

NOTES ON A COLLECTION OF IGNEOUS ROCKS FROM LORD HOWE ISLAND.

Introduction.—The collection comprises about twenty specimens, collected by Mr. R. Etheridge, junr., and Mr. Alexander Morton.

Classification.—All the hand specimens examined belong to the basalt group. They appear to belong to three leading types.—

1. *Basalt with olivine.*—These are chiefly dense dark greenish-gray rocks, for the most part little affected by decomposition, some of them probably being of comparatively recent origin.
2. *Basalt without olivine, lateritic.*—This is a lateritic rock, of a dull brick-red colour, soft, earthy and amygdaloidal; passing in places into scoria. This lava may be partly submarine.
3. *Basalt, diabasic.*—A hard dense pyritous rock of a greenish-gray colour, and resembling an andesitic dolerite; it has undergone extensive alteration, and is probably of considerable geological antiquity.

Detailed Description of Specimens.—Type 1. *Basalt with olivine* [Slide No. 1], from the "Gulch" North Cliff, is a dark-gray cellular basalt, having its joints and steam-holes partly filled with calcite.

On weathered surfaces the rock has a very fresh aspect, and has suffered less, perhaps, from decomposition than any of the other specimens. It outwardly resembles the vesicular basalt No. 6, or (30 a. and b.) north of Ned's Beach, at the Point.

Under the microscope the rock is seen to consist of a microcrystalline base of magnetic iron and granular augite, enclosing micro-porphyritic grains of olivine, occasional zeolites, and a good deal of glassy interstitial material.

The feldspars, chiefly triclinic, occur in minute lath-shaped crystals never micro-porphyritic.

Magnetite is abundant, though not present in sufficient quantity to make the base opaque, as in the succeeding section. Ilmenite is also recognizable. Augite is present, only in very minute grains of a pale purplish-brown colour.

The olivine grains are in striking contrast to the rest of the rock constituents. They are much decomposed and of very irregular shape and uneven size, most of them having the appearance of fragments broken off larger grains. All the grains are surrounded by a zone of a reddish-brown decomposition mineral, and the cracks traversing the grains are lined with similar material. Green serpentinous matter is also observable towards the centre of the olivine grains.

The absence of any sign of decomposition or fracture in the rest of the rock, as compared with the much decomposed and fractured state of the olivine, argues a derivative origin for this mineral.

Specimen No. 23 [Slide 2], exact locality unknown.—This is a dense basalt, of a blackish-gray colour on weathered surfaces, very little decomposed, and rendered slightly porphyritic by crystals of augite and grains of olivine. The rock consists of a blackish-gray, rather opaque microcrystalline base of triclinic feldspar, and abundant magnetic iron, with porphyritic crystals of augite, feldspar, and olivine.

The base contains so much magnetic iron as to be nearly opaque, excepting at the thin edges of the section, and it appears to be wholly devitrified.