the eastern crater, halfway up from the beach. Gas samples were also taken from two fumaroles, sites 705 and 713 (Fig. 2), and subsequently analyzed by mass spectrometry. Weather permitting, some environmental measurements were made every three hours from noon to 9:00 p.m., on January 25 to 29, 1969.

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Physiological Studies of Antarctic Mosses, 1968–1969

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The second year of a two-year program directed toward physiological studies of antarctic mosses was completed during the past austral summer at Palmer Station. Following several reconnaissance field trips, five moss taxa were selected for comparative studies. These taxa consisted of *Polytrichum* sp., *Brachythecium* sp., *Drepanocladus* sp., and *Pohlia* sp. from the easternmost of the Corner Islands (Argentine Islands) and *Dicranum* sp., *Drepanocladus* sp., and *Brachythecium* sp. from Litchfield Island.

The new, well-equipped biology laboratory at Palmer Station permitted the authors to carry out assays and tests on plant materials as they were collected from the field. Chlorophyll, protein, and carbohydrate contents were determined spectrophotometrically on the five selected moss taxa. In addition, photosynthetic and respiratory rates were measured under controlled conditions by using differential respirometry to measure oxygen exchange over a wide range of temperatures and light intensities.

Except for *Dicranum*, the above moss taxa were cultured on mineral agar and yeast extract in mineral agar to test their regenerative capacities. There were appreciable differences among the taxa tested in this respect. Also, tissue samples of the above five taxa and a few others were washed, dried, ground, bottled, and shipped back to the University for element assays. Approximately one square foot of each of the selected moss taxa was air dried, packaged in plastic bags, and returned to the States for further physiological investigations. Herbarium specimens consisting of 165 packets were prepared from plant materials collected from various localities in addition to the Corner Islands and Litchfield Island sites. The authors wish to acknowledge their appreciation to the personnel of USCGC *Edisto* and the research vessel *Hero* for their cooperative field support.

Results of Bryological Field Work in the Antarctic Peninsula, Austral Summer 1968–1969

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During a period extending from early January to February 7, 1969, intensive field work was pursued in the Antarctic Peninsula from Hook Island, north of Adelaide Island, northward to Admiralty Bay, King George Island.

From 18 localities visited, approximately 750 specimens were collected, giving a good cross section of the bryophyte flora. Owing to a snowstorm on January 25 and 26, collections at the northernmost point reached were very limited. The opportunities for field work on the northern sectors of the Peninsula were also restricted because of the tight schedule of *Hero* and the fact that her trip was chiefly for support of field parties. In spite of these limitations, the results outlined below show clearly the spectacular additions to the known flora of the Antarctic.

Before my field activities of last summer, a small number of Hepaticae had been found in the Antarctic. These have been assigned to only two families, Lophoziaceae and Cephaloziaceae.

According to my survey, 12, and possibly 13, species occur. The most interesting additions are 4 species of *Cephaloziella* (family Cephaloziellaceae), 1 of *Anthelia* (Antheliaceae), *Pachyglossa dissitifolia,* and *Clasmatocolea georgiensis* (Lophocoleaceae). Five genera and three families are new to the Antarctic. An increase in the liverwort flora of two and one-half to three times has resulted. Most of the Hepaticae were worked up at Palmer Station.

Of the taxa collected, *Cephaloziella autoica, C. hispidissima,* and *Lophozia antarctica* are new to science.

The Musci have been labeled and their identification is being undertaken by Dr. H. Robinson of the Smithsonian Institution. A report on these will follow.

In addition to the bryological results, two finds are noteworthy:

1. A Basidiomycete, *Gerronema* sp., apparently new to science, was found at Norsel Point. This is only the fifth or sixth Basidiomycete known from the Antarctic and is the southernmost find of a Basidiomycete; the genus is new to the Antarctic.
2. A large collection of the chironomid midge, *Belgica antarctica,* was made on Hook Island; this represents by far the southernmost find of a dipteran in the Antarctic, and, except for Collembola, the southernmost known site for insects in the Antarctic.

Whenever feasible, bryophyte collections were made sufficiently large so that 2 to 6 duplicates can be distributed eventually. Thus, a wide spread of bryological material in institutional herbaria will result. In addition, when time permitted, collections of lichens were made for Dr. I. M. Lamb, Director of the Farlow Reference Library, Harvard University.

Freezing Resistance in Fishes of the Antarctic Peninsula

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Some of the *Trematomus* fishes inhabiting McMurdo Sound, Antarctica, have been observed to rest on masses of ice crystals in freezing seawater. Recent studies have shown that such fishes have low blood-serum freezing points (—1.9° to —2.0°C.) throughout the season and are extremely resistant to freezing (DeVries *and* Wohlschlag, 1969). Sodium chloride, the most abundant salt in the blood of temperate water fishes, accounts for only 50 percent of the serum freezing-point depression in the *Trematomus* fishes. Most of the remaining freezing-point depression can be attributed to a serum freezing-point depressant, glycoprotein. This compound has been isolated and its properties are described elsewhere (DeVries *and* Wohlschlag, 1969).

In contrast to McMurdo Sound, the waters of the northern Antarctic Peninsula area are warmer and are relatively ice-free during the summer. The fish fauna of the Peninsula waters is also different from the fauna inhabiting McMurdo Sound; notothenиid fishes of the Peninsula fauna belong primarily to the genus *Notothenia,* and chaenichthyids are much more abundant than in the McMurdo fauna. During the months of January and February of 1969, three species belonging to the family Chaenichthyidae and three species of *Notothenia* were caught and their resistance to freezing studied. Fishes were collected with an eight-foot otter trawl from R/V *Hero.* Most of the trawls were made in the shallow waters (40 to 200 m) on the relatively smooth banks westward of Brabant, Hoseason, and Deception Islands. Fishing in the waters adjacent to the Peninsula was unsuccessful because of the extremely rough bottom. Several specimens of *Trematomus bernacchii* were also caught by setting baited wire traps in a shallow-water channel between the Melchior Islands. Fishes caught in trawls were put in running seawater aquaria and their blood was immediately drawn hypodermically from the heart. Serum was collected from clotted blood, frozen, and later analyzed at the biology laboratory at Palmer Station. Analyses included determination of serum freezing points using a Fiske osmometer, determination of concentrations of sodium chloride in the serum, and determination of freezing points of dialyzed serum. Some of the live fishes were transported to Palmer Station and freezing-resistance experiments carried out in refrigerated aquaria. Body tempera-

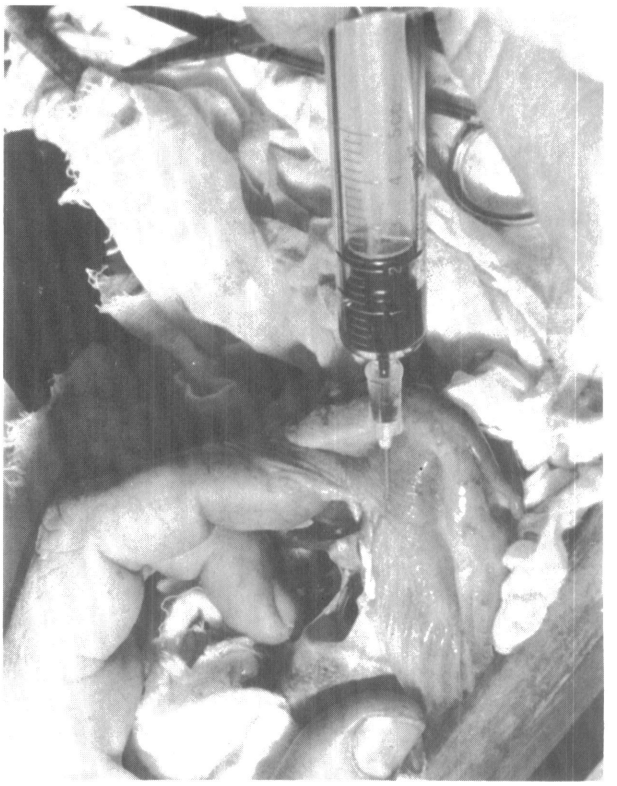

Photo by W. R. Curtsinger, USN

Dr. DeVries extracting blood sample from the heart of a fish of the genus *Notothenia*.