contain approximately the same amount of amino acids. This is in contrast with the Murchison and other carbonaceous chondrites, in which the exterior fraction usually has a greater abundance owing to contamination. It is clear not only that does the antarctic ice flow and topology provide unique fields where meteorites accumulate but also that the ice sheet preserves them from terrestrial organics, thereby making them the least contaminated meteorites known.

Dr. Takesi Nagata, director of the National Institute of Polar Research (Japan) kindly provided a portion of the Yamato meteorite. The Allan Hills meteorite was distributed by the Meteorite Working Group.

This work has been supported in part by National Aeronautics and Space Administration grant NGR 21–00–317.

References

Cassidy, W. A., E. Olsen, and K. Yanai. 1977 Antarctica: A deep-freeze storehouse for meteorites. *Science* 198: 727–31.

Kotra, R. K., A. Shimoyana, C. Ponnamperuma, and P. E. Hare. In press. Amino acids in a carbonaceous chondrite from Antarctica. *J. Molecular Evolution.*

Shimoyama, A., C. Ponnamperuma, and K. Yanai. In press. Amino acids in the Yamato meteorite 74662, an antarctic carbonaceous chondrite. In *Proceedings of the 4th Symposium on Yamato Meteorites. Memoirs of the National Institute of Polar Research, Special Issue.*

Yanai, K. 1978. Yamato–74 meteorites collection, Antarctica from November to December 1974. *Proceedings of the 2nd Symposium on Yamato Meteorites. Memoirs of the National Institute of Polar Research, Special Issue*, 8: 1–37.

Japanese scientific activities in Victoria Land, 1978–79

TAKESI NAGATA

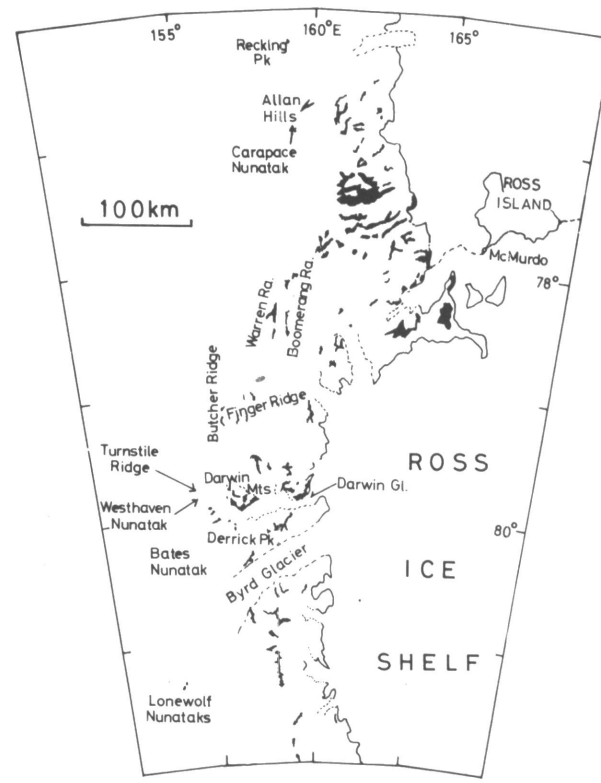
National Institute of Polar Research
Tokyo, Japan

Three Japanese scientists visited McMurdo Station and Victoria Land during the austral summer season of 1978–79. Glaciologist F. Nishio, geologist K. Shiraishi, and geophysicist M. Funaki, all from the National Institute of Polar Research, conducted their research while staying at McMurdo Station from 27 October 1978 to 19 January 1979.

The four visiting scientists participated in the following four research programs:

1. *Glaciological survey of Allan Hills bare icefield* (F. Nishio). The purpose of this survey was to investigate the mechanism whereby a large number of meteorites have accumulated within a limited area of bare ice surface near Allan Nunatak. A trangulation chain stretching for a distance of about 15 kilometers was installed in the bare icefield on the plateau side of Allan Nunatak during the period from 7 December to 2 January. Ice samples for the dating of ice and crystallographic study were also collected in the bare icefield. The U.S. participant in this survey was John O. Annexstad.

2. *Geological survey and sampling of typical rock specimens in dry valleys area* (K. Shiraishi). As a part of a comparative study of the geological structure of East Antarctica, a geological survey of dike rocks was conducted in the dry valleys area. Many dikes were identified and their relationships determined in the field in Wright Valley, near Vanda Station. The chronological succession of intrusion is as follows: black-colored lamprophyre A and B; gray-colored lamprophyre; prophyry A, B, and C; granitic porphyry A and B; felsitic dike, basalt (Ferrar dolerite); and acidic dike in dolerite. In contrast, only a few dikes were recognized in Taylor Valley.



The Allan Hills and Darwin Glacier areas.

3. *Sampling of typical rock specimens for paleomagnetic study* (M. Funaki). About 420 rock specimens were collected for paleomagnetic study in the Wright Valley, Taylor Valley, Allan Hills, Carapace Nunatak, and Ross Island areas. These specimens consist of various gneisses, marble, and granitic varieties of basement; sandstone,

shale, coal, and petrified wood of Beacon Formation; many dike rocks in Beacon Formation; and Ferrar dolerite and McMurdo volcanic rocks.

4. *Search for Antarctic meteorites.* A joint U.S.–Japan search for meteorites was continued in this season on the basis of the past experience in collecting meteorites in Victoria Land. Four U.S. and three Japanese participants revisited the bare icefield of the Allan Hills, 230 kilometers north of McMurdo Station. This time, new search sites were established on the bare icefield in Darwin Glacier area in the following localities: Boomerang Range, Warren Range, Finger Ridges, Butcher Ridge, Upper Darwin Glacier, Darwin Mountains, Turnstile Ridge, Westhaven Nunatak, Lonewolf Nunataks, and Bates Nunataks. During this field season, a total of 310 individual specimens were collected, as shown in the accompanying table.

The above four research programs have been supported by the National Science Foundation (United States), the Antarctic Division of the Department of Scientific and Industrial Research (New Zealand), and the National Institute of Polar Research (Japan).

Table 1. Preliminary tabulation of meteorite specimens found during 1978–79 field season

	Darwin Glacier Area	Allan Hills area	Total
Iron meteorites	10	1	11
Achondrites		4	4
Chondrites (other than carbonaceous chrondrites)	34	256	290
Carbonaceous chondrites		2	2
Possible meteorites		3	3
	44	266	310

Glacial geology

Former extent of glacial ice in Orville Coast region, Antarctic Peninsula

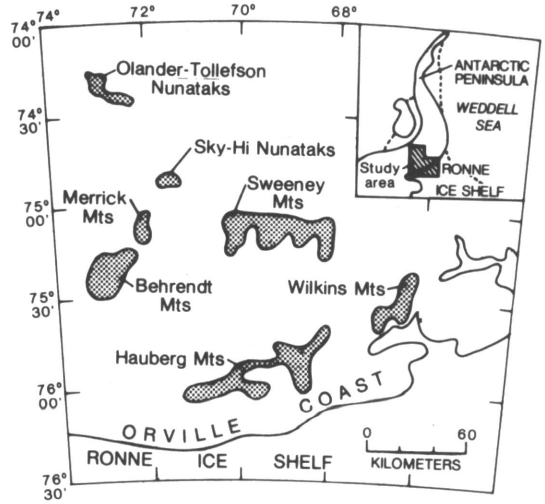
PAUL CARRARA

U.S. Geological Survey
Denver, Colorado 80225

Field observations indicate that ice in the Orville Coast region of the Antarctic Peninsula was formerly at least 450 meters thicker than at present.

Data collected by a field party during the austral summer of 1977–78 from the Behrendt, Hauberg, Merrick, Sweeney, and Wilkins mountains and the Sky-Hi Nunataks (see accompanying map) indicate the former presence of a large ice sheet that covered all mountain ranges and nunataks and flowed directly into the area of the present-day Ronne Ice Shelf. At present, the Orville Coast region is occupied by a large icefield in which ice flow is diverted around the various nunataks and ranges into large valleys that serve as outlets for ice from the interior. These few isolated nunataks and mountain ranges represent less than 5 percent of the study area and project less than 500 meters above the present ice surface.

Evidence of a former large ice sheet consists of erratics, polish, and striations found on every summit that was visited by the field party. Most erratics are of pebble or cobble size; few are of boulder size. The small size may be attributable to the close spacing of joints and intense frost shattering on the outcrops prior to incorporation into the glacier and transport. Polish and striations were noted by the field party on fine-grained rock



The Orville Coast region showing the general locations of the principal ranges and nunataks.