was determined by mass spectrometry. We analyzed one specimen of lime- 
stone obtained an $Q_{r/s6}$Sr ratio of 0.7096 ± 0.0005 (1 σ), which is in satisfac-
tory agreement with the accepted value for modern sea water. This suggests that the brine at the bottom of the lake could be sea water. However, this is not conclusive, because the domi-
nant bedrock in the region consists mainly of marine carbonates of Early to Middle Cam-
brian age. The $87$Sr/$86$Sr ratio of these rocks probably does not differ greatly from this value. We analyzed one specimen of lime-
stone of Middle Cambrian age from the Nelson Formation of the Neptune Range, Pensacola Mountains, Antarctica, and obtained an $87$Sr/$86$Sr ratio of 0.7093.

The concentration of strontium, determined by isotope dilution using a spike enriched in 
$88$Sr, was 6.239 ppm and is somewhat less than that of normal sea water, which has a strontium content of approximately 8 ppm. Using the established relationship between salinity and chlorinity in sea water and a salinity of 26%, we find a chlorinity of 14.4%e for the brine sample. Accordingly, the Sr/Cl ratio of this brine is 0.43. Riley and Ton-
gudai obtained an average value of 0.42 ± 0.02 for this ratio for a large suite of sea 
water samples. The Sr/Cl ratio of the brine from Lake Tuborg is similar to this value, which also suggests that the brine could be sea water.

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Devon Island Programs 1971

INTRODUCTION

From April to October 1971 the Arctic Institute’s research base on the northeast coast of Devon Island (75°40’N., 84°40’W.) was
the seat of operations for over 50 investigators and their field assistants. The major research program was a large integrated tundra ecosystem study sponsored by the Canadian International Biological Program (IBP); see report pp. 158-161. The Base Camp was also used, though briefly, by groups of researchers from the Canadian Wildlife Survey conducting polar bear studies in northern Devon Island, and from the Polar Continental Shelf Project who were making glaciological studies of the Devon Island Ice Cap. The two AINA-sponsored projects are summarized below.

The status and condition of the Base Camp, and the logistics services, remain essentially as reported in the 1970 field summary (Arctic, Volume 24, Number 1, page 65), although minor improvements and repairs were made to the 8 huts, and the water and power system and local transportation facilities were improved by the addition of another skidoo, bringing the total to 3. Over 70 tons of fuel and supplies were transported from Montreal and landed near the Base Camp by the Canadian Coast Guard Ship John A. Macdonald in September bringing to a total of about 158 tons of fuel and supplies transported by ship to the Base Camp since the inception of the IBP program in the summer of 1970.

In 1971, as in the previous summer, the size and capacity (unfortunately not synonymous) of the Base Camp increased. Those who have visited the Camp in previous years would find little resemblance today. The Camp at present consists of 8 Parcolls and Jamesways (many of which were enlarged in 1971), which together with tents, some lent by the Institute by the Canadian Forces, provided both laboratory and living space.

A secondary camp, situated some 5 miles from Base Camp, provided a base of operations for a group of researchers from the University of Manitoba. Remote from the large population of Base Camp it made work on muskoxen and other mammals somewhat easier.

One problem that came to the fore in 1971 was how to keep to the minimum the impact of relatively large numbers of people with their equipment on the Truelove Lowland itself. All of those who lived at Base Camp cooperated in efforts to avoid any unsightliness and in fact several visitors noted the general tidiness of the area.

Outside the Base Camp, movement, particularly vehicle movement, was also kept to a minimum. During the early spring it was of course possible to use skidoos or light tracked vehicles on the snow-covered terrain. In the latter part of the summer light-tracked vehicles were used only in those instances where it was necessary to transport heavy equipment over long distances and then on the dry beach ridges wherever possible. Finally, heavier tracked vehicles were used in the late fall when the ground was frozen and snow covered again to haul the large resupply to the Base Camp for winter storage.

During the 1971 summer, as in the past, the Camp was fortunate to have a number of visitors. Dr. E. F. Roots of the PCSP; Dr. S. D. MacDonald of the National Museum of Natural Science and some visitors of his Bathurst Island camp; Dr. M. Haycock the noted artist; Dr. W. D. Billings of Duke University; Dr. C. Jonkel and Dr. D. Muir of the Canadian Wildlife Service among others provided all with a welcome change of pace.

EcoLOGICAL STUDIES OF SEDGE DOMINATED MEADOW TUNDRAS

Recently proposed increases in the use of tundra resources have caused considerable concern regarding the ability of these systems to withstand serious perturbations resulting from development. Present research activities in a number of arctic locations include disturbance studies, oil spillage evaluation and the replanting of disturbed tundra with non-native plant materials. Little observational information or experimental data on the reproductive biology of native arctic plant species are yet available. Until more information of this sort accumulates, land management decisions for those areas will necessarily remain somewhat speculative.

Meadow tundras represent landscape units potentially susceptible to severe disturbances. The presence in many of these sites of substantial surface organic matter, fine textured, frost susceptible subsoils and high soil moisture contents (as water or often as ground ice) present conditions under which significant erosion or congeliturbation may occur if the vegetation mantle is compacted or removed.

The most common plant cover over many of these meadow systems are grasses (Gramineae) or sedges (Cyperaceae). To understand more fully the biology of sedge-dominated meadow tundras, field studies were initiated during July 1971 in the general area of the Base Camp. Concurrently comparative studies were initiated in similar sedge-dominated meadows in the alpine tundra zone of Mount Washington, New Hampshire (44°16'N, 71°16'W).

Previous synecological studies of the coastal lowlands surrounding the Devon Island Base Camp indicate that the most extensive plant association of the area is the Caricetum stantis, a hydric meadow dominated by Carex...
COMPARATIVE ECOLOGY OF HIGH ARCTIC SPECIES OF SAXIFRAGA

During the 1971 field season, studies were continued on adaptations of local populations of species of *Saxifraga*, to a variety of local habitat conditions. The work was carried out in the general Truelove Lowland area. A series of investigations concerned the mechanisms of pollinator-plant interactions, pollen flow, and general breeding behaviour of *Saxifraga oppositifolia*. Transplant gardens, habitat manipulations, and controlled-environment studies have been used to demonstrate and quantify different modes of reproductive behaviour of several genetically distinct populations of *S. oppositifolia*. Metabolic activity in the field was studied by means of monitoring processes of respiration by O₂ and CO₂ exchange and enzyme activity. Physiological responses of various populations to severe drought conditions on polar desert microsites were studied in terms of differential survival, stomatal responses, comparative growth rates and flowering responses. Experimental studies of field-collected transplants and seed populations are continuing in the controlled environment chambers of the Duke University Phytotron.

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distance and lack of communication always
managed to provide what was required, and
also his opposite number in Edmonton, Mr.
John Owen; Mr. René Toms of Bradley Air
Services; and last but not least Mrs. Walker
who acted as camp cook during the summer
— certainly not always the easiest of jobs.

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IBP High Arctic
Ecosystem Study,
Devon Island

The research in 1971 continued to emphasize
the physical environment and the biological
response of organisms on meadows (c. 49
per cent of the lowland) and raised beach
ridges (c. 15 percent of the lowland) in the
Truelove Lowland. The lakes (22 percent)
were not included in the studies and all data
are expressed on the basis of a 3,300 ha. land
area. As in 1970, the research was concen-
trated on a typical mesic meadow (soils,
meteorology, primary production, nitrogen
fixation, invertebrates, decomposition) with
additional data gathered in 2 to 5 other mea-
dows (extensive sites), depending upon the
research unit. The intensive beach ridge site,
approximately 7,500 years old, was studied
with the same components of research as the
master meadow site. In addition, 2 to 11
other beach ridges (extensive sites), and a site
on the plateau (c. 300 m. above sea level)
were studied in varying detail (soils, mete-
orology, primary production, and inverte-
brates). In all, 22 separate research projects
were conducted in 1971.

Two flights for aerial photography of the
Truelove Lowland were made. The Atmo-
spheric Environmental Service of the Depart-
ment of Transport photographed black and
white and an infrared scan in late July, and
the Inland Waters Branch photographed
black and white imagery at 3,330 and 830 m.
and infrared false colour at 1,660 m. in mid-
August. The 1:20,000 scale photography will
be used to produce a photographic map
devoid of horizontal and vertical distortions
and will be able to resolve height differences
of 1 m. The 1:5,000 scale photography will
be used for detailed mapping of land and
vegetation features, enabling the interpreta-
tion of features 1 m. in diameter.

Eleven holes were drilled in the major ter-
rain units of the lowland and one on the
plateau. The holes varied in depth from 1 to
9 m, and each contained a series of 12 ther-
mocouples. July temperature data of the
permafrost ranged from —9°C. to —15.6°C.
at depths of 3 to 9 m. From the summer and
winter data, and determinations of thermal
conductivity of the granite gneiss, limestone,
dolomite, and sandstone, estimates will be
made of permafrost thickness in the lowland
and on the plateau.

Soils of the intensive beach ridge and mesic
sedge meadow were mapped, based upon a
total of 111 and 137 small pits respectively.
Profile samples from 9 pits were collected for
physical and chemical analyses. The exten-
sive sampling program included descriptions
and soil collections from an additional 14
profiles from meadow, beach ridge and out-
crop sites scattered over the lowland.

The microclimatic studies initiated in 1970
at the 2 intensive sites and the 3 extensive
ones (rock outcrop, cliff base, and Base
Camp) were continued. Additional stations
were set up on the plateau and near the sea
(Rocky Point). An additional "roving" sta-
tion was placed for 2-week periods each on
Beschel Hill, a hydric sedge meadow, and a
coastal sedge meadow.

In general the microclimate of the Truelove
Lowland in 1971 was very different from
that of 1970. Lake ice was thinner (1.5 v.
2.3 m.) and average snow cover was greater
in 1971. Both June and July were sunnier in
1971. The lakes were free of ice for 2 days in
late August 1970, but from late July until late
August in 1971. August 1971 was cloudy and
cool. The lowland experienced 2 Chinooks
(26 June, 29 to 31 August) in 1970 and 3 in
1971 (August, September, October). The week
of maximum temperatures lagged the solar
high by 3 weeks in 1970 and by 4 weeks in
1971. In mid-June warming was greatest in
the areas of more massive rock outcrop away
from the coast. From the end of June and
through mid-July there were three areas of
local heating (plateau edge, Beschel Hill and
near intensive study sites).

Water flux studies using both lysimeters
and sod blocks were conducted on the 2 in-
tensive study sites. While temperature at 1.5
m. was very similar in the 2 sites, micro-
climatic conditions (temperature, wind, va-
pour pressure deficit and soil moisture) were
very different. Foliose and fruticose lichens
nearly doubled the rates of evaporation com-

SHORT PAPERS AND NOTES