

The rock is quite fissile in one direction, but in others breaks with difficulty, and with a rough splintery fracture. A microscopic examination suggests, however, no further alteration in the description already published, and it is therefore evident that the "Wolf Rock" may be regarded as a typical Phonolite composed of nepheline, nosean, sanidine, hornblende, and a little magnetite.

The base, or mass of the rock, consists of small crystals of nepheline and felspar, the former being most abundant, numerous small yellowish-green prisms of hornblende are scattered through it, and then there are comparatively large crystals of sanidine, nosean, and a few of nepheline porphyritically imbedded in the mass. As this is the only English Phonolite hitherto observed, it affords a good illustration of the value of microscopic investigations, the result in this instance being the discovery of a rock and two minerals not previously known to occur in these Islands.

It may be observed in conclusion, that the rock does not exhibit the least trace of alteration in any of its constituents; and as it is mineralogically identical with the Tertiary phonolites, it is quite possible that it may belong to that period, although we have as yet no evidence of the extension of the great Tertiary volcanic eruptions to the southern end of our island.

NOTICES OF MEMOIRS.

I.—BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.
 FORTY-FOURTH MEETING, BELFAST, August, 20th—25th,
 1874. LIST OF PAPERS READ BEFORE SECTION C. (GEOLOGY).

President—Professor EDWARD HULL, M.A., F.R.S., F.G.S.

The President's Address.

Prof. Harkness, F.R.S.—Sketch of the Geology of the N.E. of Ireland.

The Report of the Sub-Wealden Exploration Committee.

E. T. Hardman, F.C.S.—On the Geological Structure of the Tyrone Coal Fields.

Prof. A. Nicholson, M.D., D.Sc.—On a Remarkable Fragment of Silicified Wood from the Rocky Mountains.

Prof. A. Nicholson, M.D., D.Sc.—Description of New Species of *Cystiphyllum*, from the Devonian Rocks of North America.

Prof. A. Nicholson, M.D., D.Sc.—Description of Species of *Alecto* and *Hippothoa* from the Lower Silurian of Ohio, with a Description of *Aulopora arachnoidea*.

Prof. A. Nicholson, M.D., D.Sc.—Description of New *Polyzoa* from the Lower and Upper Silurian Rocks of North America.

Prof. A. Nicholson, M.D., D.Sc.—On *Favistella stellata*, and *Favistella calicina*, with Notes on the Affinities of *Favistella* and Allied Genera.

W. Pengelly, F.R.S.—Tenth Report of the Committee for Exploring Kent's Cavern, Torquay.

R. H. Tiddeman, F.G.S.—Report of the Committee for assisting in the Exploration of the Settle Caves (Victoria Cave).

Sir Willoughby Jones, F.R.G.S.—(Communicated by). Notes on Cavern Explorations in the Pyrennees by M. Frossard.

W. Chandler Roberts, F.G.S.—On the Columnar Form of Basalt.

W. H. Baily, F.G.S.—On the Coal-measure Fossils of Ireland.

G. H. Kinahan, F.G.S.—Geological Maps and Sections of West Galway and South-West Mayo, see *ante* p. 453.

W. Jolly—Third Report of the Committee for Collecting Fossils from Localities Difficult of Access in North-Western Scotland.

- R. Russell, C. E., F. G. S.*—The Permian Breccias of the Country near Whitehaven.
- L. C. Miall*—Second Report of the Committee on Coal-measure Labyrinthodonts. The Classification of the Labyrinthodonts.
- H. Willett and W. Topley*—Second Report on the Sub-Wealden Exploration.
- Dr. W. B. Carpenter*—Further Researches on *Eozoon canadense*.
- J. Gwyn Jeffreys*—Note on the so-called Crag of Bridlington.
- E. T. Hardman*—On the Age and Mode of Formation of Lough Neagh.
- Rev. H. W. Crosskey*—Report of the Committee for Recording Information on the Erratic Blocks of England and Wales.
- J. Thomson*—Report of the Committee for Investigating Mountain Limestone Corals.
- Prof. A. S. Herschel and G. A. Lebour*—Report of the Committee for Carrying on Experiments on the Conducting Power for Heat of certain Rocks.
- Dr. Bryce*—Report of the Committee for Observations and Records of Earthquakes in Scotland.
- Joseph Wright*—On the Discovery of Microzoa in Irish Flints.
- Rev. Dr. Grainger*—On the Fossils of the Post-Tertiary Deposits of Ireland.
- Prof. Hull*—On the Progress of the Geological Survey of Ireland.
- W. A. Traill*—On Geological Sections in the County Down.
- E. T. Hardman*—New Localities for Upper Boulder-clay in Ireland.
- G. Langtry*—On the Occurrence of the Middle Lias at Ballycastle.
- Dr. Vaughan* (communicated by F. Drew)—Physics of the Internal Earth.
- Prof. J. Thompson*—On the Jointed Prismatic Structure of the Giants' Causeway.

II.—NOTES ON THE GEOLOGY OF THE ISLAND OF YESSO, JAPAN, FROM OBSERVATIONS MADE IN 1862. By W. P. BLAKE.¹

THE salient features of the geology of the Island of Yesso, Japan, are volcanic. Symmetrical cones, snow-capped for a great part of the year, are the first landmarks that greet the eyes of the mariner as he approaches the coast, and are the last to disappear as he leaves it behind. The cone of Esan, in a solfataric condition, forms the eastern and southern headland of the island, not far distant from the port of Hakodadi and from Komangadaki Mountain; another solfataric cone rises conspicuously upon the southern shore of Volcano Bay at about the same distance from Hakodadi. This last-mentioned mountain was in a state of violent eruption a few years ago, and threw out an enormous quantity of ashes, pumice, and hot water. Further north, beyond Volcano Bay, the beautiful cone of Shiribets is grouped with several others; all of them are remarkable for their symmetry and grandeur. Most of these volcanic mountains may be regarded as extinct, though many yield quantities of sulphur and emit steam. At an early period their activity must have been prodigious, for almost everywhere throughout the island, or at least the southern portion of it, so far as explored, there is a vast deposit of fragments of trachyte, lava, scorïæ and volcanic débris. These materials are generally in the form of a stratified brecciated conglomerate, sometimes alternating with finer materials, such as beds of sandstone and volcanic ashes.

A coarse conglomerate of this formation is found bordering the island from Esan nearly to Komangadaki, and extensively upon the western coast, as in the neighbourhood of Iwanai. It is also found extensively developed in the interior.

¹ From the Transactions of the Connecticut Academy of Arts and Sciences, vol. ii. part 2. Read February 21, 1872.

Older and stratified formations appear to form the basis or foundation for the volcanic formations. At Ota, on the west coast, granitic and metamorphic rocks, in well-defined outcrops, form a rugged coast. In the interior they form the principal watershed, and give rise to many rivers, in the beds of which gold is found in deposits which can be profitably worked. These metamorphic strata are uplifted, and generally trend northwest and southeast, and show flexure and bending exactly as in other and better known regions. Slates, sandstones, and limestones are found also at Esan, Shuokobi, and near Kakumi, and at the lead mines of Ishinowatari and Urup. The rocks at the two last-named places are not as much uplifted and metamorphosed as the granitic and auriferous rocks, but they are probably parts of the same series of formations. The only recognizable fossil found is apparently a fragment of a Calamite, leading me to suspect that the beds are of Carboniferous age; but this is by no means certain, and although diligent search was made no other evidence of the age of these formations could be found. Near Iwanai there are beds of good coking coal in strata that have no lithological resemblance to the auriferous series, but they are uplifted at a high angle. Fossils apparently of Cretaceous or Jurassic age are found in the eastern part of the island.

The next stratified formation of interest is marine Tertiary or Post-tertiary, which rests unconformably upon the older stratified beds, and is highly charged in some places with well-preserved fossils scarcely distinguishable from the mollusca now existing upon the coasts. In these deposits, and in later terrace-like formations, there is abundant evidence of the comparatively recent uplift of the whole island, and the same evidences are found upon the island of Nipon.

Dynamically, the formation of greatest interest is without doubt the volcanic conglomerate and the associated beds of finer volcanic materials. They record the most energetic volcanic action at an early period before the recent uplift, for it is almost certain that the mass of the conglomerate was deposited under water. It seems as if there had been a series of violent subaqueous eruptions, perhaps at the time the now-existing cones began to be formed. It is most probable that the island has been gradually formed by the rising of these separate cones above the sea, thus giving at first a group of islets, each a volcano, similar perhaps to those which can now be seen off the coast and at the entrance to the Bay of Yeddo. One is represented opposite the western coast on the Japanese maps.

REVIEWS.

GEOLOGICAL SURVEY OF YESSO.

IT may be news to some readers of the *GEOLOGICAL MAGAZINE* to learn that there is a Geological Survey in progress in Japan; but the fact is recalled by the appearance of the "Preliminary Report on the First Season's Work of the Geological Survey of Yesso," the large northern island of the group, by Mr. Benjamin Smith Lyman, an American Mining Engineer of experience, a few years since specially