Section 5 — Petrological Notes

TR4_136_148

NOTES ON SPECIMENS COLLECTED IN VARIOUS LOCALITIES

by G. Everard.

(a) Burnie District, Limestone Creek, near Hampshire.
(b) Longford District, Breadalbane.
(c) Middlesex Distict, Forestry Road, South of Liena.
(d) Rossarden District.
(e) Savage River District, Magnetite Creek, D.D. Hole No. 3 core.
(f) Sheffield District.
(g) Surges Bay District.
(h) Zeehan District.

BURNIE DISTRICT

The following descriptions are of specimens taken from the samples of calc-silicate rocks collected by Senior Geologist T. D. Hughes from Limestone Creek near Hampshire.

1. *Medium grained granular white to pale cream rock with some calcite veinlets.*

In thin section the rock consists principally of calcite in grains up to 2 mm. across. There is a minor amount of fine granular diopside and some wollastonite.

2. *Fine grained pale grey rock.*

In thin section the rock consists principally of fine grained diopside with some feldspar and calcite. Dark coloured sulphides are prominent as accessory minerals.

3. *Fine to medium grained pale grey or white rock.*

In thin section the rock consists chiefly of calcite with some diopside and a trace of wollastonite.

None of these rocks would appear to be a promising source of wollastonite.

The following petrographic description applies to a specimen collected by F. C. Gillespie from Burnie.

A fine grained black rock with cream coloured weathered surface. A few glassy phenocrysts are present and occasional vesicles filled with pale coloured material.

In thin section the specimen shows intergranular texture with titanaugite, olivine and magnetite grains filling the interstices of a network of feldspar laths. Phenocrysts of olivine are present and patches of semi-opaque zeolite.

The specimen is a Tertiary basalt of Edward's titanaugite type.

LONGFORD DISTRICT

The following description applies to a rock specimen collected by Geologist F. Blake, at Cocked Hat Hill, three-quarters of a mile N.E. of Breadalbane.

The specimen is of medium grain and greyish green in colour. It is divided into lenticular pieces by small irregular joints. Feldspar crystals are visible as gleaming laths 2-3 mm. long and as pearly cleavage faces.

In thin section the rock has an intergranular texture, small grains of augite, olivine and magnetite-ilmenite filling interstices of a network of feldspar crystals. The feldspars are generally about 1-2 mm. long and have a preferred orientation, indicating flow, but phenocrysts 2-3 mm. or more are very common.

The rock is a Tertiary olivine dolerite or basalt.

MIDDLESEX DISTRICT

The following petrographic descriptions apply to rocks received from Regional Geologist I. B. Jennings, from the Forestry Road, Mersey River, South of Liena.

77. Fine to medium grained leucocratic rock, with sugary quartz grains, opaque white euhedral feldspars and pinkish feldspars showing pearly cleavage. Small flakes (about 1 mm. across) of biotite show on newly fractured surfaces, and there is a half inch dark patch containing much tourmaline on a corner of the specimen.

In thin section the rock consists of a mosaic of opaque white euhedral crystals of altered, zoned plagioclase, anhedral cloudy felspar, and transparent colourless quartz. Small ragged patches of biotite sometimes altered to chlorite are scattered through the section. Much of the felspar shows an ill defined micro-perthitic twinning, including the largest anhedral masses. Fairly fresh albite is present and in one instance a euhedral crystal of albite has a core of altered zoned plagioclase.

The rock is an aplite and appears to be closely related to the granodiorite specimen No. 80.

78. Dark purplish coloured rock containing innumerable pink platy fragments up to 5 mm. across and 1 mm. thick with planar orientation, and colouriess glassy grains of quartz in a fine dark matrix.

In thin section the rock consists of cleavage flakes of feldspar, grains of clear quartz and brownish quartzite in a siliceous matrix containing magnetite and haematite. There are also a few ragged flakes of biotite.

79. Pinkish granular leucocratic rock, with sugary quartz, white opaque felspar, and large euhedral felspar with pearly cleavages.

In thin section the rock consists of glassy anhedral quartz grains, euhedral and anhedral feispar largely altered, and less altered felspar in bigger lath-like crystals, cloudy but less altered, and showing microperthitic twinning and undulose extinction. There are also a few ragged wisps of biotite and chlorite.

The rock is an aplite and shows affinities with granodiorite specimen No. 80.

80. Medium, even grained, holocrystalline rock containing black biotite, sugary quartz, and greenish, pinkish and colourless mica, the last with bright pearly cleavages.

Thin section shows an allotriomorphic texture with some euhedral felspars and hornblende, while most of the felspar and biotite grains show irregular outlines. Quartz is interstitial and there are smaller euhedral crystals of apatite. There are occasional masses of epidote, and epidote is a prominent secondary mineral in the altered felspar. Black opaque octahedra and irregular masses of magnetite are associated with the ferromagnesian minerals.

Felspars are of three kinds. The first to crystallise was plagioclase which is present as zoned euhedral crystals now altered to a very fine grained aggregate of albite, epidote, sericite, &c. A small amount of relatively fresh albite is present as small anhedral grains with lamellar twinning. Larger interstitial masses of microperthite contemporaneous with quartz comprises about half the amount of total feldspar.

The rock is a granodiorite.

81. Medium grained rock containing black prisms of hornblende, greenish feldspar and white granular quartz. There is also a white feldspar with bright pearly cleavages.

In thin section the large hornblende crystals contain inclusions of euhedral, altered and zoned plagioclase; large untwinned masses of orthoclase contain euhedral crystals of plagioclase and hornblende. There is some anhedral quartz and smaller lath like crystals of little altered albite with lamellar twinning.

The rock is a granodiorite.

83. Fine grained dark purplish coloured rock with irregular pink fragments, grains of glassy quartz, black flakes of biotite and disseminated fine grains and small masses of pyrite.

In thin sections the rock consists of angular fragments of quartz, feldspar, quartz and feldspar, and quartzite in a fine grained matrix containing crystals of magnetite and pyrite. There are also a few ragged plates of biotite and chlorite, and much fine grained chlorite in the matrix.

ROSSARDEN DISTRICT

The rock specimens described hereunder were collected by Geologist J. Baird at Rossarden.

Aberfoyle 5 Level South

Pale, greenish grey, soft, aphanitic rock.

In thin section the rock consists of a mosaic of granular albite showing simple or no twinning, and occasional ragged flakes of sericite.

Carbonate is present as minute grains, occurring in densely packed masses so fine grained as to appear nearly opaque under low power magnification. Fine needles of apatite are common, and other inclusions too minute to be identified.

Storeys Creek Dyke

Less carbonate and more sericite than in Aberfoyle Sill.

Nesbit Creek 'Granite' (Margin)

Medium grained pale grey rock containing granular quartz, white mica and a little tourmaline in black acicular crystals, flanked by a mass of pale yellowish green mica in plates up to about 5 mm. across; on the other side the rock is composed entirely of massive yellowish green mica in microscopic flakes.

In thin section the pale grey rock consists of granular quartz shattered by a very fine network of irregular cracks. There is a little interstitial mica and occasional crystals of tourmaline.

Except for the shattering of quartz grains, the rock is similar to the Aberfoyle aplite. The specimen is actually a greisenised aplite.

Storey Creek aplite from 243' 6" D.D.H. U 81

Medium grained granular, pale greenish grey rock, containing quartz and a greenish sericite. The specimen is sparsely mineralised with sphalerite and chalcopyrite.

In thin section the rock consists of irregular grains of quartz with lath-like inclusions of fresh albite. White mica is common in somewhat ragged plates, and albite is also common along grain boundaries and in inter-granular spaces. Quartz grains are criss-crossed with lines of bubbles and fine grained pyrite occurs in veinlets and aggregates.

Aplite from 10 Level Aberfoyle Mine

Pale grey medium to fine grained rock, mineralised by small very sparsely disseminated aggregates of chalcopyrite, bornite and galena.

In thin section the rock consists of irregular quartz grains and books of white mica. An occasional small crystal of albite occurs in the quartz grains. Opaque sulphides appear occasionally in cleavages.

This specimen differs from the Storey's Creek specimen in a somewhat finer granularity and the all but complete absence of albite.

SAVAGE RIVER DISTRICT

The following petrographic descriptions deal with minerals in core from No. 3 DD. Bore, Savage River, collected by Senior Geologist T. D. Hughes, which have been identified as follows:—

361' Tremolite

This mineral is coloured deep green in part by intergrowth with chlorite, but the actual mineral in question is colourless tremolite.

No footage given. Tremolite. The mineral forms radiating growths of a silvery grey colour.

541' Calcite

The carbonate occurs as yellowish resinous grains at the intersection with a veinlet of epidote. It effervesces with acid in the cold.

The rock described herein was collected by Senior Geologist T. D. Hughes south of Magnetite Creek, Savage River.

Fine grained pale grey schistose rock containing quartz and sericite. Numerous small holes filled with limonite indicate the weathering out of iron bearing minerals, and the rock is somewhat iron-stained. Laminae are sub-parallel which may indicate severe folding on a small scale, but this is difficult to observe in hand specimen.

In thin section the rock consists of a mass of recrystallised quartz in grains averaging about ·1 mm. across, with oriented sericite, some of which is stained brown with limonite. The quartz grains contain myriads of tiny prisms of tourmaline. There are also occasional rounded crystals of zircon.

Outlines of original grains of quartz are sometimes faintly visible. The remains of a few garnets, up to about 1 mm. across, can also be seen.

The rock is a quartz sericite schist and indicates a fairly high grade of metamorphism.

Core from D.D.H. No. 3 Savage River has been sectioned and polished and is described hereunder:—

250′-270′

Very strongly magnetic, slightly crumbly black material, consisting of minute crystals. Pyrite is common as irregular crystalline aggregrates, and some white crystalline minerals and serpentinous rock material are also present.

Thin and polished sections show the specimens to be aggregates of octahedra of magnetite ·1-·75 mm. across. Pyrite is of similar grain size or perhaps somewhat coarser grained on the average; but the grains are more irregular with deep embayments and contain inclusions of magnetite. Rare inclusion of chalcopyrite of small size occur in the pyrite grains and are distinguishable by their deeper colour.

In thin section non-opaque minerals appear in appreciable quantity as interstitial material. Acicular tremolite is prominent in single crystals and radiating sheafs. Apatite occurs in allotriomorphic form, but is recognisable as material of low birefringence, moderately high refractive index, and uniaxial negative sign, filling the interstices between octahedra of magnetite. There is also a finely granular mineral of high refractive index and high birefringence which is difficult to investigate further because of internal reflection and grain size, but which has been diagnosed as sphene.

Besides being interstitial, these minerals have penetrated along cleavages parallel to the octahedron, to give minute grains in lines less than ·01 mm. in width.

273′ 7″-290′

The pieces of core examined were very similar to 250′-270′ sections except for being slightly coarser grained and more porous. The porosity is no doubt due to the removal of silicates interstitial to the magnetite octahedra. Crystals of pyrite up to about ·5 mm. across are common in irregular aggregrates.

In thin and polished section serpentine and a mineral of very low birefringence, possibly a zeolite, appear as irregular inclusions in the magnetite, as well as in cleavage planes, and the interstitial relationship noticed in the 250′-270′ section is not prominent.

310'-330'

Similar to 250'-270' section but with more and coarser grained pyrite.

In thin and polished sections the magnetite appears as euhedral crystals up to 1 mm. across. Enstatite occurs interstitially and is crowded with inclusions including minute octahedra of magnetite and fine needles of apatite and rutile.

525'-539'

Microscopically this section is notable for no new textures in the ore minerals, but the silicates exhibit clear sugary masses of enstatite and opaque greenish white substances. The silicates are interstitial to magnetite octahedra, except when in excess, when the magnetite remains as clumps of octahedra or disseminated crystals darkening the silicates.

In thin section the greenish opaque silicates appear as fibrous serpentine with inclusions of enstatite in rectangular crystals with irregular boundaries. A thin vein of small quartz grains was noticed.

565'-588'

This section was very similar to the preceding one. Silicates are rather more prominent and are full of inclusions.

In general, for all the pieces of core examined the ore consists of magnetite largely as well formed octahedral grains ·5 mm-·05 mm. across. Pyrite is in grains, often euhedral crystals, and clumps of grains and crystals, usually of somewhat larger size, that is up to 1 mm. across.

The silicate minerals include serpentine, a little labradorite and enstatite, the crystals of which contain many minute inclusions among which rutile and apatite are prominent.

The texture of the ore seems to confirm the opinion already expressed by geologists that the deposit is a magmatic segregation from basic or ultrabasic rock material.

SHEFFIELD DISTRICT

The following petrographic descriptions apply to specimens received from Regional Geologist I. B. Jennings.

No. 60.

Medium grained greenish rock with dark irregular patches of chlorite up to 1 cm. across, and pink angular inclusions 1-2 mm. across; some of which are aggregates, and others single crystals of feldspar, in a dark green groundmass.

In thin section the light coloured areas appear as a microcrystalline matrix containing phenocrysts of albite and rarer quartz. Fragments of colourless augite are also present and some disseminated minute grains of epidote and opaque iron oxides.

The green groundmass is of similar texture except that much of the matrix consists of an interlocking mass of small crystals of epidote. Some euhedral augite is present and occasional dodecahedra of garnet. A palimpsest structure of very fine grained opaque white material overlies the epidote, outlining former phenocrysts

and a complicated network of perlitic cracks. These perlitic cracks also occur in the lighter coloured quartzo-feldspathic matrix where they have been filled with epidote.

The rock seems originally to have been a glassy lava with phenocrysts and basic xenoliths. The lava was devitrified and reacted with the basic inclusions, resulting in the development of epidote and pyroxene.

No. 62.

Medium to fine grained, pale coloured, sheared rock, with quartz grains, about 1 mm. across, in a mottled grey, fine grained matrix.

In thin section the rock consists of cracked and corroded phenocrysts of quartz in a very fine grained quartzo-feldspathic matrix, with irregular bands and patches of sericite. Some of the patches are completely sericitised feldspar phenocrysts. White opaque leucoxene is thickly disseminated.

The rock is a sericitised quartz-feldspar porphyry.

No. 63.

Massive aphanitic greenish rock, showing well marked joints, but no definite bedding planes. It is dense and tough, but scratches easily.

In thin section the rock consists of feldspathic grains in a chloritic matrix. Some grains show crystalline outlines, but most are irregular, and there are also rounded grains of quartz and pyroxene. Indistinct veinlets and rounded composite grains also occur.

The rock is of clastic origin. The matrix has been reconstituted, and possibly there has been some recrystallisation in the larger grains, by low grade metamorphism.

P4.

Pale greenish grey medium grained rock. Black flakes of biotite, green needles of hornblende and white rhombs of feldspar are all visible in hand specimen.

In thin section the above three minerals appear in a fine grained feldspathic matrix; made up of minute prisms with dark centres, and eutectic mixtures. The feldspar phenocrysts are however, completely altered to opaque white kaolin and sericitic aggregate. Apatite is also prominent, and the hornblende frequently has a crystal of apatite at its centre. The biotite may be moulded on hornblende. Magnetite is also present. The rock is a lamprophyre.

P5.

Medium grained, greenish grey rock, showing white and pale greenish feldspars, dark green micaceous ferro-magnesian crystals and some glassy quartz.

In thin section two generations of feldspar are visible—an earlier euhedral form now completely altered to sericite and chlorite &c., and a later anhedral form, with simple twinning and only slightly altered. The fresh feldspar is orthoclase. Quartz is present in lesser quantity and tends to show intergrowth with orthoclase.

Chlorite also occurs in large irregular plates and intergrown with biotite in euhedral crystals.

Secondary minerals are epidote in anhedral yellow crystals and carbonate in irregular grains.

The rock is a granodiorite and resembles some varieties of the Dove granite, especially varieties exposed in the bed of the Forth River near Lorinna.

B16.

Pale coloured massive felsitic rock.

In thin section a brecciated structure becomes visible, consisting of fragments of orthophyre porphyry in a somewhat finer grained quartz feldspar porphyry.

The orthophyre consists of phenocrysts of feldspar 1-2 m. long in a cryptocrystalline matrix containing stumpy feldspar crystals about 2 mm. long. Brown opaque iron oxides tend to be associated with the phenocrysts, which have been completely altered by recrystallisation to a quartzo-feldspathic mosaic.

The remainder of the rock consists of a very fine grained matrix containing indefinite patches of quartzo-feldspathic mosaic, irregular opaque white material, and hydrated iron oxides.

141 N.W. of C. Eaglings 429 600 E 900 000 N

Medium grained brownish grey rock. In hand specimen shows pink and white crystals of feldspar, dark ferromagnesians and black opaque crystals of iron ore minerals.

In thin section altered crystals of feldspar and hornblende about 1 mm. across may be seen in a finer grained feldspathic matrix. The hornblende is largely altered to chlorite and to a minor extent to epidote, and forms somewhat ragged crystals. The feldspar phenocrysts are almost completely altered to sericite and epidote. Ilmenite largely altered to leucoxene is common.

The groundmass is feldspathic and shows some alteration. A very minor amount of interstitial quartz may be present.

The pinkish feldspar of the matrix belongs to the albite-oligoclase range.

142 Hill N.E. of Claude Road, 426500 E 899000 N

Grey-brown medium to fine grained rock with pinkish brown and grey crystals of feldspar about 1-2 mm. across, in a finer grained groundmass.

In thin section the rocks show a great many pink euhedral crystals of albite, showing simple and multiple twinning in a finer grained ground mass. Some feldspar crystals are colourless and fresh but otherwise similar to the pink ones, and may have smaller pink crystals as inclusions.

Ferromagnesian minerals are represented by ragged patches of chlorite and epidote.

Prehnite is present in irregularly shaped radiating masses with yellowish-brown selvedge. Small octahedra of ilmeno-magnetite, partly altered to white leucoxene and red limonite are disseminated through the section.

The rock is an albite porphyrite.

143 Hill to the South of Clydebanks 428500 E 897300 N

Greyish-brown medium to fine grained rock consisting of white feldspars and dark ferromagnesian crystals of about 1 mm. diameter in a fine grained pinkish brown matrix.

In thin section euhedral crystals of plagioclase feldspar and hornblende may be seen in a feldspathic groundmass. The feldspar phenocrysts are altered in part to sericite, calcite and a pale yellow-green to colourless epidote, which makes it difficult to distinguish the twinning. Hornblende is less altered but is replaced to some extent by calcite, epidote and chlorite; but some crystals have been completely replaced. It also has inclusions of euhedral feidspars.

Euhedral crystals of magnetite and ilmenite, partly altered to leucoxene, about ·25 mm. across, are common. There are occasional single grains and aggregates of quartz. Apatite is present in scattered crystals and groups of crystals.

There are occasional compact masses of recrystallised quartz about ·5 mm. across, and some interstitial albite in clear grains. But the larger crystals of feldspar are probably oligoclase.

The rock appears to be of hybridised basic or intermediate origin, and intermediate between 141 & 142.

Two specimens of basic rock received from Regional Geologist I. B. Jennings from between Forth Fails and Luttrels Bridge are described as follows. Yellow mica seems a rather improbable weathering product of these rocks.

Medium grained greyish green rock with visible laths of feldspar and dark prismatic crystals of ferromagnesian minerals.

In thin section a typical sub-ophitic or doleritic texture is seen with feldspar crystals penetrating amphibolised, chloritised and epidotised ferromagnesian minerals. Biotite is present in ragged plates. Strongly pleochroic iron ore minerals, sometimes in skeletal crystals, are common and may enclose feldspar prisms. Quartz is interstitial and is present in appreciable amounts and apatite is common.

The rock is a quartz diabase.

In hand specimen this rock is somewhat more felsic and finer grained than the foregoing.

In thin section amphibolised, chloritised and epidotised ferromagnesian crystals are not present in sufficient size and quantity to give an ophitic texture. The rock therefore consists of an interlacing mass of feldspar crystals with hornblende, epidote and chlorite. Interstitial quartz is present in fair amount and there is much magnetite and ilmenite. Biotite is also common.

The rock is a quartz diabase.

SURGES BAY DISTRICT

The following descriptions apply to specimens received from Mr. F. C. Gillespie. Some specimens not described hereunder were examined in the hand specimen only and judged to be decomposed dolerites. The specimens are from the Surges Bay district.

1. Cream coloured soft weathered rock. The specimen is almost completely kaolinised; but a fine granularity remains as a result of original texture.

In thin section much of the specimen is still faintly birefringent, allowing something of former textures and structures to be observed. Hornblende, altered to opaque white clay minerals and limonite,

can be recognised as lath-like crystals 1 mm. long, hexagonal in cross section; and sometimes the amphibole cleavage can be seen. Feldspar is in long acicular crystals altered to kaolin and cryptocrystalline silica. Radiating spherulitic structures occur.

The rock is possibly decomposed syenite.

2. Cream coloured, fine, even grained rock showing minute flakes of sericite, and containing a few dark, fine veins of quartz.

Angular grains of feldspar and quartz, averaging about 1 mm. across, set in a much finer matrix of feldspar, quartz and sericite, may be seen in thin section. Minute grains of zircon are also present.

The specimen is similar to No. 5. It is somewhat finer grained and contains very little limonite.

3. Fine grained greyish white, soft weathered rock, with occasional very fine dark veins. Small irregular masses of very fine grained pyrite were observed. There is some staining by limonite.

Lath-like crystals of feldspar are indicated by opaque white substances and sericite, but the bulk of the specimen consists of very fine grained faintly birefringent kaolin.

The specimen is a decomposed crystalline rock containing little or no quartz.

Fine even grained rock, iron stained by weathering.

4. In thin section the rock consists of angular to sub-rounded grains of feldspar and quartz averaging about ·3 mm. across in a matrix of fine grained feldspar, quartz and chlorite, the grains averaging about ·01 mm. across. Zircon and rutile in minute crystals are common in the ground mass and as inclusions in the larger grains. Many of the larger grains are cemented together with limonite. The feldspar is fairly fresh and shows fine twinning, but some grains contain networks of sericite.

The rock is an arkose.

ZEEHAN DISTRICT

The following petrographic descriptions are of rocks collected by Regional Geologist, A. H. Blissett, from the Zeehan district.

Z5/639/2

Contact between Cambrian conglomerate and gabbro.

The hand specimen is a siliceous green and white mottled rock with included quartz grains.

In thin section these grains appear as grains of quartzite up to 2 or 3 mm. across into which blades of radiating micaceous material penetrate. The main mass of the rock consists of interpenetrating radiating masses of sericite and chlorite, the chlorite tending to be much finer grained, with patches of quartz mosaic appearing between the micaceous blades. The rock is by no means uniform and different textures and grain sizes appear from place to place.

Z5/641/1

West Comstock Tram, Zeehan.

Fine grained greenish grey rock, black or brown on weathered surfaces with dark irregular patches about 1 mm. long.

In thin section the rock is seen to contain much opaque white and opaque black material, showing flow structure. The black material is in irregular, contorted lenticles which are parallel to

each other and it appears to be volcanic glass. The rest of the section consists of angular grains averaging ·1 mm. across, of colourless glass, partly devitrified, containing minute needles of feldspar, single crystals of feldspar and little groups of epidote crystals.

Z10/732/1

The rock is a basic tuff.

E.B.R. cutting near Renison Bell.

Fine grained black rock with sub-conchoidal fracture.

In thin section the rock consists of broken and slightly worn crystals of feldspar, showing simple and compound twinning, similar crystals of colourless pyroxene, ragged plates of chlorite and sericitised rock fragments in a sericitic matrix. There are also patches of partly devitrified glass, and scattered minute grains, and clumps of grains, of epidote.

The rock is a basic tuff.

The following specimens were collected in the Moore's Pimple area.

Z7/530/1

Pale greyish green, medium grained sheared rock. The minerals composing it are soft and easily scratched and have a dull lustre.

In thin section the rock consists of a rough network of euhedral and subhedral feldspars about 1-2 mm. long, and altered micaceous material. The interstices are filled with carbonate and a fine grained quartzo-feldspathic mosaic.

The rock has been much altered, sericitised and carbonated probably from a gabbroic type.

Z7/531/3

Fine grained greenish grey rock. The structure consists of a fine pale grey matrix containing irregularly rounded spots of dark green or glassy colourless material.

In thin section the rock consists of a mass of interlacing needles and minute grains of carbonate containing fairly closely spaced, rounded areas of granular quartz, chloritic material and calcite.

In places the minute grains of carbonate are densely packed with few or no interstices but in others the larger needles form a network with interstices filled with chloritic material.

The rounded areas consist of quartz, carbonate, and chloritic or zeolitic material. Many of these areas have regular peripheries of granular quartz, with centres of chlorite and carbonate, others consist entirely of granular quartz.

The structure of the rock and the fabric of the groundmass strongly suggest a vesicular basalt, the feldspar laths of the groundmass having been carbonated, the ferromagnesian minerals altered to chlorite and the vesicles affected by silicification.

Z7/531/4

Fine grained grey bedded rock with carbonate veins cutting through the bedding. These fine veins contain a little pyrite.

In thin section the specimen is seen to consist chiefly of very fine grained carbonate. Some very fine opaque clayey material gives

the slice a dark cloudy appearance in transmitted light. There is also a little quartz in grains about ·1 mm. across and some thinly disseminated pyrite in minute grains and aggregates.

The rock is a limestone.

ZEEHAN QUADRANGLE.

The following are descriptions of rock specimens received from Regional Geoiogist A. H. Blissett:—

Z 9/691 B Loc. 4.

Fine grained pale grey siliceous rock, showing bedding planes. A quartz vein containing chlorite appears on a joint plane.

In thin section the rock is indistinguishable from 691 A.

Z 11/180 Loc. 1.

Aphanitic pale greyish green sheared rock.

In thin section the rock consists chiefly of very fine grained yellow green epidote with lesser amounts of very fine grained quartz and plates of chlorite. In some small areas quartz becomes the principal mineral. Magnetite in strings and clumps of tiny crystals is common.

Z 9/691 Loc. 6.

Fine grained greyish green rock, with signs of plastic flow structure. Rosettes about 1 cm. diameter of radiating columnar epidote appear on cleavage surfaces and joint planes.

In thin section the rock shows strong shearing with roughly banded quartz and epidote. Chlorite is plentiful. Black opaque iron ore mineral occurs scattered through the rock with brown stains.

The portion with the rosette structure, shows a felted mass of bladed crystals.

Z 9/691 A.

Fine grained yellowish green sheared rock.

In thin section shearing is well shown, with a mosaic of recrystallised quartz grains about 1 mm. across, ragged plates of chlorite and irregular granular masses of yellow epidote and there are small clumps of grains of opaque white material.

Z 9/691 B.

Sheared fine grained greenish grey rock. Glassy grains of quartz, green epidote and black magnetite are visible in hand specimen and pyrite is present in cracks and cleavages.

In thin section shearing is well shown by irregular strings of epidote and chlorite against a background of fine grained recrystallised quartz. The predominant mineral is quartz and the rock may be described as a quartzite.

Z 9/692 Loc. 4.

Medium grained rock consisting of opaque white and transparent glassy grains of quartz in a purple matrix.

In thin section the rock consists of irregular and sub-rounded grains of quartz, quartzite, quartz-sericite schist, and fine grained clayey material which may be weathered feldspar.

The quartz grains, which are by far the most numerous, show strain and inclusions. Included bubbles are sometimes so crowded that the quartz has a white opaque appearance in reflected light. Rare grains of epidote, zircon, &c., may be found.

The cement is haematite and opaque limonite.

The rock is a ferruginous sandstone, very well consolidated.

Z 9/691 A Loc. 4.

Pale grey, fine grained, siliceous rock, showing bedding planes, and with a few patches of coarse grained haematite in joint planes.

In thin section the rock consists chiefly of recrystallised quartz, with a little chlorite, some fine grained sericite and haematite.

Shearing is well shown and there is a quartz veinlet crossing the section.

The rock is a quartzite.

The quartzites and epidote rocks suggest interaction between siliceous sediments and basic igneous rocks, the igneous rocks being hybridised in the process and the sediments contaminated by igneous activity. Subsequently the complex was subjected to regional metamorphism and recrystallised.