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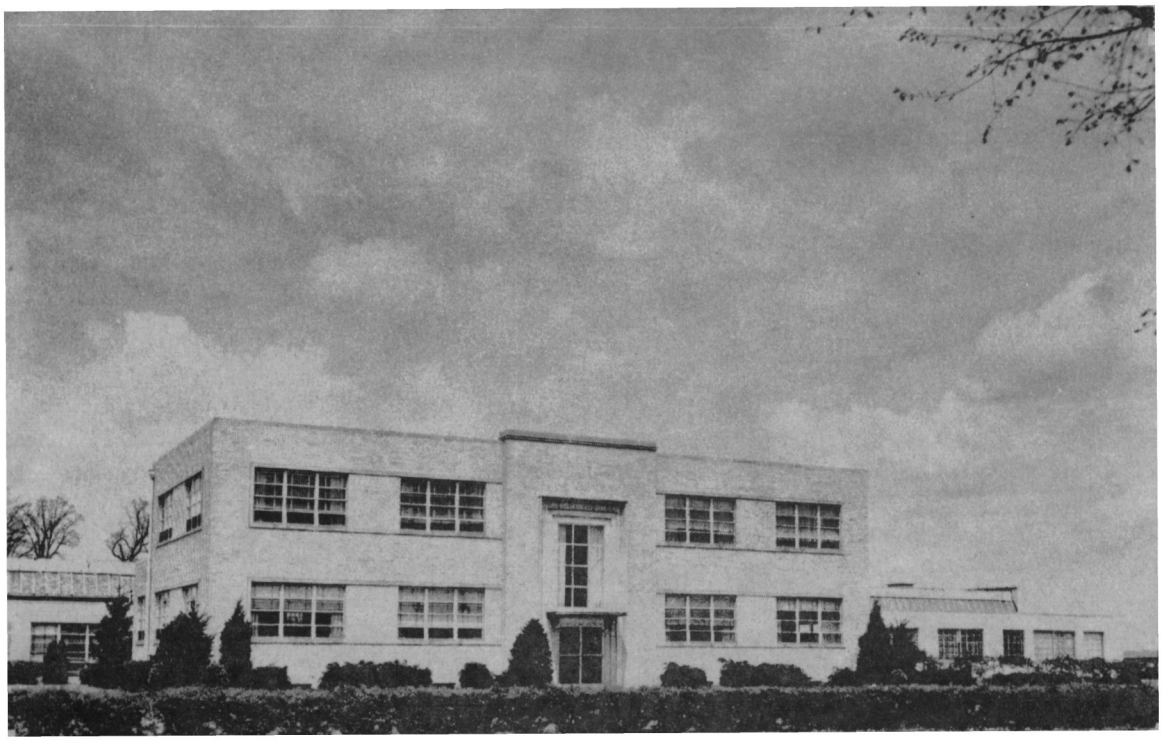

RESEARCH FOUNDATION

USNC-IGY ANTARCTIC GLACIOLOGICAL DATA
FIELD WORK 1958 AND 1959

(Description of Specimens from a
Nunatak in the Ross-Weddell "Graben")

Report 825-2-Part V
IGY Project No. 4.10
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Richard P. Goldthwait
August 1959

USNC-IGY ANTARCTIC GLACIOLOGICAL DATA

Report No. 2: Field Work 1958-59

Part V

DESCRIPTION OF ROCKS

Ohio State University
Research Foundation
Columbus 12, Ohio

Project 825, Report No. 2, Part V

submitted by

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to the

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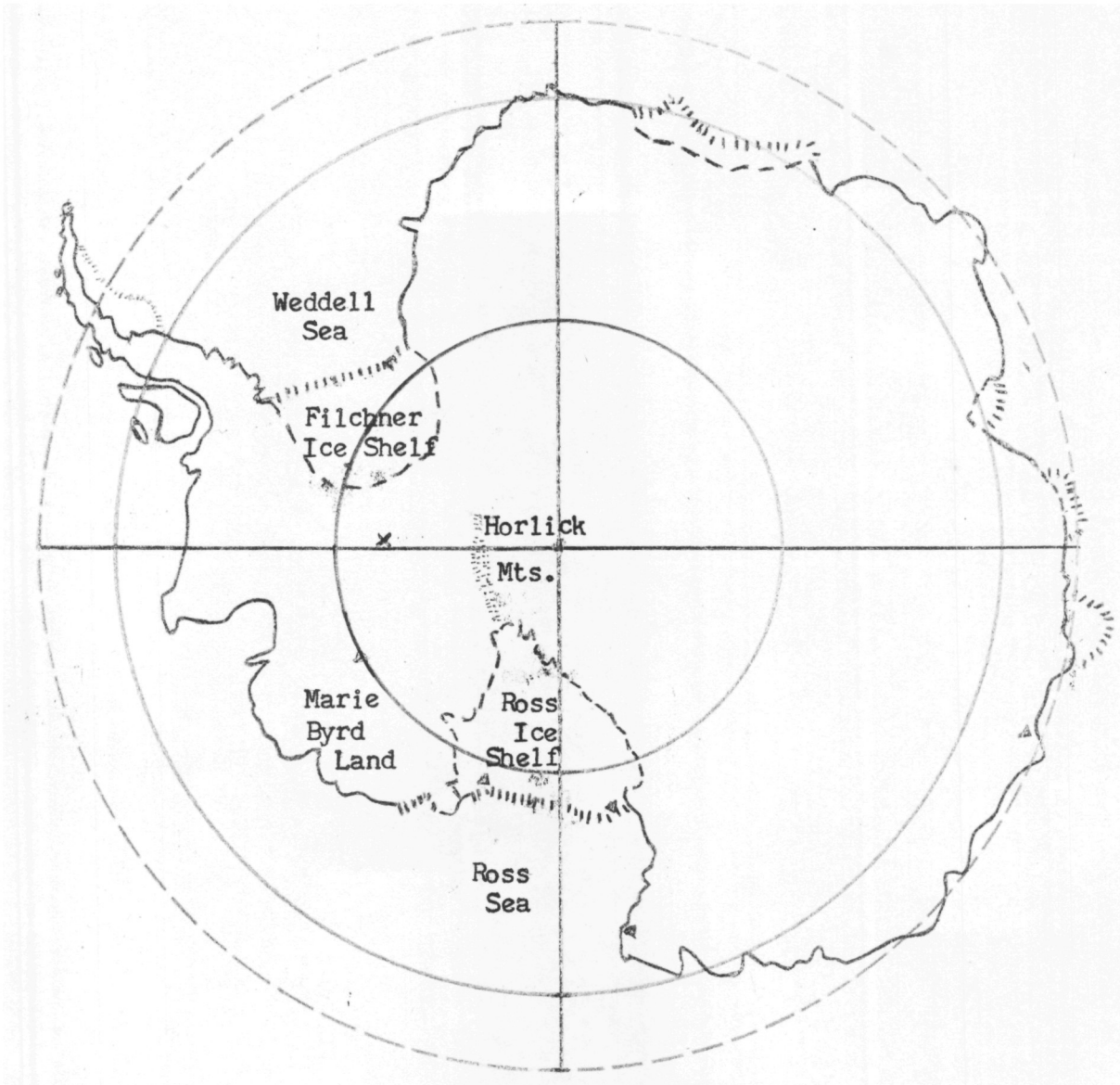

Map showing the location of the nunatak from which the specimens were collected.

DESCRIPTION OF SPECIMENS FROM A NUNATAK IN THE ROSS-WEDDELL "GRABEN"

by

Samuel Treves

Introduction

The following descriptions are of rocks collected by Mr. J. Pirrit from a nunatak located at latitude 81°53'S, longitude 89°20'W. They are reported as typical samples of the rocks which crop out in this area and are described in this preliminary manner because of the scarcity of information concerning the bedrock geology of this area.

The specimens consist of two similar samples of metamorphic rock, one which shows a contact with an igneous rock; two different specimens of granitic rock, one fresh and the other weathered; and a specimen collected from the talus. They will be described in this order.

Metamorphic Rocks

The samples were taken from the bedrock at the nunatak. They are spotted rocks and show faint planar structures which resemble bedding. The spots are about the size of a wheat grain and are composed of darker material than the matrix. They are either black or very dark grey, whereas, the matrix is a rather uniform dark grey. One of the specimens is coursed by quartz veins parallel to and at right angles to the planar structure; the other specimen shows a contact with an igneous rock and both the matrix and the spots are slightly coarser. Under a hand lens, the matrix of the coarser specimen appears to be composed of very fine quartz grains and micaceous minerals. The spots show occasional shining, black biotite plates and small, pink garnets.

In thin section, the texture is decussate. The matrix consists of fine, subangular fragments of quartz and feldspar, shreds of sericite, biotite, chlorite, and carbonate (?).

The distribution of minerals in the matrix is generally uniform. Occasionally, however, biotite is lacking and sericite becomes abundant. These areas are outlined by borders of fine biotite and are quite distinct. They may be areas of incipient crystallization of some new component, possibly andalusite or cordierite. The dark spots consist of green-brown biotite and chlorite and are not well defined in thin section and fade into the matrix. The cores of some spots contain coarse recrystallized quartz and an opaque mineral which appears is probably magnetite.

The rock is a spotted pelitic hornfels such as might be expected in the outer parts of a contact aureole. The original rock was probably a shale or graywacke.

The igneous rock in contact with the hornfels is a granitic pegmatite. It consists of white potash feldspar, grey quartz, silvery white muscovite, and minor biotite. The contact with the hornfels is knife-sharp. At the contact the pegmatite is much finer grained, whereas, the hornfels is a little coarser than the other specimens but is otherwise unaffected.

Igneous Rocks

The fresh specimens are granitoid and porphyritic. The phenocrysts are pink, prominently twinned (Carlsbad law) potash feldspars, which occasionally show a narrow border of white, indeterminate feldspar. They are randomly distributed and constitute about 20% of the rock.

The groundmass is medium-grained and consists of plagioclase, quartz, biotite, and potash feldspar. The plagioclase is grey-white and is prominently twinned. Some crystals are saussuritized and are pale yellow-green. The quartz euhedra are smoky grey and occur in the interstices between the other minerals and as minute inclusions in the feldspars. Large quartz crystals are fractured and frequently show false cleavage. Biotite occurs as subhedral black, shiny plates scattered throughout the rock.

Potash feldspar in the matrix has much the same characteristics as the large potash feldspar phenocrysts and, although smaller and not so well crystallized, probably has the same origin.

Accessory magnetite, pyrite, and honey colored crystals of titanite (?) or garnet (?) are present. There is some alteration, biotite to chlorite and plagioclase to epidote and sericite. Joint surfaces are covered with a thin film of carbonate and quartz.

The composition of the rock based on a hand specimen identification is as follows:

Phenocrysts	Percentage
Potash feldspar	100

Groundmass	Percentage
Potash feldspar	10
Quartz	35
Plagioclase	45
Biotite	10
Magnetite	Tr
Pyrite	Tr
Garnet (?) or Titanite (?)	Tr

The rock is a porphyritic granodiorite.

The weathered specimens of igneous rock are covered by a yellow-brown limonite stain and badly weathered. They are medium-grained and consist of quartz, muscovite, and feldspar. The quartz is milky-white on weathered surfaces but smoky grey when freshly broken. It is generally subhedral but euhedral crystals project into miarolitic cavities. The feldspar is creamy white and subhedral and fills interstices between quartz crystals. It is badly weathered but appears to be potash feldspar. Muscovite is coarse and abundant. It is silvery-white and occurs as radiating sheaves and individual plates that are wrapped around the other minerals. Accessory biotite and magnetite (?) are rare.

The composition based on hand specimen identification is as follows:

Minerals	Percentage
Quartz	55
Muscovite	25
Feldspar	20
Biotite	Tr
Magnetite (?)	Tr

Evaluation is difficult without further information on the occurrence of this rock type. The hand specimens are similar to greisen in some respects, but are probably merely a quartz-rich, pegmatitic phase of the quartz monzonite. Similar rocks have been described from Precambrian terrains in Antarctica and this is their usual occurrence.

Talus Specimens

The sample was taken from the talus and consists of abundant quartz and minor amounts of chlorite and feldspar. The specimen is similar to a contorted boudin or vein that has been freed from its matrix by weathering. Some weathered feldspar adheres to outer surface.

Thin sections of the specimen show abundant graduated quartz which is commonly strained. Where the original relationships are preserved, the quartz is anhedral and the arrangement is that of a quartz vein. The chlorite occurs as interstitial wisps and the feldspar as subhedral crystals surrounded by quartz. The hand specimen is very similar to a quartzite, and it is possible that a strongly deformed, slightly impure quartzite could exhibit the characteristics described above. The thin section analysis and form of the specimen, however, strongly suggest that the specimen is a granulated quartz vein.

Conclusions

The specimens come from a nunatak in the controversial Ross-Weddell "graben." They are not like the rocks of the Beacon series, which would be expected here if the area was really part of a graben. The metamorphic specimens, however, are not unlike rocks that might be expected if the graywackes of the Robertson Bay group were intruded by later granitic rocks.

The specimens, therefore, may be Precambrain rocks or later sedimentary rocks, possibly Robertson Bay equivalents, which have been intruded by later granitic rocks. The absolute age of the granitic rocks and further information concerning the relationships of the igneous rocks to the metasedimentary rocks are needed before any definite age determination can be made.