. Attractive looking specimens were collected with some crystal assemblages taking on a cross shape. Ian found a boulder that might have been the one Heddle discussed in his book *The Mineralogy of Scotland*. It contained a large hole that had been drilled so the boulder could be broken up using explosives. Small amounts of labradorite, and sphene were also found.



Pic 8: Ian showing how big hornblende crystals are in a boulder

Glenbuckat: Creag an Eunan [N] 375 172]

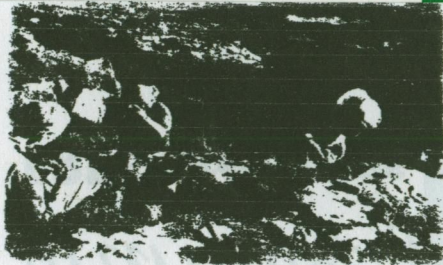
This site was located somewhere on a hillside at Creag an Eunan. It reportedly contained a quartz vein containing hornblende, labradorite, and sphene. After looking across the hillside for about 1 hour no sign of the quartz vein could be located and it was decided to move on to an alternative location at Lendenside Burn

GLENBUCKAT

Scot. (11)

PeatFold, Glenbuckat [N] 358 198]

We all arrived at Dulax Glenbuckat walked about 1.5 miles up the track and across the fields to the locality on the hill just below the top of the hill. When we arrived at the collecting site very large holes were observed that should have been backfilled when other collectors had finished, we were all quite shocked to find the site in such a poor state of repair. Please backfill any holes dug and leave the site in a good condition.



Picture 5: Ian, Phil and Steve

Digging down through the peat samples of tourmaline's started to be located as well as samples of lepidolite, schorl, arrojadeite, columbite-tantalite and triplite. It was quite a windy day and the peat was dry so the dust ended up by being blown into your eyes and making it very uncomfortable. The only way the that author found to get out of the wind was to dig the hole deeper and site in it while finding samples of rubellite. The best that the author found was a terminated zoned tourmaline (red to green) about 5mm long. Lyn and Clive Minker also found some rather nice rubellite crystals after quite a bit of digging and perseverance. Every body seemed to find something.



Pic 6: The group digging for Tourmaline's

site was tidied up and made more presentable. It cannot be stressed more strongly we need the good will of the landowners for access to these sites. So please backfill all holes that have been dug and leave the site tidy.

Dulax, Glenbuckat [N] 354 182]

On the way back down to the cars we stopped on the hill at Dulax to collect hornblende crystals that are just below surface and exposed after the gorse was burned back a few years ago. Lyn and Clive Minker found a particularly large sample with hornblende crystals in relief on the white rock.

Now it was time to find a tearoom near Ballater for a break in the days collecting!

Hector McNeil of Glenbuckat Estate must be thanked for his permission for access to the sites.

After about five hours collecting all the holes we had made and others were filled back in and the



Pic 7: Harry, Clive and Phil searching for Hornblende

^{1" 46}
GLEN CERAN, Strathclyde, Scot.

S. Ingram et al (1996) "Celtic Minerals" Spring Catalogue

COIRE BUIDHE (NOT on 1" 46), Glen Ceran (NN 04)

Strathclyde: Epidote, lustrous green
x/s to 12 x 10 mm on quartz

1" 35 1:50,000 33

NG 81, 82, 91

GLENELG area, Inverness, Rosse Cromarty (I)

TMH (1868) Asbestos, epidote, molybdenite, talc, zoisite.
EILAN REACH:- Actinolite

G&L (1858) EILAU REACH:- Pale green "hornblende" [actinolite]
GLENELG:- Epidote, x-lised & in lamellar & radiating masses.

Summ Min Res Crofters Co's. (1969) Talc mined at Ardintoul
1931-3 from 5-6' thick 20°-inclined sheet along
boundary Moine/Lewis gneisses. Adit.
Ratagan.- celestine a minor const^t of a pluton
igneous mass. Thin qtz veins with

local conc's of fluorite & traces pyrite & galena in
Ratagain granite adjacent to Strathconon fault
Glen Beag - asbestiform mixt of tremol + chlorite
in fault zone in Lewisian
Map p 12. Serpentine/peridotite in area.

Heddlie Zircon, Mam Ratagan, Loch Duich, v. minute
colourless xls in red "syenite".
Epidote x'l'ed in veins, S of Ellanreoch
Actinolite, S of Ellan Reoch

PT Riv Comm 7/85 Nr Balvraid Fm, glenn Beag [847166]
Actinolite stubby terminated xls with diopside

MM? Balvraid, gl. Beag. Pyroxenite, rhodonite, grunerite, garnet

Inverness,
GLENELG area, Ross & Cromarty (II)

N side of Beinn a Chapuill [N 825 160], eclogite, w/
garnet-hornblende-kyanite schist.

PT (1982) Riv Comm. Actinolite, N end of
Loch na Lochain, 8095135. Diopside xls
w. actinolite/tremolite, to SW of Meall Buidhe,
at 81051395

RSWB, 8/76. 76-159 Actinolite + thin vein epidote
in rolled pink feldspar pebble on beach
nr mouth of Gleann Beag, EILANREACH.
76-158 Epidote ~1" x 1 section in pyrite + quartz
vein in road cut 1/2 mi SW of EILANREACH

Hartfield Moss, Renfrewshire

4156

Hall (1868).

Hartfield Moss, Paisley: trap, etc. Analcime, laumontite, levyne, mesolite, natrolite, prehnite, weissigite.

Greg and Lettsom (1858).

Hartfield Moss, near Glasgow: natrolite, mesolite, weissigite.

Levyne, occasionally, flesh-red, opaque; Mr. Greg has a solitary crystal, flesh-red, nearly 1" across (fig.), but this is possibly gmelinite.

White translucent xls of laumontite (fig.) which he forms veins in the trap rock. Prehnite and analcime are here abundant, too. Twins of

laumontite (fig.) met with quite recently.
Prehnite, white opaque radiated, with cluthalite
and analcime, often pseudo after the last.
Analcime changed into white prehnite and forming
an interesting pseudomorph (fig.).

Houston, Paisley N.S. (1922).

Levyne (Phillips, 1837). Brochante visited Hartfi
Moss to collect prehnite (Ann. de Chim. 1, 213).
Natrolite.

K Meikle, BMSN (1988) 23, 15. Nat. silver,
filiform, cubes & dendrites to ~ 0.6 mm assoc
w. prehnite & thomsonite

HEADS OF AYR, Ayrshire, Scotland

(Just S of Ayr)

Spec shown to RWB 4/74. Agate

HILDERSTONE Ag mine, Scot.

BMS News (1999) 54, 17

Kemp Meikle :- uraninite;
a U-Cu-As phase (? zinnerite)

HOBKIRK, Roxburgh, Scotland.

Ron Brown, Gems (1973) 5 [2] 2-4 Easily
 taken agate, embedded in O.R.S.,
 at ROBERT'S LINN [] near Hobkirk
 Reddish-brown & white, no real patterning
 inferior to Cheviot agates, but in
 4-5 ft seams! Much faulted, though

KILPATRICK HILLS

Scot.

RSN(106) 48 32-33. Zeolites & list of
Scot locs for red-orange zeos

KNOYDART

Scotland.

R.P. McIntosh, J Russ Soc (2001) 7 [2] 71-74
Mica mining. - details

LISKY HILL Q.

Scot.

MJMins Cat. (12/93) Prehnite, in basalt,
with tiny white xls (?) Thomsonite
"Lisky Hill Q, nr. Glasgow.

LOANHEAD Q'y, Beith, Ayrshire, Scot.

NS 364 553

NS 3454

(I)

See also TREARNEQ

Roy Stankey, Priv. Comm. (2/85) working:

Big vert. dyke; wrote for permiss.

Garnets at dyke contact. Paeinite

w. occas. greenockite xls → 2mm

(which break up on attempted collection!)

T.K. Meikle (1989) J. Russ Soc 2 [2] 15. 'Sci'y min'y of Clyde
Plat. lavas, 2: Loanhead Q'y.

M. Wirth (1983) BMSN'le Z

WILEY NEW BOOK INFORMATION

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INTRODUCTION TO POLYMER VISCOELASTICITY,

edited by John J. Aklonis,
University of Southern California,
William J. MacKnight,
University of Massachusetts,
and Mitchel C. Shen,

Saturday 15 May, Loanhead Quarry, Beith,
Strathclyde *RSN (1094) 24*

An early start saw 15 members gathering at the quarry entrance having braved unseasonable wintry weather while travelling north. Kemp Meikle briefly outlined the geology and mineralogy of the quarry and the changes that had taken place during the past few years. The quarry is worked on three benches, although most activity appears now to be concentrated on the lowest.

Collecting was concentrated on the lowest bench, with a large pile of boulders on the quarry floor providing some thomsonite crystals and a little prehnite with calcite. A large cavity, mostly under water was located by Jonathon O'Dell within a few metres of the face. This produced some excellent translucent green botryoidal masses of prehnite, reportedly some of the finest to have been found for several years. Representative specimens of prehnite, calcite and a little analcime were collected by most members.

Loanhead Quarry appears to be slowly exhausting its reserves unable to work below the lowest bench because of planning constraints. It is estimated that the quarry will be worked out within five years.

1" maps (59 +) 60

↑ not essential; overlaps.

Beith [NS/35] Area:

Dockra limestone quarry (I haven't located it; can you?): millarite, calcite, aragonite, dolomite, chalcopryrite.

1"60 364 525?

Quarry near Loanhead, at 363555, discovered by Dick Bond & me a year ago. It's a deep narrow gash straight into the hillside, approached from A 737 road N of Beith by turning off at 358558 on "yellow" road going ESE & then on to quarry road going SE. We found

a nice specimen of prehnite here.

Other quarries round here are worth looking at for zeolites.

Hartfield Moss [NS/4156]: analcime, laumontite, levyne, mesolite, natrolite, prehnite, etc. etc. — see enclosed card
I know no exact locs.

88-532b

H

IR
sampled

Q's

LOANHEAD

Loanhead @ nr Berth S Scot.

B Taylor 6/88 → RSWB

? analcime 1 v 9g

Clbs needly ? zeo

White massive vugh fillups - no RR = ? (mix?) HCl

Laumontite?

IR = thomsonite

IR = albite

Epid - yellow-green

IR = epidote

Pink microsheaves

IR = albite

Garnet - andradite?

IR = andradite

Asbestos (? actinol)

IR = near TILLEYITE!!

Green Cu ~~zls~~

? Pumpellyite

Prehnite

IR = α chlorite NOT pump!

Haem (microplaty)

Rect. clear plates

Greenish/b rad (micro)

? Adamite - like thing

Calcite

Magnetite grains - magnetite

Limestone @ nearby, has

IR = Prehnite

Fe-rich chlorite
(chamositic)

Edingtonite Kemp M (1994)

Haem or

Phillipsite recorded in
BMSN No 7

Analcite

Calcite

Prehnite

Magnetite grains - magnetite

Haem (micro-platy)

Beryl Taylor

973-0858

(III)

Saturday 30 April - Loanhead Quarry, Beith.

Most of the party assembled at the filling station in Sanquhar at 9.30 a.m. for the drive north to Beith. The weather was fine, and upon arrival at the quarry, the party was welcomed by Brian Jackson of the Royal Museum of Scotland, and Gordon Todd of Kilbarchan.

Species collected (field identification only) were as follows :-

<u>Prehnite</u>	<u>Garnet</u>	<u>Quartz</u>
<u>Thomsonite</u>	<u>Analcime</u>	<u>Calcite</u>
<u>Epidote</u>	<u>Hematite</u>	<u>Laumontite</u>

No greenockite crystals are known to have been collected, although the species has been reported on previous occasions.

p15 K. Meikle has coll nat copper in prehnite; nat silver micro

In the afternoon the party moved on to the nearby Trearn Limestone Quarry. Here interesting micro-specimens can be found inside fossil brachiopods (*Productus* sp.).

Minerals noted were as follows :-

BMSN(1988) 23, 5

RSN (1993). 14

Thomsonite, prehnite, calcite.

LOCH GILPHEAD, ~~84~~ NR 874 847
Scotland

BMSN(2000)55, 9, 10. D. green → BMS Coll.

From CASTLETON M., 874 847. 2166,

clinoatacamite, brill emer-green;

2167, botallackite

LOSSIEMOUTH, Morayshire, Scotland
(I)

Soverby?

STOLFIELD, nr. Lossiemouth -

? anglesite or phosgenite

J. Nicol "Elements of Mineralogy" (1873) Edinburgh.

p 244

Stottfield, nr Elgin: PHOSGENITE

OS 1" map:

STOTFIELD, 2270

LOSSIEMOUTH, Morayshire, Scotland (II)

galena + quartz



Dick + Tim (+ Bob),

Mon. 13/7/64

NATURAL COLOUR

J. Arthur Dixon

PHOTOGRAVURE

POST CARD



Rained out of Wester Ross
(never having even got to Skye)
moving via Lossiemouth & Deeside
to Cairngorms, for silicates.
secondaries found at Lossiemouth.
At beginning of trip, Boylestone
+ Kripes mine were good, Leadhills
area a dead loss. Attacked Strang
mine in a gale + picked up a
lot of quartz + pyromorphite,
but probably no wulfenite.
Hope to stop in Kirkcudbrightshire
on way back. Back next week.

A very popular seaside resort on the Moray coast
and also a busy fishing port. It is here viewed from
the edge of the Golf Course, looking towards the
beach and the western side of the town.

Colour Photograph by J. Arthur Dixon Studios

will contact you before then. George

Dr. R. S. W. Braithwaite,
60 Osbourne Road,
Levenshulme,
MANCHESTER

Plans to open Morvern mine

PLANS FOR the development of the derelict 17th century lead mine at Lurga in Gleann Dubh, Morvern, were recently submitted to Lochaber Divisional Planning Department.

Minworth Limited, of Bakewell, Derbyshire, parent company of the locally operating Strontian Minerals, plan to extract 25,000 tonnes per annum of barytes and associated minerals from the site of the old mine.

Ore from Lurga will be transported to the company's plant above Bells Grove, Strontian, by trucks returning from delivery of material from the Strontian plant to Corpach.

Rate of Extraction

The proposed rate of extraction is in the region of 180 tonnes per day over at 2½-mile haul road to Achgavel then about one mile on the reconstructed existing track that connects with the A884 near the summit of Liddesdale Hill.

Planned intention is that the ore from Lurga will be used for blending purposes at the Strontian plant prior to treatment.

Although the scale of operations is planned over an area of 40 acres, Minworth Limited already hold mineral rights over a much larger area of Laudale Estate, with access rights near Achgavel.

Open cast methods of extraction will be used initially, employing four operatives and a foreman but the workforce will be increased when deep

mining operations commence later.

The estimated period of extraction from Lurga is 10 years; no permanent buildings will be erected and an old building near the site will be used as an explosive magazine.

Minworth state that when all mining operations are completed the workings will be backfilled with waste rock and revegetated by seeding.

Ten years ago the Highlands and Islands Development Board produced a report which stated: "The board have been advised by mineral consultants Robertson Research International Limited that the areas of Sunart and Morvern contain barytes occurrences offering the best prospects for development. Probably here, if anywhere in the Highlands and Islands, an exploitable body of barytes may be found."

Apart from its ever increasing demand for use in drilling muds for oil exploration barytes is also used in the glass, ceramics, electrical, paint, filler, rubber and paper industries.

tex

22%
STONE
PAINT

46 NM 7355

MULL, Island of, Scotland (I)IGS (1961) Sect 1: The Tert Volc. Districts.

p9 ROSS OF MULL. In the pelitic schist, streaks & lentils of pegmatite, adjacent to which are concentrations of tourmaline and Kyanite xls. Schists have $\sim 1/3$ mile wide metam. cur. to the granite, with sillim, andal & cordierite.

p73 Map showing sills etc w. sapphire in xenoliths, described p75; with mullite.

p118 Sapphire. (also Glebe Hill nr Kilchoan in Ardnamurchan). In Mull xls $\rightarrow$ 1" but thin & full of inclusions. L. SCRIDAIN area.

TG P Ziembra, Pers. Comm., (1975) Collected
quite good epidote xls with
white radiating scolecite from
An gearna area, NW slopes of
BEN MORE ("~ 1/2 way up NW slope of
Ben More")

RSWB 75-314. Scolecite (IR) milky
white radiating, 3 mm; with weathered
epidote xls to 5 mm.

RSWB 75-~~314~~ 313, scolecite; 75-315 epidote
with white platy albite xls (IR). (good xls)

MULL Is., Scotland (II)

TGP2 (1975) Contd.

RSWB 75-316 Xonotlite pale pink & white
pearly (IR) Quarry ESE of Taoslin, Ross of
Mull [~ NM 2239 - 2240]; also laumontite
from same quarry RSWB 75-317

RSWB 75-318 Kyanite blue blades in
biotite schist. 300 yd NE of Tel. Box,
Blàr Dubh, S of Bunessan, NM 385 196

RSWB 75-377 Prehnite xls in vugh from
quartz vein (weathered) "MULL" [whose?]
Coll & pres by a friend of Harold Winstanley.

CARSAIG BAY: Beryl Taylor: RSWB 91-49

Prehnite, w. traces copper, lining vugh
in basalt.

Pers Comm 9/90: "Basalt cavity minerals" at
~ 544 205.

Pers Comm 6/99: "An old map" shows a
"silver mine" on coast [near 530 206
"within shouting distance of Nun's Cave/Pass"]

BT found one spec on beach with
cerargyrite-bromarg xls. (XRD BMNH;
spec: - $\frac{1}{2}$ to BM, $\frac{1}{2}$ to R Scot Mus). Found
good sapphires in pink mullite near
Nun's Cave [523 203]. From area also:
gd aragonite; v.g. pumpellyite; apoph(?); allanite;
ceprite xls; zircon; bright yellow unident ("epid")

and along
bay shore

MULL Is., Scotland (III)

BMS Newsl. (1999) 53, 9, 10 → BMS coll.

K. Meikle.

2141, 2 Tourmaline, Loch Assapol, Bunessan ^{NM} 397 207

2143 Kyanite NM 380 197, Ardnalanish, Bunessan

RCN (2001) 39 15. C. Critchley. CARSAIG BAY NM 543 24

Around pier: pumpellyite, zoolites traces Cu mineralisation;

Beach: dykes w. xenoliths w. mullite & sapphirine in a
"promising pinkish-looking rock". Naetrol on prehnite.
epidote, analcime, calcite, nat Cu, ?mal, chalced.

[Includes NUNS PASS "up in cliffs beyond" [524 203]
larger cavs w. calcites etc].

BEN MORE ~~44~~ 505 365: NW slope of AN GEARNA
Little @ far end of valley but in scree along valley
Scolecite (spec's $\rightarrow$ 5"), epidote, garnet

BMSN('02) 63, 10 LUNGA TRESHNISH - scolecite
(Oneta Wilson)

PIBBLE MINE, Kirkmabreck, Dumf' e Galloway.

Pibble Mine, Kirkmabreck, Dumfries & Galloway [Grid Ref: NX 527 607].

This entails a rather pleasant drive along a track and through several gates, having opened them first of course! Who ever said that midges don't appear in Scotland till June? As I held the gates open (what a hero) swarms of midges appeared! Early risers?

The owner, who lives in the last house on the track, gave us permission to go on the site, and informed us that it had just been declared SSSI. She is not too happy about that!

On site there are the remains of what must have been a fine engine house and a possible wheel pit. At least one adit is open but is very wet and in poor condition. Minerals noted on the tips were typical of copper/lead/zinc - chalcopyrite, galena, sphalerite, linarite, malachite, cerussite, brochantite, hemimorphite and pyromorphite.

Up till now the weather had been fine but it started to rain. We decided to return to the track, gates, midges and on to Sanquhar for the night.

RSN (1996) 28

SKYE

Scotland (I)

See also PSWB's booklet

BM. Actinolite falc. Ornsay Is. (7112)^{NG.}

C. Rogers 10/72.

Near SKEABOST 452 473 Vg stilbite;
analcite.

Quarry E of SLIGACHAN.
calcite

Laumontite, epidote,

Road widening nr. BRACADALE. Large loose boulders (used to make a banking for road leading to bridge - similar material in nearby cutting). Basalt, v. vesicular with much analcime with tiny needles ? natrolite

R. Starkey (1988) UK J. Min. Mins. 1(5) 18-20

Ea 4 ml NE of Portree on road to Dunvegan:-
brownish basalt with smallish rather
plugged vesicles with pinkish mud
& traces thick white needles.

Q'y at DUNVEGAN. Good compact radiating
white Thomsonite; analcime; apophyllite.

The STORR:- Colourless radiating ^{? gyrolite} with greenish
~~surface~~ analcime with thin
fluffy ? natrolite

FLODIGARRY (a) Roadside near:- Chabazite; analcime;
small stilbite plates on analcime.

(b) The QUIRANG:- Levyne; chabazite; IV?

SKYE

Scotland (IT)

BMSN(2000) 55, 9, 10. D. Green → BMS coll.,
from SGURR NAN CEARCAL, NG 420 166. (1"33)
2168: Connellite; 2169: Spangolite
"nice, vicious blue-green".

BMSN(01) 58 8-10 S. Rust "Miarolitic minerals from
Loch Ainort, Centr. Skye. [1"25 NG 52; around 54 27]
~25 euhed. species ex granite blocks from road-cuts &
outcrops. Adular, allan, anatas, apat (?) (1), apoph,
biot, Ca, chabaz, cl-chlore, epid, hedenb'g, feldspars.
fluor (octa → 1.5 mm + odd shapes), gadol-Y, h'blende,
heuland, ilmen (?), kainosite-Y (W. to Br. H), laumont,
magnet, prehn, pyrite, pyrrhot, qtz, stilb, stilb-K, sphal, sulphur
Titanite, Zircon common → 2.5 mm. 2 unidents.

BMSN(01) 59, 6. G. Henwood → coll No 2261 Natrolite
lustr. clear transp prismatic xls from S of
Cuillins.

D. Green, D. McCallum (2005) UKJMM 26, 23-26.
Kainosite-(Y), 1st Brit with STROTTIAN (gr)
clear blocky → prism xls in microl cavs
in Cuillins granite near EAS A BHRADAIN
(S. Rust pers comm)

RSN('05) 47, 40-43. VG zeosite exp MOONEEN BAY
RSN('06) 49, 33-35.

ALLT DABHACH,

Skye.

GMus. Donation (1967), R. Emms.

natrolite, heulandite,
Allt Dabhach, Skye

Pectolite,
from valley of

OSGA22 - X

? Allt Daraich (to the E from Sligachan)

GLEN OLLISDALE, Skye.

Scor.

M. Wolfe (1996) UKJMM 17 4-6. "Min. News"

Fine calcite to 4 cm on mesolite
in basalt at the remote loc. of
Glen Ollisdale, Skye.



The Skye's the limit...

A PHOTOGRAPH of shafts of light breaking through the cloud over the Isle of Skye has won a top award. Emmanuel Coupe's picture of the pinnacles of The Old Man Of Storr earned him £10,000 and the Landscape Photographer of the Year Award. The Paris-based photographer's shot was chosen from thousands of entries. The top 100 pictures featuring Britain's diverse landscape – from ancient woodland to the Houses of Parliament –

will go on show at the Take A View exhibition at the National Theatre in London from December 5. 'This extraordinary collection of photographs serves as a reminder of the enduring beauty of our countryside, its wonderful wildlife and of the vital natural services that a healthy environment provides', said Dr Helen Phillips of Natural England, which is supporting the exhibition along with the English National Park Authorities.

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SOUTH HARRIS, Hebrides, Scot.

OIM/4307 Baba et al Am Min (2000) 1474-1484

Surinamite $(\text{Mg,Fe})_3\text{Al}_4\text{BeSi}_3\text{O}_{16}$

sapphirine-like species in metamosed pegs.
grains (tabular) $\rightarrow$ 1 mm in cordierite & kyanite

1"55

NO 07 09

STRONACHIE, Kintross,

Scot.

See CHAPEL BURN (cinnabar; gold)

R.S.W.B.

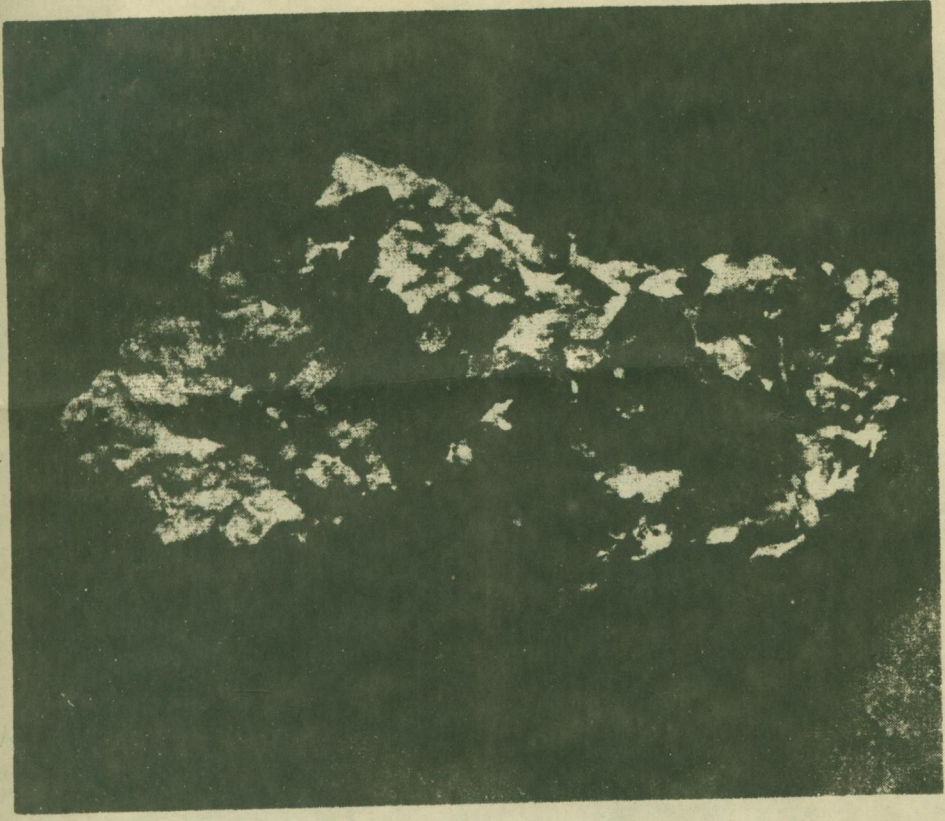


Fig. 1. This specimen with fine galena crystals was found on the dumps at Bellsgrove Lodge.

Whitesmith, Middleshop, Bellsgrove and Fee Donald, all of which have been worked since 1722. The mines were not particularly rich in lead but were worked continually until 1815 when they were shut down. They were reopened however, a few years later but chiefly with the view of finding employment for the local men who were employed subsequently as labourers, the skilled miners being brought from the Leadhills-Wanlockhead mining district in the Southern Uplands of Scotland. After closing down again in 1836, work was carried out from time to time until 1904. Since then the mines have remained idle.

Opencast mining took precedent over conventional tunnelling with subsequent stoping of the veins. Large scars caused by this opencast mining can be seen extending for 2½ miles over the heather-covered countryside. Although the clefts resulting from opencast mining reach depths of 100 feet, they are easily accessible, for the most part dry, and, what is more important, they are

In addition to history, color and scenic beauty, Scotland has much to offer the rock hobbyist. If you're fortunate enough to make a trip there, be sure to do some —

Rockhounding At Strontian

By Brian Jackson
Royal Scottish Museum
Edinburgh, Scotland

Increasing visits to Scotland by rockhounds from the U.S.A. have prompted me to write this account of my collecting trip to the old lead mines at Strontian, Argyll. Perhaps others will benefit from my experience if they decide to go there.

The Strontian mines, which recently have been examined by a Canadian mining company, lie 3½ miles north of the village of Strontian which is situated by the shore of Loch Sunart on the Ardnamurchan peninsula (see map). The road from Strontian to the mines is in good condition as far as Bellsgrove Lodge and this section may be covered by car. However, the remaining 200-300 hundred yards are cut by rills and gullies and in some parts is washed away, especially at the mouth of the grand level.

There are five main mines: Corantee,

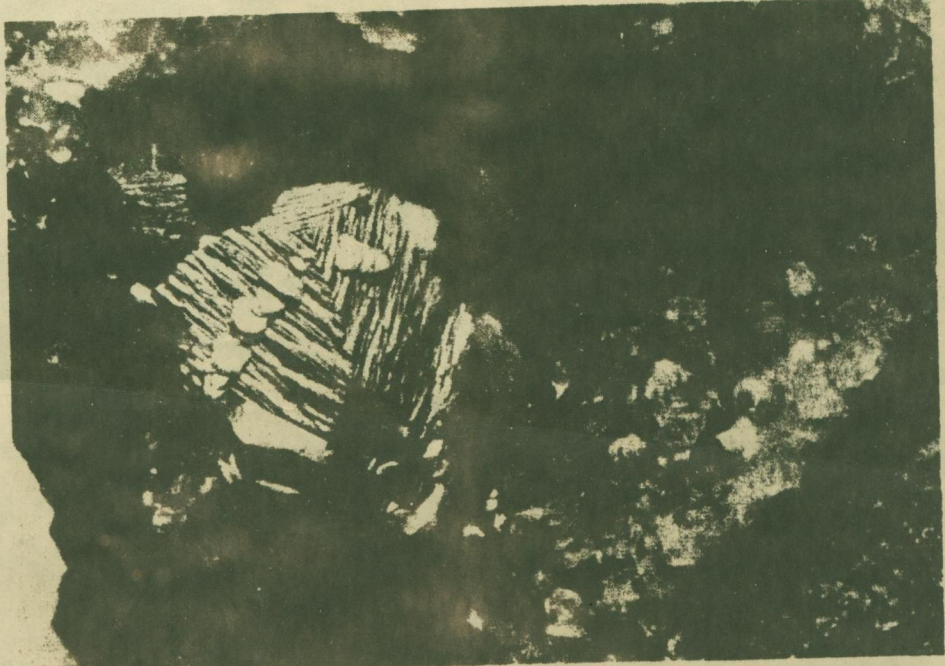


Fig. 2. Schieferspar protruding at different levels on a crystal of brown calcite.

DECEMBER 1968

safe. While searching for minerals in the opencast pits, I found a hand-torch invaluable. Although the cuts are open to direct sunlight, the depth of the clefts causes much of the sunlight to be cut out.

The Strontian lead mines consist of wide veins, sometimes 35 feet across, trending more or less East-West and dipping at 5° to the vertical. These veins are intruded into Moine rocks (schists and quartz gneisses) and white Strontian granites of Caledonian age. The age of the veins themselves generally is held to be Permo-Triassic, that is about 230 million years old.

Mineralogy

Galena, sphalerite, pyrite and jamesonite are the primary ores found in the veins, galena being the foremost amongst these. The gangue minerals of the veins are barites, calcite, harmotome, brewsterite, strontianite and quartz. The galena is found as truncated cubes and is interstitial in a calcareous-barites gangue matrix (Fig. 1). The percentage of galena compared with the rest of the vein material is low, but many crystals can easily be found both as single and as interpenetrated crystals. The crystals are, as a rule, about 1/2 inch across the prism faces and never attain a size greater than 1 inch across such faces. Interpenetrated masses, however, are found in all shapes and sizes up to about 3 inches. Wide sections of massive galena, up to 30 inches across, have been recorded. From the galena remaining in the veins, evidently these broad masses were mined and smelted long ago.

I found no sphalerite, jamesonite or pyrite while I was there, but a specimen of pyrite from Strontian on display in the Royal Scottish Museum, Edinburgh, shows small crystals on a calcite matrix. Sphalerite is recorded as being plentiful in the Corantce mine and dumps.

Of all the minerals found in the veins, the gangue minerals are the most plentiful, barites and calcite being the most abundant. Calcite occurs not only in the usual dog-tooth and nail-head forms, but in an unusual triangular pyramidal form, sometimes with schieferspar protruding at different levels on the pyramid (Fig. 2). In this form, the calcite colour is generally brown, but milky and translucent material does occur in the more conventional forms. Calcite of a delicate violet colour also may be found.

A specimen in the Royal Scottish Museum shows calcite crystal with three distinct generations of growth which result in an unusual crystal group (Fig. 3). It gives rise to interesting fluorescent effects; when tested under both long and short wave light, the first and third generation of growth fluoresced deep red while the second generation fluoresced a dirty cream, contrasting with

and sandwiched between the two deep red areas. When I switched off the ultraviolet lamp, I was surprised to find that the second generation growth was also phosphorescent. Further "gunning" of the Strontian calcites with the ultraviolet lamp showed that the translucent and milky specimens fluoresced deep to brilliant red, while the brown fluoresced cream and were phosphorescent. A gentle gradation in color from brown to translucent also produced a gradation in fluorescence from cream through pink to red.

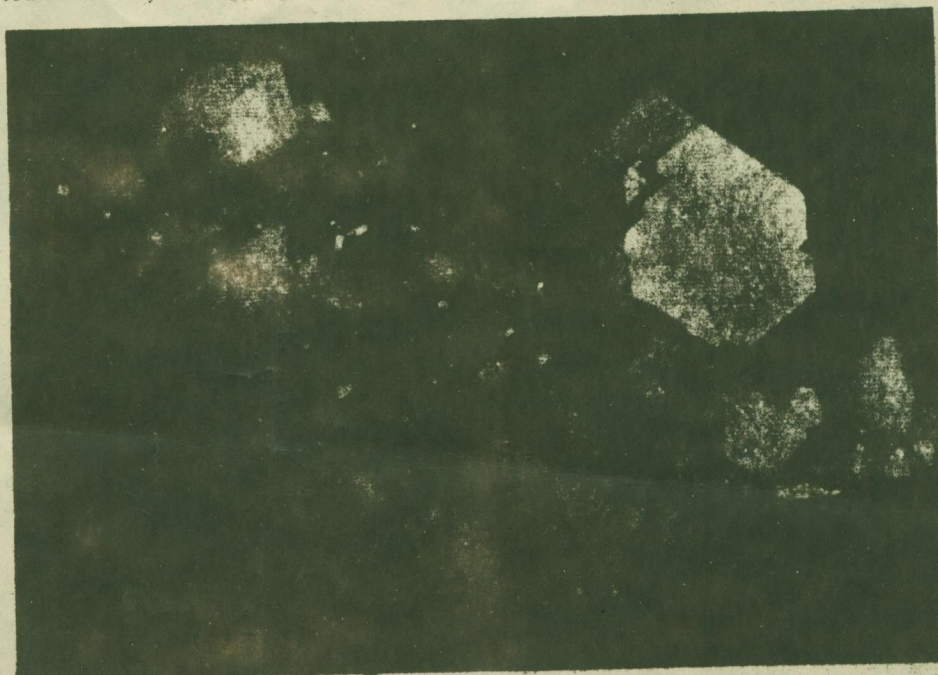
Often associated with the brown calcite is the barium zeolite, harmotome (Fig. 4) which occurs as well developed milky white to translucent monoclinic crystals. The translucent variety is known as morvenite. Harmotome is found as crystal aggregates and fre-

quently occurs as contact and interpenetrated twins which may take the shape of cruciform penitral twins (Fig. 5). The crystals are of a size comparable with the galena crystals although not so abundant.

Brewsterite (Fig. 6), another barium mineral, is very common on the hanging wall of the main vein where it occurs as small crystal masses which cement fragments of rock vein between granite and gneiss. These crystals make excellent micromount specimens.

Strontianite, named after the village of Strontian, occurs as compact diverg-

Fig. 4. Large crystals of harmotome on barite



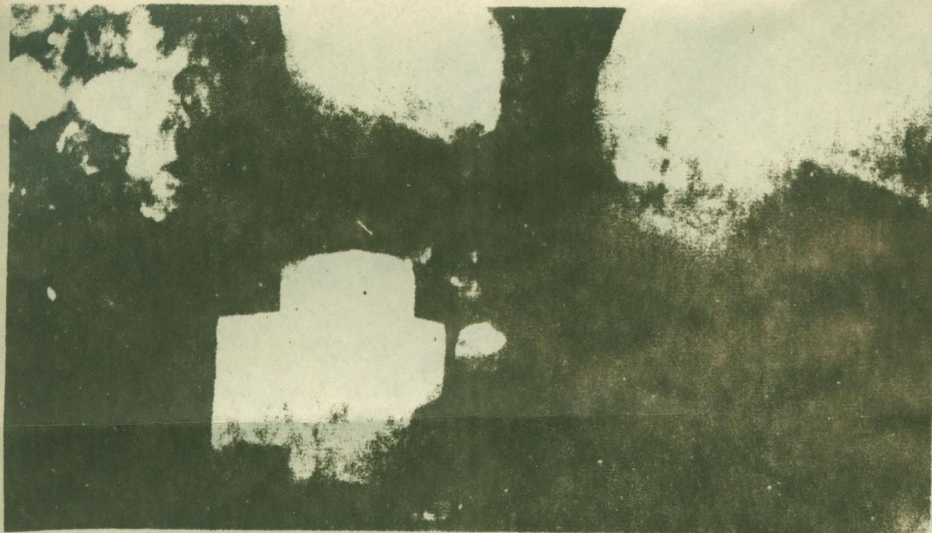


Fig. 5. A small cruciform twin of harmotome, showing columnar crystals, specimens of which are not uncommon (Fig. 7). This mineral, which is found associated with calcite and barites, comes in various colors ranging from white through yellows and greens to brown. It tends to be in veins or pockets in the calcareous barites matrix. One of these veins, on the foot wall of the Strontian main vein, contains green strontianite. However, the mineral is not confined to this vein. Under long and short wave light, the specimens of strontianite showed a strong reaction, all of them fluorescing in various shades of green, yellow green and white. The fluorescence of weathered material however, was subdued. All the specimens were phosphorescent, some brilliantly, others less so, and this seemed to depend on the freshness of the specimen. Sometimes strontianite is found altered to celestite.

Quartz does not occur in large crystals and, in fact, most of it is in massive form, generally associated with the granite and quartz gneiss. Although barite is probably the most abundant mineral to be found, it invariably occurs in the massive white form. It is rarely, if ever,

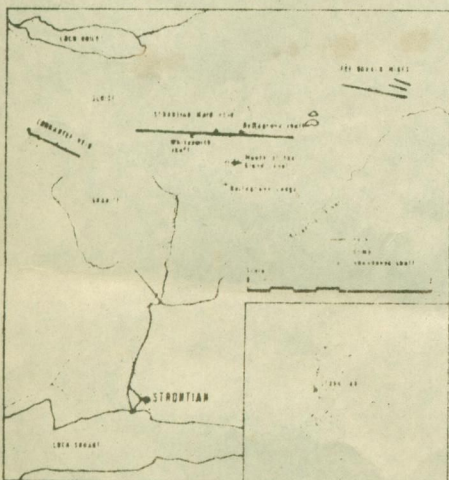


Fig. 6. Brewsterite crystals associated with fragments of Moine schist

found as crystals, which is rather unusual considering the vast amount of barite in the veins. Occurrences of jamezonite and covellite also have been recorded but these are rare and in amounts of no consequence, being merely trace associates of the other gangue minerals.

So far, I have referred to the open-cast workings and the veins where, in most cases, I had to dig out the minerals with a hammer and chisel. It is not surprising that I concentrated my efforts here. Previous to my collecting trip, I joined the Grampian Speliological Group, a caving club based in Edinburgh. With underground experience, I was bound to be drawn to the old workings, indeed, I had a few sorties along the old adit levels.

There are large dumps which are virtually untouched by mineral collectors and in which are found all the minerals that occur in the old workings, although here the crystals tend to be slightly damaged. The dumps begin at Bellsgrove Lodge and continue alongside the road up to the adit level for the

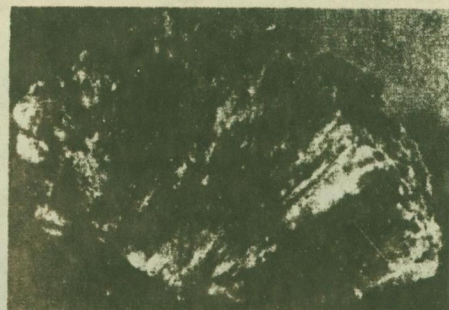


Fig. 7. A large specimen of brown strontianite measuring 8x4 inches.

main vein. This string is the waste from what was the most productive area, the Bellsgrove, Middleshop and Whitesmith Mines of the main vein. About one mile west from these are the Corantee dumps, three in all, while one mile to the east of the same mines lie the Fee Donald dumps. Other small dumps occur beside each mine but the Bellsgrove Lodge string is, by far, the largest and most productive specimen-wise.

The Strontian lead mines offer the observant rockhound a variety of well formed crystals of various minerals most of which are easily found in both the open-cast pits and the large un-combed dumps. As a bonus, these minerals are found in some of the finest scenery Scotland can offer.

Editor's Note:

Twenty year old Brian Jackson is the youngest member of the Geology Department of the Royal Scottish Museum and is assistant to Dr. Macpherson, curator of minerals and gems. The area described is owned by the Board of Agriculture of Scotland. Mr. Jackson said that permission to collect is not required but he added, "simple courtesies and safety precautions should be observed."

The cream of the specimens, collected by a member of the geology staff, are registered by the Museum and the remaining material is used in various ways. Duplicates are put in a reserve collection which is a standby in case of damage to registered specimens. Some material is placed on sale in the Museum's shop. A collection is maintained for temporary display at universities, libraries, etc. and there is one used for exchange with other museums, geological institutes, and private collectors.

Since this article was written, a newspaper has reported that the Minister of State, Dr. Dickson Mabon, has chosen Strontian for an experiment in rural development. Roads and other facilities are planned to turn the village into a holiday resort. Facilities will include camping, caravanning, sports, boating, fishing in Loch Sunart, pony trekking and nature trails.

STRONTIAN, Argyll, Scot.

D. Green, D. McCallum (2005) UKJMM 26
pp 23 - 26

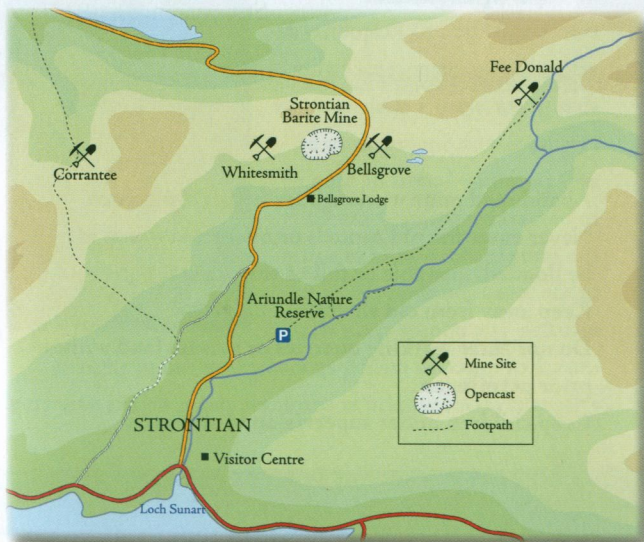
Kainosite-(Y), 1st Brit. $\text{Ca}_2(\text{Y}, \text{Ce})_2$
 $\text{Si}_4\text{O}_{12}(\text{CO}_3)\cdot\text{H}_2\text{O}$ 1st Brit, with a find

~~at~~ in microl cavs in granite near Eas
a. Bhàrdain, Cuilling, Skye (S. Rust).
white micro sprays, spherules, also pink
bipyrr ancylite-(Ce) $\rightarrow$ 1 mm. (Whitesmith).

K-(Y) from Corranree, Whitesmith, a
"Stront Baryte M" (post 1980's which

The Mines

The Strontian mines are situated on rough, boggy, moorland about 3 miles north of Strontian village. From east to west, they are named Fee Donald, Bells Grove, Middleshop, Whitesmith and Corrantee. Fee Donald, the most easterly mine is wrongly marked as Bells Grove on the Ordnance Survey map. A track through the Ariundle Nature Reserve eventually leads to the abandoned workings, which are accessible only on foot. The westerly workings at Corrantee are also only accessible to walkers. The easiest route follows the old coffin track from Strontian village, but this requires a considerable ascent before dropping down to the mine. The road from Strontian to Polloch passes the Bells Grove, Middleshop and Whitesmith mines, though most of the old nineteenth century workings once visible here were quarried away by the new barite mine in the 1980s. There are a few mine dumps near Bells Grove Lodge. The old mine drainage level (also known as the Grand Level) can be seen on the north side of the road just past the Lodge. The modern workings of the barite mine are located west of the road on the steep hill behind Bells Grove Lodge. This site is currently being worked for aggregate; it is on private land.

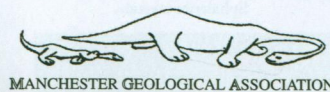
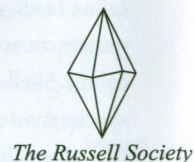


Further information is available from
The Strontian Tourist Office
Minerals of Scotland website: www.curriehj.freemove.co.uk

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www.visithighlands.com
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www.mangeolassoc.org.uk
The Russell Society
www.russellsoc.org
National Museums of Scotland
www.nms.ac.uk
UK Journal of Mines & Minerals
www.ukjmm.co.uk



The Strontian Mines



Past and
Present
(2004)

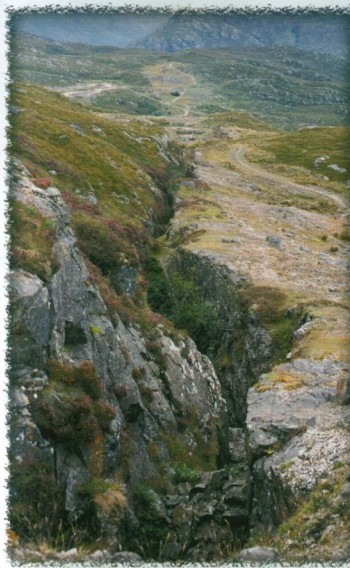
History

The first record of mining at Strontian dates from 1722, a time when conditions in the Highlands were very different from today. The quickest access was by sea, there were virtually no roads, and the area was considered both lawless and rebellious. Sir Alexander Murray had recently inherited the Sunart estate and set up residence in Mingary Castle. He was determined to make improvements and brought skilled miners from the south to work the mines. At first things appear to have gone well, but Murray and his partners were relatively inexperienced. Following several bad years they had the great misfortune in 1730 to lease the mines to the York Building Company. This company rapidly ran up huge debts which bankrupted both the mines and Sir Alexander. The York Building Company relinquished their lease in 1740 and a succession of companies tried their luck, some with moderate success, until 1767 when the estate was purchased by James Riddell.



Rusting gear from the waterwheel at Corranree

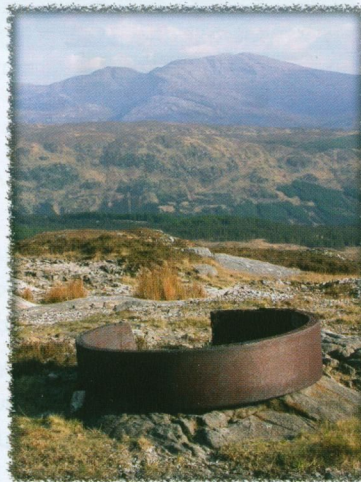
Little is known of the history of the workings for the next half century, though it is clear a considerable amount of work was done on the Grand Level, which was cut to drain the Bellsgrrove workings. It seems likely that the mines were worked by small groups of men who paid a certain fraction of the ore raised (usually an eighth) to the lord in tribute. Since it was not unusual for an annual income of a thousand pounds to be raised in this way, there must have been significant activity. The first detailed plans of the mines date from the turn of the eighteenth century and they show that a great deal of work had been done. In 1846 the Strontian Mining Company took the lease, but they seem to have given up by 1850. A succession of small



The Strontian main vein at Whitesmith

companies followed, producing a few hundred tons of lead ore at most, until the early 1870s when bankruptcy followed the crash in the world price of lead. A final attempt to reopen the Bellsgrrove Mine in 1901 failed before any ore was raised and, with it, the tradition of lead mining at Strontian came to an end.

In the 1970s, at the height of the North Sea oil boom, Strontian became a tempting target for mining companies once again. Lead was of no interest but barite, a heavy white mineral that had previously been thrown away, was an essential part of the lubricating mud used in drilling. A processing plant was built and barite mining began in the early 1980s. The quarry and dumps visible from the Strontian to Polloch road date from this period. The barite mine worked through some of the old lead mine workings, completely obliterating most of the Bellsgrrove and all of the Middleshop Mine. The area around the barite quarry is currently being worked for aggregate by a local company. There is no public access.



Iron rim from a crushing wheel at Whitesmith

Strontium

The village of Strontian occupies a unique and honoured position in the history of chemistry. It is the only place in the British Isles and one of the very few places in the world to have a chemical element named for it. There are only



Painting of strontianite from 1804

about 90 naturally occurring chemical elements. They are the building blocks from which everything is made. The elements are grouped into an arrangement known as the periodic table. Strontium is a metallic element, which has the symbol Sr, it is in the second group of the periodic table.

Strontium was first found in the mineral strontianite. Credit for the discovery usually goes to Adair Crawford and his assistant William Cruikshank who realised that strontianite contained a "new earth" as a result of their research on the medicinal properties of minerals in the late 1780s. Thomas Charles Hope, later to be Professor of Chemistry at the University of Edinburgh, subsequently carried out experiments which showed strontium to be a unique element with properties between calcium and barium. It was not until 1808 that Sir Humphry Davy, who had stayed in Strontian in 1804, isolated the metallic element by electrolysis.

Strontium has relatively few uses. It is best known for the brilliant red colours that are produced in fireworks and warning flares. It is also a minor component of special glasses used in television screens.

Geology

Strontian village is built on granodiorite. This is an igneous rock which rose as molten magma in the crust of the Earth and cooled slowly at great depth. The granodiorite is thought to be about 430 million years old. It is surrounded by older metamorphic rocks including gneiss (pronounced nice) and schist. These rocks were produced by the collision of two huge blocks of the Earth's crust, known as plates.



Calcite-barite vein in granodiorite.

The mineral veins at Strontian are mostly within gneiss and schist but run for part of their length along the boundary with the granodiorite. The veins are much younger than the surrounding rocks. They formed from hot metal-rich fluids, which deposited the minerals in cracks and fractures. The veins follow pre-existing lines of weakness in the earth, known as fault zones. These fault zones also contain dykes made of dark basalt rock. There are two sets of dykes visible at Strontian. One is older than the veins and is often dark green in colour and relatively soft. It has been altered by the hot fluids that formed the veins. The other is much younger and cuts across the veins. The younger basalt is black and hard, it has not been altered.

The area around Strontian is a Site of Special Scientific Interest because of the remarkable geology and the unusual minerals that are present.

Barite

The Strontian mines were reworked for barite in the 1980s to satisfy an increasing demand for drilling mud by the North Sea oil industry.

Barite forms a major part of the veins over most of their length and grades of 20% to 35% were typical of the mined ore. Barite can be identified by its bright white colour and the fact that specimens feel unusually heavy. The crystalline cockscomb variety is sometimes found in cavities in the veins.



White barite with black sphalerite

Brewsterite

Brewsterite was named by Henry Brooke in 1822 in honour of Sir David Brewster (1781–1868), the

distinguished Scottish scientist and inventor of the kaleidoscope. Strontian is the only locality in Britain where it has been found.

Brewsterite occurs at all of the mines at Strontian except Corranree. It forms crusts of colourless to pale brownish blocky crystals up to about 5 mm long. Brewsterite is a member of the zeolite group of minerals.



Pale brown brewsterite in gneiss.

Calcite

Calcite is very common at Strontian but it occurs in such a variety of different crystal shapes that it can be hard to identify. The photos show a few of the more common types. In the veins calcite occurs as white to pale cream bands. Crystals may be white, yellow or brown. Calcite is a carbonate mineral, so it fizzes when a drop of dilute acid is placed on it. This test is commonly used by geologists as an aid to identification.



Hexagonal prisms of calcite



Pale brown calcite rhombs



Calcite coronets

Galena

The Strontian mines were developed in the eighteenth and nineteenth centuries to extract galena, the major ore of lead. Galena is common in the veins where it occurs as dark grey masses which are usually enclosed by barite and calcite.

When broken these show cubic cleavage and a bright silvery-blue metallic lustre. Crystals like the one in the photo are rare.



Grey galena crystal on white barite.

Harmotome

The Strontian mines have produced some of the world's finest specimens of the rare mineral harmotome. Like brewsterite, harmotome belongs to the zeolite group of minerals. Zeolites have unusual atomic structures which make them suited for a variety of industrial applications,

but the zeolites at Strontian do not occur in sufficient quantities to make them worth mining. Harmotome occurs as blocky white crystals to 3 cm across often with calcite and



Blocky white harmotome crystals.

sometimes with brewsterite or barite. It occurs at all of the mines, from Corrantee in the west to Fee Donald in the east, but the best specimens with the largest crystals were found on the dumps near Bells Grove Lodge.

Pyrite

Pyrite (also known as fools gold) is reasonably common at Strontian and has been found at all of the mines from Corrantee to Fee Donald. Crystals vary up to about 20 mm on edge and masses up to fist size also occur. Specimens are silvery to golden metallic when fresh but commonly tarnish to a bronzy colour.



Golden metallic pyrite.

Quartz

Quartz is uncommon except at Fee Donald Mine, where it makes up a significant proportion of the vein and where

tiny crystals commonly line fractures and cavities in the rock. A few crystalline specimens of pale smoky quartz and pale amethyst (which is a variety of quartz) have been found at the barite mine. Quartz is very hard and breaks like glass so it is easy to identify.



Smoky quartz on cockscomb barite.

Sphalerite

Sphalerite, the ore of zinc, is common in the Strontian mines and especially so at Corrantee, which was at one time considered to be a worthwhile prospect for zinc. Sphalerite was called black jack by the miners on account of its colour. Well crystallised specimens are rare but black metallic masses and veins frequently occur on the old mine dumps.



Sphalerite crystals.

Strontianite

The mineral strontianite was first recognised by the Rev. Dr John Walker who discovered it on a journey he made in 1764 to survey the Highlands and Hebrides. It is named after the village of Strontian. Strontianite occurs most frequently in the central group of mines between Bells Grove and Whitesmith, but it is rather rare even there. It forms white, pale green and pale brown masses, often with a radiating structure, but is only rarely found as distinct crystals. The element strontium was



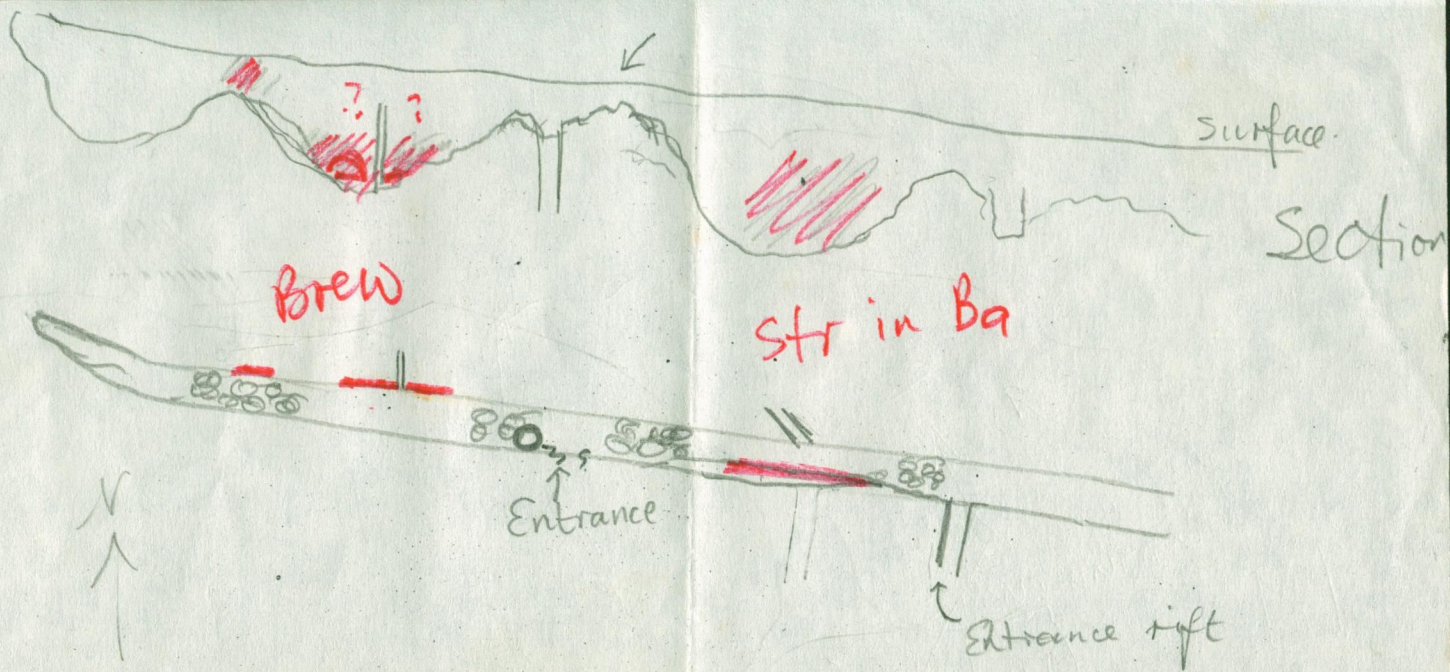
Pale brown strontianite.

discovered in strontianite and there was a great deal of scientific interest in it at the beginning of the nineteenth century. As a result many of the world's natural history museums have specimens of strontianite from the Strontian mines.



Spray of green strontianite

Abandoned mine workings are highly dangerous. Never enter the old tunnels or opencuts, which may be flooded, unstable or full of toxic gases. Keep away from old shafts. Do not enter working quarries or private land without prior permission. Keep children under supervision at all times.



Hill

Whitesmith

Hill
Hill

Field

Bells Grove

(T)

STRUY QUARRY

Inverness, Scotland.

G.Mun. Pale green beryl, on quartz, with mica. STRUY QY

Hedde St. Bridge Qy. Be, tourm, garnet, muscov, pink o'd, microcline, zircon in feldspar

Bull 25 p96. Narrow pinkish-gtz-muscovite peg with beryl
nr Struy Bridge. NH 398 397

Rothwell & Mason (1992) UKJMM II 30-40. A. Russell (1946)
ident wulfenite (XRD) as small orange
red xls w. pyrom. at LOCH NA MEINE MINE
(acute bipyram) [NH 374 381]

STRUY, Inverness, Scot. (II)

Struy Bridge Area [NH38 40]

The first stop of the day was at Allt Tigh Cumhaig burn for harmotome, Sphalerite and calcite. It was here that the midges started to be irritating and a great deal of midge spray was used, some of us smelt like oranges. Climbing the steep burn and looking for the minerals in the streambed you had to concentrate on find specimens rather than letting the midges do there best to distract you. Small crystals of harmotome were found and some of the best by Steve Plant.

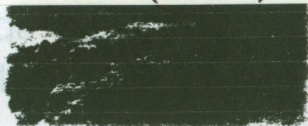
The mine working here is located at the top of the burn there is a trial level that was driven from the bed of the burn. The workings are only open for a short distance until a collapse in the roof bring exploration to a stop. In the bed of the burn can be seen a baryte vein that was about six inches in width and it was here that the Harmotome was found together with Sphalerite, Calcite.

42 After about an hour or so we all moved on to the next locality at Struy. River Farrar at the confluence of Neaty Burn on the Culligrann estate Struy. About 100 yards through the estate gates the group parked on the river banking and stared to look around for Garnets, Tourmaline and Beryl. Collecting by the stream was rather relaxing and by just tuning over the boulders you had to look carefully for signs of beryl and then break open the boulder hoping there was more inside and sometimes there was, Steve Plant found a beryl about 50mm long. The boulders of muscovite mica on closer inspection contain small garnets and sometimes small beryl crystals if you were lucky. We were all just finishing for the day when the author found a Tourmaline crystal about 50mm long in a small boulder he happened to break open heading back to the car. The water colour artist who was panting a landscape of the area as we arrived must have got a bit annoyed with us knocking large chunks out of boulders and making a great deal of noise and soon left!

STRUY, Inverness,

Scot. (III)

The last site of the day was only visited by Ian, Steve, Lynn, Clive and myself. It was getting late and the map reader needed time get his bearings to find the stream (i.e. myself). This was to a small burn just after the first dam to collect garnets. The way to get garnets here was to pan for them in the stream. But there was only one gold pan so the rest of us had to improvise, so sandwich box lids and plastic bags came in handy, this was a nice bit of fun and very relaxing end to a good days collecting.



Pic 2: Ian and Phil collecting Graphite

Thursday 3rd June

Struy: Loch na Meine Lead Mine [NH395 388]

Before we could explore the old mine site Mr. Frank Spencer Nairn the owner of the Culligrann Estate who hand granted us permission had invited all nine of us for coffee so that he could find out a bit more information about the Russell Society and us. Frank had made copies of two papers on the mines for all of us, first published in 1914 and 1921 respectively. We all thanked him and his wife for their kindness and Frank offered to show us to the path and the use of his head gamekeeper.

43
6
The Struy lead mines are situated on the West Side of Strath Glass, about 2 miles southwest of Struy village, and comprise of three small long abandoned workings. They are on veins traversing the Moine schists that are extremely hard. The mines where last worked in 1864 and owing to there small size were unprofitable for the landowner to work so were abandoned. At the Loch na Meine lead mine there can be seen a hush running down the hill to prove a vein. There are filled in shafts and a water wheel pit for pumping water from the mine.

The head game keeper drove Gill and two others up to the mine in an eight wheel all-terrain buggy, at least this saved them the hard two mile walk up a mountain, they do not know what they missed!! The mine site was very over grown and the lead smelter chimney had collapsed many years

1" 48,49 1:50,000 43

NN 8-9, 6-7

Glen TILT, Perth

"Beinn A' Ghlo" 9673

NN 8765

TMH (1868) Blair Athol:- garnet, in mica schist.
Ben-y-Gloe Mts:- Kyanite, rutile, in quartz rock
Glen Tilt:- Actinolite, bronze, calcite,
chlorite, hornblende, mountain-wood,
saussurite, serpentine, talc.

GL (1858) Glen Tilt: "hornblende", white silky [trem-actin?]
bronze, in syenite
Kyanite, in qtz, nr summit of Ben-y-gloe.
Garnet, in mica schist at Blair Athol, at Balichan
e other places.
Actinolite, as kestiform.

Hedde. Rutile-hills bounding SE side of G.T. - prismatic
xls in chlorite ass. w. quartz veins cutting mica-sch.
Kyanite Perthite: - Ben Vannoch [= Ben Vuirich,
NN 9971], summit, in quartz belts with garnet
in mica-gneiss. Glen Tilt, in a quartz v.
W side of Carn Liath.

TOWIE

Aberdeenshire.

?B/G Mus. vq Manganite.

OS Gazz NJ 5327, also NJ 4412

TREARNE Q'y, Beith, Ayrshire (I)

See also LOANHEAD Q

D I Green et al, UKJMM (1993)
12, 22...

Millerite (Todd, 1990)

BM5 Newsl (1995) (June) 41 10

Skellak strontianite
in a vug.

RSN (1994) 244

Trearne Quarry, Beith, Strathclyde

An afternoon visit, facilitated by Kemp Meikle the previous weekend, proved worthwhile. The quarry is working Lower Carboniferous (Upper Visean) limestones with interbedded shales. The beds exposed are highly fossiliferous with well developed corals and brachiopods. The Carboniferous rocks have been intruded by dolerite dykes which are associated with minor faulting.

The limestones are generally thinly bedded, carrying abundant fossils; many of the brachiopods are hollow and contain a variety of different minerals. Ten members visited the quarry collecting worthwhile material. Harry Critchley found a fluorite cube in a calcite lined brachiopod, as far as I know, the only one found on the day. Harry also located the only area to be producing abundant strontianite in brachiopods.

Trearne Quarry is always an interesting location, the geology alone, particularly with the fossiliferous horizons is particularly rewarding.

TREARN(E) Limestone Qy Beith, Ayrshire
(II)

BMSN (1988) 23 6

Fluorite

Strontianite (previously XRD identified)

Barytes

Calcite

Chalcopyrite

Quartz

Best specimens of the day considered to be a prehnite hand specimen
collected by Richard Bell, and a strontianite of Mike Leppington.

→ Loanhead?

Saturday 30 April - Wanlockhead

The remainder of the party met outside the Wanlockhead Mining
Museum at 10.30 a.m. Roy Starkey had already been paddling in the
cold waters of the Mennock Water and had a few tiny grains of gold
to show for it. The group moved off promptly, lead by Steve Rust,

RSN (1993) p14. Fossils, one w. a yellow fluor.

BMSN (1989) 26, 7. Strontianite, fluorite,
(straw-yellow); gypsum, transp xls in
brachiopods. Millerite known but not
found

Glen URQUHART, Inverness

- Heddele. Almandine, nr Free Church of Millton, ass. with biotite, e including zircon, minute blue-black xls; in edomite e white biotite [?]
- Zircon, nr Free Church, Millton, minute blue-black xls emb. in garn.
- Kyanite. Above Millton on E side of road to l'st q's, in large isolated xls e sheafy aggs. in gneiss
- Actinolite, $\frac{1}{2}$ ml NW of Urquhart Hotel, w. albite, and at Millton, in l'st q's as thick yellow xls w. graphite, margarodite

Summ Min Res Crof Cols (1969) Plain dark green "common"
serpentine vis. at roadside in Glen Urquhart [see GS_{map}]