

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 ~~and~~ consisting of granular-massive linarite with small vughs containing tiny xls of caledonite.

- ~~(4)~~ 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 ~~have~~ 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 Meine 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 of 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 schists 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 S08206, Bìod 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 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 1½ mm fibres (I/R.S.107, somewhat similar to that of Transvaal crocidolite).

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

Heddlé (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) Clachnaharry (NH/6446; 1" 28), near Inverness, Inverness-shire.

Heddlé (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 up.

- (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; 2 1/2" NJ16), near Elgin, Morayshire.

Three small to medium-sized abandoned sandstone quarries, shown on 2 1/2" map at 1763, in the woods. Overgrown. Barren sandstone.

- (29) Quarries round NJ/167632 (1" 29; 2 1/2" 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 1/2-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/83.105 (1/4-in. map), near Tyrebagger, Aberdeenshire (Abandoned).

Old water-filled quarries in barren granite.

- (33) Aboyne. (NO/49-59, 1" 39.42), Aberdeenshire.

~~Heatham (1900) and~~ Geol. Surv. Wartime Pamphlet No.13, Area VI, gives positions of Dee castle quarry and Corn tulloch 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 (NS/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 1/3 ml. east of Dalnabo farm (which is at 303 0105, 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),

occasionally in xls up to $\frac{1}{4}$ cm. White calcite. Not common, small prisms of bright-green diopside (I/R.M.15).

- (37) "Ironstone Mine" (NJ/237159: 1" 38). Conglass Water, near Well of the Lecht, Banffshire. (Abandoned)

The "Ironstone Mine" marked on the 1" map (some 5 mls SE of Tomintoul, near the Aberdeenshire border) consists of ruins of a large mine-building, some lumps of ore lying about, and what may be dumps of fine-grained material or merely glacial hummocks.

What is presumably the ore consists of a black opaque amorphous botryoidal mineral (perhaps psilomelane??).

- (38) Strathdon (NJ/31: 1" 38, 39). Aberdeenshire.

Examined small exposures of serpentinite on south side of Water of Nocht near the bridge at 336157 (cf. Geol. Surv. Wartime Pamphlet No.9, 1946). Nepheline seen. Occasional 1-mm veinlets of asbestos (I/R.M.23, near I/R of chrysotile from Rhodesia), with the fibres across the veins.

At 363136, on the east side of the B973 road, there is a road cutting with a sill of a pretty rock consisting of 1-inch elongated black-brown silicate crystals in white feldspar.

- (39) Devil's Elbow (NO/17: 1/4" map). Gleann Beag, Perthshire.

Old quarry just south of the Devil's Elbow, on west side of road. Contorted micaceous schist and quartz. No graphite.

- (40) Spittal of Glenshee (NO/1070: 1" 49). Glenshee, Perthshire.

Examined streams on south side of the main road SE of Spittal of Glenshee. Glacial drift; no bedrock exposed, and no graphite found. (Contrast Heddle, 1901).

- (41) Head of Glen Isla (NO/17-27: 1/4" map). Angus.

Snelling (1957) describes good exposures of coarsely xline kyanite-staurolite gneiss "on the Crags of Carnes at the head of Glen Isla". These, though not named on 1" map 41 (not available on expedition), must be the impressive south- and south-east-facing crags of Caderg, at the head of Glen Isla, where Carness Glen and Caenlochan Glen carry the headwaters of River Isla. Clambered up Carness Burn and followed the top of the crags from 206771 to 197768, but saw no trace of staurolite gneiss. Neither any among the stream-pebbles in the valley.

This 10-mile walk was rewarded only by the sight of a herd of red deer on the skyline.

- (42) Tillicoultry mine (NS/914976: 1" 55). Mill Glen, Tillycountry, Clackmannanshire.

No trace of the mine seen. It may have been at the site of the roadstone quarry now being worked here.

- (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) ~~needle~~ 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.