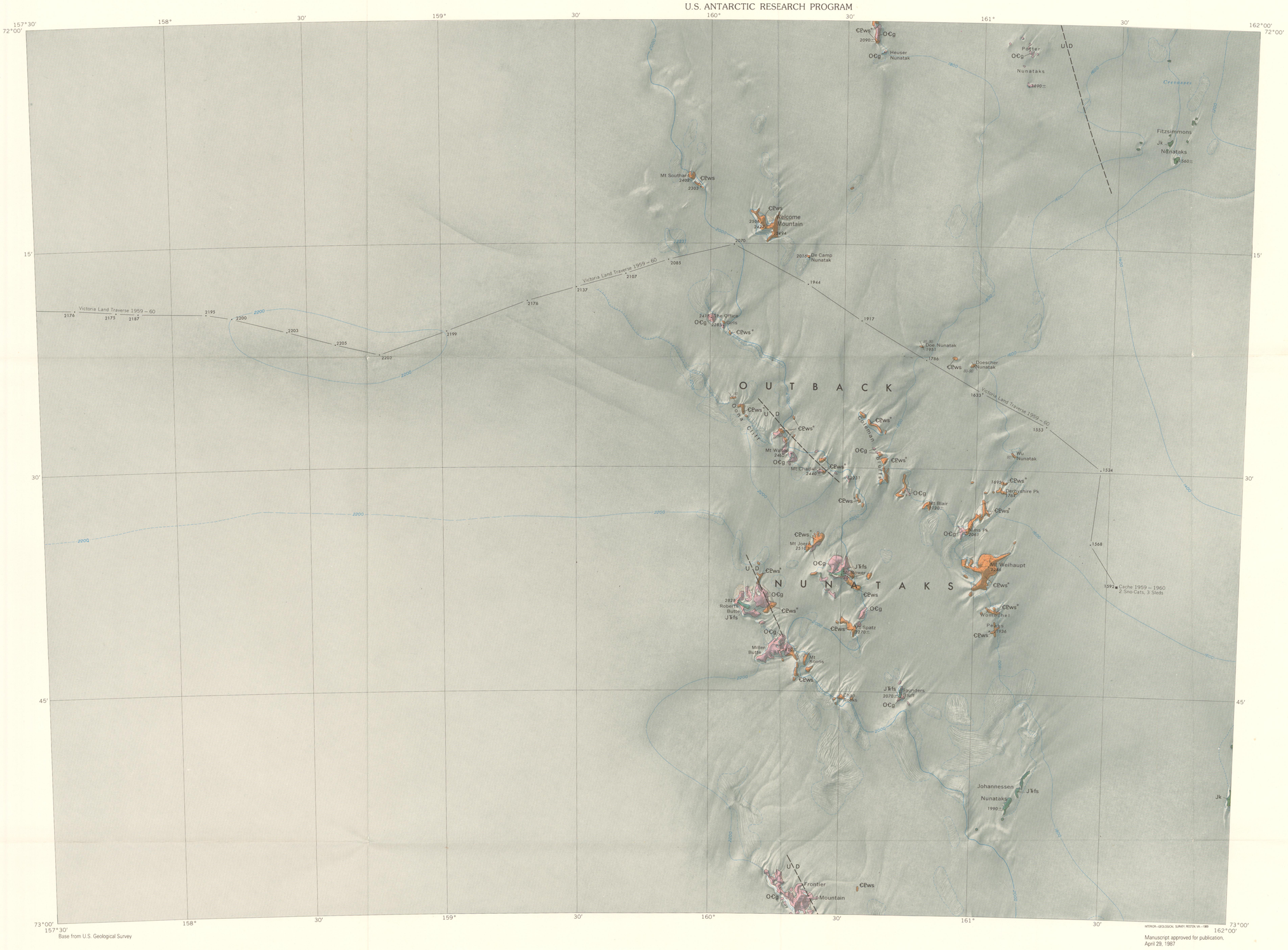
DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

Prepared by the
UNITED STATES GEOLOGICAL SURVEY
Under the auspices of the
NATIONAL SCIENCE FOUNDATION
From contributions by
BUNDESANSTALT FÜR GEOWISSENSCHAFTEN UND ROHSTOFFE
and
U.S. ANTARCTIC RESEARCH PROGRAM

U.S. ANTARCTIC RESEARCH PROGRAM
WELCOME MOUNTAIN QUADRANGLE
ANTARCTIC GEOLOGIC MAP A–14



Base from U.S. Geological Survey

INTERIOR—GEOLOGICAL SURVEY, RESTON, VA.—1989

Manuscript approved for publication,
April 29, 1987

CORRELATION OF MAP UNITS

Jk	JURASSIC
JŦfs	JURASSIC AND TRIASSIC
Angular unconformity (Kukri erosion surface)	
OЄg	ORDOVICIAN AND CAMBRIAN
ЄPws	CAMBRIAN(?) OR PROTEROZOIC(?)

DESCRIPTION OF MAP UNITS

Jk — **Kirkpatrick Basalt**—Tholeiitic lava flows with thin sedimentary and pyroclastic interbeds occurring very sparsely.

JŦfs — **Ferrar Dolerite and Section Peak Formation undifferentiated**—Ferrar Dolerite—Sills of tholeiitic diabase separated and underlain by thin slivers of sandstone. Typically has columnar jointing. Age is Jurassic.

Section Peak Formation—Medium to coarse-grained, trough-cross-bedded sandstone, that is feldspathic and contains volcanic detritus including altered shards. The sandstone overlies an irregular erosion surface on granite at Mt. Bower and Roberts Butte, where it is approximately 18 m thick and capped by diabase. At Johannessen Nunataks, sandstone crops out at the northern end both above and below a diabase sill approximately 80 m thick. A Late Triassic age is suggested by microfloral fossils.

OЄg — **Granite Harbour Intrusives**—Strongly peraluminous syeno- and monzogranites, both equigranular and porphyritic (K-feldspar phenocrysts). Tourmaline and garnet are accessory phases in some plutons. Muscovite is common, though most or all is probably secondary. The granites generally are texturally homogenous in pluton interiors, but have complex intrusive and migmatized margins.

Pegmatitic and aplitic dikes are common throughout the quadrangle, intruding both Wilson metasediments and Granite Harbor plutons. The pegmatites are both zoned and unzoned. Graphic texture occurs in some. Cavities with euhedral crystals are common. Tourmaline, mainly schorl, is ubiquitous; rubellite and verdellite occur in a brecciated pegmatite at Mt. Joerm. Beryl and Fe-cordierite occur in pegmatites of Frontier Mountain. Garnet is common.

ЄPws* — **Wilson metamorphics-metasediments**—Equivalent to Rennick Group of Gair (1967). Fine-grained, psammitic and pelitic schists with minor layers and lenses up to several cm thick of calcsilicate granulite and impure marble. At Mt. Weihaupt layered quartz-biotite schists contain plagioclase, muscovite, fibrolite, altered cordierite(?) porphyroblasts, and rare andalusite; quartz segregations contain garnet and vesuvianite.

* Indicates localities where pegmatites and aplites intrude Wilson metasediments

EXPLANATION OF MAP SYMBOLS

Contact

Fault deduced from change in height of cover rocks

Gradational igneous contact

Strike and dip of bedding

SELECTED REFERENCES

Borg, S.G., 1984, Granitoids of northern Victoria Land, Antarctica: Arizona State University, Tempe, Ph.D. dissertation, 355 p.

Borg, S.G., Stump, Edmund, and Holloway, J.R., 1986, Granitoids of northern Victoria Land, Antarctica: A reconnaissance study of field relations, petrography and geochemistry; *in* Stump, Edmund, (ed.), Geological Investigations in Northern Victoria Land, Antarctic Research Series, v. 46, American Geophysical Union, p. 115–188.

Borg, S.G., Stump, Edmund, Chappell, B.W., McCullock, M.T., Wyborn, Doone, Armstrong, R.L., and Holloway, J.R., 1987, Granitoids of northern Victoria Land, Antarctica: Implications of chemical and isotopic variations to regional crustal structure and tectonics: American Journal of Science, v. 287, p. 127–169.

Collinson, J.W., and Kemp, N.R., 1982, Sedimentology of the Takrouna Formation, a Permian-Triassic fluvial deposit in northern Victoria Land: Antarctic Journal of the United States, v. 17, p. 15–17.

Collinson, J.W., and Kemp, N.R., 1983, Permian-Triassic sedimentary sequence in northern Victoria Land, Antarctica: *in* Oliver, R.L., James, P.R., and Jago, J.B., (eds.), Antarctic Earth Science, Australian Academy of Science, Canberra, p. 221–225.

Collinson, J.W., Pennington, D.C., and Kemp, N.R., 1986, Stratigraphy and Petrology of Permian and Triassic fluvial deposits in northern Victoria Land, Antarctica: *in* Stump, Edmund, (ed.), Geological Investigations in Northern Victoria Land, Antarctic Research Series, v. 46, American Geophysical Union, p. 211–242.

Gair, H.S., 1967, The geology from the upper Rennick Glacier to the coast, northern Victoria Land, Antarctica: New Zealand Journal of Geology and Geophysics, v. 10, p. 309–344.

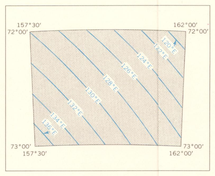
Gair, H.S., Sturm, Arnold, Carryer, S.J., and Grindley, G.W., 1969, The geology of northern Victoria Land: American Geographical Society, Antarctic Map Folio Series, 12, Sheet 13.

Grew, E.S., Kleinschmidt, Georg, and Schubert, Wolfgang, 1984, Contrasting metamorphic belts in north Victoria Land, Antarctica: Geologisches Jahrbuch, v. B 60, p. 253–263.

Pennington, D.C., and Collinson, J.W., 1984, Sedimentary petrology of Permian and Triassic Beacon sandstones, northern Victoria Land: Antarctic Journal of the United States, v. 19, p. 10–11.

1. Department of Geology, Arizona State University, Tempe, Arizona 85287, U.S.A.
2. Department of Geology and Mineralogy and Institute of Polar Studies, The Ohio State University, Columbus, Ohio 43210, U.S.A.
3. Department of Geological Sciences, University of Maine, Orono, Maine 04469, U.S.A.
4. Department of Geology, University of Melbourne, Parkville, Victoria 3052, Australia
5. Bundesanstalt für Geowissenschaften und Rohstoffe, D–3000 Hannover 51, Federal Republic of Germany.

COMPILATION DIAGRAM



Photogrammetric compilation

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

SCALE 1:250 000

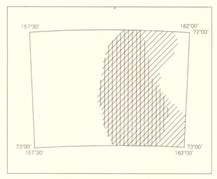
5 0 5 10 15 20 25 MILES

5 0 5 10 15 20 25 30 35 KILOMETERS

Lambert Conformal Conic Projection—Standard Parallels 72°40′ and 75°20′

CONTOUR INTERVAL 200 METERS—NATIONAL GEODETIC VERTICAL DATUM OF 1929

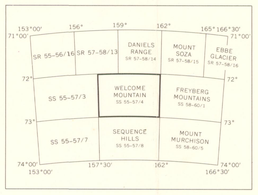
GEOLOGIC MAP COMPILATION



Mapped by U.S. Antarctic Research Program

Mapped by Bundesanstalt für Geowissenschaften und Rohstoffe

INDEX TO ADJOINING SHEETS



Sheet numbering system based on International Map of the World

RECONNAISSANCE GEOLOGIC MAP OF THE WELCOME MOUNTAIN QUADRANGLE, TRANSANTARCTIC MOUNTAINS, ANTARCTICA

Compiled by
Edmund Stump
From contributions by
Scott G. Borg[1], James W. Collinson[2],
Edward S. Grew[3], John R. Holloway[1], Michael Sandiford[4],
Norbert W. Roland[5], and Edmund Stump[1]

1989

For sale by U.S. Geological Survey, Map Distribution,
Box 25286, Federal Center, Denver, CO 80225