05_159

(1)

17

PETROGRAPHICAL REPORT.

Government Geologist's Office,
Launceston, Tasmania, 30th June, 1900.

SIR,

I HAVE the honour to present this Petrographical Report, consisting of notes on rocks which have been examined during the year ending 30th instant. Fresh varieties of rocks are continually being discovered, and I think it desirable to preserve and describe same as far as time and other duties permit. The descriptions will benefit workers in science throughout the Colonies, and the collections will prove useful to the department. I may add that these collections are open to the inspection of any interested in them. Microscopical slides have been prepared from all specimens, but in the descriptions reference is made to the naked-eye appearance of the rock, so as to assist its identification in the field. The numbers are those of the catalogue.

Granite found as a Boulder near Lefroy.

(776.) This was found resting on the Silurian slates and embedded in wash.

It is a medium-grained grey rock, with large fresh-looking crystals of orthoclase felspar. The constituent minerals are orthoclase, oligoclase, microcline, biotite, muscovite, quartz. This is a two-mica granite, therefore a granite proper, and, probably, a tin-bearing one. Whenever our granites become stanniferous, white mica is developed in them, and this fact suggests a secondary origin for the muscovite. The microcline is a triclinic felspar, showing in polarised light its characteristic spindle-shaped grating structure in rectangular bars.

Elvan, or Intrusive Quartz-felsite, Ringarooma Mine, Mount Victoria.

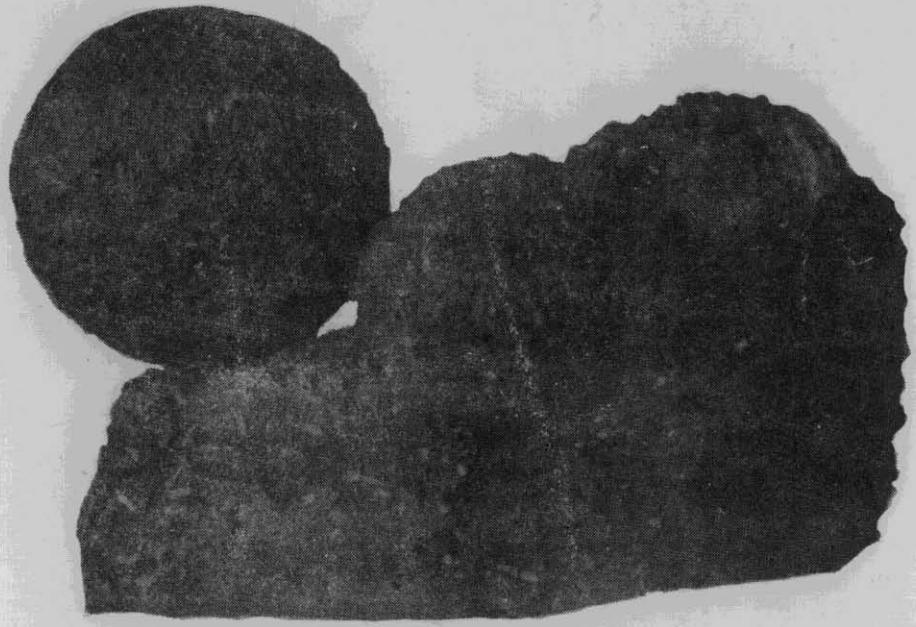
(779.) This occurs as a dyke, 22 feet wide, in the main tunnel of the Ringarooma Gold Mine, at North

Mount Victoria, and is intrusive in the Silurian slates. It proceeds, no doubt, from underlying granite, and is probably of Devonian age. Its colour is light buff, with a slight greenish tinge. It is hard and compact, nearly homogeneous in texture. It has a few blebs of quartz, and, more rarely, crystals of felspar scattered porphyritically in the groundmass. It is also sparsely sprinkled with arsenical pyrites. Microscopical characters: Those of quartz-felsite, the groundmass a holocrystalline granular mixture of quartz and felspar, with an abundance of small flakes, nests, and rosettes of muscovite; porphyritic quartz, with sharply angular, also rounded and corroded, boundaries. A tendency exists towards minutely granophyric structure.

The structure is, characteristically, that of elvans. Rosenbusch defines the Cornish elvans as granite porphyries, with biotite and muscovite (Massige Gesteine, 1896, p. 415). Harker includes granite porphyries and elvan dykes among the acid intrusive rocks, which he describes as "bridging over the difference between the even-grained holocrystalline granites and the porphyritic, largely glassy rhyolites." (Petrology for Students, 1897, pp. 99–105). Rutley, in his "Granites and Greenstones," calls the acid intrusives the "elvan group." Hence, despite the outcry against "elvan" as a miner's term, it can be used with sufficient precision for the needs of the petrologist. It means a dyke which proceeds from a granite mass. These dykes often pass through granite, and must then be supposed to originate from some deeper unconsolidated part of the granitic magma which had already crystallised in its upper portion.

Scapolite, from Serpentine, at Anderson's Creek.

(780.) This mineral, a hydrous silicate of alumina and lime, was found as loosened rounded boulders in a seam of asbestos near Beaconsfield. It was mistaken by the miners for quartz, which it somewhat resembles. It has, however, a slightly greenish tinge, and its hardness is only between 5 and 6. It is soluble, with difficulty, in HCl. Microscopical characters: Confusedly crystalline, with the larger crystal faces obscurely divergent. The crystals often form rosettes. Double refraction



SPHEROIDAL WEBSTERITE FROM NORTH MAGNET

Showing orbicular segregations in the rock. Photo. (natural size), by Mr. F. E. Burbury

strong; interference colours higher than quartz. Extinction straight in longitudinal sections. No sensible absorption.

Scapolite is mostly found in schists and gneiss. It also occurs in amphibolites and ophites. When it is found in gabbro it has been derived from felspar, and this may have been the case here, though there is some reason to believe that the serpentine was originally a pyroxenite. Scapolite is, undeniably, a secondary mineral, and was here formed during the hydrometamorphic process of serpentinisation.

Diabase from summit of Mount Victoria, 4000 *ft.*

(781.) The usual augite-labradorite dolerite of our Tiers, usually assigned to the close of the Mesozoic. It is holocrystalline, with occasional unindividualised groundmass showing microscopically between the felspars. I take this anisotropic pseudo-groundmass to be felspathic and not vitreous. The augites have a slightly ophitic tendency.

At the top of the mountain this rock is columnar, and forms a mass, apparently capping the summit, 1500 feet thick. The question which geologists have to settle is whether the occurrence, which is matched everywhere on the other mountains of eastern Tasmania, is that of a real cap, the remnant of a volcanic sheet or intrusive sill, or whether it has a downward extension as a core or laccolite column. This is one of those points in theoretical geology which have important practical bearings. Any theory of the origin of these dolerites (variously termed diabase, greenstone, or trap) affects the continuance of our coal seams.

Bronzitite from Anderson's Creek, near Beaconsfield.

(784.) This is from the serpentine on the asbestos section at Anderson's Creek. It is a dark, granular rock, composed wholly of bronzite, which shows in glistening crystals. The pyroxene is largely converted into bastite, the serpentinous modification of enstatite, and contains only small grains of olivine embedded in the pyroxene crystals. No felspar is visible in this section. The rock is, accordingly, a true pyroxenite, and is

interesting, as being the parent rock from which a good deal of the serpentine on this field has been derived. I have not seen any gabbro here, but, from the appearance of scapolite referred to above, its existence is highly probable.

Syenite from Heazlewood River.

(785.) Found on the north bank of the river, a mile N. of the road at the 13-mile. A light-grey hornblendic granitoid rock, with hornblende very plentiful. Constituents: Orthoclase, oligoclase, hornblende, quartz, and accessory sphene. The quartz is very miarolitic, and beautiful granophyric intergrowths of quartz and felspar are abundant. Mica absent or very rare. The orthoclase seems to predominate over the triclinic felspar, but the rock is, evidently, verging on quartz-diorite.

Websterite from Heazlewood Extended Mine.

(786.) A nickel-stained pyroxenite forming the dyke, which is the ore-channel in this mine. Both microscopically and macroscopically it resembes the dyke-rock at the Magnet Mine. It is composed of pyroxene crystallising in both the monoclinic and orthorhombic systems. The two forms may be optically differentiated under the microscope by the straight extinction and lower interference colours of the rhombic pyroxene. The enstatite is undergoing alteration into bastite. A good deal of chloritic and serpentinous matter, with some talc, occupies the spaces between the more perfectly preserved crystals. It is not easy to say whether the original structure was porphyritic or gabbroid. There is a marked absence of iron ore in the slide.

Gneissose Gabbro-amphibolite from Rocky River Mine.

(787, 788.) This is the rock which is the channel of (819.) the cupriferous magnetite lode at that mine. It is enclosed in talc schists, into which it apparently passes. In places it is a pale banded gneiss; at other spots it is fissile and compact, passing into a hornblendic schist; or, again, it is coarse and gabbroid in texture. Its colours are green and grey in various shades. It consists of a fibrous green hornblende, with

large gabbro-like plates of plagioclastic, none too basic, felspar (perhaps reconstructed), apatite, quartz, and a good deal of epidote. Talc, hornblende, asbestos, calcite, and serpentine occur as minerals in its more decomposed portions. The hornblende is often in streaks or bands, giving the rock its gneissose character.

Its nearest allies seem to be the gabbro-diorite of Törnebohm and the zobtenite of Justus Roth, which are amphibolites derived from gabbro by dynamo-metamorphic processes. It is of much more ancient date than the Heazlewood and Mount Agnew gabbros, being, probably, Cambrian or pre-Cambrian. Tasmanian geologists would do well to pay this locality a visit.

Granite from Mount Darwin.

(806.) The specimens taken by me are composed nearly entirely of orthoclase, felspar, and quartz. A little dark mica and hornblende are accessories. Oligoclase is also present. The apparent absence of muscovite would suggest the name granitite, were it not for the abundant quartz, which is a more sparing constituent of granitites.

This rock forms the southern knob of Mount Darwin, and runs N. for some distance along the crest of the mountain, lying between the quartz-felsite on the W. and schist on the E. The point which requires settling is whether it belongs to our post-Silurian granites or is of earlier date. Its actual contacts are not satisfactorily exposed.

Spheroidal Websterite from Magnet Range.

This remarkable rock is exposed along the W. side of the diabase-porphyrite belt to the W. of the ore-bearing websterite dyke on the North Magnet section. It may be seen in a trench along the track half a mile north of the mine. It is yellowish-brown in colour, nearly always in a soft decomposed state, and full of balls of rock from the size of a pea to a cocoa-nut, and which drop out of their cavities readily upon being tapped with the hammer. These spheres split easily in halves, and to the naked eye appear to consist of the same mineral substance as their matrix, and without any sign of a radiated or concentric structure.

The rock itself has the appearance of being a confused soft mass of crystals of enstatite, which are often arranged in a cruciform manner, giving a very characteristic impress to the rock. Under the microscope the only primary constituent which can be seen is pyroxene, chiefly enstatite, with a little diallage or augite. A good deal of talc and chlorite fill up spaces which were once, probably, occupied by pyroxene, and there are occasional vesicles filled with chloritic aggregates.

Spheroidal gabbro is known from Norway, and locally called potato-rock; but the spheroids are made up usually of concentric layers, and are occasionally radiated. Spheroidal granite, too, is concentric. The balls in the present rock are not always perfect spheres, and, sometimes, have the form of dumb-bells. Evidently their shapes have been influenced during the formation of the rock, and while the latter was still plastic. If this be admitted, we seem shut up to the conclusion that they are the result of a process of segregation.

I have the honour to be,
Sir,
Your obedient Servant,

W. H. TWELVETREES,
Government Geologist.

W. H. WALLACE, *Esq.*,
Secretary for Mines, Hobart.

JOHN VAIL,
GOVERNMENT PRINTER, TASMANIA.