



Paths across Antarctica, over which the two-station surface wave method is to be applied.

References

- Biswas, N. N. 1971. The upper mantle structure of the United States from the dispersion of surface waves. *Pb.D. dissertation*, University of California, Los Angeles.
- Biswas, N. N., and L. Knopoff. In press. The structure of the upper mantle under the United States from the dispersion of Rayleigh waves. *Geophysical Journal of the Royal Astronomical Society*.
- Block, S., A. L. Hales, and M. Landisman. 1969. Velocities in the crust and upper mantle of Southern Africa from multi-mode surface wave dispersion. *Seismological Society of America. Bulletin*, 59: 1599-1629.
- Bolt, B. A., and M. Niazi. 1964. Dispersion of Rayleigh waves across Australia. *Geophysical Journal of the Royal Astronomical Society*, 9: 21-35.
- Fouda, A. A. 1973. The upper mantle structure under the stable regions. *Pb.D. dissertation*, University of California, Los Angeles.
- Gabriel, V. G., and J. T. Kuo. 1966. High Rayleigh wave phase velocities for the New Delhi, India-Lahore, Pakistan profile. *Seismological Society of America. Bulletin*, 56: 1137-1146.
- Knopoff, L. 1969. The upper mantle of the earth. *Science*, 163: 1277-1287.
- Sherburne, R. W., and S. S. Alexander. 1971. Crust and upper mantle structure for continental South America from surface wave measurements (abstract). *American Geophysical Union. Transactions*, 52: 281.

Geologic survey of Marie Byrd Land and western Ellsworth Land

F. ALTON WADE

*The Museum
Texas Tech University*

Progress continues on the reduction of data and analysis of specimens collected during the 1934, 1940, 1966, 1967, and 1968 field seasons in Marie Byrd Land and Ellsworth Land. The task of unravelling the geologic history of this large sector of West Antarctica is dependent upon detailed microtextural studies of late Precambrian-early Paleozoic metasedimentary rocks and interpretations of orogenic and metamorphic events recorded in these rocks. Four orogenic events in this sector have been radiometrically dated and reported. These are: (1) 445-475 million years, Ross orogeny equivalent (Krylov *et al.*, in press); (2) a mid-Paleozoic event, 325-360 million years (Klimov, 1967; Halpern, 1968; Wade, 1972); (3) a late-Paleozoic event, 265-285 million years (Halpern, 1972; Wade, 1972); and (4) Cretaceous, a circum-pacific event about 100 million

years ago (Boudette *et al.*, 1966; Halpern, 1968; Wade, 1969, 1972).

Evidence for the first two events is restricted to western Marie Byrd Land; for the third, it is restricted to eastern Marie Byrd Land. On the basis of this and the distribution of metavolcanics, Lopatin and Orlenko (1972) concluded that two geologic provinces can be distinguished in this sector: one includes the Ford Ranges, and the other includes all of Marie Byrd Land to the east of the Ford Ranges. I disagree and suggest that the two areas constitute a single geologic province in which the orogenies during the Paleozoic era progressed in age from older in the west, to younger in the east. Western Ellsworth Land should be included with eastern Marie Byrd Land, and a break between provinces, if any, should be placed between the Jones Mountains and the Behrendt Mountains, in the Eights Coast sector.

Laudon (1972) described the similarities of eastern Ellsworth Land and the Antarctic Peninsula. Mesozoic geosynclinal deposits are present in both and are lacking to the west in western Ellsworth Land and in all of Marie Byrd Land. A major tectonic event, probably during early Cretaceous, appears to have united the entire coastal sector of West Antarctica into a single province. Cretaceous and Cenozoic histories of all of the segments are quite similar. Additional field and laboratory studies of the basement complex, particularly in the Kohler Mountains-Bear Peninsula area, will be necessary before the single province hypothesis for Marie Byrd Land and western Ellsworth Land can be accepted with confidence.

An attempt to date and zone the metasedimentary rock sequences, on the basis of acritarch and other microfossil assemblages, was scheduled to begin in this laboratory in August of this year. If successful to any degree, the project will be expanded to include the metasedimentary sequences of the Queen Maud Range, Transantarctic Mountains. A more meaningful geologic history of Antarctica during the Precambrian and early Paleozoic times may be the result of these investigations.

Topographic maps of three quadrangles of Marie Byrd Land, 1:250,000 reconnaissance series, have been issued by the U.S. Geological Survey. They are: the Alexandra Mountains, Guest Peninsula, and Boyd Glacier quadrangles. The geology will be superimposed on them by Jerry Oldham and Carl Cathey, research assistants in this office who have been trained in the art at the U.S. Geological Survey, Federal Center, Denver, Colorado. The maps will be included in the final reports scheduled for completion on July 1, 1974. This work is supported by National Science Foundation grant GV-22901A.

References

Boudette, E. L., R. F. Marvin, and C. E. Hedge. 1966. Biotite potassium-feldspar, and whole rock ages of adamellite, Clark

Mountains, West Antarctica. *U.S. Geological Survey. Professional Paper*, 550-D: 190-194.

Halpern, M. 1968. Ages of antarctic and Argentine rocks bearing on continental drift. *Earth and Planetary Science Letters*, 5(3): 159-167.

Halpern, M. 1972. Rb-Sr total rock and mineral ages from the Marguerite Bay area, Kohler Range, and Fosdick Mountains. In: *Antarctic Geology and Geophysics* (R. J. Adie, ed.). Oslo, Universitetsforlaget. 197-204.

Klimov, L. V. 1967 (English language translation). Some results of geological observations in Marie Byrd Land, 1966-1967. *Information Bulletin of the Soviet Antarctic Expedition*, 6(5): 473-479.

Krylov, A. Ya., B. G. Lopatin, and T. I. Mazina. In press. The age of rocks from the Ford Ranges and Ruppert Coast. *Information Bulletin of the Soviet Antarctic Expedition*, 80.

Lopatin, B. G., and E. M. Orlenko. 1972. Outline of the geology of Marie Byrd Land and Eights Coast. In: *Antarctic Geology and Geophysics* (R. J. Adie, ed.). Oslo, Universitetsforlaget. 245-250.

Laudon, T. S. 1972. Stratigraphy of eastern Ellsworth Land. In: *Antarctic Geology and Geophysics* (R. J. Adie, ed.). Oslo, Universitetsforlaget. 215-224.

Wade, F. A. 1969. Geology of Marie Byrd Land. *Antarctic Map Folio Series*, 12(XVII).

Wade, F. A. 1972. Geologic survey of Marie Byrd Land. *Antarctic Journal of the U.S.*, VII(5): 144-145.

Antarctic geological studies

CAMPBELL CRADDOCK

*Department of Geology and Geophysics
University of Wisconsin, Madison*

Work continued this year on bringing to publication the results of 8 seasons of geological study in parts of West Antarctica. Recent effort has been concentrated on the geology of the Jones Mountains and the Ellsworth Mountains. Evidence for Tertiary continental glaciation in the Jones Mountains was summarized in a recent paper (Rutford *et al.*, 1972). Because of the importance of establishing an accurate minimum age for this glaciation, additional work is underway at the University of Nebraska to check, by fission track dating, the age of the volcanic rocks immediately overlying the glaciated surface. With the help of Dr. K. B. Sporli, of the University of Auckland, work on the stratigraphy of the Ellsworth Mountains is nearing completion. In addition, there has begun a special study of the environment and provenance of the Polarstar Formation (Permian), the youngest bedrock formation in the Ellsworth Mountains.

The 1:5,000,000 Geologic Map of Antarctica (Cradock, 1972a) has been published and it was announced in a number of journals and displayed at four national or international geological meetings.* Along with Folio 12 (Bushnell and Craddock, 1970) and my field work, this map provided the basis for a new interpretation of ant-