THE IGNEOUS ROCKS OF THE LYNGEN PENINSULA, TROMS, NORWAY

by

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1. The Lyngen Gabbro

The largest body of igneous rock in the region is the gabbro massif (85 km by 3-12 km) which forms an elongated core to the peninsula (Fig. 1). All the contacts of the gabbro are of tectonic origin and there is no evidence of a metamorphic aureole. It is considered that the gabbro has been thrust, from the west, into its present position. Layering within the gabbro reveals such a complex internal structure (the result of thrusting, faulting and folding) that the 'stratigraphic position' at any point is as yet indeterminable.

The gabbro has been extensively saussuritised and uralitised and only a small amount of fresh rock is available for study. These latter rocks indicate that the original composition was that of a hypersthene gabbro characterized by basic feldspar (bytownite), hypersthene (Ens_{70}) and clinopyroxene. Olivine has only been observed in small quantity in a limited number of rocks.

The main alteration of the gabbro results in the formation of a pale or colourless amphibole, oligoclase, and clinozoisite. Where shear has been significant the rocks are composed of green hornblende, epidote, oligoclase and quartz (gain of Fe and SiO_2). Numerous late veins disordant to the layering exhibit a mineralogy similar to that of the sheared gabbro, while mylonitized gabbro from thrust planes has the appearance of phyllite and may be Mg rich. Discordant pegmatites (Qu, oligoclase, muscovite, clinozoisite and epidote) are of late and restricted development.

Since the contacts of the gabbro are tectonic and sheared gabbro resembles the green rocks of the Kjosen Formation and Vardtind Group which

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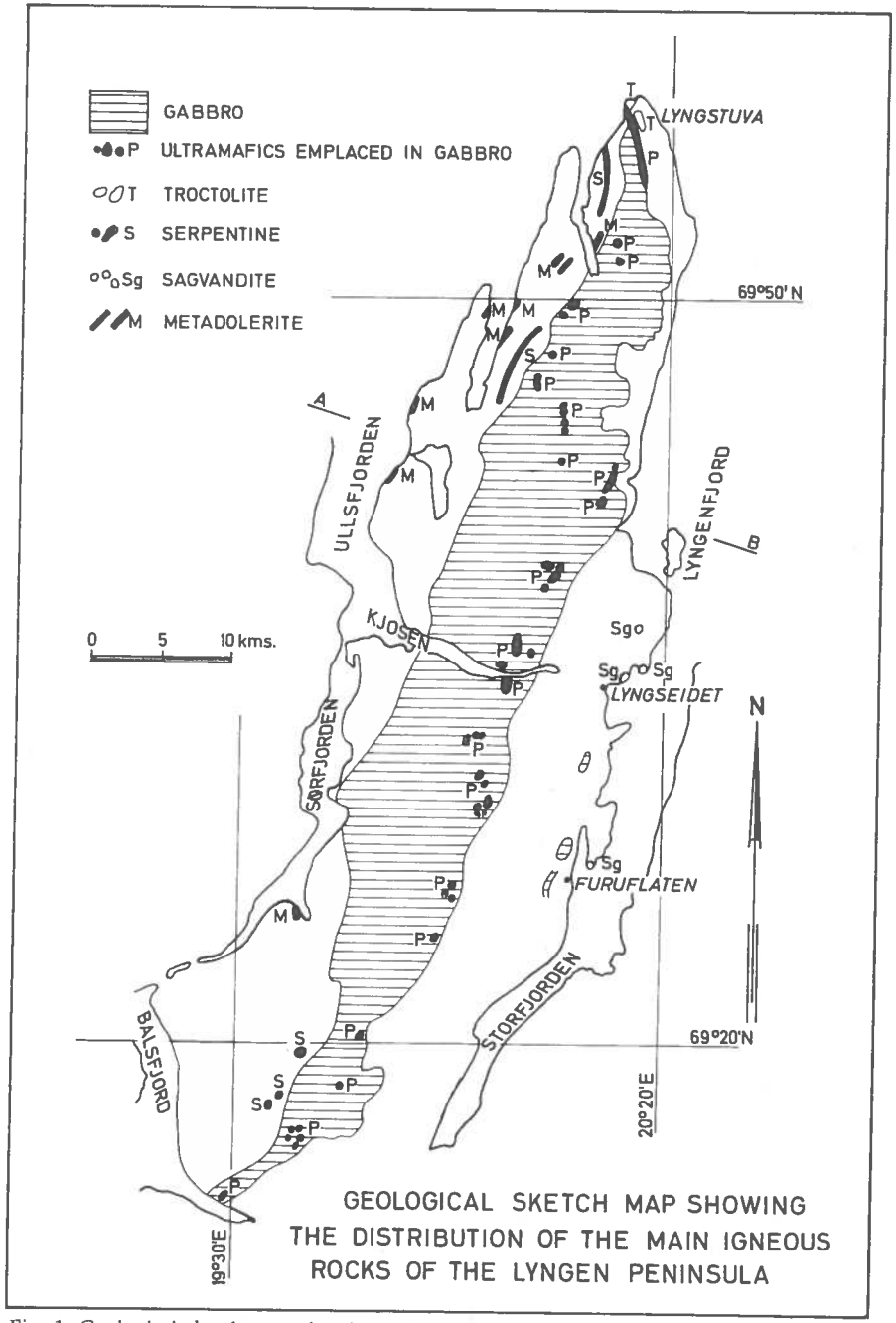

Fig. 1. Geological sketch map showing the distribution of the main igneous rocks of the Lyngen peninsula. The area north of the line A-B is based on unpublished work by R. J. C. Munday.

border it, the boundary can not always be precisely located. In the northern part of the peninsula a 'melange' zone on the east side of the gabbro is occasionally over 1 km wide.

2. *The Furuflaten Gabbro.*

Several small masses of 'gabbro' are located within the Kjosen Formation east of the main gabbro. The most significant of these is the small mass which forms a prominent peak two kilometers NNW of Furuflaten. It shows a similar alteration to that of the Lyngen gabbro but is of importance because it has a metamorphic aureole where garnet is associated with poikiloblastic, decussate hornblende.

3. *The Ultramafics emplaced within the Lyngen Gabbro.*

Most of the ultramafics are found in small bodies (¼ - 2 km in length) which in the south are elongate to and located close to the eastern boundary of the gabbro. In the north the association with the eastern contact of the gabbro is lost although one large (6 km long) body forms the north boundary to the gabbro.

The dominant rock type of these masses is dunite (composed of Fo_{90}) or dunite serpentine. Pyroxenite (composed of a clinopyroxene Ca_{45} Mg_{42} Fe_{13}) is relatively common. Other rock types vary between these two extremes. Frequently the ultramafics show a foliation which is sub-parallel to that of the gabbro and their boundaries seem 'tectonic'. The pyroxenites may occur massive on either side of the dunite or may occur as distinct layers, often parallel to the foliation, but layers with different orientations may intersect. The main ore in the rock is magnetite often with a small core of cromite.

4. *Lyngstuva Troctolite*

This rock found at the northern tip of the peninsula appears originally to have been of troctolitic type. The olivine has altered, via. an orthopyroxene corona, to a green hornblende and the rock is now composed of dominant hornblende set in a matrix of clino-zoisite and oligoclase. The body is extensively sheared and passes in all directions into hornblende schists of the Kjosen Formation.

5. *Serpentines*

The serpentines are located along the major dislocation which forms the westerly boundary of the Vardtind Formation. In the south they occur

as pod like bodies some 100 to 200 m in length. They are normally brecciated around their periphery. No fresh olivine has been found in them and some have been largely replaced by carbonate. In the north the serpentine forms a dyke-like body traceable for several kilometres and is here characterized by large magnetite octahedra and alteration to talc and carbonate. Development of green hornblende in adjacent gritty rocks at one locality appears to be due to contact metamorphic effects of the serpentine.

6. Sagvandite

Several small bodies of olivine-dolomite sagvandite are located in the high-grade Lyngseidet Group near Lyngen Fjord (Randall, 1960). These rocks differ from the type rock by containing some olivine and having dolomite in the place of magnesite. It is still debatable whether these rocks are of igneous or metamorphic origin.

7. Meta-dolerites

These rocks are early minor intrusions and are located in the Svensby Formation. Some of them truncate S_1, appear parallel to S_2 and show a weak S_3 foliation.

Acknowledgements

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Reference

RANDALL, B. A. O., 1960. Sagvandites of Lyngen, Troms, North Norway. *21st. Int. geol. Congr. Copenhagen*, pt. 13, 443-451.

DISCUSSION

Mr. Munday described troctolites within the problematic green rocks associated with the Lyngen gabbro. In these, olivine possessed coronas of orthopyroxene, surrounded by hornblende and then hornblende and spinel next to the plagioclase. In places, the troctolites were altered to hornblende rocks with 90 % — 95 % hornblende with individual euhedral crystals up to 15 cm long associated with zoisite and oligoclase.

Dr. Mason asked if the composition of the olivines in the ultramafic rocks was known.

Dr. Randall replied that they were approximately Fo_{90} in the ultramafics, but probably nearer Fo_{80} in the troctolite.

THE MAFIC AND ULTRAMAFIC INTRUSIONS OF S. W. FINNMARK AND NORTH TROMS

by

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The northern part of the area between Øksfjord and Kvænangen, shown on Fig. 9, forms the southwest corner of the Seiland Gabbro Province (Barth, 1953). Here, mafic and ultramafic intrusive rocks predominate. On the west, hypersthene gabbros intrude the folded metasedimentary succession along a generally north-south line from Sandland in the north to Spitsnes on the Kvænangen Fjord. These include the Sandland—Middagsfjell hypersthene gabbro and the Olderfjord norite. To the east a series of olivine gabbros, gabbros and an ultramafic intrusions are separated from the hypersthene gabbros by a belt of garnet gneiss. From north to south these include the Marøen Gabbro, the Søndre Tverfjord gabbro sheets and the Reinfjord Ultramafic Complex. At Søndre Tverfjord and eastwards the gabbros grade into the high temperature granulites (gabbro gneiss) which probably constitute the most abundant rock type in the Seiland Gabbro Province as a whole. South of the Kvænangen isolated sheets of gabbro occupy the axes of gentle synforms in topographically high positions.

The Sandland—Middagsfjell Gabbro

The upper part of the Sandland—Middagsfjell hypersthene gabbro contains an unusually high proportion of large metasedimentary rafts and smaller inclusions which form a ghost stratigraphy and imply proximity to the roof of the intrusion. A brief description of the northern part of this mass is giben by the author in Ball et. al. (1963). Its westerly contact is transgressive, cutting across F_1 folds and lineations but with the F_2 folds not penetrating the marginal hornfels. This gabbro is therefore considered post F_1, pre F_2 in age. (See, however, the discussion following Hooper and

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