EXPERIMENTAL STUDIES ON ARIEGITES

A. MOTTANA
Istituto di Mineralogia, Universita di Milano, Italy

A. D. EDGAR AND W. R. CHURCH
University of Western Ontario, London, Ontario

The crystallization behaviour of three ariegites from the type locality (L'Etang de Lherz, Ariege, France) and their surrounding lherzolite has been studied under different experimental conditions: in air, in an argon atmosphere, and a ta P_{H_2O} of 1 kilobar.

All the ariegites show olivine as the primary phase, with liquidus temperatures ranging from 1335 °C to 1375 °C and depending slightly on the oxidation conditions. Spinel ariegite has a simple crystallisation sequence (olivine, clinopyroxene 1295 °C, plagioclase 1210 °C and orthopyroxene ± spinel) which is completed in 250 °C below the liquidus. Garnetiferous ariegite shows a complex series of mineral reactions, with final consolidation taking place at much lower temperature than in the non-garnet bearing variety (985 °C). Between liquidus and solidus the mineral assemblages are tholeitic and noritic in composition (clinopyroxene 1220 °C, plagioclase and orthopyroxene 1205 °C, disappearance of olivine 1155 °C). Amphibole ariegite shows an analogous behaviour but the stability field of plagioclase and olivine is strongly increased. A moderate hydrous pressure generate various subsolidus reactions and produces crystallisation of olivine (metastable?) at less than 600 °C. The lherzolite melts in excess 1,480 °C with orthopyroxene crystallizing at 1375 °C and clinopyroxene at 1225 °C.

The relationship of these results with Yoder & Tilley's, and Green's studies on Salt Lake hypersthene eclogite nodule (ariegite, after Ravier) are discussed. By comparison with Ito and Kennedy's results on the melting of a peridotite at high pressure it is suggested that ariegites were formed as differentiates during the late phases of the crystallization of the surrounding parental lherzolite.

These studies have been made preparatory to a more extensive investigation of eclogite reactions at high pressure.

LARGE NEPHELINE AND BIOTITE CRYSTALS IN CALCITE VEINS NEAR BANCROFT, ONTARIO

L. MOYD
Natural History Branch, National Museum of Canada, Ottawa, Ontario

Large, well-formed crystals of nepheline and biotite line veins of calcite which cut Precambrian nepheline-bearing gneisses. In 1966, a field party from the National Museum of Canada opened a series of veins on the Davis Hill in Dungannon Township.

The tabular to pod-like veins are localized, coarsely crystallized fillings in tension joints. Veins are up to tens of feet in length and up to about two feet in width. In the stripped area, most veins are steeply dipping and subparallel. Some are less steep and may curve, crossing or coalescing with others.

The principal minerals of the veins are the same as those of the host rocks—nepheline, albite, biotite, and calcite—and apparently indicate hydrothermal reworking of the wall rocks adjacent to the joints. Well-developed crystals of nepheline, biotite, and feldspar project inward from the walls into cores of coarsely crystalline calcite.

Nepheline occurs as light gray, almost equidimensional crystals up to a foot in diameter showing varying degrees of development of prism, pyramid, and base. Biotite (lepidomelane) occurs as prismatic to tapered crystals up to two feet long and albite as tapered crystals up to several inches long. Crystals of apatite, tourmaline, and zircon occur in minor amounts. Alteration products of the nepheline include sodalite, cancrinite, and "hydronephelite".

This vein zone appears to be of very limited extent. Dilation of the joints may have been directly related to the intrusion of adjacent syenite dikes, and the development

of the vein fillings may have been aided by hydrothermal emanations associated with the syenite.

RESULTS OF PETROFABRIC ANALYSIS BY AN X-RAY UNIVERSAL STAGE

P. PAULITSCH
Mineralogisches Institut der Technischen Hochschule, Darmstadt, Germany

The paper describes a new instrument, i.e. an X-ray universal stage. Results on the following are given: the preferred orientation of ore minerals such as hematite and garnet, the position of the prism of quartzmaxima in different rocks, of the prism participating on the ellipsoid of *sand* quartz grains, the bending axes in undulatory quartz, and the *fracture* and gliding planes of quartz depending on various paragenesis.

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MERISMITIC DIOPSIDE-MICROCLINE-HORNBLENDE ROCK IN NORTHEASTERN BRAZIL

A. B. RAO
School of Geology and Institute of Earth Sciences, Recife, Brazil

Bands of merismitic diopside rock about one metre thick are located at two localities one along the road section of Uauã-Bendegó in Bahia State, and another along the Floresta-Belem do São Francisco highway in Pernambuco State. They are interesting in that they show large masses of diopside crystals (15 × 12 cm) in a microcline matrix and in places show formation of hornblende either as dark masses or as acicular crystal aggregates. The rock has a patchy appearance and is thus called merismitic in character.

Associated in this region are calc-silicate rocks (skarns and tactites) which do not show contact relations with this rock. Optical and petrographical studies have been made. It is considered that this rock may be classified as diopside hornfels (restrictions are made for its inclusion in the skarn rocks) pertaining to the pyroxene hornfels facies.

A STRUCTURAL CONCEPT OF BORBOREMA PEGMATITE, NORTH EASTERN BRAZIL

A. B. RAO
School of Geology and Institute of Earth Sciences, Recife, Brazil

J. DA CUNHA E SILVA
Sudene, Recife, Brazil

In 1944–45, W. D. Johnston, Jr., classified Borborema pegmaites of Rio Grande do Norte and Paraiba States as homogeneous, mixed, and heterogeneous types. In the heterogeneous type he distinguished four zones, with quartz as nucleus.

Observations made by the authors from south to north across the Borborema province proved: (1) in the southern part of the province mineralized pegmatites are rare; (2) zoned pegmatites are very typical in the southern part of the province but grade gradually northward into the homogeneous type; (3) the gentle pitch of the Borborema geosyncline suggests, in the northern part, the possible presence of pegmatites which have not been adequately exposed due to insufficient erosion; the exposed parts are homogeneous and few of them show indications of mineralization and partial zoning; (4) the general structures of the pegmatites are extremely variable, with bifurcations, lenticular forms, bulging, and tapering. With the indications mentioned above, an idealized structure for the pegmatite in this area is proposed.

When visualized longitudinally, the pegmatite is expected to show bulging in the central portion. This bulged part is zoned and often well mineralized. The tapering at the upper and lower portions is represented by the continuation in the outer zone of the heterogeneous type, which is homogeneous in aspect. The level of erosion in the southern part of the province has exposed the bulged central portion towards its lower