DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

Prepared by the
UNITED STATES GEOLOGICAL SURVEY
Under the auspices of the
NATIONAL SCIENCE FOUNDATION

U.S. ANTARCTIC RESEARCH PROGRAM
MT. BLACKBURN QUADRANGLE
ANTARCTIC GEOLOGIC MAP A–12

Base from U.S. Geological Survey, 1968

SCALE 1:250 000

5 0 5 10 15 20 25 MILES

5 0 5 10 15 20 25 30 35 KILOMETERS

Polar Stereographic Projection – Standard Parallel 80°14′

CONTOUR INTERVAL 200 METERS – NATIONAL GEODETIC VERTICAL DATUM OF 1929

Geology mapped in 1934–35 by Q. A. Blackburn; in 1962–63 by G. A. Doumani and V. H. Minshew; in 1969–70 by H. R. Katz and B. C. Waterhouse; in 1970–71 by J. D. Burgner, E. Stump and V. P. Wendland; and in 1980–81 by S. Self, J. H. Smit, and E. Stump

INTERIOR—GEOLOGICAL SURVEY, RESTON, VIRGINIA—1985—083336

EXPLANATION OF MAP UNITS

JPu		Ferrar Group Beacon Supergroup	JURRASSIC PERMIAN AND PENNSYLVANIAN(?)
Angular unconformity (Kukri erosion surface)			
O€z O€t	O€g	Granite Harbour Intrusives	ORDOVICIAN AND CAMBRIAN
p€a p€w p€l		Beardmore Group	LATE PRECAMBRIAN

DESCRIPTION OF MAP UNITS

JPu **Beacon Supergroup and Ferrar Group Undifferentiated**—Interbedded sandstone, siltstone, and shale, carbonaceous toward the top. Basal tillite on striated pavement. *Glossopteris* flora in higher portions of the sequence. Two sills of Ferrar Dolerite intrude the section, one of which caps Mt. Blackburn.

Minshew (1967) subdivided, but did not map, the Beacon Supergroup in this area as follows:

Queen Maud Formation—Cyclic alternations of volcanic sandstone, siltstone, shale, carbonaceous shale, and coal, overlying about 75 m of conglomeratic sandstone, arenaceous limestone and calcareous sandstone. Poorly distinguishable boundary with underlying

Weaver Formation—Upper portion—Sandstone, calcareous sandstone, carbonaceous shale, conglomeratic stringers. About 350 m.

Lower portion—Black to green, silty shale, with carbonaceous intercalations. On northern face of Mt. Blackburn strata grade into fine-grained red sandstone and siltstone, with numerous desication cracks. About 15 m thick. Disconformably overlies

Scott Glacier Formation—Massive tillite, with clasts predominantly of granite, with lesser amounts of La Gorce and Wyatt Formation, set in a poorly-sorted matrix. Minor lenticular beds of siltstone and shale. 0–20 m thick. Overlies glacially striated pavement.

Nonconformity and Angular Unconformity

O€g **Granite Harbour Intrusives, undifferentiated (Borg, 1983)**—Calc-alkaline plutonic complex including granite, granodiorite, quartz monzonite, quartz diorite, tonalite and diorite. Gray and pink phases, equigranular and porphyritic (K-feldspar phenocrysts). Predominantly non-foliated, but with some foliated portions. In general rocks contain quartz, plagioclase, K-feldspar and biotite. Hornblende is a common phase in the Mt. Blackburn–Gothic Mountains area. Altered cordierite is present at Price Bluff.

O€z **Zanuck granite**—Coarse-grained, K-feldspar porphyry, with phenocrysts 6–10 cm in length. Quartz, K-feldspar, plagioclase, biotite, and altered cordierite. Cross-cut by younger pluton at Mt. Zanuck (Liv Glacier Quadrangle).

O€t **Tourmaline-bearing granite**—Pink, equigranular, K-feldspar rich granite, with 5–6 cm spheres of tourmaline evenly distributed throughout the pluton.

p€a **Ackerman Formation (Stump, 1983)**—Alternating clastic and volcanic units. Interbedded gray to green sandstone, and gray, green, and purple shale and phyllite. Sandstones are both wackes and arenites, containing clasts of quartz, plagioclase and/or volcanic rock fragments. A minor calcareous fraction occurs. Light-colored, well-rounded, sparce-pebble conglomerates occur at several horizons.

Massive, dark green to gray silicic, volcanic porphyry. Phenocrysts of embayed quartz, plagioclase, and altered biotite, orthopyroxene(?) and cordierite(?) in finely recrystallized groundmass. Both tuffs and lava flows.

2000-meter section, with top faulted at contact with La Gorce Formation. Cleavage developed within 500 meters of fault. Metamorphism produced a chlorite-muscovite assemblage.

p€w **Wyatt Formation (Minshew, 1967)**— Massive, dark green, gray and black, silicic porphyry. Phenocrysts of embayed quartz, euhedral, twinned plagioclase, biotite, and alterations of orthopyroxene(?) and cordierite(?) in finely recrystallized groundmass. Porphyroblasts of K-feldspar to 5 cm around Johansen Peak.

Volcanic phase overlain conformably by Ackerman Formation on Ackerman Ridge. Hypabyssal phase intrudes folded La Gorce Formation south of Hourglass Buttress.

p€l **La Gorce Formation (Minshew, 1967)**—Alternating dark gray to black silty argillite, black metapelite and medium to light gray metagraywacke. Complets of massive to finely laminated metagraywacke beneath metapelite with eroded top, Bouma sequences, minor graded-bedding, scour marks, load casts and flame structure. Metagraywackes contain poorly-sorted, coarse sand to silt-sized clasts of quartz and plagioclase, with minor muscovite and garnet, set in a pelitic matrix comprising 55–75 percent of the rock.

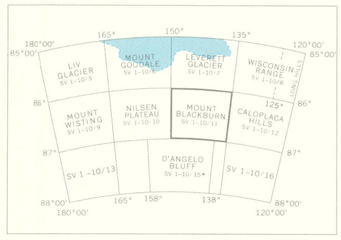
Deformed during Beardmore Orogeny into steeply plunging, tight to isoclinal, chevron-style folds, with axial plane cleavage variably developed. Highly folded zones interspersed with zones of unfolded strata.

Metamorphism produced a muscovite-chlorite-biotite assemblage at Kessen's Peak and biotite-muscovite on much of Ackerman Ridge. Cordierite ± andalusite is developed around Hourglass Buttress. Retrograde chlorite–muscovite assemblages occur adjacent to contacts with Wyatt and Ackerman Formations.

EXPLANATION OF MAP SYMBOLS

- Contact
- Fault—Dotted where concealed. U, upthrown side; D, downthrown side
- 45 Anticline, showing plunge
- 70 Syncline, showing plunge
- 50 Anticline–syncline pair, showing plunge
- 50 Zone of multiple anticlines and synclines, showing average plunge
- Strike and dip of bedding
  - 65 Inclined
  - Vertical
  - 80 Overturned
- 70 Strike and dip of cleavage

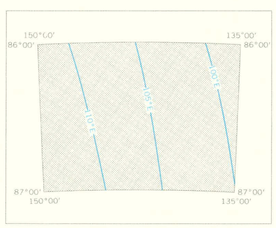
INDEX TO ADJOINING SHEETS



Sheet numbering system based on International Map of the World

Dashed outlines show coverage of previously published sheets, not on this system

COMPILATION DIAGRAM



Photogrammetric compilation

Isogonic lines compiled from U.S.N.O.O. Chart 1706 S, 1965

REFERENCES

Blackburn, Q. A., 1937, The Thorne Glacier section of the Queen Maud Mountains: Geographical Review, v. 27, p. 598–614.

Borg, S. G., 1983, Petrology and geochemistry of the Queen Maud batholith, central Transantarctic Mountains,with implications for the Ross Orogeny, *in* Oliver, R. L., James, P. R., and Jago, J. B., (eds.), Antarctic Earth Sciences: Australian Academy of Science, Canberra, p. 165–169.

Burgener, J. D., 1975, Petrography of the Queen Maud batholith, central Transantarctic Mountains, Ross Dependency, Antarctic: University of Wisconsin, Madison M. S. thesis, 75 p.

Burt, D. M., and Stump, Edmund, 1983, Mineralogical investigation of andalusite-rich pegmatites from Szabo Bluff, Scott Glacier area: Antarctic Journal of the United States, v. 18, p. 49–52.

Doumani, G. A., and Minshew, V. H., 1965, General geology of the Mount Weaver area, Queen Maud Mountains, Antarctica: American Geophysical Union Antarctic Research Series, v. 6, no. 1299, p. 127–139.

Dreschhoff, G. A. M., Zeller, E. J., Schmit, Hubert, Bulla, Claus, Morency, Maurice, and Tremblay, Alain, 1983, Radioactive mineral occurrence at Szabo Bluff, Transantarctic Mountains: Antarctic Journal of the United States, v. 18, p. 48–49.

Katz, H. R., 1982, Post-Beacon tectonics in the region of Amundsen-Scott Glaciers, Queen Maud Range, Transantarctic Mountains, *in* Craddock, Campbell, (ed.), Antarctic Geoscience: University of Wisconsin Press, Madison v. 4, p. 827–834.

Katz, H. R., and Waterhouse, B. C., 1970, Geological reconnaissance of the Scott Glacier area, south-eastern Queen Maud Range, Antarctica: New Zealand Journal of Geology and Geophysics, v. 13, no. 4, p. 1030–1037.

Minshew, V. H., 1965, Potasssium-Argon age from a granite at Mount Wilber, Queen Maud Range, Antarctica: Science, v. 150, 741–743.

_____ 1967, Geology of the Scott Glacier and Wisconsin Range areas, central Transantarctic Mountains, Antarctica: Ohio State University, Department of Geology, Ph.D. dissertation, 268 p.

Mirsky, A., 1969, Geology of the Ohio Range–Liv Glacier area: American Geographical Society Antarctic Map Folio Series, 12, XVI.

Smit, J. H., 1981, Sedimentology, metamorphism, and structure of the La Gorce Formation, La Gorce Mountains, upper Scott Glacier area, Antarctica: Arizona State University, Tempe, M.S. thesis, 83 p.

Stump, Edmund, 1976, On the late Precambrian—early Paleozoic metavolcanic and metasedimentary rocks of the Queen Maud Mountains, Antarctica, and a comparison with rocks of similar age from southern Africa: Ohio State University, Institute of Polar Studies Report no. 62, 212 p.

Stump, Edmund, 1983, Type locality of the Ackerman Formation, La Gorce Mountains, Antarctica *in* Oliver, R. L., James, P. R., and Jago, J. B., (eds.), Antarctic Earth Sciences: Australian Academy of Science, Canberra, p. 170–174.

Stump, Edmund, Self, Stephen and Smit, J. H., 1982, Timing of events during the Beardmore Orogeny, Antarctica, and comparison with phases of the Pan-African episode in southern Africa: Geological Society of America Abstracts with Programs, v. 14, no. 7, p. 627.

Stump, Edmund, Self, Stephen, Smit, J. H., Colbert, P. V., and Stump, T. M., 1981, Geological investigations in the La Gorce Mountains and Scott Glacier area: Antarctic Journal of the United States, v. 16, p. 55–57.

RECONNAISSANCE GEOLOGIC MAP OF THE MT. BLACKBURN QUADRANGLE, TRANSANTARCTIC MOUNTAINS, ANTARCTICA

By

Edmund Stump, J. H. Smit, and Stephen Self

1985

For sale by Branch of Distribution, U.S. Geological Survey, 1200 South Eads Street, Arlington, VA 22202