SUNYAB, and the University of Nebraska. The objective of the operation was to conduct a hasty, but intensive, programme of surface geochemistry sampling and ice-core retrieval to as great a depth as possible utilizing the Swiss electromechanical drill.

The party, with its 1 590 kg of drill equipment and camp supplies, assembled at Thule air base, and was then flown by the Royal Danish Air Force (RDAF) to Kap Harald Moltke on Independence Fjord, Peary Land. From there the field group was taken to Hans Tavsens Iskappe by a Sikorsky S-61 helicopter. An associated two-man party from the Geological Survey of Greenland was landed in J. P. Koch Fjord, to the south-west of the ice cap. Four days of camp operation yielded 60.1 m of core, the deepest sample of which had a density of 0.865 g/cm^3 with an estimated age of 280–300 years. Snow sampling was conducted by the SUNYAB representative in a 2-m deep pit for chemistry, stratigraphy, and density, while the University of Copenhagen team sampled the surface snow and collected ice-core samples for total dust, oxygen-isotope and beta-particle analyses. Temperature profiling was accomplished from the boreholes. Upon completion of the field programme, and after sending back the field party members, cargo and samples were flown to Thule air base, the core samples were flown to the University of Copenhagen, the SUNYAB pit samples were stored in a Søndre Strømfjord air base freezer, and the shallow drill, plus a back-up, duplicate drill were shipped to Port Hueneme, California, for transport to Antarctica.

The Technical University of Denmark Electromagnetics Institute conducted 10.5 hours of radio echo soundings at 300 MHz in north Greenland aboard an RDAF C-54 aircraft. Coverage included the ice sheet in north Greenland, the Hans Tavsens area, and Camp Century. Additional flights of the C-54 originated from Narssarssuaq, south Greenland and Søndre Strømfjord air base, during which the 300 MHz radar and prototype side-looking radar were used. Flights covering the southernmost extent of the ice sheet and the surrounding sea ice, and the ice sheet between Søndre Strømfjord air base and Mesters Vig, on the east coast of Greenland, totalled 20 flight hours.

Further radio echo soundings were carried out in a ground operation at Dye 3, employing recently developed short-pulse radar. The programme's main objective was to study the upper portion of the ice sheet—down to 400 m—with this high-resolution radar, for a more exact correlation with core data than had been previously possible. Another objective was to investigate the details of deep layer structure of the ice sheet. The Scott Polar Research Institute and Expédition Antarctique Belge provided one scientist each for this programme.

All GISP-75 field activities were completed and all GISP personnel had departed from Greenland by 25 August.

The GISP management and scientific personnel are grateful for the excellent support provided by the US and Danish armed forces units and civilian organizations at Søndre Strømfjord and Thule air bases, Dye 2 and Dye 3, Kap Harald Moltke and Narssarssuaq. The co-ordination and management functions of GISP as performed by the Ross Ice Shelf Project Management Office are supported by National Science Foundation Contract C-861 through the Office of Polar Programs.

NORWEGIAN-CANADIAN SVALBARD EXPEDITION, WINTER 1975

By F. T. BERKEY* and O. E. HARANG**

Current theories and observations in magnetospheric physics suggest that low-energy particle fluxes, exhibiting the characteristics of solar-wind particles, have direct access to certain regions of the high-latitude polar ionosphere (Akasofu and Lanzerotti, 1975). The precipitation of these particles occurs over a few degrees of latitude and several hours of magnetic time (centred on geomagnetic noon) and this region has been termed the 'dayside magnetospheric cleft' (Vasyliunas, 1974). The resultant phenomena, such as dayside auroral emissions, have not been extensively studied due to the rather remote location of accessible land mass at latitudes high enough for

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observations at local apparent noon to be made (Fig 1). Magnetospheric cleft observations have been carried out from instrumental aircraft (Whalen and Pike, 1973) and from Cape Parry, NWT (Peterson and Shepherd, 1974) in previous winters. Aircraft observations are, obviously, of limited duration and twilight at Cape Parry severely restricts photometric observations.

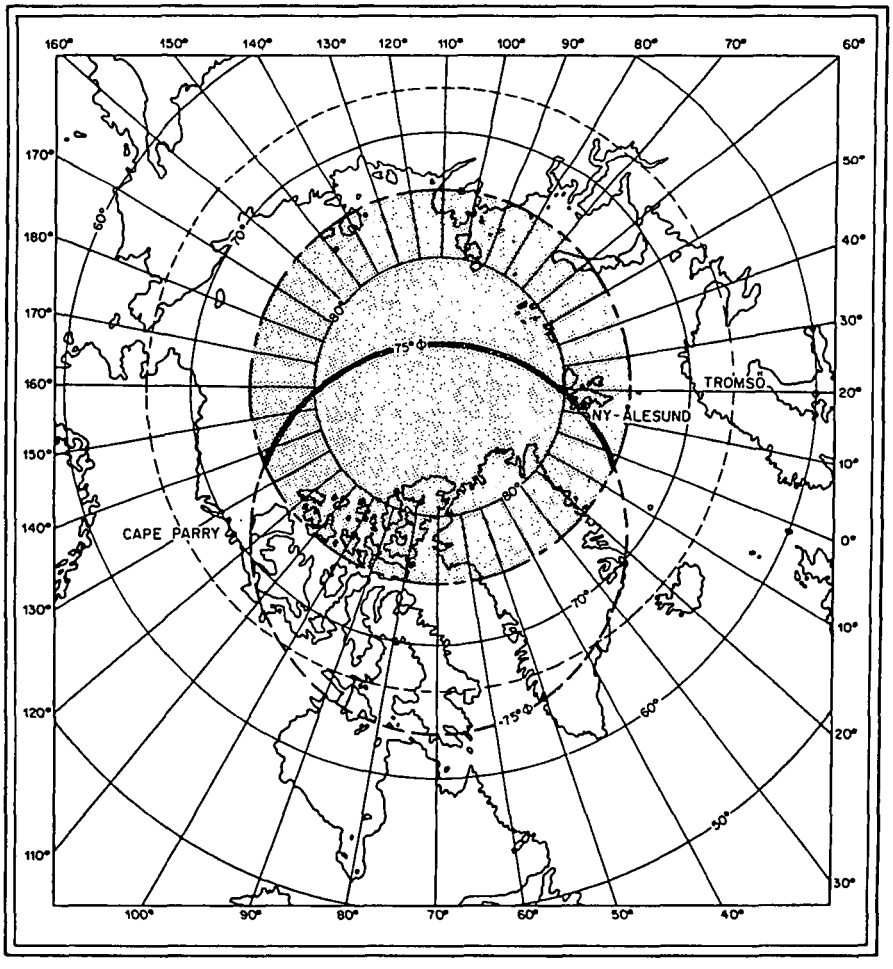

FIG 1. A projection of the approximate location of the magnetospheric cleft (heavy dashed and solid line) onto the polar regions of the Northern Hemisphere. The dotted region denotes those latitudes at which the sky is dark at local noon during mid-winter. Note that Svalbard is the most suitable Arctic land mass for observing dayside auroras with optical instrumentation.

Our choice of Svalbard for observations of optical phenomena associated with the magnetospheric cleft was based on the fact that measurements can be made throughout the day without interruption by twilight. As noted in Figure 1, Svalbard is the only land mass in the Northern Hemisphere for which this is true. Local magnetic noon occurs 4.25 hours before local noon, providing a further advantage for optical measurements of cleft phenomena. In conjunction with the International Magnetospheric Study, an expedition to Ny-Ålesund (78°55'N, 12°E) was undertaken during the period 20 November to 12 December 1975. Observations were carried out at Forskningsstajonen [the Research Station] operated under the auspices of the Norsk Polarinstitutt, Oslo, Norway.

The party conducted a series of experimental programmes: a morphological study of auroral emissions in the dayside cleft region using image intensifier TV techniques; meridian scanning and fixed four-colour photometric observations of auroral emission; spectrophotometric measurements of dayside cleft auroras; and radio drift measurement of high-altitude ionospheric winds. In addition, the expedition undertook routine observations of the magnetic field, the absorption of cosmic radio noise and all-sky camera photography.

Transportation from Longyearbyen to Ny-Ålesund was by charter aircraft; nearly 900 kg of electronic equipment was flown in for the expedition. The recent completion of a year-round airfield at Longyearbyen enabled the expedition to utilize commercial transport to that point. The members of the expedition were F. T. Berkey and D. H. McArthur (Department of Physics, University of Calgary), and T. Brattli, O. Harang, K. Henriksen and K. Johanssen (The Auroral Observatory, University of Tromsö).

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