

COMMONWEALTH OF AUSTRALIA.

DEPARTMENT OF NATIONAL DEVELOPMENT.
BUREAU OF MINERAL RESOURCES
GEOLOGY AND GEOPHYSICS.

RECORDS.

1955/33



PRELIMINARY GEOLOGICAL ACCOUNT FOR WESTFORD HILLS AREA,
ANTARCTICA.

by

P.W. Crohn.

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The Westfold Hills area, situated between latitudes $68^{\circ}25'$ south and $68^{\circ}40'$, and between longitudes $77^{\circ}50'$ east and $78^{\circ}35'$ east, comprises an ice-free area of approximately 120 square miles, including a large number of islands.

The central portion of this area was visited by an Australian National Antarctic Research Expedition party under Mr. P. G. Law on January 30th and 31st, 1955. The following preliminary account is based on the observations made on this occasion and is subject to revision when petrological examinations and further examination of air photos have been completed.

Magnetic variation in this area is about 70° west, and all bearings quoted in this report refer to true north.

The area shows relief of the order of 400 feet with numerous isolated, hummocky hills, somewhat modified in shape by joint and shear directions of the country rock. The major valleys trend in a roughly east-west direction, parallel to the predominant strike of the rock foliation, and are filled to various depths by glacial drift and moraine. In the central coastal portion of the area, moraines also form low hills, and no country rock at all is exposed in this vicinity. Elsewhere, only scattered erratics occur on the upper portions of the hills and few of these show significant faceting or striations. Lakes and fiord-like inlets are very prominent features of the landscape, but there are no defined stream channels and many of the lakes do not appear to have any surface outlets.

The country rock consists largely of medium-grained charnockite gneisses, which in places show banding due to the segregation of ferro-magnesian minerals. The dominant strike of both foliation and banding is 90° with vertical to steep northerly dips, but deviations in strike of up to 45° are not uncommon. No significant lineation is present. Extensive zones of slight shearing, in places up to a hundred feet in

width, cut this foliation at various angles, with a slight preference for trends close to 360° .

Numerous narrow seams of bluish and glassy quartz are present, generally sub-parallel to the foliation, as well as a few larger lenticular or irregular bodies of granite pegmatite, charnockite pegmatite, quartz-garnet rock and quartz-epidote rock. Segregations of almost pure epidote or almost pure pyroxene are up to 2 or 3 feet in diameter.

Bodies of biotite granulite and pyroxene granulite occur at several points, and the largest of them attains an outcrop diameter of at least half a mile. Their relations to the gneisses are not known.

Basic dykes are very numerous, ranging up to about 30 feet in width, and some can be traced for distances of at least one mile. They include fine-grained dolerites, basalts and lamprophyres. The dominant strike directions are between 340° and 20° , with a minor set approximately at right angles to this and a few dykes oblique to both these directions. Dips are generally within 20° of vertical. The dykes typically cut across shear structures in the country rock, but some of the dykes themselves are faulted and show slight local shearing. On the other hand, they do not contain any quartz veins or other indications of younger magmatic activity. No petrological or structural differences could be detected between the various sets of dykes of different strikes, and no consistent age relationships exist at intersections.

The erratics and boulders of the moraine deposits generally belong to one or other of the rock types already described, the main exceptions being a few specimens of a contorted garnet schist and of a mica schist with porphyroblastic feldspars, neither of which corresponds to any rock type seen in situ in this area.

At Magnetic Island, about three miles off-shore, observations by K. Lodwick and H. Oldham indicate very similar conditions to those described above, and it appears likely that

similar rock types also occupy the remaining unvisited portions of the Westfold Hills area and the adjacent islands.

The only indications of economic mineralization seen in this area consisted of some specimens of glassy quartz containing traces of ? copper carbonate (malachite), and one specimen of felspathic gneiss containing ? chalcopyrite. Both of these identifications are tentative, pending chemical tests, and none of the specimens was found in situ, although it is unlikely that any of them had been transported for any great distance.

No significant radioactive anomalies were encountered. Background counts were of the order of 80 to 120 counts per minute, and no consistent difference was apparent between different rock types.