

PETROGRAPHICAL REPORT.

*Government Geologist's Office,
Launceston, 30th June, 1901.*

FIELD and routine work during the past year have not left so much time available for this branch as could be desired. Viewed from the point of view of the practical man, this line of study is apt to be treated as of no real use, though, curiously enough, it is from the miner and prospector that most enquiries have been received as to the names and nature of the rocks associated with our ore-deposits. The splendid work now being done in this department by geological surveys all over the world, and the thousands of pounds which are being spent by civilised nations on petrographical work alone, should convince the most sceptical of its importance.

The establishment of a petrological laboratory is highly desirable, where analyses of all our rocks and soils could be made continually, and our minerals subjected to complete quantitative analysis. Besides the usual equipment for chemical work, this laboratory would be fitted with lathe for rock-slicing and grinding, microscope, photomicrographic camera, goniometer, specific gravity, liquids, and other necessaries for petrographical and mineralogical work. A beginning might be made in a small way. The work would provide constant employment for one man. The Acting Government Geologist of Victoria (Mr. H. Herman) has made a similar suggestion for his State in his report for the past year. The results, when obtained, would be published, and their bearing on Tasmania's geology and our mineral resources would be at once apparent.

During the past twelve months some advance has been made in the elucidation of rocks in the peculiar petrographical province of Port Cygnet. These rocks occur all round the townships of Lovett and Lymington, on the arm of the River Huon known as Port Cygnet. They are associated with permo-carboniferous sandstones, into which they often intrude. Besides intrusives, effusive and plutonic types are found. They are characterised chemically by an excess of soda and potash, and mineralogically by the presence of *elæolite* and *nepheline*, *hauyne* or *nosean*, *sodalite*, *ægirine*, *melanite*, and other minerals of the alkali rocks. What makes the Port Cygn

group especially interesting to geologists is that it is the only occurrence known in Australasia.

Several of these rocks were described by Mr. W. F. Petterd and myself in 1898, under three divisions, a soda trachyte group, a soda aplite group, a soda syenite group, representing volcanic, dyke, and plutonic rocks. We assigned provisional names to several varieties, names which might be used in the field, and which would not be incongruous with eventual final determinations. From the great variety of types, it was apparent that such determinations would be forthcoming. Considerable caution was exercised in the determinations of *elæolite*, which we recognised as existing in accessory quantities in some of the syenite. In sending a parcel of Tasmanian rocks to Professor Rosenbusch, he was specially requested to give his opinion on one of these syenites, and, in a letter recently received from him, he determines it as an *elæolite syenite*. He says:—

"No. 87 is a medium to fine-grained *elæolite syenite*. It is not at all poor in *elæolite*, or *nepheline*, in idiomorphic, somewhat dusty crystals. In hexagonal cross-sections, I observe the interference figure with — sign. Besides *orthoclase feldspar* and *elæolite*, or *nepheline*, *ægirine augite* is abundant, also a peculiar *biotite*, and *melanite garnet*, in beautiful crystals (110), often with splendid zonary structure, and in grains as well. The *biotite* has a plainly oblique extinction, as occurs mostly in the alkali rocks. In addition to the fresh *elæolite*, or *nepheline*, there are *natrolitic pseudomorphs* after *sodalite*. You would lay me under an obligation if you could send me a few larger specimens. Compared with the numerous *elæolite syenites* known to me, this Port Cygnet rock has decided characteristics of its own."

The above rock was met with a good deal south of the Regatta Ground, but varieties of similar rocks can be found *in situ* on the beach at the Regatta Ground itself. There is a good deal of variation in the type, some being coarsely plutonic, while the bulk is medium-grained. The colour is typically yellowish, but ranges to dark grey. A trachytic character is recognisable in the existence here and there of glistening porphyritic crystals of *sanidine*. Sometimes these pseudophenocrysts have rhomb-shaped sections, and are then most likely *anorthoclase*. The age of these rocks has not yet been well established. Appearances, so far, indicate that the eruptions belong to the close of the permo-carboniferous. Some distance south of the Regatta Ground is a very striking greenish rock, with parallel layers of glistening tabular crystals of *sanidine*, well known to collectors in the Island. In the paper mentioned above,

this rock was referred to as ægirine trachyte. Professor Rosenbusch writes as follows:—

“ No. 83 I would call a tinguaité-porphyr, or, perhaps better, sölvbergite-porphyr; but I have no objection to your name, although I can scarcely believe the rock was effusive. There are phenocrysts of sanidine, and a strikingly light-coloured ægirine (and ægirine augite), with $a:c$ up to 20° in 010, in a groundmass of felspar and ægirine needles. Staining in the colour-bath shows the groundmass to contain very small quantities of nepheline. The ægirines often contain a kernel of amphibole, with $a:c$ equal to 17° . It is noteworthy that the sanidine phenocrysts often contain ægirine as an inclusion. I also saw melanite twice in the same relation. The rarer elæolite minerals are more plentiful than in No. 84, but I could not determine them with certainty. There is also some titanite present.”

In 1899, Mr. D. E. White and Mr. W. A. Macleod described a new variety of garnet, to which they gave the name of Johnstoneite, occurring in a trachytic dyke rock south of the Regatta Ground. This rock, too, has been submitted to Professor Rosenbusch, who writes:—

“ No. 84, with the beautiful crystals of garnet (211), I would call a garnetiferous mica-sölvbergite. Apart from the garnet phenocrysts, the rock is essentially composed of orthoclase felspar laths, and wisps of a peculiar brownish-yellow mica, slightly pleochroic, optically negative, apparently uniaxial; its cross in convergent light does not open out appreciably. This mica takes readily the form of rosettes, which, in one place, have collected into a rectangular aggregate, the outline of which reminds one of the form of amphibole. Besides these, iron ores are present in very small quantity (titaniferous magnetite and some pyrite), and in one place, so far, a colourless mineral in short laths, which, judging from its refraction and double refraction, might possibly be mosandrite; but I have no certain proof of this. At all events, it belongs to the numerous elæolite-syenite minerals of the titanite, or zircon, silicates. There is, further, present sporadically, in separate grains, a strongly-refractive, rusty-brown, transparent mineral, which I cannot identify. Between the laths of felspar there is a colourless mineral, the refraction of which is only a little stronger than that of the felspar, and its double refraction is weak. On staining, it is shown to be not nepheline, but albite. Under the glass, I see, in two casts of the garnet left behind on falling out of the rock, that there is a fine violet coating, which may be flourspar, and that often the garnet was immediately surrounded by pyrite, in which the former left its imprint.”

The rock described as häuyne trachyte (magpie), with the biscuit-like felspars, has been further examined. It will be remembered that some doubt was expressed at the time as to the original mineral of the limonite pseudomorphs, the probabilities being in favour of garnet. A fresh slide has placed this reference beyond doubt, for the zonary structure of garnet is plainly evident in a section of one of the pseudomorphs. The other porphyritic pseudomorphs in this rock have been further studied, and I think they may be separated into two classes, viz., pseudomorphs after häuyne and after nepheline. The häuyne ones may be distinguished by their soft grey tint in polarised light, while the nepheline ones give vivid interference colours characteristic of some mica mineral. If this distinction can be sustained, the häuyne rocks of Port Cygnet are fairly rich in nepheline. These coarse porphyries occur at the Mount Mary Mine, and on the Livingstone Hill. The best specimens for häuyne are to be picked up on the hill just north of the Livingstone Mine shaft, between the shaft and the road.

W. H. TWELVETREES,
Government Geologist.