CONTENTS

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MEETINGS

The following meetings have been held:

One hundred and sixty-second meeting (Annual General Meeting). 9 January, 1968. Following a discussion of the Club's business, two films, made by the National Film Board for the Department of Indian Affairs and Northern Development, were shown. They were entitled, "The North Has Changed" and "The Accessible Arctic".

One hundred and sixty-third meeting. 30 January, 1968. (Special meeting held jointly with the Nordic Society). N.O. Christensen, Governor of Greenland, outlined the changing conditions and current problems of economic and social development in Greenland. Aspects of the relations between Greenland and continental Denmark were also discussed, and a short film on Greenland life was shown.

One hundred and sixty-fourth meeting. 13 February, 1968. The film "Knud Rasmussen", a biographical appreciation of the great ethnologist and explorer, was shown.

One hundred and sixty-fifth meeting. 13 March, 1968. Colonel Bernt Balchen discussed present and future conditions in the Arctic with particular reference to air and sea navigation and transport. Strategic factors and the effects of possible climatic change were also mentioned.

One hundred and sixty-sixth meeting. 9 April, 1968. Dr. J. Terasmae of the Geological Survey of Canada discussed his research, and has kindly furnished the following abstract of his talk.

Postglacial Palynology and Quaternary Studies in the Arctic

For more than ten years the writer has been engaged in palynological studies in the Canadian Arctic. His results have indicated that such studies can be applied usefully in both geological and biological investigations where information on past changes in vegetation and climate are required. Other useful applications are in geochronology

and stratigraphic correlation of deposits, features and events. Although the potential usefulness of palynological studies in the Arctic has been adequately demonstrated, the current status of this research must still be described as partly completed reconnaissance.

It is important to emphasize the limitations and sources of error in arctic palynology. Among these are the general paucity of pollen in many types of arctic sediments and the problems of redeposition from older beds and of long-distance atmospheric transport from southern sources. Particular attention should be given to studies of recent pollen deposition in different parts of the arctic region, in order to improve the interpretation of fossil pollen assemblages.

In spite of the many difficulties encountered, the writer is optimistic about the future success of postglacial palynology in the Arctic and he would like to recommend that such studies be supported as an integral part of multi-disciplinary investigations such as are now underway in several arctic areas.

EDITORIAL

The Arctic Circular is losing its Founder and sole Editor, Mrs. Diana Rowley, who has decided to relinquish the responsibilities which she has held since the first meeting of the Arctic Circle, on December 8, 1947.

In the first issue, dated January, 1948, Mrs. Rowley wrote:

"This first number of the Arctic Circular is largely an experiment and should be considered as a basis for discussion rather than a fixed form. It is longer than was expected[1/] and future issues will probably contain only three or four pages. They will be produced whenever there is sufficient material.

"The objects are:

1. To provide concise and accurate information on current activities in the Arctic.

2. To assist research by publishing requests for information on particular regions or subjects, and for collection of specimens."

Eight issues were published in 1948, for a total, with index, of 111 pages for the volume! The Circular obviously filled an urgent need in the post-war expansion of Canadian activities in the North, and

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1/ Nine pages-Ed.

Mrs. Rowley has the gratitude of all members for the tremendous contribution to knowledge of arctic affairs that the Circular has made.

Since the first Arctic Circular appeared, the Canadian Arctic has been transformed. The last islands have been found, and the prominent features of the country--whether of topography, hydrography, geology or biota--have been surveyed and mapped. The trading posts have turned into communities with electricity, telephones, schools and supermarkets. Regular airline services link the major settlements with Montreal, Winnipeg and Edmonton. There are arctic specialists in every field of activity, employed in universities, industries and government establishments across the country. How can the Arctic Circular best fill present-day needs?

"Concise and accurate information on current activities in the Arctic" may have become even more necessary than it was in 1948, when there were far fewer people working in the Arctic and on arctic subjects, and it was easier to be well-informed. There is possibly a lesser need now than there was then for requesting information and specimens from northern travellers. The seventeen completed volumes of the Arctic Circular have carried many valuable articles on scholarly subjects and journeys, and useful reports on expeditions, activities at field stations and other arctic programs. It is proposed that future Arctic Circulars publish news and preliminary announcements of northern activities, articles and reports, and reviews of new publications. Three issues are planned for each yearly volume, to be published in January, May and November. Please help by sending your material, comments and criticism to the Editor.

I have agreed to accept the editorship of the Arctic Circular with the reservation that the standards of editing set by Diana Rowley are impossible to maintain. The President and Committee of the Arctic Circle Club have agreed to assist by providing material. Dr. M. Jean Ferrari and Mr. Peter J. Usher have very kindly agreed to assist in all phases of editing and publication.

A.H. Macpherson.

NEWS

Universities form Northern Research Committee[1/]

At a meeting held in Saskatoon on October 30 and 31, 1967, representatives of eleven Canadian university groups and the Arctic Institute of North America agreed to form a continuing committee to coordinate research activities and to discuss future objectives and needs in both programs and funds. The meeting, the First National Conference on Northern Research, was convened by Dr. Walter O. Kupsch, Director of the Institute of Northern Studies of the University of Saskatchewan, and sponsored by the Northern Coordination and Research Centre of the federal Department of Indian Affairs and Northern Development, represented by Mr. G.W. Rowley (its Coordinator). Mr. Rowley is also Secretary to the Advisory Committee on Northern Development, which advises the Minister on grant allocation.

Dean B.W. Currie welcomed the Conference on behalf of the University. Following an outline by Mr. Rowley of the granting policy of the Department, representatives of the groups receiving grants described the research underway at their respective institutions. The Conference concluded with panel discussions and an organizational session at which the continuing ad hoc committee was formed, and Dr. Kupsch elected by acclamation as its first Chairman. A second conference is tentatively scheduled for August 26-27, 1968, at Whitehorse, Y.T.

The following groups were officially represented at the Conference:

Institute for Northern Studies (University of Saskatchewan)
Committee on Arctic and Alpine Research (University of British Columbia)
Boreal Institute (University of Alberta)
Committee on Northern Studies (University of Manitoba)
Northern Area Studies President's Committee (Lakehead University)
Committee on Arctic and Subarctic Research (University of Toronto)
Centre Canadien de Recherches en Anthropologie (St. Paul University)
Arctic Institute of North America (Montreal)
Centre d'Etudes Nordiques (Université Laval)
Committee on Northern Research (McGill University)
Groupe de Recherche Nordiques (Université de Montréal)
Institute of Social and Economics Research (Memorial University Of Newfoundland)

1/ W.O. Kupsch, ed. 1968. Proceedings of the First National Northern Research Conference, Oct. 30 & 31, 1967, 135 pp. (offset). Institute for Northern Studies, Saskatoon.

Manpower for Northern Industry[1/]

The Fourth National Northern Development Conference was held in Edmonton on November 1 to 3, 1967, under the auspices of the Edmonton Chamber of Commerce and the Alberta and Northwest Chamber of Mines and Resources. Mr. W.S. Ziegler was the Conference Chairman. Under the general theme, "Man and the North", panels discussed historical perspectives, community development problems in the North - in Canada and abroad, and the present and future manpower supply in Northern Canada. Resolutions were adopted calling on governments for measures to assist industry with northern development, in particular to help solve the crucial manpower shortage in northern mines. The delegates were honoured with addresses by the Hon. Dr. J.W. Grant MacEwan, Lieutenant-Governor of Alberta, the Hon. Arthur Laing, Minister of Indian Affairs and Northern Development, Dr. John J. Deutsch, retiring Chairman of the Economic Council of Canada, Mr. William Dodge, Executive Vice-President of the Canadian Labour Congress and Mr. Victor Allen, Vice-President of the Inuvik Association, Inuvik, N.W.T.

Success of the Plaisted Expedition

Mr. Ralph Plaisted and three of his nine-man party arrived at the North Pole at 4 p.m. E.S.T., on April 19, 1968, after a 44-day journey on the ice from Ward Hunt Island in the Canadian arctic archipelago. Mr. Plaisted's companions were J.-L. Bombardier, G. Pitzl (navigator) and W. Pederson. The party was equipped with four Super Olympique Bombardier Ski-doos, powered by 16 h.p. Rotax engines and pulling moulded fibre-glass sleds. The four men actually travelled about 825 miles to make good the 474 air miles between Ward Hunt Island and the Pole, their final position being confirmed by navigators on a United States Air Force ice patrol aircraft which flew over them by request. The expedition was supported from Eureka by Mr. W.W. Phipps, flying a deHavilland Twin Otter. Mr. Plaisted, an insurance executive from Minneapolis, also made an attempt to reach the Pole in 1967, starting from Eureka, but had to call off the expedition when faced with difficult travelling and deteriorating conditions in the polar pack off the northwest coast of Ellesmere Island. Controversy surrounds the claims of earlier travellers to have reached the North Pole overland, a feat that may indeed have been impossible before the age of flight.

1/ Proceedings, Fourth National Northern Development Conference. Theme: "Man and the North". 165 pp. illus., Edmonton, 1968.

Ontario's New "Polar Bear Provincial Park" on Hudson Bay.

On April 22, 1968, the Honourable Rene Brunelle, Minister of Lands and Forests, made the following statement in the Ontario Legislature.

Mr. Speaker, before the orders of the day I take great pleasure in announcing to you, sir, and to the hon. members the establishment of a new provincial park which will preserve for the people of Ontario one of the truly unique areas in our province. This park, to be known as Polar Bear provincial park, encompasses an area of over 7,000 square miles and is located in that part of our far north where James Bay and Hudson Bay meet. The park area includes Cape Henrietta Maria, the James Bay coast as far south as the Ekwan River, and the coastline of Hudson Bay west to the Kinushseo River.

Polar Bear provincial park includes a significant area of one of the southernmost extensions of the Arctic tundra in the world. The tundra supports many species of flora and fauna which are unique in Ontario. The park derives its name from the most important population of polar bears in the province which occurs in this area. Other Arctic mammals found in the area are the bearded seal, walrus, and Arctic fox. The tundra also supports one of our most important breeding colonies of snow and blue geese, estimated to number some 70,000 in 1967. Canada geese also breed throughout the area. A herd of 200 to 300 woodland caribou range throughout the tundra in the summer season and winter to the south in the scrub spruce forest land which is known as taiga and is another important part of this interesting park.

The marine coastline of the park is characterized by extensive mud flats which are exposed by the receding tides and are typical of the west coast of James Bay and Hudson Bay in Ontario. Also of interest are the remnant beach strands which are clearly visible at varying distances from the present coast and which mark earlier periods of marine submergence in this area which is still slowly rising from the sea.

Members will perhaps recall that about one year ago I announced to the House a new classification system for our provincial parks. Polar Bear provincial park is the first to be set aside within the primitive park class under this system. As such it will be managed so as to carefully preserve the unique natural resources of the area.

These natural resources will be reserved from exploitation except in respect of our continuing recognition of the traditional hunting, fishing, and trapping rights of the Indian people in that general area, none of whom are resident within the park. No development, of the type usually associated with provincial parks, will be carried out. There will, however, be a designated landing point for aircraft to give access to those wishing to visit the park.

In conclusion, Mr. Speaker, it is of interest to note that Polar Bear provincial park is the second largest park in Canada, and is exceeded in size only by Wood Buffalo national park. With the addition of this park, the area of the provincial park system in Ontario exceeds 8,000,000 acres.

International Polar Bear Group Formed

The polar bear is listed as an endangered species in the Red Data Book of the Survival Service Commission, International Union for the Conservation of Nature and Natural Resources. At an international conference held in Fairbanks, Alaska, in September, 1965, the IUCN was asked to assist in the conservation and management of the species, by serving as a coordinating agency for research and management information obtained by arctic nations. On February 29 to 31, 1968, the IUCN acted as host for a meeting of biologists representing the governments of the United States, Canada, Norway and the Soviet Union at its headquarters in Morges, Switzerland. The meeting proved most productive: the biologists became aquainted with their co-workers in other countries, research information was freely exchanged, and a continuing specialist group was established under the Survival Service Commission. Dr. S.M. Uspenskii, a Soviet biologist whose writings on arctic birds and mammals are well known in Canada, was elected first Chairman of the group.

Those attending the meeting were: D.J. Kuenen, Noel Simon and C.W. Holloway, IUCN; R.A. Cooley (Conservation Foundation), J.W. Brooks and J.W. Lentfer, United States; J.S. Tener, A.H. Macpherson and C.J. Jonkel, Canada; Thor Larsen and Magnar Norderhaug, Norway; and A.G. Bannikov and S.M. Uspenskii, U.S.S.R. C. Vibe of Denmark was unable to attend.

ARTICLE

Australian, American and Canadian Trans-Arctic-Expedition, 1967-1968.

By M. Jeanne Ferrari

David Humphreys with his four man team almost made it to the Pole, finally.

When the insatiable urge to conquer the North first overtook him, Humphreys was teaching Chaucer in an exclusive girls' school in New York State. In his spare time he was reading about the exploits of Peary and Cook and of the others who attempted to reach the Pole. Finally, in the grip of this white "fever", he dreamed up a means of financing a similar venture. Watching television, he realized that the key word in documentaries at the time was "Russia". With this in mind he drafted a letter to the Chief of the Documentaries Section at NBC and mentioned that he and his (prospective) group intended to rendezvous with the Soviet ice-breaker Severnaya Zemlya. This apparently captured the imagination of NBC and he soon received a reply asking for further details.

Was it a Chaucerian quality that caused Humphreys to select people with widely different backgrounds and previously unknown to one another? There was Shri Phursumba, the brother-in-law of the Sherpa who accompanied Hilary; Leif Lundgaard, a Norwegian with an interest and experience in the North; and Ken Poste, a photographer with the National Film Board and the only Canadian in the group. This man was eventually replaced by Dick Mickelson, an NBC photographer.

These three, led by Humphreys, an Australian, would proceed on skis to the Pole, together with two pack-dogs and two specially constructed sleds to be pulled by the men. The plan, as outlined in Humphrey's proposal to the Advisory Committee on Northern Development, was to "locate and delineate the mid Arctic Ridge.... and to obtain a geophysical and bathymetric profile of the Arctic Basin between Ward Hunt Ice Shelf and the mid Arctic Ridge".

In December 1967, with more enthusiasm than caution, the expedition members proceeded to Resolute Bay where they camped waiting to be flown to Ward Hunt Island. They opened their supplies of "human" pemmican (Beauvais) and Frutifort[1/], and waited.

Meanwhile, back in Ottawa, the formal proposal and request to make the expedition was belatedly received. Somehow, two of the group had neglected to obtain medical clearance, and Humphreys lacked a licence to operate a transmitter. Humphreys flew back to Ottawa, and then to Washington, to convince officials of the value and soundness of his expedition. Clearance was finally granted, NBC being asked to post a $500,000 bond, and to guarantee to pick up the expedition if it failed, or to reimburse the Canadian Government for any necessary search and rescue operations.

Humphreys returned to Resolute Bay with the promise also of air support from the U.S. Navy's Bird's Eye flight and assurance of a radio licence effective January 15 to April 30. He hoped to start out from there "the first full moon in January".

After some discussion early in October, the idea of using pack-dogs had been abandoned and it was decided instead to use eight dogs to pull two sleds. They proved insufficient. Furthermore, the equipment provided by the Dominion Observatory for bathymetric and gravity measurements weighed approximately 150 lbs., (68.1 kg.) and was too heavy for the sleds, which were built to carry only about 50 lbs. (22.7 kg.). To complicate matters further, on January 21, 1968, a U.S. B-52 with 4 nuclear bombs aboard crashed at Thule. Bird's Eye and other air support for the expedition was in doubt, and extra food and supplies had to be packed. For these reasons the Dominion Observatory equipment

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1/ Frutifort: A stew containing pre-cooked rice (minute rice) malt, chicken bouillon cubes, milk chocolate, butter and raisins.

was left behind, and it was subsequently recalled for use elsewhere. Humphreys instead planned to use a theodolite for making sun observations to locate himself on the Lomonosov Ridge. Data obtained were to be transmitted to Data Control Corporation in Minneapolis where a man was on duty 24 hours a day waiting to feed them into a computor for accurate and rapid positioning.

It was decided to have two new sleds built in Norway to replace the original ones and the men now camped at Alert waited for these. They were there 2½ months. During this period, Humphreys attempted to arrange air transport to Ward Hunt Island with W.W. Phipps of Resolute Bay. It is reported that Phipps agreed to undertake the job, but apparently was deterred from doing so by weather and other complications.

Nor were this delay and the monotonous diet (human pemmican (Beauvais) and Frutifort) the only frustrations. Once a much needed air-drop landed .8 km from the camp and the four men searched for 36 hours in weather registering -60°F. (225 K) for food and sleeping bags.

Finally about mid-April, Humphreys decided to have his party flown to the Pole to make the scientific observations and return on foot. Two aircraft would carry them, their equipment and extra fuel for the flight to within 30 km, of the Pole, refuelling on the way at Ward Hunt Island. Phipps in his smaller plane was to land to check the ice for the larger Wardair Bristol. Unfortunately, once again the weather intervened and the trip was cancelled. Even after the news was received that Plaisted and his party reached the Pole at 4 p.m. E.S.T., April 19, 1968, Humphreys asked to be flown to the Pole to carry out the scientific observations for which he had come. But now it was felt that ice conditions were too dangerous and the project was abandoned.

Humphrey's attempt at geographical accomplishment in the polar regions ended with a trip in early May to the region of Cape Morris Jessup. Observations made with the theodolite and analyzed by the Minneapolis computor placed him some 11 nautical miles (20.4 km) east of the Cape on May 6.

A film on the Trans-Arctic Expedition is planned by NBC, with the Sherpa's whistling for background music. It will no doubt be entertaining, and perhaps, to other would-be polar explorers, instructive also.

REPORTS

The Mackenzie Delta Research Project-A Progress Report.

By A.J. Kerr[1/]

Background

The Northern Co-ordination and Research Centre, of the Department of Northern Affairs and National Resources[2/], commenced in 1955 a program of social research among northern peoples. In 1965, it was decided to undertake a research program which would draw from a number of scientific disciplines in order to investigate in depth the problems besetting the human population of a defined geographical area. The area chosen for the first studies of the program was the Mackenzie Delta. This geographic region had a variety of social and other environmental elements broadly representative of those encountered elsewhere in the Northwest Territories. The availability of a good field base, the Inuvik Research Laboratory, was another advantage of the area. A Research Co-ordinator was appointed and the Mackenzie Delta Research Project got underway in April, 1965.

Objectives & Procedures

The project was planned as a study of those characteristics and problems of the native peoples which inhibit them from participating in northern development, and of the process of adjustment to the cultural and economic changes that have been brought only by commercial and government expansion in the North. Suggestions about how research might help to provide useful analyses of the situation were requested from government and other agencies operating in the Delta.

It was recognized that research of several different kinds would be required. Insofar as proved possible and practical, it was planned to develop a team of specialists whose work would be mutually complementary. The program was itself largely pioneer work, breaking new ground in methodology.

The First Phase

Four studies were undertaken through contractual arrangements in the summer of 1965.

1. Reliable and reasonably comprehensive information about the

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1/ Cheif, Northern Science Research Group, Department of Indian Affairs and Northern Development, Ottawa.

2/ Now the Northern Science Research Group of the Department of Indian Affairs and Northern Development.

current economic situation in the Delta was not available. In order to provide a basis for realistic assumptions about the area's economic present and future, a study which would provide an "outline map" of the economy was undertaken. This was not planned to be a detailed and intensive analysis, but was intended rather as a guide to other researchers when they came to consider future possibilities for the native people of the area.

3. The second study undertaken in Phase 1 was an analysis of the social structure of Inuvik. Studies of fur trade settlements in the North already provided a basic framework for understanding the structure of smaller communities in the Mackenzie Delta, but the new town of Inuvik was unique and required special attention.

3. Previous research in the Delta, by Claremont and others, had indicated that one of the most serious human problems arose from the fact that the native people were learning new needs at a greater speed than that at which they were acquiring the means to satisfy them. A preliminary investigation of the problem was initiated.

4. To provide a sound understanding of the present, as well as a limited basis for projecting the future, a fourth study was directed toward the technology of the area. Technology was seen as one of several influences which determine present and future developments in the area, and this was a necessary component of the background studies.

The above studies were carried out during the summer of 1965. Preliminary reports of field work were submitted toward the end of that year and a research conference was held in Ottawa on 28 February and 1 March, 1966. Several anthropologists with extensive northern experience, with representatives from agencies within the Department of Indian Affairs and Northern Development, and from other government agencies including the Department of National Health and Welfare and the Department of Citizenship and Immigration (Indian Affairs Branch), met with the principal researchers to discuss the work that had been done, and the directions future research should take.

The Second Phase 1966-68

The report on the community structure of Inuvik revealed the presence of what were, in many respects, not one but two communities.

5. The first community was in the unserviced area, and consisted of the native people, together with some other permanent residents. The second was in the serviced[1] area of government housing, and was composed almost exclusively of transient members of Federal Government agencies.

1/ The "serviced area" of Inuvik is connected to insulated sewage, heating and water mains.

Since the basic concern of the Mackenzie Delta Research Project was with the adaptation of the native people in the area, further investigation of the social structure in the unserviced area was dictated. Preliminary investigation had revealed it to be a fragmented community, and a study was now directed toward providing some understanding of this fragmentation.

6. It was also apparent that a good many of the attitudes, and much of the behaviour of people who lived in the unserviced area, could be understood as responses to some of the attitudes and actions of the transients in the serviced area. The attitudes of these latter people about the problems of the native people were therefore investigated.

7. Also, with the data already available at this time, it could be seen that many of the problems accompanying the change in life-style from living in the bush to living in the relatively urban environment of Inuvik, had important psychological components which it would be necessary to investigate if some important areas of behaviour were to be understood. Included here was, for example, the attitudes of native people relating to the use of alcohol, as well as behavioural manifestations of male-female relationships in the new urban environment. To collect and analyze data in this category, a study was undertaken by a psychiatrist who had had research experience with other Eskimos.

8. Another subject on which further investigation was necessary to provide a comprehensive understanding of the human situation in the Mackenzie Delta was the historical background of life there. Only a small amount of the data related to this subject was easily available, and it was recognized that a search among original sources in archives and similar places would be necessary to supplement data obtained from interviews.

9. Finally, vital information was demonstrably deficient in one other research area. Although a considerable amount of information about the behaviour, the ideas, the attitudes, and the life-ways of the native people of the Delta was available, almost all had been observed from the vantage point of the administrator, the teacher, the social worker, the nurse, or the policeman. But much of what the native people did, said and felt was not open to observation by government agents, who were usually allowed to become aware only of what was deemed appropriate for them to know. In order to understand what native people regarded as the real and legitimate choices when they made decisions to follow certain courses of action, it was necessary to know what they themselves listed as the options, and how they weighted them. This information could be obtained only by a researcher who would not be viewed as a government functionary, but as one whose role was not in any degree seen to involve a directive or instrumental capacity. It would be necessary for this investigator to live as close to them as possible, for a period sufficiently long for him to gain their trust and confidence in his non-manipulative interest in them, as well as in his personal regard for them as people. A continuous year of field work was regarded as the minimum. A suitable anthropologist

with sufficient training and experience was available, and he began field work at the end of the summer.

Two other undertakings having a slightly different significance in the project were initiated.

10. A consolidation of the reference lists of the researchers showed that some bibliographic sources remained unexplored, and it was therefore decided to produce a modest 'area bibliography' as an aid to all the researchers.

11. A study of town planning in the north was initiated at the request of the northern Town Planner, whose duties included drawing up plans for northern communities. In supporting this request, the Town Planner explained that he felt an urgent need for assistance in developing techniques of planning for northern communities, which could not be done satisfactorily on the basis of experience gained in the south, where many quite different sets of social and environmental conditions obtained. He therefore supported the application of a team of two graduate students in Planning who wished to develop a planning methodology suitable for the North. Because of the volume of data dealing with the people of the area which would be available as a result of other research being done in the Delta, the students wished to undertake the study there, and to work with the other researchers. Their field work began in May, 1966.

Following the end of summer field work in 1966, a second conference was held on 6 December. Agencies in the Department of Indian Affairs and Northern Development were invited, including Northern Administration Branch, Indian Affairs Branch, Resources and Economic Development Group, and Canadian Wildlife Service, and also the Commissioner of the North-west Territories. Preliminary reports of the field work of the previous summer were presented by the investigators, and the findings were discussed.

The Third Phase

Emphasis in the final phase of the program will be on feedback to potential users of the findings of the research. Three categories of potential users are considered here:

1. Employees of the Federal Government in policy-making and operational roles. Feedback to people in this category can be accomplished, it is hoped, through written reports, formal and informal conferences, and frequent consultation.

2. People of the Mackenzie Delta. Since the residents of the area have themselves the capability of making many decisions about their future, they are also considered to be potential users of research findings, which

can provide them with an improved understanding of the choices open to them. However, the communication of such findings to a group with such a spread in literacy skills poses a problem. Techniques to accomplish this will be exploratory, and it is proposed to undertake this task in co-operation with adult educators in the department. Devices to be tested for their effectiveness will include specially prepared printed materials and radio broadcasts. In preliminary discussions, the CBC has expressed a willingness to co-operate in such an undertaking both in the field and at headquarters. Another possible feedback device being considered is to hold short residential workshop courses, where a limited number of native opinion-leaders can meet with the researchers and educators.

3. Professional colleagues. They can be kept informed by publication of reports.

A suitable scientist has now been engaged to take over the duties of Co-ordinator of the project and to assume responsibility for implementation of the third phase. He will begin in the early summer of 1968.

Publications[1/]

The publication status of each report (the numbers correlate with Items 1-11 in the preceding text) is as follows:

1.	John R. Wolforth	The Mackenzie Delta - Its Economic Base and Development - A Preliminary Study.	In Print
2.	Jose Mailhot	Community Structure - Inuvik, Summer 1965.	At the Printers
3.	Derek Smith	Mackenzie Delta - Domestic Economy of the Native People.	In Print
4.	P.F. Cooper Jr.	Mackenzie Delta-Technology.	In Print
5.	A.M. Ervin	New Northern Townsmen in Inuvik.	At the Printers
6.	G.F. Parsons	Attitudes of Inuvik Transient Residents: A Survey.	Final draft in preparation
7.	J.M. Lubart	Psycho-dynamic Problems of Adaptation-Mackenzie Delta Eskimos -A Preliminary Clinical Study.	Final draft prepared.

1/ Those in print may be obtained from the Chief, Northern Co-ordination and Research Centre, Department of Indian Affairs and Northern Development, Ottawa.

8. John Wolforth	The Mackenzie Delta: Changes in Human Ecology.	Draft in preparation
9. Derek Smith	The Mackenzie Delta: A Plural Community.	Draft in preparation
10.	Mackenzie Delta Bibliography.	Near completion
11. C. Aasen and W. Wright	Comprehensive Settlement Planning in the Mackenzie Delta, N.W.T.: A Proposed Planning Theory and Methodology.	Final draft being edited

Activities of the Geological Survey of Canada in the North, 1967.

By R.G. Blackadar

During 1967 the Geological Survey of Canada placed about 100 full-time parties in various parts of the country. About 15 per cent were in the Northwest Territories or in 'arctic' parts of the provinces. Their studies will form the basis for maps and reports of the Geological Survey. These brief notes are intended only to indicate the nature of the work done and not to report the scientific results.

District of Franklin

W. Blake, Jr. began a study of the glacial geology and geomorphology of south-western Ellesmere Island and north-western Devon Island. Main support was provided by a Piper Super Cub equipped with oversized tires but on occasion a helicopter was available. It was found that the limit of marine submergence decreases northward along the Ellesmere fiords. Dark brown pumice similar to pumice occurring on raised beaches on Spitsbergen was noted at several places along Jones Sound. Precise levelling showed that the pumice horizon rises towards the west indicating that the ice cover during the last glacial maximum was thicker over the west end of Jones Sound than along the south coast of Ellesmere.

Brief studies were made of M'Clintock Inlet region, northern Ellesmere Island, by T.O. Frisch and H.P. Trettin. These studies concluded work begun in 1965 as part of 'Operation Grant Land' which was directed by R.L. Christie. H.P. Trettin also spent about one month studying the pre-Mississippian geology of the United States Range and Hazen Plateau in northeastern Ellesmere Island.

In preparation for a reconnaissance geological survey of northeastern Ellesmere Island planned for 1968, G.D. Jackson made a short trip through the area. A Cessna 180 equipped with oversized tires was used and about 20 landings were made as well as numerous low passes. Information was obtained concerning geology, topography, weather, available facilities and suitable camp sites, and arrangements were made for caching gas supplies.

J. Wm. Kerr initiated a study of the structure and stratigraphy of southwest Ellesmere Island and western Devon Island. Those parts of Ellesmere Island west of 84° W. and south of 77° 33' N. were completed in 1967. A small area of Precambrian gneiss on the south coast of Ellesmere Island is overlain and flanked on the north and west by northwest-dipping Devonian and older rocks of the Central Stable Region. These strata were disturbed by normal faulting, probably during the Tertiary.

Stratigraphic and biostratigraphic investigations of Pennsylvanian and Permian rocks in southern Ellesmere, northwestern Devon and northeastern Melville islands, were made by W.W. Nassichuk.

On Ellef Ringnes Island, D.F. Stott carried out geological mapping at a scale of 1 inch to 4 miles. Two sedimentary successions, virtually unknown before this study, were mapped on Reindeer Peninsula. Limited stratigraphic evidence from the vicinity of the large gypsum- and anhydrite-cored diapirs in the central and southern part of Ellef Ringnes Island suggest that these structures were formed during a long time interval probably as a result of halokinesis and geostatic loading followed by compressional stress related to the Tertiary orogeny.

District of Mackenzie

In preparation for a major geological reconnaissance, 'Operation Norman', planned for 1968 in the lower Mackenzie Valley (NTS map-sheets 86, 96, 97, 106, 107) J.D. Aitken and others conducted a reconnaissance of the area using fixed-wing aircraft. The amount and quality of outcrop was evaluated and terrain data were obtained to aid in projected laboratory airphoto studies.

A study of the boundary between the Slave and Churchill structural provinces was begun by J.A. Fraser. This area is of considerable scientific interest because it includes areas that have had greatly different geological histories.

A detailed study was initiated by J.B. Henderson of sedimentary rocks of Archean age in the Yellowknife area. This study is designed to explain the mechanism of deposition of these rocks and hence to develop a palaeoenvironmental interpretation of the deposit and its role in the history of the Archean basin of deposition in the region.

A two-year study of Precambrian sedimentary and volcanic rocks near the East Arm of Great Slave Lake was completed by P.F. Hoffman. Much new information was obtained concerning the origin and significance of algal stomatolites. This study forms the basis for interbasinal stratigraphic correlation of sedimentary strata of Aphebian (Lower Proterozoic) age in northwestern Canada.

District of Keewatin

A comprehensive study of the Precambrian Hurwitz Group strata was begun by R.T. Bell. These strata comprise sedimentary and volcanic rocks and are of additional interest because they include conglomerates which, in the Padlei area, were found to be slightly radioactive.

A. Davison carried out reconnaissance mapping of the Kaminak Lake area using a combination of helicopter and ground traverses supported by a light float-plane for camp moves. The area comprises 1) volcanic rocks of low metamorphic grade which are intruded by plutonic rocks, 2) metasedimentary rocks, and 3) an area characterized by a complex mixture of gneisses and migmatites. Many small gossans were seen in the volcanic rocks and most contained finely disseminated pyrite and/or pyrrhotite. In places magnetite-hematite iron-formation is associated with sediments intercalated with the volcanic rocks.

Reconnaissance mapping of the Tavani map-area was undertaken and completed by W.W. Heywood. The southern half of the area comprises an assemblage of metavolcanic rocks and sedimentary rocks. In the northern part schists and granites predominate. Southwest of Wilson Bay iron-formation as much as 150 feet thick overlies conglomerate. Elsewhere disseminated chalcopyrite occurs in some of the volcanic rocks. None of the mineral occurrences is of economic importance.

During 1967 the Geological Survey continued a co-operative aeromagnetic project with the National Aeronautical Establishment and as part of the program studies were carried out in northern Baffin Bay and southern Nares Strait. A study of the data obtained indicates that a considerable thickness of sedimentary rock underlies Melville Bay, and P.J. Hood who was in charge of the study suggests that were it not for the hazard presented by the numerous icebergs in the bay this would be an interesting area for oil exploration.

Hudson Bay Lowlands

An extensive reconnaissance study was made of the Hudson Bay Lowland. This project, 'Operation Winisk', was directed by A.W. Norris who was assisted in the mapping of the Paleozoic strata by I.K. Cummings, B.S. Norford and B.V. Sanford. Precambrian rocks within the Lowlands were examined by H.H. Bostock. Mesozoic rocks were mapped by E.I. Price and the Pleistocene deposits were studied by B.G. Craig and R.C. McDonald.

The project was supported by two Bell 47G-4 helicopters and a deHavilland Otter. Inflatable rubber boats equipped with outboard motors were used to traverse many of the rivers along which most bedrock and Pleistocene exposures occur.

Of interest was the discovery of a fairly large area of Proterozoic and older Precambrian rocks immediately south of Cape Henrietta Maria. These rocks are brought to the surface by a broad north-trending arch that divides the lowlands in two sedimentary basins. Middle and Upper Ordovician strata are more abundant in the Lowlands than was previously thought. Silurian strata are widely distributed in both basins but Devonian rocks are better developed in the southern basin. Rocks of Upper Jurassic or Lower Cretaceous age containing lignite coal outcrop in the southern basin. In recent years there has been renewed interest in the economic potential of these low grade coal deposits.

Labrador

During the 1967 field season, geological reconnaissance of northeastern Quebec and northern Labrador was started under the direction of F.C. Taylor assisted by R. Skinner, C.K. Bell and E.W. Reinhardt. This project, 'Operation Torngat' will take at least two years to complete. All exposed bedrock is Precambrian and includes rocks of both Archean and Proterozoic ages. No major economic mineral occurrences are known in the area.

Indications are that the Geological Survey of Canada expects to carry out the following projects in the Northwest Territories during the 1968 field season.

District of Keewatin

R.T. Bell will begin a study of the stratigraphy and structure of the Hurwitz Group of Precambrian rocks in the Henik Lake - Ferguson Lake map-areas.

K.E. Eade will begin the mapping of Ennadai Lake map-area on a scale of 1 inch to 4 miles.

District of Mackenzie

J.D. Aitken will direct a major reconnaissance survey of the central and lower Mackenzie valley including an assessment of the mineral and fuel potential of the region.

J.A. Donaldson will carry out sedimentological and stratigraphic studies of the Hornby Bay Group in map-areas 86 J, K, L, M, N.

A.M. Goodwin will do field work in Flin Flon, Yellowknife, and Ennadai Lake areas as part of a long-range study of volcanic rocks in the Canadian Shield.

J.B. Henderson will continue paleoenvironmental studies of Archean sedimentary rocks of the Yellowknife Group in map-areas 85 J/8, 9, 16.

B.C. McDonald will begin a detailed study of eskers in selected areas in the Districts of Mackenzie and Keewatin.

F.W. Reinhardt will study the gneisses and mylonites between MacDonald Fault and Nonacho Basin in parts of map-areas 85 H/10, 11, 14, 15. This work is part of a broad study of the 'Thelon Front' and is for publication at a scale of 1 inch to 1 mile.

J.C. Ritchie will conduct palynological sampling of postglacial pond deposits in pingo sections and will carry out a regional plant ecology study in collaboration with Prof. J.R. MacKay of the University of British Columbia.

District of Franklin

W. Blake, Jr. will continue a reconnaissance study of Quaternary deposits in southeastern Ellesmere Island to provide areal data on deposits and land-forms.

R.L. Christie, who left for the field in early April, is carrying out stratigraphic and structural studies in eastern Devon and southern Ellesmere islands. Prof. J.W. Cowie, University of Bristol, a specialist in Cambrian paleontology, will be with the party for part of the season.

G.D. Jackson will direct 'Operation Bylot', a helicopter-supported reconnaissance of that part of Baffin Island lying north of 69° N. and east of 80° W.

D.C. McGregor and T.T. Uyeno will carry out work in NTS map-area 49 in order to establish microfaunal and microfloral zonation for the Paleozoic of northern Canada. They will make collections of palynological and microspaleontological material from the Devonian and Permian strata. H.P. Trettin will study the Paleozoic rocks in parts of map-areas 35, 36, 36, 37, 38, 45, 46, 47. This work will be aircraft-supported and will in part complement that being done by G.D. Jackson.

It is expected that geomagnetic coverage of north-central Baffin Island will be obtained in 1968.

Operation "Hazen-Tanquary", 1967 and 1968.

By G. Hattersley-Smith[1/]

- 1967 -

The Defence Research Board continued to maintain Tanquary and Hazen camps as scientific field stations. Altogether, 34 scientists were in the field for periods varying from two weeks to four and a half months between early April and late August. As in previous years members of the party were flown by Canadian Forces C. 130 Hercules aircraft to Eureka or Alert, then by smaller aircraft under commercial charter to Tanquary Fiord or Lake Hazen, and thence to outlying camps. About 9 tons (9144 kg.) of material was flown in by charter aircraft in the spring. In August the CCGS John A. Macdonald reached Tanquary Camp for the third year in succession to evacuate and resupply the station.

The following were based at Tanquary Camp in 1967 while working in the camp area, on the central ice cap, and from auxiliary camps at Disraeli and Hare fiords, and Ward Hunt Island; the McGill University members of the party were working under Defence Research Board contracts.

G. Hattersley-Smith (Defence Research Board) in charge April-June, Glaciology
H. Serson (Defence Research Board) in charge June- August, Oceanography
W.R. Anderson (McGill University), Meteorology
E.J. Arnold (Department of Energy, Mines & Resources), Survey & Glaciology
R.J. Blake (McGill University), Meteorology
G.R. Brassard (New York Botanical Garden), Botany
H.A. Curtis (McGill University), Marine Biology
H. Ealscher (McGill University), Glaciology
D.H. Farmer (McGill University), Marine Biology

1/ Defence Research Telecommunications Establishment, Shirley Bay, Ottawa 14, Ontario, Canada.

D.J. Finlayson (McGill University), Oceanography
O.M. Johannessen (McGill University), Oceanography
J.E. Keys (Defence Research Board), Oceanography
M.F. Langleben (McGill University), Ice Physics
A. Long (Smithsonian Institution), Geochemistry
J. Mielke (Smithsonian Institution), Geochemistry
G.R. Schram (McGill University), Meteorology
P. Stalinski (McGill University), Ice Physics
J.R. Stein (McGill University), Ice Physics
J. van der Leeden (McGill University), Glaciology

The following entomologists from the University of Alberta were based on Hazen Camp:

B. Hocking in charge June
P. Kevan in charge June-August
K.W. Richards
J. Shorthouse.

Between late April and late June the Royal Air Force Ellesmere Island Expedition, 1967, of eight men under Wing Commander D. le R. Bird, worked out of Tanquary Camp. The expedition received logistic support from Canadian Forces aircraft, and engaged the DRB charter aircraft for support flying. From late June until late August, R.E. Longton (British Antarctic Survey botanist with the RAF expedition) worked out of Tanquary and Hazen Camps.

Meteorology

Routine synoptic meteorological observations were continued at Tanquary and Hazen camps. Data from the last five summers are being analyzed by Dr. C.I. Jackson under a contract with McGill University.

Physical Oceanography and Limnology

The physical oceanographic program was concentrated on the north coast of Ellesmere Island. A camp was established in Disraeli Fiord near the inner edge of the Ward Hunt Ice Shelf, where Keys and an assistant measured temperature, salinity and current profiles from 12 May to 17 July. During this period Serson and Finlayson occupied eight stations between Cape Aldrich and the mouth of Nansen Sound. Temperature and salinity measurements were made in Lake Tuborg, a meromictic lake, on 19 April and 22 June. In late July and August oceanographic stations were taken in Tanquary Fiord, mainly to investigate effects near the pack-ice to water interface.

Sea Ice Physics

An extensive series of acoustic attenuation measurements along horizontal transmission paths was completed, and an attempt was made to investigate attenuation in the vertical direction of the ice cover. An experiment was also designed to measure the albedo of a sea ice surface under melt and premelt conditions. It was recognized that albedo observations from radiometers at the surface are of limited value after melting starts, on account of the difficulty of selecting a representative ice surface. It was therefore decided to suspend radiometers at a height of 15 m between two towers anchored to the bottom of the ice cover; the average albedo of the surface was successfully measured with the instruments mounted in this way.

Radiochemistry

In Disraeli Fiord Long and Mielke collected a series of water samples for tritium analysis, and extracted dissolved bicarbonate for carbon 14 analysis. In addition, they collected water samples for tritium analysis from Lake Tuborg, and from Ekblaw and Rollrock lakes.

Glaciology

Between 9 May and 13 June, on a glaciological traverse by motor toboggan and dogteam from the snout of the Gilman Glacier to the snout of the Air Force Glacier, a distance of about 130 km via the ice cap, Hattersley-Smith and Embacher made accumulation measurements and pit studies at about fifty stations up to an elevation of 2,000 m. The main conclusion from this traverse was that the sequence of four summers 1963 to 1966 had been the coldest sequence in the last 40 years. At the same time Arnold, assisted by F/L's D. Drew and P.G. Pinney of the RAF and by van der Leeden surveyed the Gilman Glacier to determine height changes over a longitudinal and several transverse profiles, originally surveyed in 1957-58. Arnold also took part in ascents of the two highest peaks in northern Ellesmere Island, situated 12 and 7 km west of the head of the Henrietta Hesmith Glacier, and established theodolite stations on their summits. His observations give the height of the highest peak (previously unclimbed and still unnamed) as 2603 m, and of the second highest (previously climbed by a D.R.B. party in 1961 and identified as Greely's Mount Whisler) as 2560 m. These are the highest mountains in North America east of the Rocky Mountains.

Mass balance and movement studies were continued on the Per Ardua Glacier for the fourth successive year. Arnold and a party of three from the Inland Waters Branch of the Department of Energy, Mines & Resources, were assisted by Embacher in this work during the latter half of June and in late August and early September. Measurements were also made at

stakes set in the Ward Hunt Ice Rise and Ice Shelf by Serson and Finalyson. Net ablation values of 18.8 g/cm² on the ice rise (mean at 40 stakes) and of 37.1 g/cm² (mean at 23 stakes) on the ice shelf were obtained for the period June 1966 to June 1967. For the period June 1964 to June 1967 the average annual net ablation on the ice shelf was 21.3 g/cm² (mean at 4 stakes). A 1 km square of 100 thin aluminum stakes was completed on the ice shelf about 5 km east of Ward Hunt Island.

Marine and Lake Biology

A program of sampling the benthos was undertaken by Curtis and Farmer from May to mid-July at Hare Fiord and continued at Tanquary Fiord for the remainder of the season. Several hundred samples were obtained with a 0.1 m² Peterson grab in depths from 5 to 100 m; a small dredge was also used in Tanquary Fiord at depths down to 60 m. Plankton was sampled weekly in Hare and Otto fiords and later in Tanquary Fiord. Temperature and salinity samples were taken once a week in Hare Fiord and occasionally in Otto Fiord.

Long and Mielke made further collections of two relict species of copepods from the upper freshwater layer of Lake Tuborg. They also collected plankton samples and specimens of molluscs and fish (including Arctic Cod) from Disraeli Fiord.

Botany

Botanical studies were carried out by Brassard and Longton from Tanquary Camp, Van Hauen Pass and Hazen Camp. In Tanquary Fiord the vascular flora was raised from 107 to 116 species and the moss flora from 85 to about 105 species, with the addition of many genera. At Van Hauen Pass, previously unbotanized, 82 species of vascular plants and about 90 species of mosses were collected. At Lake Hazen, whose vascular flora was already well known, collecting was concentrated on bryophytes. At all three localities Longton made detailed studies on the phenology, micro-habitat, and reproductive behaviour of widespread moss species.

Entomology

In the program at Lake Hazen, which was directed by Hocking, Kevan continued working on insect-flower relations. He studied the micro-climate of various types of flowers, especially in relation to the insects using them, and measured body temperatures of certain insects both inside and outside flowers. Flowers were examined spectrally in relation to insect vision; photographs were taken of the ultra-violet reflection from flowers; and several species were tested for their spectral preference from infra-red through ultra-violet. Investigations were also made of flower scents, and on the role of insects as cross-pollinators of arctic flowers. Richards studied the nest ecology of bumble-bees and the general life history and development of colonies and of the various bee castes.

The activities of colonies were studied in relation to the time of day, and the weather, especially wind, rain, and temperature. Shorthouse worked on the life histories, general ecology and parasites of the Lepidoptera.

Archaeology

At Cape Gleason in Tanquary Fiord Nerson took photographs and measurements of seven structures believed of Paleo Eskimo age and discovered in 1966 at an elevation of 8 to 10 m above sea level. On the west side of the Air Force River valley Hattersley-Smith gathered several flints from the surface of a Paleo Eskimo site, discovered in 1964 at an elevation of 71 m above sea level, and in Hare Fiord Curtis recorded five new Eskimo sites.

- 1968 -

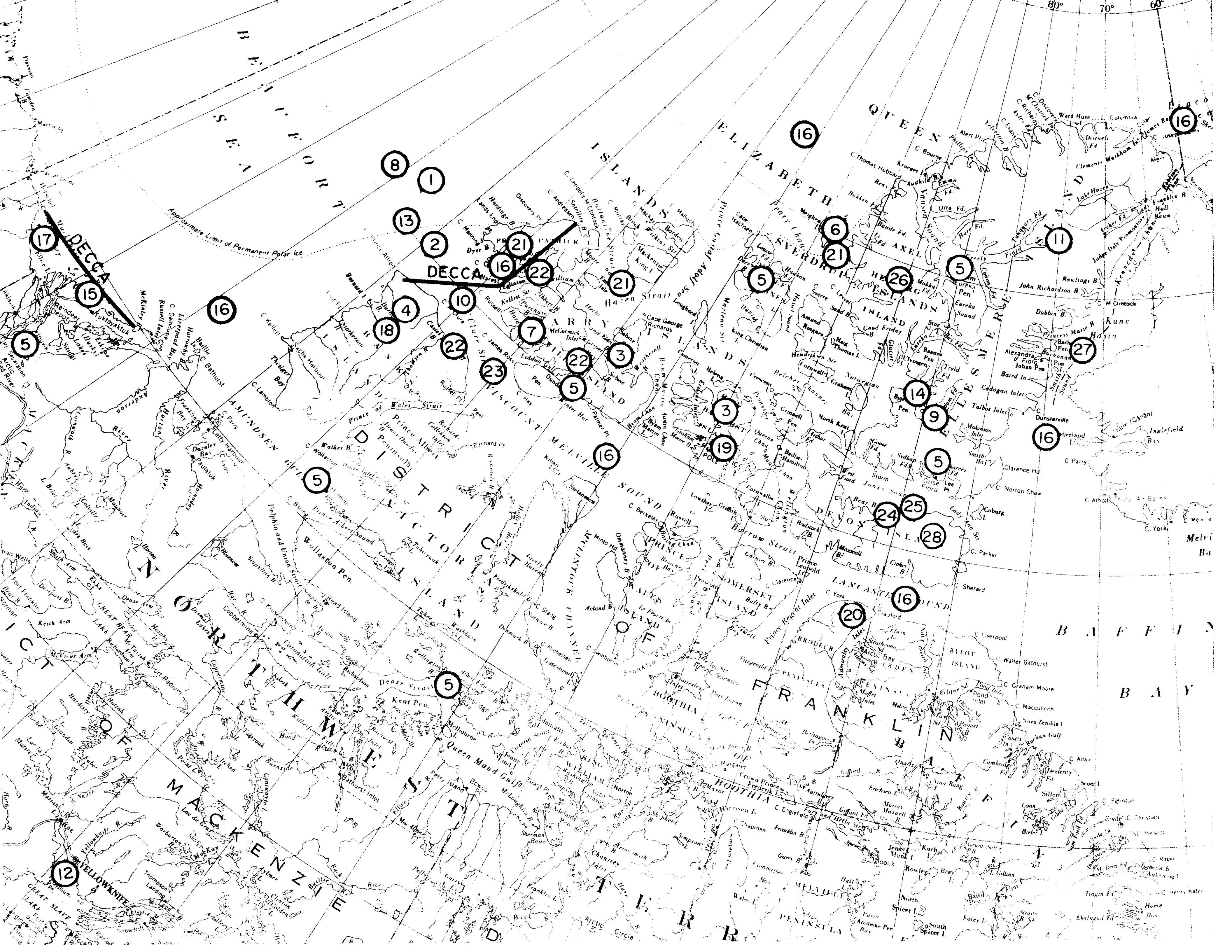
It is planned to continue field programs from Tanquary and Hazen camps in 1968 at about the same level as in previous years.

The Polar Continental Shelf Project - 1968

By E.F. Roots 1/

Field work for the tenth season of the Polar Continental Shelf Project started on 25 February, when the first party departed Ottawa for Mould Bay. By the end of the first week in March, operations were in full swing, with about 50 men and six aircraft operating out of Mould Bay. Aided by unusually good weather, the field survey and research program got off to an excellent start. The Decca Lambda survey and navigation system, based on transmitters at Cape Andreasen on Prince Patrick Island, Eglinton Island and Cape Prince Alfred on Banks Island, went on the air on March 15. An excellent site for the drifting ocean camp was found on March 18 at approximately Lat. 75° 25' Long. 129° 45', or approximately 155 km west of the mouth of M'Clure Strait, on a relatively smooth thick floe of old polar ice. A comfortable camp for seven men, stocked with supplies and fuel for a month's survey operation with two helicopters, was soon established on this floe, which became "Camp 200 (1968)". (It has become traditional for any offshore ocean camp of the Polar Continental Shelf Project to be called "Camp 200", because the early ones, and indeed most, have been about 200 km offshore.) During April and May, other field camps were established or stocked, according to schedule, on the icecap on Meighen Island, at Bauman Fiord and Alexandra Fiord on Ellesmere Island, and on Bathurst Island.

1/ Co-ordinator, Polar Continental Shelf Project, Department of Energy, Mines and Resources, Ottawa, Ontario, Canada.


BEAUFORT SEA
QUEEN ELIZABETH ISLANDS
SVERDRUP ISLANDS
ELLESMERE ISLAND
AXEL HEIBERG ISLAND
PARRY ISLANDS
MELVILLE ISLAND
BANKS ISLAND
VICTORIA ISLAND
PRINCE OF WALES ISLAND
SOMERSET ISLAND
DEVON ISLAND
BYLOT ISLAND
DISTRICT OF FRANKLIN
NORTHWEST TERRITORIES
DISTRICT OF MACKENZIE
BAFFIN BAY
LANCASTER SOUND
VISCOUNT MELVILLE SOUND
M'CLINTOCK CHANNEL
BOOTHIA PENINSULA
AMUNDSEN GULF
Approximate Limit of Permanent Polar Ice
DECCA
DECCA
YELLOWKNIFE
Queen Maud Gulf
Barrow Strait
Kane Basin
Hazen Strait
Jones Sound
Prince of Wales Strait
Coppermine
Great Bear Lake
Great Slave Lake
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A brief listing of the field program follows, with comments on progress to the time of writing (15 May 1968):

A. Investigations of the Department of Energy, Mines and Resources

1. Aeromagnetic surveys: western M'Clure Strait and Arctic Ocean west of Prince Patrick Island and M'Clure Strait.

-measurement of total magnetic intensity, from a height 430 m above sea level.

-area covered: 38,850 line km over some 142,000 km^2 with Decca control for mapping at a scale of 1:250,000.

-principal investigator: Geological Survey of Canada, with flying and compilation contract let to Survair, Ltd.

-flying started from Mould Bay on April 27; survey completed on April 23; compilation in progress.

-field transport: Aero Commander aircraft.

2. Geology, marine: west end of M'Clure Strait.

-a continuing study of sediments, the processes of sedimentation, and the present and past organisms of the sea floor in an arctic environment.

-principal investigator: Gustav Vilks, Bedford Institute of Oceanography

-tentative dates in field: May 20-July 1.

-field transport: Sikorsky S-55 helicopter.

3. Geology, palaeontology: Bathurst Island, Melville Island.

-detailed palaeontological and stratigraphic study of critical Palaeozoic formations.

-principal investigators: D.C. McGregor, T. Uyeno, Geological Survey of Canada.

-tentative period in field: 5 July to 10 August.

-field transport: Otter aircraft.

4. Geology, surficial and glacial: northern and western Banks Island.

-a study of the Tertiary and Recent geological history of a part of Banks Island that appears to lie beyond the limits of the latest major glaciation.

-principal investigators: J.G. Fyles, Geological Survey of Canada; L.V. Hills, University of Calgary.

-tentative period in field: 15 July to 15 August.

-field transport: Nodwell tracked trucks, with Otter aircraft support.

5. Geomagnetism: various localities in Arctic Archipelago.

-repeat measurements at permanent magnetic stations at Eureka, Isachsen, Grise Fiord, Winter Harbour, Holman Island, Cambridge Bay and Inuvik.

-principal investigator: Benno Przybylski, Observatories Branch.

-tentative period in field: 31 May to 25 July.

-field transport: Beechcraft D-18S and Otter.

6. Glaciology and climatology: Meighen Icecap.

-a continuing study of the behaviour of a small dry high arctic icecap and its influence on and reaction to the local climate; mass balance measurements; temperature and deformation in a borehole that penetrates the icecap.

-principal investigator: Beatrice Taylor, McGill University/ National Research Council.

-tentative period in field: 15 May to 1 September.

-field transport: motor toboggan; Otter aircraft support.

7. Glaciology: Melville Island icecaps.

-a continuing study of the mass balance of these thinnest and driest of North American arctic glaciers. Detailed aerial photography is planned.

-principal investigator: W.S.B. Paterson, Polar Continental Shelf Project.

-tentative period in field: 15 to 25 May; 20 July to 15 August.

-field transport: Sikorsky S-55 helicopter; motor toboggan.

8. Gravity: Arctic Ocean and M'Clure Strait.

-gravity measurements at intervals of approximately 8 km, for mapping at a scale of 1:500,000.

-principal investigator: L.W. Sobczak, Observatories Branch.

-period of survey: survey started April 5, completed 6 May. 931 gravity stations were established, covering an area of 135,000 km².

-field transport: Bell 204B helicopter; Sikorsky S-55 helicopter.

9. Gravity: Bauman Fiord, Ellesmere Island.

-gravity measurements at intervals of approximately 8 km, for mapping at a scale of 1:500,000.

-principal investigator: D. Todd, Observatories Branch.

-tentative period in field: 10 May to 29 May.

-field transport: Sikorsky S-55 helicopter.

10. Heat flow studies: M'Clure Strait.

-measurements of the flow of geothermal heat from the floor of M'Clure Strait.

-principal investigator: A. Judge, Polar Continental Shelf Project/Observatories Branch.

-period of survey: April 8 to April 16. 5 oceanic and 1 bore hole stations were completed in this study.

-field transport: Otter aircraft.

11. Heat flow studies: Lake Tuborg, Ellesmere Island.

-measurement of the heat flux at the bottom of an ice-dammed lake of unusual limnological characteristics and geological history.

-principal investigator: Allan Judge, Polar Continental Shelf Project/Observatories Branch.

-tentative period in field: 10 June to 5 July.

12. Hydrography: Great Slave Lake.

-A small survey undertaken en route to the field, at the request of the Department of Indian Affairs and Northern Development, in connection with a proposed engineering scheme.

-Investigator: Paul Davies, Canadian Hydrographic Service.

-Period of survey: February 20 to March 2.

-Field transport: snowmobile.

13. Hydrography: Arctic Ocean and M'Clure Strait.

-hydrographic mapping by sounding through the ice at intervals of approximately 8 km, for charting at a scale of 1:500,000.

-principal investigator: George Yeaton, Canadian Hydrographic Service.

-period of survey: March 19 to May 6. 966 soundings were taken during this period, charting an area of 135,000 km^2.

-field transport: Bell 204B helicopter; Sikorsky S-55 helicopter.

14. Hydrography: Bauman Fiord, Ellesmere Island.

-hydrographic mapping by sounding through the ice at intervals of approximately 8 km, for charting at a scale of 1:500,000.

-principal investigator: George Yeaton, Canadian Hydrographic Service.

-tentative period of survey: 10 May to 29 May.

-field transport: Sikorsky S-55 helicopter.

15. Hydrography: Beaufort Sea-Mackenzie Bay area.

-limited hydrographic surveys may be undertaken along the outer limits of the Mackenzie River delta in preparation for an extensive program in subsequent years.

-principal investigator: George Yeaton, Canadian Hydrographic Service.

-tentative period in field: late July.

16. Sea ice studies: Arctic Archipelago.

-a systematic aerial survey of the distribution, nature and movement of sea ice in all the main channels of the Canadian Arctic Archipelago, and in the adjacent Beaufort Sea and Arctic Ocean, supplemented by surface studies.

-principal investigators: D.C. Lindsay, W.J. Siefert.

-tentative period of survey: mid-March to mid-October.

-field transport: Beechcraft D18S and other aircraft.

17. Topographic Control Surveys: Mackenzie River delta region.

-determination of the geographic position of the sites for transmitters of the proposed Decca Lambda survey chain in the Mackenzie delta area, and establishing survey ties between the various survey networks in the area.

-principal investigator: F.P. Hunt, Polar Continental Shelf Project.

-tentative period of survey: 10 to 20 July.

-field transport: S-55 helicopter, with fixed-wing aircraft as needed.

B. Investigations of other agencies of the government of Canada, supported by the Polar Continental Shelf Project.

18. Entomological studies: Banks Island.

-a survey of the insect life of central and northwestern Banks Island.

-principal investigator: W. Mason, Department of Agriculture.

-tentative period in field: 1 July to 1 August.

-field transport: camp support by Otter aircraft.

19. Ethological and zoological studies: Bathurst Island.

-ornithological study of Bathurst Island, with particular attention to the courtship and territorial behaviour of ptarmigan, and the breeding cycles of shore birds; and studies of the behaviour of muskoxen.

-principal investigator: S.D. MacDonald, National Museum of Natural Sciences.

-tentative period in field: 15 May to 31 August.

-field transport: camp support by Otter aircraft.

20. Ornithological studies: northwestern Baffin Island.

-investigation of reported breeding colonies of ivory gulls on Brodeur Peninsula, Baffin Island.

-principal investigator: S.D. MacDonald, National Museum of Natural Sciences.

-tentative period of investigation: 24-31 July.

-field transport: Sikorsky S-55 helicopter or Supercub.

21. Botanical investigations: western Queen Elizabeth Islands.

-mapping of vegetation types and study of peat deposits, on Prince Patrick Island, Eight Bears Island, and Meighen Island.

-principal investigator: Marion Kuc, National Museum of Canada.

-tentative period in field: 25 May to 10 August.

-field transport: camp support by Otter aircraft.

22. Studies of marine botany: western Arctic Archipelago.

-a survey of the distribution of marine algae along the coast of Prince Patrick, Ellef Ringnes, Banks and Victoria islands.

-principal investigator: Robert Lee, National Museum of Canada.

-tentative dates in field: 1 July to 25 August.

23. Acoustic propagation measurements under arctic sea ice.

-study of acoustic properties under late winter conditions in M'Clure Strait.

-principal investigator: A.R. Milne, Defence Research Baord.

-period of field survey: April 18 to May 2.
(survey successfully completed.)

-field transport: Otter aircraft.

C. Investigations by University parties, aided by the Polar Continental Shelf Project.

24. Botanical studies: northern Devon Island.

-part of Devon Island research program of the Arctic Institute of North America.

-principal investigator: P. Barrett, University of British Columbia.

-tentative dates in field: 5 June to 31 August.

-field transport: Otter aircraft.

25. Ornithological studies: northern Devon Island.

-part of Devon Island research program of the Arctic Institute of North America.

-principal investigator: D. Hussell, University of Michigan.

-tentative dates in field: 5 June to August 7.

26. Glaciological and hydrological studies: Axel Heiberg Island.

-principal investigator: F. Müller, McGill University.

-tentative date in field; 25 April to 30 August.

-field transport: Otter aircraft.

27. Oceanographical studies: Kane Basin.

-current measurements, temperature and salinity profiles.

-principal investigator: G. Siebert, McGill University.

-tentative date in field: 5 June to 30 June.

-field transport: Sikorsky S-55 helicopter and Otter aircraft.

28. Glaciological studies: Devon Island

-mass balance and velocity measurements on Devon Icecap and Sverdrup Glacier.

-principal investigator: I. Whillans, Institute of Polar Studies, Ohio State University.

-tentative dates in field: 5 June to 30 August.

-field transport: motor toboggan.

The itened numbers above correspond to circled numbers on the map accompanying this report.

Northern Field Projects of the National Museum of Natural Sciences, 1968.

By D.E. McAllister

Studies of the birds and mammals of Bathurst Island, between Cornwallis and Melville islands, will be made by a National Museum party in 1968. Biologists participating are Mr. S.D. MacDonald of the National Museum, Dr. D.F. Parmelee of Kansas State Teachers College, Dr. C.G. Hampson of the University of Alberta and Dr. W.W. H. Gunn of the Federation of Ontario Naturalists. Their projects include behavioural studies of ptarmigan and muskoxen, life history studies of shore-birds, studies of locomotion in the arctic hare, and the recording of sounds made by the birds and mammals of the High Arctic.

Work on the distribution and classification of marine algae of Canadian arctic waters is underway at the National Herbarium, where Dr. R.K. Lee is amassing the collections needed for work in this hitherto neglected field. Excursions were made in the summer of 1967 to localities in Hudson Strait and Lancaster Sound, and more than 350 specimens of benthic algae were collected. Collecting excursions in the Western Arctic are planned for 1968. Most algae have been found in the subtidal zone, the intertidal zone being comparatively poor in both species and abundance.

Transport and certain other assistance in the field has been made available to National Museum personnel by the Polar Continental Shelf Project, Department of Energy, Mines and Resources.

REVIEW

Arctic Bibliography, Volume 15. Marie Tremaine (ed.) for the Arctic Institute of North America, 1 October, 1967. lxiv+1554 pages, fold-map. McGill University Press, 3458 Redpath Street, Montreal 25. $12.50.

The latest volume of this valuable reference work marks the 20th year of the Arctic Institute's continuing effort to systematize, abstract and index the vast body of scientific literature on the arctic and subarctic regions of the world". 1967 is the most common and recent date of abstracted publications: Russian with 3857 items, and English with 3650, are the two most common languages of the originals. In addition to the Editor's quintessential introduction, the volume contains a comprehensive, 48-page list of all journals cited four or five times in volumes 1 to 18, a list of library acronyms (e.g., AINA), the abstracts themselves, and a thoroughly classified multiple-entry index of 368 pages. Volume 18 marks also a reversion to the superior printing style of volumes 1 to 11. While the project still enjoys the farsighted support of government agencies of both the United States and Canada, volume 18 is the first to be printed in Canada, by McGill University Press.

ANNOUNCEMENTS

19th Alaskan Science Conference

The Alaska Division, American Association for the Advancement of Science, will hold its 19th annual conference in Whitehorse, Yukon Territory, between August 26 and 30, 1968, under the general chairmanship of R.M. Hill, Manager of the Inuvik Research Laboratory, and President of the Alaska Division. Conference co-Chairmen are Dr. A.W. Pearson and Dr. D.C. Findlay of Whitehorse. Sessions are planned in the biological sciences, human resources, physical sciences, earth sciences and natural resources. Associated activities include a field trip to the Icefield Ranges Research Project in the Kluane-St. Elias area. The address of the conference organizing committee is:

P.O. Box 968,
Whitehorse, Y.T.,
Canada.

The Arctic Circle

The Ottawa members of the Arctic Circle are invited to attend meetings, usually held on the second Tuesday of each month from October to May. Single subscriptions are $4.00 and family $4.00. Out-of-town members receive the Arctic Circular, and attend meetings when in town. Subscriptions are $1.00.

For membership or further information, please write the Treasurer, Mr. S.D. MacDonald, Box 68, Postal Station "D", Ottawa.

News items, articles, etc., for publication in the Arctic Circular should be submitted to the Editor as early as possible, and at least three weeks before publication dates (February 15, May 15 and November 15) at 358 Powell Ave., Ottawa 1, Ontario.

THE ARCTIC CIRCULAR

VOL. XVIII No. 3 Published by The Arctic Circle Ottawa November 1968

MEETINGS

The following meetings have been held:

One hundred and sixty-seventh meeting. 28 May, 1968.
A Cape Dorset stencil print, "Circle of Birds" by Iyola, was presented to Mrs. Diana Rowley by the Arctic Circle club in recognition of her many years of service in editing the Arctic Circular. Dr. R.J.E. Brown made the presentation in the absence of the President. Members present indicated their deep appreciation of Mrs. Rowley's efforts by warm applause.

Dr. R.J.E. Brown, Division of Building Research, National Research Council, described a visit to the U.S.S.R. that he and his colleague Mr. G.H. Johnson made in August and September, 1966. He has kindly furnished the following description of his visit.

Permafrost Visit to U.S.S.R.

We are engaged at the Northern Research Group in permafrost research in Canada and our visit to the Soviet Union was for the purpose of holding discussions with Russian scientists and engineers engaged in all aspects of permafrost research, and of observing permafrost conditions and construction on permafrost in Siberia. Our visit was arranged jointly by the National Research Council and the Academy of Sciences of the U.S.S.R., and the Department of Indian Affairs and Northern Development and the State Construction Board of the U.S.S.R. (Gosstroy).

We spent about 3 weeks in Moscow and one week in Leningrad visiting institutes and organizations carrying out various aspects of scientific and engineering permafrost research. We spent 5 weeks in Siberia where we visited some major centres and various construction projects. About 2 weeks of this period were spent in Yakutsk where the Permafrost Institute, Siberian Division of the Academy of Sciences of the U.S.S.R. is located. We also visited Bratsk, the site of the world's largest operating hydro-electric power dam, Aldan, the site of extensive placer gold mining in permafrost, and Mirnyy, the site of large scale diamond mining in permafrost. A trip of several hundred miles was taken by boat down the Aldan River with an archaelogical expedition from the Academy of Sciences in Yakutsk. All of these visits afforded the opportunity of observing terrain and permafrost conditions, and construction techniques and foundation designs in permafrost.

One hundred and sixty-eighth meeting. 8 October, 1968.
Dr. G.C. Monture, formerly Chief of the Mineral Resources Division of the Federal resources department, spoke on "The Canadian Indian, then and now". He was thanked by Dr. W.E. Taylor.

Dr. Monture, himself an Indian by birth, first described the distribution, civilization, and customs of the Indians of Canada and the northeastern United States on the arrival of the first Europeans. He briefly recounted the fate of the tribes with European settlement and the terms of the treaties that certain groups were persuaded to sign. He then went on to describe vividly the present condition and viewpoints of Canadian Indians. Though increasing rapidly in numbers and with improving education, health and living standards, the Indian tribes have severally suffered alienation of lands, resources and rights, and unjust discrimination, socially and in employment opportunities. Their sense of identity had been undermined. Canadians must learn to understand the complexity of the problem, and to treat Indians as individuals. Dr. Monture told the members that each bore an individual responsibility in abolishing the conditions of alienation and discrimination that had become established.

NEWS

Pirate Radio Station - Alias CHPI - Pond Inlet, N.W.T.

By Members of the Arctic District Office, DIAND, Ottawa

In April 1966 the Community Council of Pond Inlet, northern Baffin Island, proposed the establishment of a small radio broadcasting station to serve the settlement and its surrounding camps. Various types of equipment were tested and found unsuitable, and the problem was shelved for lack of progress. As an interim measure, the Department of Indian Affairs and Northern Development equipment mechanic offered to provide the desired service with his Ham equipment. In October 1966 the Council drafted letters in English and Eskimo to the CBC and the Board of Broadcast Governors asking about licencing requirements and available assistance. When the licence application forms arrived the Council learned to its dismay that it would be unable to meet the requirements.

The proponents of the station then decided to proceed without a licence, and by December a program was on the air. In March, 1967, the Council appointed an Advisory Board consisting of Daniellie, Kamaniq, Josephie, J. Sanders of DIAND, and Father Guy-Mary Rousselière, O.M.I., the local Roman Catholic missionary. It also drew up a list of regular volunteer Eskimo announcers. Programs were given for about two hours each evening with music and local announcements in Eskimo and English, and plans were made for longer programs.

The authorities officially ignored the Pond pirate radio station, until complaints were received that it was interfering with the transmissions of licenced operators, and might at any time affect

communications with trans-polar jets. In consequence, the Department of Transport had no choice but to order the station to stop broadcasting. Naturally, the story made good copy with newspapers and headlines such as "Pirate radio station defies bureaucrats and carries on in the interest of the small population of northern Baffin Island."

Long before Pond Inlet established its "pirate" station, the CBC, and the Departments of Transport and of Indian Affairs and Northern Development had established a working group to study ways of setting up small radio stations in northern communities. This group identified a wide range of complex technical, legal and financial problems. Most of the obstacles had been overcome by the time the Pond Inlet station was ordered to suspend its operations, but the remaining few were sufficiently serious to prevent the new plan being used to solve the problem there. Some expedient had to be found, and the three government departments came up with one. The CBC overhauled an obsolete 20-watt AM transmitter. The DOT sent it north to Pond Inlet and installed it there this past spring. The DIAND obtained a broadcasting licence for the equipment in its own name, and at Easter volunteers in the community began operating the station experimentally as a public service. The arrangement is, of course, only temporary, but it will be helpful in formulating plans to establish other local broadcasting stations (on a sounder footing and with improved equipment) across the Canadian Arctic.

Sea Ice Seminar

By Moira Dunbar

An interesting Seminar on Ice was held in Calgary on 6 and 7 May as a part of the nineteenth Annual Technical Meeting of the Petroleum Society of the Canadian Institute of Mining and Metallurgy and the American Petroleum Institute, Rocky Mountain District. The seminar was arranged jointly by the Petroleum Society of CIMM and the Working Group on Ice in Navigable Waters of the Canadian Committee on Oceanography, and was organized by Mr. R.A. Hemstock of Imperial Oil Limited, Calgary.

The idea of such a meeting, though on a more modest scale, had been brought up at meetings of the Working Group on Ice and was suggested to Mr. Hemstock by Mr. T.A. Harwood, Chairman of the Working Group. The enthusiasm with which the suggestion was taken up by the petroleum industry and its development to a full-scale meeting with an attendance of around 200 is a reflection of the very marked interest in the subject of sea ice which has grown up in the industry in the last few years. This interest is based not only on the possibility of tanker or pipeline operations in the Arctic, but also, and much more urgently, on the acquisition by several companies of offshore drilling rights in areas subject to sea ice, from the Grand Banks and the Labrador coast to Mackenzie Bay and Alaska. The effect of sea ice and icebergs on drilling rigs has therefore become a matter of immediate concern.

A total of fourteen papers was presented, covering all aspects of sea ice development and distribution in Canadian waters, the physical properties of ice, and its effect on structures. Titles and authors, in

the order presented, were as follows: A glossary of ice types, Moira Dunbar, Defence Research Board; On the distribution of icebergs in the North Atlantic, Commander J.E. Murray, US Coast Guard; Shipping patterns - Canadian East Coast, Capt. J. Stewart, Canadian Coast Guard; Growth, break-up and movement of ice in Canadian coastal waters, W.E. Markham, Meteorological Service; Ice distribution in the Queen Elizabeth Islands, D.G. Lindsay, Department of Energy, Mines and Resources; Strength and growth rates of ice, E.R. Pounder, McGill University; Ice pressures and superstructure icing, L.W. Gold, National Research Council; Frequency of intense storm track trajectories in Hudson Bay and the Maritime Provinces, D.C. Archibald, Meteorological Service; Remote sensing of ice, T.A. Harwood, Defence Research Board; Ice conditions on the Grand Banks, K. Blenkharn, Pan American Petroleum Corporation; Ice control structures and floating ice booms, C.J.R. Lawrie, Department of Transport; Bubbler systems, Simon Ince, National Research Council; Ice floe impact on structures, Hans Kivisild, Foundation of Canada Engineering Corporation; Ice and drilling platforms, H.R. Peyton, University of Alaska.

The seminar was very well attended, apparently arousing great interest among people in the oil industry. The Petroleum Society has undertaken to publish the proceedings.

Second National Northern Research Conference, Whitehorse, Y.T.

Scientific research in the Canadian North appeared until recently to be the preserve of government agencies and the Arctic Institute of North America. The increasingly large and vigorous role played by Canadian universities was made evident in Whitehorse this summer. In conjunction with the 19th Alaskan Science Conference, eleven university groups devoted to northern research and the Arctic Institute, met on 26th and 27th August under the auspices of the Northern Science Research Group of the Department of Indian Affairs and Northern Development. Prof. Jameson Bond of the Boreal Institute of the University of Alberta organized the conference.

As with the first such conference, held in Saskatoon in November, 1967,[1] the purpose of the meeting was two-fold. It provided an opportunity for specialists in diverse fields of northern research to get together and learn of each others' current and proposed research and interests. Second, problems of financing, organizing, co-ordinating, and directing northern research were discussed. Following the main deliberations, a session with invited substantive papers was held.

It was decided that more conferences should be convened and the invitation from Dr. Hamelin of Université Laval to meet at Great Whale River in the winter of 1970 was accepted. The Arctic Institute offered its four-issues-old Newsletter as a medium for announcements of future conferences and current research being sponsored by the university committees.

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1 Arctic Circular 18(1&2), May, 1968.

The groups officially represented were those reported to have been at the first of the conferences, except that the Groupe de Récherches Nordiques of the Université de Montréal was absent, and the University of Western Ontario was present for the first time.

19th Alaskan Science Conference

Whitehorse, Yukon Territory, was the site of the 19th Alaskan Science Conference and the first to be held in Canada. Despite lean budgets for research workers in the United States and Canada, attendance was excellent. The delegates were welcomed by Commissioner James Smith, and entertained by other distinguished speakers such as Don K. Price, President of the American Association for the Advancement of Science, Louis Audette, chairman of the Canadian Tarriff Board, and Ian McTaggart Cowan, Dean of Graduate Studies at the University of British Columbia. There were 173 offered lectures, including those of the general session and the technical sessions. Arrangements were capably handled by R.M. Hill of Inuvik, and co-Chairmen A.M. Pearson and D.C. Findley of Whitehorse. Field trips took delegates over the Kluane-Icefield Ranges area and to Inuvik on the Mackenzie River.

It was decided to issue a substantial printed program, including lecture abstracts, and to forgo the production of a volume of proceedings. The series, Science in Alaska, has thus come to an end.

Great Lake Trout From Great Slave Lake

A lake trout caught by net in Great Slave Lake on July 16 by Hay River fisherman Joe Nault, weighing 36.1 kg (79½ lbs), is said by the Information Services of the Government of the Northwest Territories to be a new territorial record. Dr. D.E. McAllister, Curator of Fishes in the National Museum of Natural History, has no previous records of lake trout from the territories larger than a 26.5 kg (58¼ lbs) fish caught by an angler on Great Bear Lakes in 1965. However, he says that the Canadian record fish weighed 46.4 kg (102 lbs) and was caught in Lake Athabaska, Saskatchewan.

The Information Services press release points out that the Great Slave Lake trophy would have weighed decidedly more had its stomach not been empty.

ARTICLES

Panarctic Oils Limited - a Joint Exploration Venture of Government and Industry

By A.C. Bryant - Dome Petroleum Limited (Operator, Panarctic Oils Limited)

After several years of planning and negotiation, twenty companies and individuals have joined with the Government of Canada in Panarctic Oils Limited, to search for petroleum in the arctic islands. This direct participation by government is unique in the Canadian oil industry but not on the international scene. Britain's British Petroleum, France's Petropar, and Italy's E.N.I. each have their national government as a partner.

Participants will provide $20 million over the initial period (now extended from three to four years) of which the Government will contribute $9 million for a 45 per cent equity. The remaining $11 million will be provided by nineteen Canadian companies (50½ per cent) and one U.S. corporation (4½ per cent). The major investors in Pararctic are Canadian Pacific Oil and Gas Limited, Cominco Limited, Dome Petroleum Limited, Eagle Ridge Petroleum Limited, Canadian Nickel Company Limited, Noranda Mines Limited, Thor Exploration Company Limited, and Bocadel Oil Corporation (the sole U.S. participant).

The initial $20 million program consists of extensive geological and geophysical surveys and the drilling of seventeen wells.

Background to Panarctic

In 1960, the rights to explore for oil and gas in the arctic islands were offered by the Government of Canada, and soon 264,000 km^2 (65 million acres) had been taken by companies willing to accept the obligation to conduct exploratory work. Scattered exploration, mainly surface geology, resulted, but most of the companies holding acreage fulfilled their obligations by participating in one or more of the three wells that were drilled in the period 1961 to 1964. The first of these wells was drilled at Winter Harbour on Melville Island by a group headed by Dome Petroleum Limited, from September, 1961 to April, 1962, and proved the feasibility of a winter drilling operation in the High Arctic. The other wells were drilled near the Caledonian River on Bathurst Island, and at Resolute Bay on Cornwallis Island.

After the drilling of three dry holes, the industry's interest in the Arctic waned. But a consultant geologist from Calgary, Dr. J.C. Sproule, reasoned that the pooling of acreage and joint exploration was the logical method of attack, and he attempted to form a consortium to put this idea into effect. It was a method well proven in other parts of the world where major companies had pooled mineral rights and financial resources to explore new, high-risk areas, but in Canada, although rights holders in the arctic islands were persuaded to contribute leases covering 142,000 km^2 (35 million acres), the necessary financial support was not forthcoming from private capital. During 1967 therefore, a group of Canadian oil and mining companies and the Canadian government put together

Panarctic Oils Limited in its present form. Dome Petroleum Limited was elected by the Directors as Operator until Panarctic could hire sufficient staff to conduct its own affairs.

Commitments

Panarctic has separate agreements with twenty-nine companies or groups of companies, to maintain in good standing over 178,000 km^2 (44 million acres) of mineral rights on permit lands, by conducting sufficient exploratory work and/or drilling wells. The minimum drilling commitment is to complete seventeen wells - nine deep (3050+ m or 10,000+ ft), six medium (1830 m or 6,000 ft to 3050 m or 10,000 ft) and two shallow (1070 m or 3,500 ft to 1830 m or 6,000 ft).

The agreement lands mainly lie north of the main east-west waterway from Lancaster Sound to McClure Strait, although some acreage is situated on Banks, Prince of Wales and Somerset islands to the south. The larger acreage blocks are situated on Melville, Bathurst, Cornwallis, western Devon, Lougheed, Prince Patrick, Axel Heiberg, Ellesmere and the Ringnes islands.

The actual well locations are limited by the agreements to certain blocks of acreage: some agreements are specific, others give the Operator more latitude in selecting the best site, but in all cases, in order to properly locate these wells, geological and geophysical surveys must be conducted prior to drilling.

1968 Program

It was not until the fall of 1967 that Panarctic Oils Limited became a reality, and detailed planning for the 1968 field season could go ahead. Until the formal announcement was made in the House of Commons on 12 December 1967 no contracts could be awarded for services or for the manufacture of special equipment. However, the advance party for the geophysical crew moved northward on 16 February 1968. A 1.5 km (5000 ft) airstrip was prepared on the sea ice at Marie Bay on northwest Melville Island, and the 454,000 kg (500 tons) of geophysical equipment, supplies, fuel and camp were airlifted by Hercules aircraft from Yellowknife. By the end of the season, on 15 September 1968, 1100 km (685 mi) of reflection seismic and gravity surveys had been conducted over northwestern Melville Island, Sabine Peninsula of Melville Island, and Emerald Island. The geophysical operation was predominantly airborne, using two Bell 204B helicopters to move the seismic drilling and recording equipment, and a Hiller F-1100 helicopter to move the gravity survey teams. During poor flying weather in the summer a Nodwell tracked vehicle was used to move the drilling equipment. Fixed wing aircraft support in the field was provided by the company's Twin Otter.

Geological and gravity surveys were conducted during July and August on Bathurst Island and Grinnell Peninsula of Devon Island.

Interpretation of all these exploration surveys is currently underway in order to select the optimum locations for the drilling program due to commence in March, 1969.

Alexbow

Panarctic has obtained 51 per cent of Alexbow Canada Limited - a company incorporated to develop Scott Alexander's unique ice-plough. This device, which breaks ice by ploughing it with a lifting action from below, has considerable potential in extending the short arctic shipping season. Panarctic has constructed two barges, one of which, the Learmonth, has a bow of the Alexbow configuration. This barge carried 1.6 million kg (1800 tons) of drilling supplies to the Arctic this summer. The second barge, the Scotty Gall, of conventional design, hauled 2160 m^3 (480,000 gallons) of fuel to Melville Island. The two barges were towed by a 4,700 hp. tug, but the Alexbow barge, the Learmonth, can be pushed when in ice. After the unloading of the Learmonth's cargo at Rea Point on the south-eastern coast of Melville Island, the Scotty Gall was secured to the shore, and left to be frozen in to contain a fuel supply for 1969. A 1.5 km (5000 ft) airstrip constructed nearby will enable Hercules aircraft to distribute fuel and supplies, although ground transportation may also be used. The Learmonth was ballasted and towed to Resolute, where the Alexbow was successfully tested. Following the tests, the Minister of the Department of Indian Affairs and Northern Development announced that the barge was reported to have had easily penetrated ice up to 1.2 m (4 ft) and had been able to handle ice of between 1.5 and 1.8 m (5 and 6 ft). Also, it had sliced through a pressure ridge some 6 m (20 ft) high without any difficulty and gave indications that it could be used on ice with a thick snow cover.[1]

Future Program

March 1969 should see the extension of geophysical surveys to other islands of the Canadian Arctic Archipelago, and the commencement of drilling. The entire drilling rig is transportable by Hercules aircraft, and will be flown directly to Melville Island from Alberta. We hope to drill at least three wells in 1969, possibly with the aid of a second rig, and once started, drilling will continue year-round.

Geological field work will continue during future summers.

Although the initial program is termed a four-year, $20 million operation, there is good reason to believe that both the Government of Canada and the private participants will be willing to invest additional funds in this unique exploration of Canada's arctic islands.

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1 Departmental Press Release of September 26, 1968.

The British Trans-arctic Expedition 1968-69

By L.A.C.O. Hunt

Man can always find unusual things to do and although exploration of little known parts of the world dates back to the most ancient times, there still remain in the Twentieth Century places hardly trodden by man, where he still can seek the challenge of pitting himself against great odds.

Even though man is now exploring outer space, the moon and even the planets, a journey across the top of the world remains a thrilling and highly dangerous undertaking. The British Trans- Arctic Expedition was conceived by Wally Herbert, a young but accomplished traveller, who has worked both in the Antarctic and the Arctic, in Alaska and Greenland. His ambitious plan for a trans-arctic crossing by dog sled, taking approximately sixteen months, has necessarily required meticulous planning and a careful choice of companions.

Herbert's team appears exceptionally able and well trained. All its members have had arctic or antarctic experience, all are comparatively young, and each has special qualifications which fit the purposes of this expedition. A supporting committee includes such people as Vivian Fuchs, who crossed the Antarctic ice in 1955-58, and Lord Hunt, the leader of the expedition which conquered Mount Everest. The Royal Geographical Society has lent its great prestige to the expedition, and the Duke of Edinburgh has become its honorary patron.

Herbert's proposal is to cross 3200 km (2000 mi) of Arctic Ocean by way of the Pole, starting at a point on the Alaskan coast and reaching land at Spitzbergen. The expedition proposes to take advantage of ice drift, which is becoming better known from data collected by American and Russian stations on ice islands. These drifting stations have been established on the ice of the Arctic Ocean since 1938, for this and other purposes.

The party of four men, with their sleds and dogs, left Point Barrow in February, 1968. It soon appeared that progress would be slower than expected. Ice floes, leads, and pressure ridges were so common and the going so rough that some days less than 3.2 km (2 mi) were logged. Some of the pressure ridges encountered were described by Herbert in his broadcasts to the relay station at Point Barrow - "an appalling landscape of frozen violence with chunks of ice, slabs of ice, rearing up twenty feet in the air". However, well planned observation flights from Point Barrow helped the expedition find ways through the pressure ridges. Parachute drops had also been planned at regular intervals - some of them by the Royal Canadian Air Force out of Resolute.

A summer camp, named "Meltville", was established some 1300 km (800 mi) north and east of Point Barrow, and within 240 km (150 mi) of the American drifting station T3. One of the members of the expedition suffered a back injury, and attempts are being made to evacuate and replace him by air.

During the coming dark period, it is hoped to progress with the drift, and to carry out intensive scientific studies. A special climatological program is being carried out, together with a general environmental study, complementary to under-ice studies by nuclear submarines. Detailed investigations of the behaviour of sea ice in relation to speed, direction of drift, and amount of open water are a particular concern. Ice thickness and snow density are being measured throughout the crossing, and studies have been made during the mid-summer pause of the ablation and disintegration of the sea ice, salinity, sea temperatures, currents, ice drift and the heat budget. Herbert plans also to make records of polar bears, seals and sea birds. The physical condition of the men is another subject for study. Members of the party are subjecting themselves both before and immediately after the journey to thorough examinations by research physiologists.

In preparation for the expedition, training and practice journeys were made in the winter of 1966-67 from Qanaq in northern Greenland. The first Plaisted Expedition met Herbert during one such journey, a crossing of Ellesmere Island, on Nansen Sound near Eureka, where they were obliged to provide him with necessities. At that point, Herbert, his companions and his dogs were all physically exhausted. It was this kind of training and self-punishment that was needed for the expedition proper. As would any proud explorer, Herbert declined with thanks the opportunity to complete his trek by aeroplane. This is the stuff which makes explorers unique, of masochists if you will, but also a necessary ingredient of the character and guts required to cross the Arctic Ocean on foot.

Ethnozoological Interpretation of the Brow-tine in Arctic Caribou

By Milton M.R. Freeman

Antler threshing of vegetation appears to be a necessary component of courtship in caribou over much of the species' range. A recent report ascribes a primarily protective function to the brow-tine, the protection of the eyes during the vigorous vegetation-threshing precoital period of the rut (Pruitt 1966). It has further been observed that in Newfoundland where vegetation presents less of a hazard to the eyes, caribou (Rangifer tarandus caribou) may lack, or have poorly-developed, brow-tines (Bergerud, in Pruitt 1966).

Caribou (R.t. pearyi) are not very common in the Jones Sound region of the arctic archipelago where the writer conducted ecologic studies (1965-7). However, numbers of shed antlers collected over a period of years by Eskimo hunters living at Grise Fiord were examined and my impression, confirmed by hunters from their more extensive observations, is that despite the complete absence of shrubby vegetation in the region, the brow-tine remains a substantial structure in these high arctic caribou populations. Hunters further suggested that the Melville Peninsula and north Baffin Island caribou also retain well developed brow-tines, again in regions where shrubby vegetation is virtually absent.

The following information relating to the problem of brow-tine function in caribou was obtained from Melville Peninsula and north Baffin Island hunters who have been resident on Ellesmere Island between ten and fifteen years.

> Caribou on Ellesmere and Devon islands are widely scattered in small groups, generally with 3 to 7 caribou per group. Rutting occurs in October, with males engaged in antler-hooking contests in September. Females may occasionally engage their antlers, but these are gentle side-by-side encounters unlike the head-on encounters of males. Antlers are shed in November, and begin to re-grow in April.

Two functions are ascribed the brow-tine by these hunters:

(1) It is used as a sighting device to investigate distant objects: by lining-up the lower edge of the brow-tine and a distant object, the caribou ascertains whether the object moves or remains stationary.

(2) It is protective: the eyes are protected from damage during antler-locking contests. The expanded brow-tines prevent lateral movement once the antlers are engaged.

Two names are given the brow-tine: sulubau (from suluk, a wing) and nutissinak (perhaps from nutissin-, to arrange objects prior to their moving or being moved). Netsilik Eskimo are reported to believe the brow-tine helps the caribou guide himself, and to stay on a chosen path when moving (Lorson 1966).

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Lorson, G., 1966. The antlers of the caribou. Eskimo Vol. 71, Spring-summer 1966: 9-11.

Pruitt, W. O. Jr., 1966. The function of the brow-tine in caribou antlers. Arctic 19(2):111-113.

REPORTS

Inuvik Research Laboratory

The Inuvik Research Laboratory was opened in April, 1964. According to a report on the 1967-1968 program by Manager R.M. Hill, the use made of it continues to increase. The laboratory is operated by the Department of Indian Affairs and Northern Development as a free service to scientific investigators, in the belief that it will encourage useful research in this interesting and important area. Among the services offered are logistical and technical help, equipment, field camps, and laboratory space.

In 1967-68, 151 visiting investigators working on 79 projects spent a total of 352 man months working from the laboratory, whose staff was kept busy on these and other projects, and in filling local requests for technical assistance. The projects included geomorphological and other geographical studies by U.B.C. investigators, permafrost studies by Chevron Research, experimental pipeline investigations by Imperial Oil, and sewage testing with chemical and bacteriological techniques by staff members. The laboratory published 38 "Northern Information Notes" and 20 "Arctech Notes", respectively on northern research activities and on technical studies conducted by the staff.

Two biologists of the Canadian Wildlife Service, Dr. T.W. Barry and Mr. V.D. Hawley, are based at the IRL, from which they conduct ornithological and mammalogical studies, chiefly in the Mackenzie delta and in the lower Anderson River region.

Geodetic Findings in North Greenland

On page 9 of our last edition, it was reported that recent observations made in the region of Cape Morris Jesup by David Humphreys raised doubts as to the accuracy of maps of the area. More recently, the position of northern Greenland has been thoroughly investigated by staff members of Control Data Corporation, Minneapolis.[1]

R.L. Lillestrand visited North Greenland during late August, 1968, and took fixes on stars and satellites from eight stations. Analysis of his observations at Control Data Corporation showed that the central part of the coast was well positioned, but that eastern parts were mapped up to 16 km (10 mi) too far east and western parts up to 16 km (10 mi) too far west. North Greenland is thus shown to be narrower than once believed.

Where then was Humphreys when he made his observations? Probably not at Cape Morris Jesup, which Lillestrand visited, and where he found Peary's cairn and confirmed Peary's position determination. Evidently, he was near a small island, called Kaffeklubben, some 18 km (11 mi) ENE of the Cape.

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1 See: App, F.N. and R.L. Lillestrand. Analysis of measurements made by Humphreys Arctic Expedition when at Cape Morris Jesup, Greenland. 3 + 34 + 8 (appendix) pp. Illus. 24 June, 1968. Control Data Corp., 8100 - 34th Avenue s., Minneapolis, Minn. 55440, U.S.A.: Dr. J.R. Weber of the Dominion Observatory has kindly supplied information on the work done in August, 1968.

Lauge Koch Record from Beaumont Island

Dr. E.F. Roots, Coordinator, Polar Continental Shelf Project, has kindly supplied the following information.

The Polar Continental Shelf Project had a Decca transmitter station on Beaumont Island from April to June 1967, in connection with a hydrographic and gravity survey of Lincoln Sea. Dr. Koch's cairn was close to camp, and the record found in it was removed. A copy (in Danish) was replaced in the cairn, with a note that the original was being returned to the Danish authorities.

Here is a translation of the text:

"Thule Scientific Expedition Around North Greenland

The undersigned arrived here on the 29th April on the way north around Greenland, accompanied by 3 Eskimos with 33 dogs in good condition. We are equipped for the summer and have dog food for 20 days. We left Upernavik on the 27th January, were at Headquarters on the 19th of March, then hunted musk-oxen at Lake Hazen from the 5th to the 17th April. Have had deep snow from Cape Bryant to here. There have been musk-oxen on this island a short while ago; we will attempt to hunt on John Murray Island. All well and in good health and spirits.

30 April 1921 sig. Lauge Koch"

Colonel J. Helk, Director of the Arktisk Institut, Denmark, has acknowledged receipt of the record, saying, "I wish hereby to express our sincere thanks for letting us get this small document "back". It has now been incorporated in our still growing collection of cairn-messages and relics from North Greenland."

REVIEW

"The Caribou", a Canadian Wildlife Service Monograph

Reviewed by A.G. Loughrey

The Canadian Wildlife Service of the Department of Indian Affairs and Northern Development has recently issued "The Migratory Barren-ground Caribou of Canada" by Dr. J.P. Kelsall. This publication, titled simply "The Caribou" on the cover, is the third in the Canadian Wildlife Service's scientific monograph series and is available at Queen's Printer bookstores at $3.50.

The book is a report on life history studies of the mainland population of barren-ground caribou inhabiting the area south of the arctic coast, east of Mackenzie River and west of Hudson Bay, undertaken between 1950 and 1962. The volume incorporates the results of original research by Dr. Kelsall and by the many federal, provincial and contract biologists and conservation officers who assisted in field work and specialized studies.

The monograph is not intended as a definitive work on caribou, but rather as a summation of the research and management findings resulting from the 12 years that Dr. Kelsall was associated with the study. It describes the physical features of the caribou and its environment, feeding habits, migrations, population dynamics, reproduction, growth and limiting factors. The final chapter discusses the value of the caribou as a renewable resource and makes recommendations for management and conservation.

Dr. Kelsall's publication will provide the biologist and student of natural history with an essential reference text not only for the results of more than a decade of research on the species, but also for historical facts accumulated from over 300 literature sources and from many interviews with knowledgeable residents of caribou range. It can also be highly recommended to the casual reader with an interest in the North, particularly the sections dealing with "Man and the Caribou" and "Migration". The section on predation by wolves is particularly recommended to those who have read Farley Mowat's "Never Cry Wolf". The text is well illustrated with black-and-white reproductions, maps, charts and line drawings.

ANNOUNCEMENTS

Polar Expedition Planned

Dr. Hugh Simpson, his wife Myrtle and navigator Roger Tufft plan to be the first British party to reach the North Pole. Dr. Simpson, a Scottish pathologist, plans to carry out research into human biological rhythms and protein metabolism.

Mrs. Simpson hopes to be the first woman to reach the Pole. The author of "Home is a Tent" and "White Horizons", she took part with her husband and others in the Scottish Trans-Greenland Expedition in 1965.

The expedition is scheduled to run from February to August, 1969. It will be flown to Cape Columbia or Ward Hunt Island whence it will proceed to the Pole to return either via Cape Morris Jesup or Cape Columbia. A standard Nansen sledge and wooden skis will be used for the expedition, which proposes to depend on traditional man-hauling techniques.

The Daily Telegraph of London, England, has assumed financial responsibility for the group.

New Arctic and Alpine Research Journal

The Institute of Arctic and Alpine Research of the University of Colorado (Boulder, Colorado 80302, U.S.A.) announces its plan to publish a new quarterly journal "devoted to the study of arctic and alpine environments". The first number is to appear early in 1969. Subscriptions at

$12.00 U.S., and further information, are available from the Institute. Dr. Jack D. Ives, former Director of the Geographical Branch, Department of Energy, Mines and Resources, is chairman of the Publications Committee of the Institute.

Polar Library Catalogue to be Published

The catalogue of the library of the Arctic Institute of North America is to be published early in 1969. The Librarian, Miss Nora T. Corley, estimates that the collection includes 8,700 volumes and 20,000 reprints and pamphlets. About 600 volumes a year are added, and about 850 periodical titles. of the 1,100 held are received regularly. The estimated 70,000 cards of the author and multiple subject index will be reproduced in four volumes, with facsimiles of twenty-one cards per page. In addition to polar literature, the library includes publications on cold weather research, snow and ice studies, and other related topics.

G.K. Hall and Company, of 70 Lincoln Street, Boston, Massachusetts 02111, U.S.A., the publisher, has also produced shelf catalogues of the Wordie Collection of Polar Exploration from the National Library of Scotland, and a "Bibliographie de la Péninsule du Québec-Labrador", compiled for the Centre d'Etudes Nordiques at Université Laval.

The Arctic Circular

The Arctic Circular is published three times a year for members of the Arctic Circle Club, Box 68, Postal Station "D", Ottawa. Membership is open to all, and may be arranged by writing to the Treasurer, Mr. S.D. MacDonald, at the above address, and enclosing, for a single Ottawa member $3.00, for an Ottawa couple $4.00, and for an out-of-town member $1.00. Members are requested to notify the Club promptly of changes of address.

Reports for publication are welcomed from those living in the North, or having information on northern activities, particularly news of research, travel and technological, industrial and social developments. Opinions on content and format are also welcomed. The address of the Editor is 258 Powell Avenue, Ottawa 1, Ontario.

Arctic Circle ties, featuring a white narwhal on a dark blue background, are available from the Treasurer at $3.50 each.

INDEX VOLUME 18