

ART. VIII.—POLARISCOPIIC EXAMINATION OF CRYSTALLINE ROCKS OF ANTIGONISH COUNTY.—BY REV. D. HONEYMAN, D. C. L., F. R. S. C., F. S. Sc.

(*Read April 12, 1886.*)

THE rocks which I have submitted to this method of examination, by sections, prepared by Dr. A. Julien, are the following :

- 1st. Two from the "Typical Archæan Series," on Northumberland Strait. *Vide* Papers in Transactions of the Institute, "Geology of Antigonish County," Vol. IV, 1875.
- 2nd. A section of the summit rock of Antigonish "Sugar Loaf."
- 3rd. Three sections of the axial rocks of the mountains north of the "Sugar Loaf."
- 4th. Three sections of the Crystalline rocks in the "Arisaig Mountains."
- 5th. A section of one of the Arisaig Pier rocks, and another of a rock at Doctor's Brook, on the shore.

No 1 is an Archæan diorite, having the feldspar in large patches in hornblende. I have characterized it as "porphyritic." Our section has both minerals. The hornblende is dichroic. With crossed nicols the other part of the section is (a) sepia coloured with parallel spaces of dark shade, twining lines, indicating a triclinic feldspar; (b) there is also in the white a pleochroism. The corresponding part of the rock treated with an acid effervesces, showing calcite.

Interposing a section of albite, which also shows a sepia colour without parallels. The effect is very striking. The pale sepia of our rock section becomes light purple and the dark shade parallels indigo.

By the same process we have corresponding effect in the sections of the Nictaux and Wentworth I. C. R. diorites. *Trans.* 1884, page 121, Nos. 6, 7.

Macroscopically examined this diorite is magnetitic. The magnet shows also the presence of magnetite.

The constituents of this rock are therefore Hornblende, Albite, Calcite and Magnetite.

No. 2 is a section of granitoid diorite.

The Polariscope indicates Hornblende and Albite.

A macroscopic examination of the rock and the use of the magnet show the existence of magnetite.

We have here metamorphic diorites corresponding in mineral constitution with the igneous diorites of Nictaux and Wentworth. Pyrite only is wanting in the former.

No. 3 is a section of the central and summit rock of Antigonish Sugar Loaf. It indicates Hornblende, Orthoclase and Magnetite. The rock is therefore Syenitic. It is dichroic. The opaque portions are seen to be magnetite with direct light. The magnet confirms the observation.

This rock corresponds with that of the elevated grounds on the south side of the harbour, which is in connection with the Lower carboniferous and fossiliferous limestone. The connection is often so intimate, especially on the summit, as to form a breccia. The Sugar Loaf rock is in conjunction with metamorphic slates which we have regarded as Cambrian (?).

The elevation of the syenite with fossiliferous limestone is 300 feet above the sea level (Bayfield); that of the Sugar Loaf is 760 (Bayfield.) The difference, 460, may therefore be regarded as the approximate height of the Sugar Loaf above the sea level, at the beginning of the Lower Carboniferous Period, when the conglomerate and limestone of the Doctor's Quarry at the foot of the mountain were in process of formation.

#### DEVONIAN (?).

In the mountains, about one mile north of the Sugar Loaf, we find out-cropping other Crystalline rocks. A bluff of the series is a prominent feature of the east side of Right's River. (*Vide* Paper IV., page 71, 1875.) Of these I have 3 sections. In all the rock appears unindividualized.

No. 4. The section of the bluff rock is very striking. The rock is full of kernels of calcite (amygdales?)

These in the section with polarised light are beautifully pleochroic with radiating structure. The rock seems to be a mixture of hornblende and feldspar.

No. 5 is dichroic with opaque portions. Magnetite?

Other three sections are (1) of Arisaig Pier rock; (2) of a Saw Mill rock, in the mountains, and of Doctor's Brook, south of Arisaig Pier; (3) of mountains west of the Saw Mill.

No 6. (1) section, of Arisaig Pier rock, an igneous rock of Lower Carboniferous age, shows rock unindividualized with kernels of calcite and magnetite.

No. 7. (3) unindividualized with magnetite grains. This is apparently of Devonian age.

The examination of the Nos. 4, 5, 6, 7, is not so satisfactory as of 1, 2 and 3.