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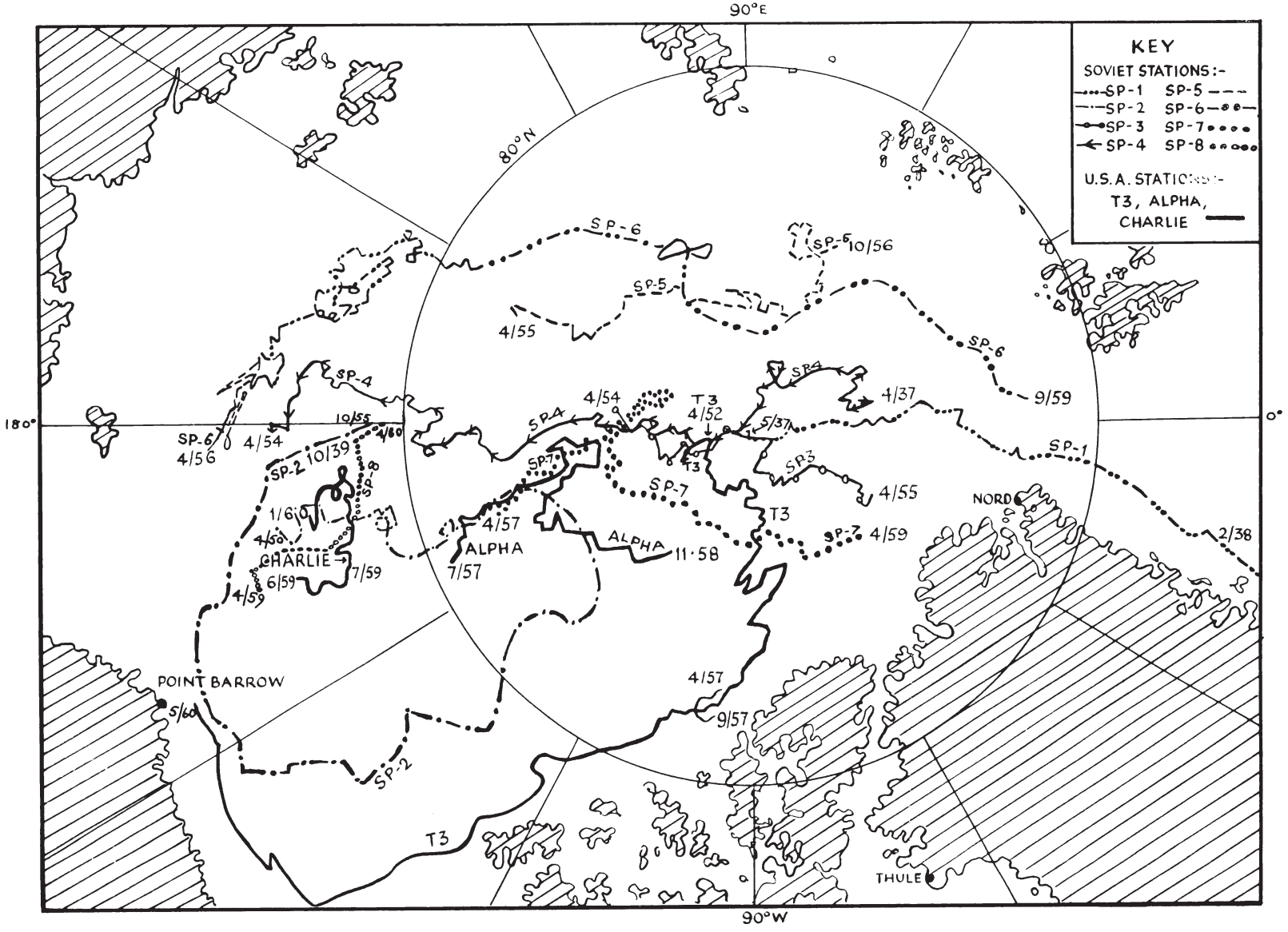
ICE

News Bulletin of the British Glaciological Society



Tracks of drifting stations in the Arctic Ocean 1937-1960

ICE

News Bulletin of The British Glaciological Society

Number 6 **July 1960**

FUTURE OF THE SOCIETY. The following letter has been sent to about 100 people eminent in glaciology and international science. Many replies have been received, and 90% of them are favourable to the Committee's ideas. We therefore propose to take advantage of the presence of many glaciologists at the meetings of the International Union of Geodesy and Geophysics in Helsinki and the International Geographical Union in Stockholm this summer to have further discussions on the problems set out in the letter. Later the Committee will formulate proposals which will be circulated to all members. We wish to make it clear that any changes will be made gradually, and that the function of the Society, in encouraging and co-ordinating research and in publishing results, will not conflict with the function of the existing International Commission of Snow and Ice (I. U. G. G.).

Dear - ,

The recent growth of interest in glaciology has given rise to a situation which was not envisaged when the original constitution of the British Glaciological Society was drawn up 24 years ago. The "Journal of Glaciology" has become international in scope, and foreign membership of the Society has risen to threequarters of the total membership. The Committee therefore feels that the time has come for foreign members to be given an effective voice in the conduct of the Society. The Committee favours changes in the structure of the Society, provided they are supported by our oversea members, so that the Society may become more truly international and so that better facilities can be offered to members.

The first change should be the inclusion of members from other countries on the Society's Committee, of which all present members are resident in the United Kingdom.

Secondly, the growth of local branches of the Society should be encouraged; these could stimulate research, organize meetings and possibly publish local bulletins. An important function of the branches would be to enrol new members, thereby increasing the Society's income and providing for an enlarged "Journal of Glaciology".

Finally, the name of the Society should be changed, so that it represents more accurately the new situation.

Before taking any further steps, the Committee wishes to obtain opinions from glaciologists outside the United Kingdom. I therefore invite you to send me your comments on all these proposals as soon as possible.

Yours sincerely,

(Mrs.) Hilda Richardson
Secretary

International Geophysical Year

Reports received in the World Data Centre C Glaciology.

The Society has received reports during the period January - June 1960 from the following places:

STATION	PROGRAMME	PERIOD	
Argentina: "Ellsworth" (Antarctica)	Activities at the station.	1959	
Australia: (East Antarctica)	Variations of the ice margins.	-	(Reprint: Geographical Journal, Vol. CXXV, part 2)

STATION	PROGRAMME	PERIOD	
(Antarctica)	Creep tests on Antarctic glacier ice.	-	(Reprint: Nature, Vol. 184, p. 717)
"	Ice flow in Antarctica.	-	(Reprint: Journal of Glaciology, Vol. 3, no. 25)
"	Mass balance studies in Antarctica.		(Reprint: Journal of Glaciology, Vol. 3, no. 26)
Mawson (Antarctica)	Australian glaciological contributions in Antarctica.		(Reprint: Journal of Glaciology, Vol. 3, no. 24)
"	Photogrammetric flow measurements on Antarctic glaciers.		(Reprint: Transactions of A. G. U., Vol. 39, no. 6)
Belgium:			
Roi Baudouin (Antarctica)	Monthly scientific observations.	1960	
"	1960 Antarctic Expedition (plans)	-	
"	Oxygen isotope variations in Antarctic snow samples.	-	(Reprint: Nature, Vol. 184, p. 1557)
Canada:	Glacial map of Canada.	-	(Reprint: Geological Association of Canada, 1958)
Lake Hazen	Survey on "Operation Hazen".	1957-58	
"	Meteorology "	1957-58	
"	Coastal and inland weather.	1957-58	
"	Geophysical methods.	1958	
"	Narrative and preliminary reports.	1957	
"	Snow and ice conditions.	1957-58	
"	Glaciological studies: snow cover, accumulation, ablation.	1957-59	
"	Research for the I. G. Y.	-	(Reprint: Arctic Circular, Vol. XII, no. 1, 1959)
"	Glaciological and botanical studies.		(Reprint: Arctic, Vol. XII, no. 4, 1959)
Salmon Glacier	Summary of work, 1956-57.		(Reprint: Nature, Vol. 178, p. 1445)
"	Vertical distribution of velocity.	-	(Reprint: Journal of Glaciology, Vol. 3, no. 26)
Denmark:			
Umanak	A west Greenland glacier front.	-	(Reprint: Meddel. om Grønland, Bd. 158, no. 5)
"	Glaciers in Upernivik Ø.	-	(Reprint: Geog. Tidsskrift, 58 bd.)
"	Weather and ablation observations.	-	(Reprint: Meddel. om Grønland, Bd. 158, no. 5)
Angmagssalik	Run-off studies.	-	(Reprint: Geog. Tidsskrift, 58 bd.)
Greenland	Glacier observations for the I. G. Y.	-	(Reprint: Tidsskriftet Grønland, Mai 1959)

STATION	PROGRAMME	PERIOD	
East Africa:			
Mt. Kenya	Observations and results.	March - April 1960	
"	Some observations on the glaciers of Mt. Kenya.	-	(Reprint: Journal of Glaciology, Vol. 3, no. 26)
Sweden/Finland:			
Murchison Bay (Svalbard)	Glaciological observations.	1956-58	
Switzerland:			
(all glaciers)	Les variations des glaciers Suisses, 1957-58, I.G.Y.	-	(Reprint: Les Alpes, 3eTrim., 1959, p. 227-240)
United Kingdom			
Halley Bay	Glaciological reports.	1957, 1958	
	Meteorology - surface observations.	1958	
U.S.A.:			
Antarctica -			
"Byrd"	Specimens from nunatak in Ross-Weddel Graben.	1958-59	
"Ellsworth"	Traverse work.	1958-59	
"Little America"	Traverse work, movement studies.	1958-59	
"	Ross Ice Shelf traverse, glaciological data.	1957-58	
McMurdo Sound	Mummified seal carcases.	-	(Reprint: Science, Vol. 130, no. 3377)
"Wilkes"	Glaciological data.	1957-58	
Northern Hemisphere -			
Blue Glacier, Wash.	Summer research programme.	1958-59	
"	Ice petrofabrics.	-	(Reprint: Journal of Geophysical Research, Vol. 64, no. 11)
Coast Ranges, Alaska; Cascades; Sierra Nevada	Glacier mapping in western U.S.A.	1959	
Coast Ranges, Alaska	Mapping of glaciers in Alaska.	-	(Reprint: Photogrammetric Engineering Dec. 1958)
Ice Floe Station 'A', Arctic Ocean	Pack ice studies in the Arctic Ocean.	-	(Reprint: Journal of Geophysical Research, Vol. 64, no. 12)
Fletcher's Ice Island, Arctic Ocean	Scientific studies.	1952-55	
U.S.S.R.:			
Antarctica	Soviet Antarctic Expeditions.	1955-59	
" and N. Hemisphere	Seismological and glaciological researches.	1957-59	
" " " "	Glaciological observations.	1957-59	
El'brus	Results of expeditions.	1957	
Khibiny	Results of expeditions.	1957	
General	I.G.Y. - Year of Discovery, by Sydney Chapman.	-	(CSAGI Bureau)
Chomolongma - Mount Everest	Map	-	(Produced by German and Austrian Alpenverein; published 1959)

Field Work

SOVIET ANTARCTIC EXPEDITION, 1959-60. During the southern winter of 1959, the Soviet Antarctic expedition manned three stations - "Mirnyy", "Vostok" and "Lazarev".

Operations from "Mirnyy": The main feature of the 1959-60 programme was an overland journey to the South Pole, with glaciological work as the primary object. For this purpose three 34-ton "Khar'kovchanka" vehicles had been driven from "Mirnyy" to "Komsomol'skaya" at the end of the 1958-59 season, and left there unattended for the winter. A party left "Mirnyy" on 27 September 1959 in five "Pingvin" vehicles, arriving at "Komsomol'skaya" on 19 October. Aircraft now flew in from "Mirnyy", bringing more members of the overland party and supplies. On 6 November the main party left "Komsomol'skaya" in three "Khar'kovchankas" and two "Pingvins", each pulling sledges. In spite of difficult soft snow "Vostok" was reached on 29 November. Here more supplies were flown in, and modifications carried out to the tracks of the "Khar'kovchankas". The party, now led by A.G. Dralkin, the leader of the Fourth Soviet Antarctic Expedition, left on 8 December with two "Khar'kovchankas" and one "Pingvin". Conditions were somewhat easier, sastrugi replacing soft snow, and the South Pole was reached on 26 December. The return journey, by the same route, was started three days later. The vehicles were left at "Vostok", which they reached on 8 January 1960, and the sixteen members of the party were flown to "Mirnyy". Five glaciologists under B.A. Savel'yev took part in the traverse, and stops were made every 100 to 200 km. for seismic soundings and other scientific work.

Another traverse party made more detailed observations, particularly of altitudes and ice thicknesses, along part of the same route. This was a party of seven under S.N. Shcheglov, travelling in two "Pingvins". It covered the first 150 km. southwards from "Mirnyy" during the winter (23 April to 8 July 1959), and left again on 14 September to continue southwards. "Komsomol'skaya" was reached in early January 1960.

Operations from "Lazarev": New buildings have been erected at the station. Geological parties with air support set up two advance camps in the mountains between longs. 8° E. and 10° E. Glaciological, meteorological, magnetic and biological work was done in and around "Lazarev". Air reconnaissance of possible routes into the interior was carried out, together with an air survey programme. A tractor train set out from "Lazarev" about 22 January 1960 and travelled 110 km. southwards, five seismic soundings being made en route. Next season it is planned to move the station 100 to 150 km. inland to the northern part of the mountains, converting it into a long-term scientific and supply centre. A major traverse to the Pole of Inaccessibility from here is also under discussion.

The Soviet Antarctic research committee has given the name "International Geophysical Year Valley" to the large depression extending from about lat. 80° S., long. 70° E. to the coast around Prydz Bay, where it extends from long. 55° to 80° E., or a width of some 370 miles.

SOVIET DRIFTING STATIONS IN THE ARCTIC OCEAN, 1959-60. After the annual relief in the spring of 1959, SP-6, a four years old station, drifted towards the Greenland Sea, and SP-8, the new station, drifted in the area about midway between Bering Strait and the Pole. As was expected, SP-6 soon reached the point at which it was about to drift out of the Arctic Ocean in the Greenland current, at lat. 83° 6' N., long. 3° 56' E., and the station was accordingly evacuated in early September 1959. While manned, the station drifted some 5800 miles, while the direct line from start to finish was 1600 miles.

Sp-8 drifted rather slowly in a north-westerly direction. In the summer the melting and cracking of the floes in its vicinity prevented any aircraft from landing there until September.

The annual high latitude air expedition, which was responsible for relief, made its base at Tiksi. Sp-8 was relieved during the first half of March, some 450 miles north of Ostrov Vrangelya. A turbo-prop AN-10 aircraft was used to bring in freight - the first occasion on which such an aircraft has landed on sea ice. A new station, SP-9, was set up in lat. 77° 23' N., long. 163° E., in mid-April. The flow measures 3 by 1.8 km. by 2 to 3 m. thick. Regular observations were started at the end of April.

SOVIET CENTRAL ASIAN GLACIER STUDIES. The glaciologists manning the I.G.Y. station on the upper reaches of Lednik Fedchenko in the Pamirs have reported on their two-year stay, according to Moscow Radio. Chinese, East German and Polish scientists collaborated with the Soviet team. The station was situated at the firn line at a height of about 5000 m. The total length of the glacier was found to be 77 km., and its maximum

thicknesses 240 m. in the lower part, 700 m. in the central part and 900 m. in the upper part. It has been established that the maximum length ever reached by the glacier was 150 km. The period of full renovation of the ice stock has been calculated to be 180 years. Tributaries of Lednik Fedchenko were also studied, many of them being explored for the first time and given names. The system seems to have been in retreat for the last ten years, but there is now evidence for a renewed advance. Three papers on this work are expected to be presented at the I. U. G. G. Congress in Helsinki in July 1960.

Exploration of the glaciers in the Transiliyskiy Alatau, a northern spur of the Tien Shan mountains, has continued, with N. N. Pal'gov of Alma-Ata as the leading investigator. More hitherto unknown glaciers have been discovered at an altitude of some 3500 m. The total number of known glaciers in this mountain region now stands at 370, an increase of 105 in the last few years, with a total area of 544 sq. km.

UNIVERSITY OF MICHIGAN. Charles Swithinbank led a four man expedition from the University of Michigan across the Ross Ice Shelf from Kainan Bay to McMurdo Sound between 18 December 1959 and 11 January 1960. The object was to measure the rate of movement of the Ross Ice Shelf. At camps 20 miles apart, sun altitudes were measured every three hours when weather permitted. In all, 12 points were fixed for ice movement studies; it is proposed to repeat the measurements in 1962 to find the amount of ice movement. In addition, 1800 snow accumulation stakes were measured, 13 pits were dug for density measurements and 21 strain stake patterns were set up. Swithinbank remained at McMurdo Sound until 13 March. During this period he resurveyed an ice movement stake planted by A. P. Crary in 1957 off the mouth of the Beardmore Glacier. Travelling in a U.S. Navy helicopter and assisted by E. S. Robinson, A. W. Stuart and S. Yevteyev, a Russian exchange observer with the U.S. Antarctic Research Program, he set up and surveyed ice movement stakes off Cape Crozier, between Black Island and Mount Discovery, between Black Island and White Island, and near the ice front in McMurdo Sound. The members of the expedition returned separately to New Zealand in vessels of the U.S. Navy. For the 1960-61 season it is planned to start measurements on the rate of movement of the valley glaciers flowing into the western and southern margins of the Ross Ice Shelf. Swithinbank's party will include another of our members, John Tuck, who spent two years in the Antarctic from 1955-57.

McGILL SUB-ARCTIC RESEARCH LABORATORY. Dr J. D. Ives has sent us the following news of the Laboratory's activities.

In addition to the permafrost programme, covered in a note for the Journal of Glaciology , the major efforts of the Laboratory this summer are directed towards fielding four two-man field parties as part of a concerted research programme to elucidate the process of deglaciation, from the maximum of the last glaciation, of the peninsula of Labrador-Ungava. The parties are comprised as follows:

a) Leader, John T. Andrews, assistant, Timothy Fielding of Trinity College, Cambridge. Area of study: Labrador coast northwest of Kiglapait Mountains. Objectives: Detailed study of systems of end moraines in main troughs, and evaluation of glacier wastage.

b) Leader, E. Michael Matthew, assistant, Alan Stronger, of St. Catharine's College, Cambridge. Area of study: Nain Plateau between Indian House Lake and Ford River, in George River basin. Objectives: Precise survey of shorelines of former proglacial lakes, evaluation of isostatic adjustment, and progressive deglaciation.

c) Leader, Brian Haywood, assistant, André Grenier of Laval University, Quebec. Area of study: Koroksoak Valley between Ungava Bay and southern Torngat Mountains. Objectives: Survey of glacial lake shorelines formed by water trapped between Ungava Bay and Atlantic watershed. General deglaciation.

d) Leader, Olav Løken. Area of study: Eclipse Bay, northern Torngat Mountains. Objectives: Detailed study of glaciation and deglaciation of Torngat Mountains, and, in particular, investigation of relationship between marine limit and late-phase glaciation in coastal area.

The four expeditions will receive support from: Arctic Institute of North America; Geographical Branch, Mines & Tech. Surveys, Ottawa; McGill University; McGill Sub-Arctic Research Laboratory; British Newfoundland Exploration Company. They form part of a long-term field programme initiated by Dr Ives on behalf of the Laboratory. Each party leader is a member of the Laboratory staff.

VICTORIA UNIVERSITY OF WELLINGTON EXPEDITION TO VICTORIA LAND. The University's second expedition to this area of ice-free land was mounted in the 1959-60 summer season. The programme was designed to complete the broad fields of the previous expedition and to supplement their findings. The members were: R W. Balham (leader, biologist and meteorologist), R. H. Wheeler (topographical survey), two geologists (A. Allen, G. Gibson) and a student of paleomagnetism (I. Willis). Bases were established in the Victoria Valley, just north of Wright Valley, with the base camp at Lake Vashka. The expedition concentrated on the northern half of this block, an area covering 2500 sq. miles. Because of the logistic problems involved, the expedition was made possible solely through the generosity of the United States Navy. 66 days were spent in the field, and the general exploration of the area is now complete. The expedition covered about 1,200 miles on foot. The geologists covered 600 miles on their traverses; they have mapped the pre-Cambrian metamorphic basement, the younger Beacon sandstones and the intruded dolerites and granites. They discovered that the thickness of the Beacon series is much greater than was found hitherto, and is of the order of 3,500 feet. Biological studies included the collection of specimens, analysis of the fresh waters in the lakes, collection of plankton and studies of desiccated carcases of seals and birds on the valley floor. A new and surprising discovery this year was some 40-odd carcases of skua gulls around the shores of Lake Vashka. Topographical survey and paleomagnetic studies were completed in the mountains to the north and south of the camps. Meteorological observations were taken at base camp and on self-recording instruments at a depot near Lake Vida.

UNIVERSITY OF LONDON 1959 EXPEDITION TO JAN MAYEN ISLAND. Four members from Birkbeck College and four from Imperial College visited Jan Mayen in 1959 to plot and expand known glaciological and geological boundaries and data. A preliminary report of their work has been sent to the three World Data Centres for Glaciology. The leader was Dr A. T. J. Dollar, and the glaciologists were B. Chadwick, D. J. J. Kinsman, P. Smith and R. G. Wright. The expedition split into three groups: the geologists concentrated on the north and the south of the Island, and the glaciologists worked in the east. A detailed study was made of Sörbreen, one of the glaciers descending from Beerenberg, including measurements of strain, ablation and temperature. Re-mapping of the snout suggests that it has advanced about 180 metres since the last survey in 1949. All the glaciers of Beerenberg appear to have steep gradients, the maximum of 1:3 being shown by the Weyprecht Glacier over a distance of about 3 miles, and they are proportionately shallow: it is estimated that none of them exceeds 300 feet. Glaciological observations were also made on stagnant coastal ice and soil polygons.

UNIVERSITY OF CALIFORNIA AT LOS ANGELES EXPEDITION TO AUSTERDALSBRE. Following Dr R. L. Shreve's visit to Austerdalsbre last summer with the Cambridge group he has taken a small party there this summer to make a detailed structural map of the lower part of the Odinsbre icefall with the object of elucidating the processes by which the foliation develops in the ice. The party includes Barclay Kamb and Leon Knopoff from U. C. L. A. and two Swiss from the E. T. H., Zürich. Arrangements have been made for a series of vertical air photographs to be taken. The work is supported by a grant from the Geological Society of America.

NEWS FROM OUR NEW ZEALAND CORRESPONDENT.

(1) A. J. Heine, who took part in the United States 1959/60 North Victoria Land Traverse, Antarctica, as assistant geologist, returned to New Zealand at the end of March, 1960, after spending the previous winter and summer working on glaciological projects at Scott Base. He is now assisting with reduction of the Antarctic field data at the Institute of Polar Studies, Ohio State University, under Professor R. P. Goldthwait.

(2) In April, 1960, a party from New Zealand Geological Survey, D. S. I. R., G. Warren, B. Skinner and I. McKellar, made measurements of net snow accumulation on the névé of the Tasman Glacier, rounded off ablation measurements for the 1959-60 summer period on the lower end of the same glacier, and carried out an aerial reconnaissance of possible working sites for a future extension of the glaciology programme. A new coring auger from S. I. P. R. E. was used successfully to sample the very deep snow pack. Coring had to be continued to 10 metres to be sure of penetrating one year's accumulation. The very rapid ablation rates found the previous summer were confirmed.

A recent paper by L. O. Krenek "Changes in the Glaciers of Mount Ruapehu in 1955" (N. Z. Journal of Geology and Geophysics Vol. 2 No. 4 Nov., 1959) is the first published record of modern North Island glacier trends.

NEWS FROM OUR SWEDISH CORRESPONDENT.
Just now we have a seismic party measuring the thickness of the two largest Kebnekajse glaciers, Storgläciaren and Rabots glaciär. They have also measured the dead ice content of some terminal moraines a few hundred metres from the present ice edge. A refraction profile straight over the Ladtjojaure delta will give us quantitative information about the amount of silt brought down from the heart of the Kebnekajse massif in postglacial time. The régime studies on Storglaciären will be continued - we have now complete accumulation and ablation records for all years since 1945.

Water and silt discharge of the Tarfala river will be studied during the summer as part of a larger project dealing with the morphological activity of the glaciers.

GLACIOLOGICAL RESEARCH IN CANADA. In 1959 field glaciological work was carried out in three areas of British Columbia and in three areas of the Queen Elizabeth Islands. Some work has already been summarised in Ice no. 5.

A combined expedition from the Universities of British Columbia and Alberta to the Athabasca Glacier worked in association with groups from the Federal Water Resources Board of Canada, and from the National Bureau of Standards and the United States Geological Survey. The Geological Survey of Canada carried out auxiliary studies near the margins of several glaciers in the Selkirk Range and in the northern Coast Mountains.

The Jacobsen-McGill Arctic Research Expedition made a reconnaissance of the ice cap and glaciers in the South Fiord area of Axel Heiberg Island in preparation for extended field work in the 1960-61 seasons, and the Polar Continental Shelf Project of the Department of Mines and Technical Surveys started an investigation of the ice cap on Meighen Island. A small party from McGill University, supported by the Arctic Institute of North America and the Defence Research Board, made glaciological and meteorological studies in the Gilman Glacier area of northern Ellesmere Island in continuation of the work on "Operation Hazen", 1957-58. The United States Air Force Cambridge Research Center, through a contract with the Arctic Institute of North America, sent an expedition to the Ellesmere ice shelf.

The Geographical Branch of the Department of Mines and Technical Surveys has undertaken to complete an inventory of Canadian glaciers, much of the work on which has already been carried out under Prof. J. T. Wilson's direction. The Branch is also carrying out research on Meighen Island.

Photogrammetric and laboratory studies have been carried out by the National Research Council. The Photogrammetric Research Section completed and published a map of the Salmon Glacier, B. C. and is planning a mapping programme on glaciers in Axel Heiberg Island. The Snow and Ice Section continued laboratory work, much of which has a direct bearing on problems of glacier research. At the University of Toronto, the Geophysics Laboratory under Prof. Wilson has good facilities and equipment for a wide range of research in both the laboratory and in the field.

All available reports and publications resulting from IGY and IGC research have been forwarded to World Data Centres A, B, and C. These comprise the Glacial Map of Canada, and reports, papers and maps from the University of Toronto Salmon Glacier expedition, the Defence Research Board "Operation Hazen", and the National Research Council Snow Survey.

Institutions and Committees

UNIVERSITY OF SASKATCHEWAN: INSTITUTE FOR NORTHERN STUDIES. The Institute has been formed recently with the object of acquiring new knowledge about the Canadian north, and of training personnel academically in fields of study having a bearing on the north. It plans to aid staff members, graduate students and post-doctorates who wish to carry out research in this area under the guidance of the University's various departments. Close co-operation between the various disciplines will be encouraged. There is no thought of competing or overlapping with other institutions or bureaux working in this vast field.

It is not at present planned to carry out research in the Arctic but rather in the sub-Arctic as far as the northern fringe of settlement. More distant fields will be investigated as the need arises and trained personnel is available. In the summer of 1960 a modest beginning is being made, in biology, plant ecology, geology and records concerned with northern economic matters.

UNIVERSITY OF ALBERTA: THE BOREAL INSTITUTE. The University of Alberta, situated in Edmonton, seeks to encourage attention to the north through the establishment of the Boreal Institute. Objectives: the acquisition and dissemination of knowledge of the north. This is to be effected through a threefold programme: (a) establishment of an Information Centre; (b) training and instruction; (c) research. During 1960-61 the Institute will be concerned chiefly with organization details and with the first stage of the implementation of its objectives. It seeks immediately to establish contact with similar institutes and interested individuals and solicits material of all types concerning the north for its Information Centre.

The Directorate: W.A.Fuller, W.D.Gainer, Richmond W.Longley, R.Spence Taylor, William C.Wonders (Chairman). Correspondence regarding the Institute should be addressed to the Boreal Institute, University of Alberta, Edmonton, Alberta, Canada.

CANADA: NATIONAL RESEARCH COUNCIL. At its meeting on 4 March 1960, the Associate Committee on Geodesy and Geophysics of the National Research Council constituted a Sub-Committee on Glaciology. The members of this new Sub-Committee are as follows:
G. Hattersley-Smith (Chairman), P. D. Baird, T. J. Blachut, G. Falconer, G. D. Garland, L. W. Gold, F.S.Grant, J.A.Jacobs, F.Muller-Battle, S.Orvig, E.F.Roots, J.O.Wheeler.

The purposes of the Sub-Committee are: (1) To encourage and advise on research on glaciers in Canada. (2) To collect and distribute information on glacier research. (3) To assist in the publication of research material. The Sub-Committee hopes to keep in close touch with organizations outside Canada which are engaged in glaciological research.

Other groups concerned with glaciology, under the auspices of the National Research Council, are the Sub-Committee on Snow and Ice Research (Chairman: L. W. Gold), which comes under the Associate Committee on Snow and Soil Mechanics (Chairman: R. F. Legget); and the Working Group on Ice in Navigable Waters (Chairman: T.A.Harwood), which comes under the Canadian Committee on Oceanography.

THE OHIO STATE UNIVERSITY: INSTITUTE OF POLAR STUDIES

Established: February 12, 1960.

Location: 125 South Oval Drive, Columbus 10, Ohio, U.S.A. (Mendenhall Lab., Rooms 103, 102).

Scientific Subjects: bacteriology, glacial geology, glaciology, ice physics, lichenology, marine zoology, microclimatology, paleobotany, photogrammetry, plant ecology, soils sciences, bedrock geology, etc.

Area of concern: the environment where ground is permanently frozen or glaciers are nearby.

Purposes: (1) to plan, support, and direct significant scientific research in polar phenomena; (2) to bring together investigators of polar areas; (3) to facilitate and encourage the training of polar research workers; (4) to make the fruits of such research available.

Administration: a director, Professor Richard P.Goldthwait, acting subject to approval of a board of five. This activity falls directly under the Vice President for Instruction and Research and the Council on Research of the University. Most research will be handled through the Ohio State Research Foundation on grants from outside.

Personnel: (1) academic staff at instructor-professor levels in the appropriate department, each devoting one, two or three quarters a year to teaching; (2) research associates, who may be graduate students or full-time research men.

Curriculum: (1) standard graduate curricula will be adapted to the polar emphasis; (2) an interdepartmental polar seminar and a few new courses such as polar geography, lichenology, and glaciology may be introduced; (3) a visiting professor will be sought annually, and visiting lecturers sponsored.

Facilities: (1) a cold room, small shop, and equipment room under the direction of a technician; (2) a central office, polar reprint and news library, map collection, and data files under the direction of a receptionist; (3) data and analysis offices with laboratory tables, calculator, dictating machine, etc. In addition, The Ohio State University offers the Orton Library with extensive polar book collection, a precise Wild A-7 stereo plotter, a 704 Computer, and all ordinary laboratory equipment in earth sciences, physics, and biology.

Funds: (1) the Institute offices, utilities, equipment, and maintenance are supplied by The Ohio State University; (2) teaching salaries come from departmental budgets; (3) research salaries come from grants from the Mershon Fund, Grants-in-Aid, and grants from National Science Foundation.

UNIVERSITY OF WISCONSIN: GEOPHYSICAL AND POLAR RESEARCH CENTER. This new Center, under the directorship of Professor G. P. Woollard, occupies a beautiful suburban estate of 15 acres given to the University by the late Thomas Brittingham. The personnel now housed at this Center are engaged in Arctic and Antarctic research in geophysics. However, it is expected that the facilities will be expanded in the near future to include that portion of the group working in broader fields of polar study and geophysical research in non-polar areas as well as the shop facilities now situated in another off-campus location.

The Center is the outgrowth of the Geophysical and Polar Research Program initiated at the University of Wisconsin in 1948 and which received considerable impetus during the International Geophysical Year. The Center also represents a consolidation with the Data Analysis Center (later called the "Antarctic Research Center") for the geophysical work done on the United States Antarctic traverse parties during the IGY and IGC. The Center has on its staff several men having between them a considerable amount of geophysical and polar experience. Under the auspices of the National Science Foundation, the University now has the responsibility for the operation of the United States Antarctic Traverse Program. An airlifted traverse was mounted during the 1959-60 season, and starting with the coming season, two oversnow and one airlifted traverse will be conducted as part of a continuing program. Other programs include the determination of continental crystal structure from seismic measurements, standardization of gravity on a world-wide basis, magnetic and gravity studies of the crust and regional geology, the determination of absolute gravity and, during the spring of 1960, a program of gravity and airborne magnetic measurements off the northern coast of Alaska initiated as a first step in a project designed to explore the nature of the transition from the continent to the Arctic Ocean basin.

In addition to Professor Woollard, permanent personnel at the Geophysical and Polar Research Center presently include Dr E. C. Thiel, Dr C. R. Bentley, Dr R. P. Meyer and Dr J. C. Rose, Senior Scientists; and Messrs J. S. Steinhart, J. C. Behrendt, H. F. Bennett, N. A. Ostenso and Sanker Narayan. Currently wintering over in Antarctica are P. Parks and E. S. Robinson. Visitors temporarily working at the Antarctic Center on data analysis are F. K. Chang, R. W. Patenaude, F. G. van der Hoeven, and J. G. Weihaupt. Other visitors working at the Center are Professor Jose Mateo of the University of La Plata, Argentina, and Ing. Jaime Lopez of Bogota, Columbia.

An institute, to be known as the Mawson Institute for Antarctic Research, is to be established in 1961 within the department of geology at the University of Adelaide.

Activities of the institute:

To - foster polar studies and research. Maintain a collection of Antarctic literature. Maintain and develop a collection of Antarctic equipment, especially that associated with the explorations of the late Sir Douglas Mawson. Maintain and develop collections of geological and biological specimens associated with the Antarctic. Maintain a room or rooms for the use of workers engaged in Antarctic research. Promote whenever possible public lectures relating to polar research.

Initially a collection of Antarctic literature will be housed in a separate section of the Barr Smith Library and other items will be shown in the geology department of the S. A. Museum.

International Meetings

FIRST INTERNATIONAL SYMPOSIUM ON ARCTIC GEOLOGY, held in Calgary, Alberta, Canada, on 11-13 January 1960, was very successful. Papers were read under the following sections: regional tectonics (7 papers), PreCambrian geology (5), stratigraphy (9), submarine geology (6), general geology Arctic Canada and Alaska (11), geomorphology and Pleistocene geology (10), permafrost (6), sea ice (5), exploration-technique, logistics, climate (12). Members of the Society presenting papers were: K. C. Arnold, W. S. Benninghoff, W. Blake, Moira Dunbar, *B. Fristrup, W. B. Harland, T. Harwood, G. Hattersley-Smith, G. W. Holmes, D. M. Hopkins, *G. Jacobsen, D. B. Krinsley, R. F. Legget, *M. M. Miller, D. R. Nichols, L. H. Nobles, H. Roethlisberger, E. F. Roots, *D. D. Smith and W. Schwarzacher. (* paper read by title). It is hoped that the next Symposium, due to be held in 3 to 5 years time, will include many more papers on glaciology and glacial geology.

INTERNATIONAL GEOGRAPHICAL UNION Xth GENERAL ASSEMBLY and XIXth INTERNATIONAL GEOGRAPHICAL CONGRESS. These meetings will be held in Scandinavia during July and August 1960. The General Assembly and the Section and Commission meetings will take place in Stockholm 6-13 August.

Symposia and excursions in all five host countries will take place before and after the Congress meetings. Those which are of especial interest to glaciologists are:

Physical geography of Greenland. Symposium in Copenhagen, 31 July - 3 August. Chairman: B. Fristrup.

Spitsbergen: glaciology, physical geography, geology. Excursion, 24 July - 6 August. Leader: O. Liestöl.

Deglaciation of S. E. and S. E. Central Norway. Excursion, 27 July - 6. August. Leaders: J. Gjessing, R. Salmer-Olsen.

High mountain region; glacial morphology and periglacial processes. Excursions and symposium at Abisko. 28 July - 5 August. Chairman: C. C. Wallén.

Glacial morphology and inland ice recession in N. Sweden. Excursion, 22 - 28 July. Leader: G. Hoppe.

Glaciology. Excursion, 19 - 28 July. Leader: V. Schytt.

Kårsa Glacier and the morphology of its surroundings. Excursion, 24 - 27 July. Leaders: C. C. Wallén, C. -G. Holdar.

Note: At the time of going to press, no list of papers was available, but we hope to publish it in the next issue of "Ice".

TRI-ENNIAL ASSEMBLY OF THE INTERNATIONAL UNION OF GEODESY AND GEOPHYSICS, HELSINKI 25 JULY - 1 AUGUST 1960.

We have been asked by the Acting Secretary of the Commission of Snow and Ice (Mr W. H. Ward) to publish the provisional programme of meetings and papers. The programme includes a symposium on Antarctic glaciology during the I. G. Y. The programme is subject to modification, and not all the papers will be presented for discussion. Summaries of the papers will be available in Helsinki.

COMMISSION OF SNOW AND ICE: Provisional Programme of Meetings and Papers

Session 1. SEA & LAKE ICE, SNOW Thursday, July 28th. 09.00 hours.

1. E. Palosuo (Finland): Crystal structure of brackish and fresh-water ice.
2. I. Sala (Finland): Experimental studies on the stress concentration index of sea ice.
3. H. Simojoki (Finland): Climatic change and the ice observations at Lake Kallavesi.
4. E. R. Pounder and P. Stalinski (Canada): General properties of Arctic sea ice.
5. E. R. Pounder and P. Stalinski (Canada): Elastic properties of Arctic sea ice.
6. E. R. Pounder (Canada): Heat flow in ice sheets and ice cylinders.
7. N. Untersteiner (Austria): On the mass and heat budget of Arctic sea ice.
8. H. van Wyngaarden (Netherlands): Investigations concerning the transport of heat through a solid sheet of ice in periods of frost and thaw.
9. M. Seppänen (Finland): On the influence of trees on the accumulation of snow in the pine-dominated forest in Finland.
10. G. D. Rikhter (U. S. S. R.): Development of snow research in the U. S. S. R.
11. M. Shoda (Japan): New laboratory of the Snow Experiment Station of the Railway Technical Institute.
12. R. W. Gerdel (U. S. A.): Wind tunnel studies with scale model simulated snow.
13. W. Price (Gt. Britain): The artificial deposition of snow in drifts.
14. A. K. Dunin (U. S. S. R.): The blizzard theory.

Session 2. SNOW ACCUMULATION AND ABLATION Thursday, July 28th. 14.30 hours.

15. V. N. Akkuratov (U. S. S. R.): Classification and distribution of avalanches according to certain climatic regions of U. S. S. R.
16. Masaki Shimbo (Japan): The mechanism of gliding in snow.
17. G. D. Rikhter (U. S. S. R.): Development of snow cover in natural conditions.
18. P. Salamin (Hungary): Les facteurs topographiques influençant l'accumulation et la fonte de la neige.

19. U. Radok, S. K. Stephens & R. L. Sutherland (Australia): On the calorimetric determination of snow quantity.
20. V. D. Komarov (U. S. S. R.): Methods of calculation of the intensity of snow ablation on the plains.
21. V. D. Komarov (U. S. S. R.): Movement of water in the snow pores and the calculation of water discharge of the snow cover.
22. A. Bauer (France): Précision des mesures d'ablation.
23. V. L. Blinova (U. S. S. R.): The use of hydrochemical methods for investigating the discharge of rivers due to melting of snow and ice.
24. G. Hattersley-Smith, J. R. Lotz and R. B. Sagar (Canada): The ablation season on Gilman glacier, Northern Ellesmere Island.
25. K. G. Makarevich (U. S. S. R.): Distribution of snow on the glaciers of the Zailiyskiy Alatau.
26. K. G. Makarevich and G. A. Tckmagambetov (U. S. S. R.): The preliminary data on the formation of ice in the zone of accumulation of the Tuyuksu glaciers.
27. E. S. Troshkina and U. V. Machova (U. S. S R.): Application of spore-pollen analysis in studying the structure of the Elbrus glaciers.

Session 3. GENERAL GLACIER STUDIES, GLACIO-METEOROLOGY
Friday, July 29th, 09.00 hours.

28. G. A. Avsyuk (U. S. S. R.): Glaciological investigations carried out on the U. S. S. R. territory under the programme of the I. G. Y. in 1957-59.
29. P. Kasser (Switzerland): Glaziologischer Kommentar zur neuen in Herbst 1957 aufgenommen Karte 1:10, 000 der Grossen Aletschgletschers.
30. A. Desio and A. Marutti (Italy): Relevés topographiques et géophysiques effectués au cours de l'expédition Italienne au Karakorum K. 2, 1953-55 sur certains glaciers du Karakorum.
31. P. A. Cherkasov (U. S. S. R.): Principal features of the glaciers of the northern slope of the Dzhungar Alatau Mountains.
32. M. V. Tronov (U. S. S. R.): Some theoretical results of the glaciological exploration in the Altai during the I. G. Y.
33. J. Büdel (Germany): Glaziologische Beobachtungen in Spitzbergen - Bäreninsel, 1959.
34. A. N. Krenke (U. S. S. R.): Firn nourished ice caps on Franz Josef Land (The Jackson cap on Hooker Island).
35. B. Fristrup (Denmark): Investigations of four Greenland glaciers.
36. L. Lliboutry (France): Les glaciers enterrés et leur rôle morphologique.
37. Jean M. Grove (Gt. Britain): Some notes on slab and niche glaciers, and the characteristics of proto-cirque hollows.
38. L. W. Gold and G. F. Williams (Canada): Energy balance during snowmelt periods at an Ottawa site.
39. R. Zanetti (Italy): Radiation temperature of the sky and ablation of ice.
40. W. Ambach (Austria): Recherches sur le bilan énergétique dans la zone d'ablation de l'Inlandsis du Groenland.
41. E. R. Lachapelle (U. S. A.): Energy exchange investigations on the Blue Glacier, Washington.
42. E. N. Vilesov (U. S. S. R.): Temperature of ice in the lower parts of the Tuyuksu glaciers.
43. A. Bauer (France): Les réalisations scientifiques et techniques de l'Expédition Glaciologique Internationale au Groenland au cours de la compagne d'été de 1959.

Session 4. RESPONSE OF GLACIERS TO CLIMATE Friday, July 29th. 14.30 hours.

44. R. Finsterwalder (Germany): On the measurement of glacier fluctuations.
45. L. D. Dolgushin (U. S. S. R): Main features of the modern glaciation of the Urals.
46. L. D. Dolgushin (U. S. S. R.): Main features of the glaciation of Central Asia according to latest data.
47. J. B. Case (U. S. A.): Glacier-mapping activities in the U. S. A.
48. P. L. Mercanton (Switzerland): Fluctuations des glaciers européens.
49. N. M. Svatkov (U. S. S. R.): Changes in the accumulation regime of the ice cap in the Russkaya Gavan area of Novaya Zemlya.

50. G. Manley (Gt. Britain): Seventeenth-century meteorology and glacier behaviour.
51. L. Jeretti (Italy): Observations sur le récent retrait accéléré et anormal de certains glaciers des Alpes occidentales Piémontaires.

Session 5. RESPONSE OF GLACIERS TO CLIMATE (continued)
Saturday, July 30th. 09.00 hours.

52. J. F. Nye (Gt. Britain): The influence of climatic variations on glaciers.
53. R. D. Zabirov (U. S. S. R.): The state of some of the Tien-Shan glaciers during the I. G. Y.
54. L. G. Bondarev (U. S. S. R.): Evolution of some of the Tien-Shan glaciers in the last twentyfive years.
55. M. F. Meier (U. S. A.): Distribution and variation of glaciers in the U. S., exclusive of Alaska.
56. V. F. Suslov, (U. S. S. R.): Morphological pecularities and tendencies in the development of glaciation in the North-Western Pamirs.
57. M. Tonini (Italy): Nouvelles notices sur le glacier Marmolada.
58. V. A. Georgio, A. B. Kazansky, V. N. Kolesnikova, V. K. Nozdrukhin and M. A. Petrosiants (U. S. S. R.): Le glacier Fedchenko et le climat.
59. A. V. Shnitnikov (U. S. S. R.): The present phase of the intrasecular variability of the mountain glaciation in the Northern Hemisphere.

Session 6. GLACIER SURVEYING AND THICKNESS MEASUREMENT
Monday, 1st August. 09.00 hours.

60. W. Hoffman (Germany): Elektronische Vermessung mit Tellurometer auf dem Inlandsis bei der Int. Glaziol. Gronland Expedition, E. G. I. G. 1959.
61. H. Mälzer and D. Möller (Germany): Das nivellement bei der Int. Glaziol. Grönland Expedition.
62. T. J. Blachut (Canada): Aerial photogrammetry in glacier studies.
63. B. A. Borovinsky (U. S. S. R.): On the question of glacier research by electrical prospecting methods.
64. J. R. Weber, H. Sandstrom and K. G. Arnold (Canada): Geophysical surveys on Gilman glacier, Northern Ellesmere Island.
65. N. N. Palgov (U. S. S. R.): Thickness of the glaciers in the Kazakh S. S. R. according to calculations and to seismic measurements.
66. I. S. Bertsan, V. A. Pack, V. N. Iakovlev and I. G. Leontiev (U. S. S. R.): Seismic and gravimetric research on the Fedchenko Glacier.
67. R. L. Shreve (U. S. A.): The borehole experiment on the Blue Glacier, Washington.
68. W. H. Ward (Gt. Britain): Experiences with electro-thermal boring on Austerdalsbre, Norway, 1956-59.

Session 7. GLACIER FLOW Wednesday, 3rd August. 09.00 hours.

69. C. R. Allen, W. B. Kamb, M. F. Meier and R. P. Sharp (U. S. A.): Structure of the Lower Blue Glacier, Washington.
70. W. B. Kamb (U. S. A.): Ice petrofabric data in relation to the structure of the Blue Glacier, Washington.
71. R. Haefeli (Switzerland): Zur Rheologie von Eisschildern der Arktis und Antarktis.
72. J. W. Glen (Gt. Britain): Measurement of the strain of a glacier snout.
73. R. Millecamps (France): Sur une methode nouvelle d'investigation du glaciologie.
74. G. Aliverti (Italy): A propos des ondes des glaciers: aspects du front du glacier du Lys.
75. A. Bauer (France): Influence de la dynamique des fleuves de glace.
76. Comité National Français: Etudes nivo-glaciologiques de 1958-60.

Session 8. BUSINESS MEETING Wednesday, 3rd August. 15.00 hours.

AGENDA

1) It is proposed by the President that the Commission should undertake the permanent task of regularly recording the quantities which govern and demonstrate the response

of glaciers to climatic changes. Discussion tc be introduced by Professor R. Finsterwalder.

2) The International Committee on Geophysics (C. I. G.) seeks the Commission's views on the future needs for the international exchange of glaciological data through the World Data Centres. Discussion to be introduced in relation to World Data Centre "C" (Glaciology) by Dr G. de Q. Robin, Secretary of the Special Committee on Antarctic Research (SCAR) and Director of the Scott Polar Research Institute.
3) Discussion on propcsal to hold a symposium on "Glaciers and Climate". Grindelwald has been suggested as a suitable place to hold the Symposium.
4) Appointment of National Correspondents to the Commission.
5) Election of Officers of the Commission.
6) Any other business.

International Association of Hydrology: Symposium on Antarctic Glaciology during International Geophysical Year (organised by the Commission on Snow and Ice and the Special Committee for Antarctic Research)

PROVISIONAL PROGRAMME OF MEETINGS & PAPERS

First Session: Monday, 1st August. 14.30 hours.

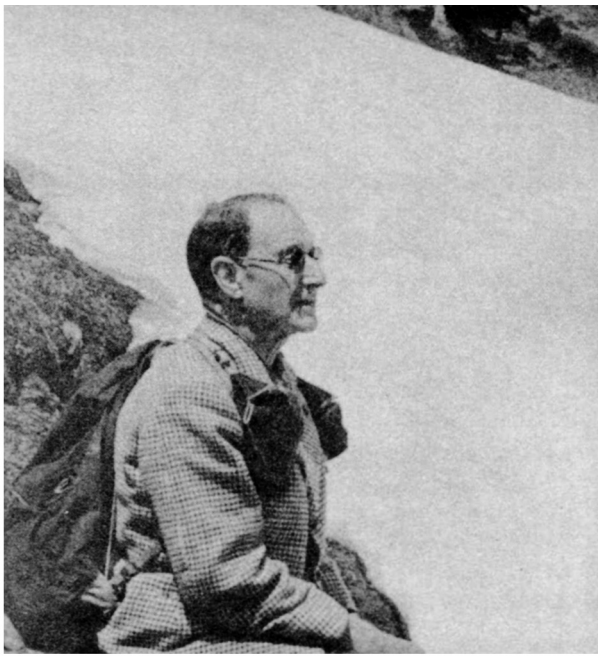
1. C. Lorius (France): Accumulation de neige en Terre Adélie.
2. R. P. Goldthwait and R. L. Cameron (U.S.A.): The U.S.-I.G.Y. contribution to Antarctic glaciology.
3. S. A. Yevteyev (U.S.S.R.): The geological activity of the ice cover in Eastern Antarctica.
4. T. L. Péwé (U.S.A.): Multiple glaciation in the McMurdo Sound area, Antarctica.
5. A. Bauer (France): Nouvelle estimation du volume de la glace de l'Inlandsis Antarctique.
6. K. K. Markov (U.S.S.R): Glacial eustatic motion of the earth's crust.
7. H. Hoinkes (Austria): Studies in glacial meteorology at Little America, Antarctica, 1957.

Second Session: Tuesday, 2nd August. 09.00 hours.

8. L. D. Dolgushin (U.S.S.R.): Zones of snow accumulation in Eastern Antarctica.
9. W. W. Vickers (U.S.A.): Statistical analysis for tracing accumulation layers in Antarctica.
10. R. Dingle and U. Radok (Australia): Antarctica snow drift and mass transport.
11. V. M. Kotlyakov (U.S.S.R.): The intensity of nourishment of the Antarctic ice sheet.
12. V. M. Kotlyakov (U.S.S.R.): The results of study of the processes of formation and structure of the upper part of the ice sheet in Eastern Antarctica.
13. K. Sugawara (Japan): Salt composition of snow, ice and pool water samples collected in Antarctica.
14. H. Wexler (U.S.A.): Consideration of the thermal structure of the deep ice in Byrd Land.
15. D. J. Jensson and U. Radok (Australia): Transient temperature distributions in ice caps and ice shelves.

Third Session: Tuesday, 2nd August. 14.30 hours.

16. C. R. Bentley and E. C. Thiel (U.S.A.): Glaciological results of traverse geophysical observations in West Antarctica.
17. E. C. Thiel (U.S.A.): Results of 1959-60 airborne traverse.
18. A. P. Crary and P. van den Hoeven (U.S.A.): Sub-ice topography of Antarctica.
19. J. A. Bender (U.S.A.): Deep drilling in Antarctica.
20. G. Rouillon (France): Epaisseur de la calotte glaciaire en Terre Adélie.
21. P. A. Shumsky (U.S.S.R.): On the theory of glacial motion.
22. J. H. Zumberge (U.S.A.): Glaciological studies on the Ross Ice Shelf.
23. P. A. Shumsky (U.S.S.R.): The dynamics and morphology of glaciers.
24. I. R. McLeod and E. E. Jesson (Australia): Inland ice movement in MacRobertson Land, Antarctica.
25. A. Cornet (France): Déplacement du Glacier de l'Astrolabe.



Gerald Seligman

Gerald Seligman was born on 26 March 1886 at Lincoln House, Clapham Park, which was at that time a garden suburb; in fact; the house stood in its own grounds of over 200 acres. In 1900 he went to Harrow School and left three years later to go to the South-Eastern Agricultural College at Wye in Kent. There he became interested in the lectures on geology and chemistry, the latter given by Dr., later Sir, John Russell, F.R.S. These revived scientific interests which had been latent in him since early boyhood and he decided that a pure scientific career would suit him better than agriculture.

So, on leaving Wye in 1905, he went to Trinity Hall, Cambridge, where he took the Natural Science Tripos, graduating in 1908.

After a trip to North America where he climbed his first mountains, he joined his elder brother, Dr Richard Seligman, in a newly founded chemical engineering business, where his scientific training found some scope. Soon after joining his brother the First World War broke out and Seligman saw service at home and in East Africa. After the war he went back to his brother's business, where he remained for another twelve years.

At an early age he had become fascinated by mountains and by ski-ing, so that he spent nearly all his holidays from business in the Alps and in Norway. Never interested in racing, he became a competent ski-mountaineer. He had joined the Ski Club of Great Britain very soon after its foundation, and was elected to its Committee in 1921. He also took over the editorship of the Club's news bulletin, Ski Notes and Queries, which he developed from a small leaflet to a sizeable publication during the next fourteen years. He became a Vice-President of the Club in 1925 and President two years later. In 1934 he was elected a member of the Alpine Club. In 1930 he became an Honorary Member of the Ski Club of Great Britain.

In the late twenties, the editor of the British Ski Year Book, later Sir Arnold Lunn, invited him to review a German work on snow and avalanches, and Seligman came to realise how much there was still to learn about the subject. The fascination of snow had always held him firmly, and in 1931 he resigned from business to devote full time to its study.

He was then able to spend whole winters in the Alps, and to devote himself to writing articles, papers, and reviews on glaciological and kindred subjects, of which he has records today of some 180. His early investigations were concentrated on the nature of falling snow, and on avalanche development. The results of his work were published in a series of articles over three years in the British Ski Year Book. Later he re-wrote these and brought them up to date in a book, Snow Structure and Ski Fields, published in 1936.

What came particularly to intrigue Seligman was the evolution of the snow crystal into glacier ice, and in 1936 he decided to visit the Jungfraujoch with the intention of following this transition from the surface down to the bottom layers of the Aletsch Glacier. The next year he also spent some time there in company with Prof. J. Bernal, F.R.S.; he was also joined later by Dr P. Bowden, and Dr M. Perutz (both of whom are now Fellows of the Royal

Society), Dr T. P. Hughes, and Dr H. Bader, the latter being at that time a member of the Swiss Snow and Avalanche Commission.

In 1938 he spent the whole summer at the Jungfraujoch as leader of a research party, of whom Dr Perutz was a member; several papers were published as a result of the work done, and some of these went much further into glacier lore than Seligman's original theme.

Just before the Jungfraujoch expedition the late Dr J. E. Church of the Agricultural Experiment Station, Reno, Nevada, had invited him to form a British Group within the International Commission of Snow (as it then was). As has been recounted elsewhere, this group became the Association for the Study of Snow and Ice, and later still, the British Glaciological Society.

Later Seligman became President of what had then become the Commission of Snow and Ice of the International Association of Hydrology. He presided at the Rome Meeting of the Commission in 1954.

During the Second World War Seligman served in the Meteorological Office in charge of the Station at Holyhead.

Since these days he has given practically all his time to the editing of the Journal of Glaciology, and to his office as the Society's President.

President's Report

MARCH 1960

I am glad to be able to report steady progress in the Society's affairs.

Taking first the membership of the Society and the circulation of the Journal of Glaciology:-

In February 1960 our records showed:-

Members	445	as against	433	last year	
Subscribers to the Journal	433	" "	421	"	"
Free and Exchange issues	67	" "	58	"	"
Total:	945	" "	912	"	"

The members and subscribers - the latter consisting of libraries and institutions - have thus together increased by 24. The Journal now goes to 48 different countries in all parts of the world.

As I have pointed out before, the Journals sent out on the Free and Exchange list bring us publicity and many periodicals and papers for our Library.

I think it will be agreed that we can call these figures "steady progress" so far as members and subscribers are concerned. However, we are also carrying on a fuller campaign to bring in more readers of the Journal. We hope to have tangible results by next year showing a further marked improvement. To this end the Nuffield Foundation has given us considerable financial help and useful advice in producing a very attractive brochure which will, I am sure, be of great help.

I will, of course, leave discussion of our finances to the Honorary Treasurer and will only say here that I think you will consider them very satisfactory.

The two issues of the Journal in 1959 again showed an increase in size over those of 1958. The first number of the present year will be larger still, in fact the largest we have yet published. Its publication will be somewhat delayed - the aftermath of the unfortunate printers' strike of last year.

The immense amount of research done during the International Geophysical Year means that we received a good deal of extra material for publication. We hope that, as further results are worked out, many more articles will be submitted to us. We shall have less difficulty than before in publishing them if they come up to our standards.

For some articles on I.G.Y. results, a part of the printing costs has been covered by a Grant from the Royal Society for the years 1959 and 1960.

We now accept longer articles than formerly, provided that they are concise. I have purposely repeated this statement this year because the impression still seems somewhat widespread that we only accept short articles. This was true in the past for reasons of economy.

I cannot speak too highly of the assistance I now receive in what has become an onerous editing task. Dr J. W. Glen and Dr R. J. Adie take a great deal - I think a major portion - of the editorial work off my hands, and Miss Doris Johnson also gives much ready help. Without this excellent team I should not be able to carry on. Other members are frequently consulted on specific points and are always ready with advice.

The Society's library grows apace. It has been decided to make journals, and, with certain exceptions, books available to members on application to the Secretary at Cambridge.

Our collection of bound Glaciological Papers now numbers 65 large volumes. Many more pamphlets, those not so suitable for binding, are stored in box files. The total number of our collected works must now well exceed 2,000.

During 1959 fourteen meetings of the Society took place at which papers were read and discussed. These were held in Cambridge, Oxford, London, and Birmingham. The latter centre has become very active through the energy of our members there, led by Drs. Glen and Adie, and Professor Shotton, F.R.S.

Work steadily increases at World Data Centre C which is under the aegis of this Society and is housed in our office at Cambridge.

It has been named as the leading centre and as such is responsible for the final catalogue of data in the Glaciology Volume of the Annals of the I.G.Y.

The centre also assists the editor of this Volume (Dr Gordon Robin) with the preparation of the other sections. This includes summaries of various aspects of glaciology, some of which will be illustrated by maps, - for example ice thicknesses, accumulation, temperatures and ice movement.

We acknowledge a Grant from the Royal Society for the running of the centre. All this work is in charge of our Secretary, Mrs Richardson, under Dr Robin and Professor Manley.

The Glaciological Research Sub-Committee again had an active year under the Chairmanship of Dr Glen. Its other members are: R.J.Adie, W.V. Lewis, J.F.Nye, G.de Q.Robin and W.H. Ward.

An increased number of requests was received for the Technical Notes which the Sub-Committee issues. There were also more requests for advice on glaciological matters from outside the British Isles, including Norway, Ecuador, and Kenya as well as from the Arctic and Antarctic. A detailed report will be published in the October issue of the Journal of Glaciology.

I think that what I have reported to you will make evident the activity, enthusiasm, and hard work of our Secretary, Mrs Richardson. To me it seems beyond all praise.

I must also acknowledge the ungrudging help given to the Society and to myself by many members whom I have not mentioned by name.

I cannot conclude this report without mentioning the debt we owe to the Scott Polar Research Institute and to its Director, Dr Robin, for housing our Society and its now increasing adjuncts. I must also thank its very co-operative staff for much assistance. The whole arrangement provides many advantages for us and I can only hope that it also provides some for the Institute.

News

The Royal Geographical Society has made the following awards: Victoria Medal to J.A. Steers, Mrs Patrick Ness Award to R.J.Adie, Back Grant to A.T.Grove.

The Geological Society of London has made the following awards: Prestwich Medal to Sir Vivian Fuchs, Murchison Medal to A.G.MacGregor.

The Geological Society of America has awarded the Arthur S. Day Medal to Sir Edward Bullard, and the Kirk Bryan Award to J.F.Nye for his paper on "The distribution of stress and velocity in glaciers and ice sheets" (appearing in the Proceedings of the Royal Society).

Miss Louise Boyd has been elected to the Council of the American Geographical Society. In June 1959 she was made an Honorary Member of the American Polar Society - there have been only six previous Honorary Members: D.L. Brainhard, R.E. Byrd, F. Debenham, L. Ellsworth, P.A. Siple and V. Stefansson.

A. P. Crary has received the Cullum Geographical Medal of the American Geographical Society, for geophysical research in the Arctic and Antarctic and for geographical discoveries.

Paul A. Siple has been awarded the Danish Hans Egede medal for polar exploration.

Harry Wexler has been cited by the U.S. Navy Department for outstanding leadership in directing weather services in the Antarctic.

Henry Bader has joined the research faculty of the University of Miami School of Engineering. He will develop the theoretical phases of active Arctic research and act as consultant to the U.S. Army's Snow, Ice and Permafrost Research Establishment.

Hal Lister writes from Ward Hunt Island, where is established the base camp for the 1960 Ellesmere Ice Shelf Program, that he is thoroughly enjoying the work, the surroundings and

the comparative comforts of this Arctic Terrain Research Expedition. George P. Rigsby and Richard H. Ragle are also taking part in the expedition.

M. M. Miller is working this summer on the Juneau Icefield Research Program and on glaciology and geophysics on the summit of Mount Rainier. Both of these projects are sponsored by the Foundation for Glacier Research, and the Juneau work also by Michigan State University. The Juneau work will be partially a joint effort with an 8-man Japanese team from the University of Hokkaido Physics Department. The Foundation for Glacier Research and Michigan State University are also initiating a research project in the Icy Bay-Yakutat Bay area of Alaska this summer, as part of a 3-year, half-century Commemorative Project, designed to bring up-to-date the work of Tarr and Martin published in their "Alaskan Glacier Studies" volume in 1914. Dr Miller plans to begin regular courses in glaciology at Michigan State University next academic year.

John F. Nye visited the U.S.A. from August 1959 to January 1960, visiting glaciological field projects in the U.S.A. and Canada, giving lectures at institutions in those countries and filling an appointment as Visiting Professor of Glaciology in the Division of Geological Sciences, California Institute of Technology. He sends the following report of his visit.

> I visited the Lower Blue Glacier, the South Cascade Glacier, and the Athabasca Glacier, with field parties. I also travelled to Alaska, where I was particularly interested in seeing glaciers which had undergone recent rapid advances, and spent four days at the Arctic Research Laboratory at Point Barrow. I gave the following lectures, and at each place had discussions with the research workers in my field: Photoelasticity and dislocations in crystals (at 3 institutions). Various aspects of glaciology (at 10). At the California Institute of Technology I conducted a regular post-graduate seminar of two hours per week on the theory of the flow of glaciers and ice sheets. Most of my time, however, was spent in constructing a mathematical theory to explain the way in which glaciers and large ice sheets respond to changes in climate. The theory links up closely with the observations of sudden advances in Alaskan glaciers. During my visit I was able to have discussions with a large number of the most active American glaciologists. These personal contacts and the paper just referred to I would regard as the most valuable results of the trip.

Stephen O. Wilson is spending the summer aboard the "Chain", a Woods Hole Oceanographic Institution research vessel, as a scientific research assistant.

James H. Zumberge is on sabbatical leave from the University of Michigan until February 1961. He plans to work in Denmark and Germany on studies of the classical Pleistocene geology of northern Europe and the Alps.

The Society's Library

Works received for the Society's Library since November 1959.

We thank the following authors or donors of papers and pamphlets and regret that it is impossible to acknowledge them individually. The glaciological works, with their complete references, will be listed in "Glaciological Literature" at the end of the Journal of Glaciology and bound in the Society's collection of glaciological papers.

Bauer, A. (2 papers)
Elliston, G. (4 papers)
Evans, S.
Fristrup, B. (2 papers)
Glassey, S. D.
Gold, L. W.
Harrison, W.
Heusser, C. J. (3 papers)
Hollermann, P.
Jangpangi, B. S.
King, C. A. M.
Kinosita, S. (3 papers)
Kuhn, W.
Kusunoki, K.
Leggett, R. F.
MacDowall, J.
Müller, F.
Nutt, D. C.
Nye, J. F.
Ono, N. (3 papers)
Pewe, T. L.
Portmann, J. P.
Proudfoot, V. B.
de Quervain, M.
Renaud, A.
Tabata, T. (4 papers)
Weertman, J. (2 papers)
Weidick, A. (3 papers)
White, G. W. (7 papers)
Williams, G. P. (2 papers)
Yosida, Z.
Zavatti, S.

American Meteorological Society
Comité Antarctique Française de l'Année Géophysique Internationale (2 items)
Comitato Glaciologico Italiano
Defence Research Board of Canada (12 items)
Department of External Affairs, Antarctic Division, Melbourne
Department of Internal Affairs, Pennsylvania
Expéditions Polaires Françaises (5 items)
Geological Society of America
Geophysics Research Directorate, U.S. Air Force, Bedford, Mass.
International Association of Scientific Hydrology (5 items)
International Union of Geodesy and Geophysics
Institut Géog. Univ. Nicolas Copernicus, Torun, Poland
Kommissionen for Videnskabelige Undersøgelser i Grønland (3 items)
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Sveriges Geologiska Undersökning
Swiss Foundation for Alpine Research (11 items)
The Royal Society of London
University of Idaho (2 items)
U.S. Antarctic Projects Officer (4 items)
U.S., H.Q. Department of Army, Chief of Engineers, Washington

OTHER BOOKS RECEIVED

Donor	
U.S.S.R. Academy of Sciences Library	Guide Book - Library of the Academy of Sciences of the U.S.S.R. Academy of Sciences of the USSR Press, Moscow, 1959. 112 p., illus., 21 cm.
Norsk Geografisk Tidsskrift	Isavsmeltnings - Tidens Drenering. By J.Gjessing. Ad Novas, No. 3, Universitets Forlaget, Oslo, 1960. 492 p., illus., maps, 25 cm. Kr. 18.
Barnes, M., and Feuz, Dr Ernst	The Mountain World. Allen & Unwin, London. Schweizerische Stiftung für Alpine Forschungen, 1946, 1947, 1953, 1954, 1955, 1956/57.
Porter, Edward C.	Glacières or Freezing Caverns. By Edwin S. Balch. Allen, Lane & Scott, Philadelphia, 1900. 310 p., illus., 25 cm.

DUPLICATE PAPERS. A list of papers still available for distribution to members can be obtained from the Editor of the "Journal", Little Dane, Biddenden, Ashford, Kent.

Reviews

ELEMENTS OF GEOLOGY. JAMES H. ZUMBERGE. John Wiley & Sons Inc., New York, Chapman & Hall, London, 1958. 382 p., illus., 23 cm. 44s.0d.

Professor Zumberge's glaciological work is known to many readers of the Journal. In producing one more elementary textbook of geology, his objective is to provide a basis for a one-semester course in geology. The first half deals with the earth, its crust, and processes modifying its surface form from within and at the surface. The second gives an outline of historical geology. The latter is almost wholly North American, and this is largely true of the illustrations included in the first half.

Comprehensive coverage is attempted by including such topics as sedimentary facies, palaeontology and economic geology, incidentally in the historical section. The degree of continuity maintained with such a miscellaneous content is quite remarkable. Although the text is lucid, the illustrations excellent, and the general format attractive, the mode of treatment does not command it as an introductory textbook for further study. Nevertheless it is likely to go a long way to meet the need of the large body of American students taking a single course of geology as a cultural subject. To potential readers who wish to obtain a general idea of what geology is it can be warmly recommended.

SCHNEE UND LAWINEN IN DEN SCHWEIZERALPEN, WINTER 1957/58. Winterbericht des Eidg. Institut für Schnee- und Lawinenforschung, Weissfluhjoch/Davos. Nr.22. Druck und Verlag Buchdruckerei, Davos A.G., Davos-Platz, 1959.

This well-produced publication records the winter's work of the Swiss Federal Institute for Snow and Avalanche Research. It contains details of weather, snow conditions, snow and avalanche research. Dr Th. Zingg has written the introduction, in previous issues written by the Director of the Institute, Dr M. de Quervain. Dr Zingg also writes on the local weather and climate, and in another section deals with snow and avalanche research in the Parsenn district of Davos.

Dr M. Schild handles the snow and avalanche conditions. Many accidents have again occurred and are described in greater detail than usual. It is surprising to learn that after many warnings in the literature of avalanche research, many accidents are still due to ignorance or to carelessness of snow and weather conditions. One would have thought that by now the public had become aware of the dangers.

An interesting report is presented by Herr H.R. In der Gand on the sliding of a snow mass on a smooth slope.

GLACIAL MAP OF THE UNITED STATES EAST OF THE ROCKY MOUNTAINS. Published by the Geological Society of America.

This map was compiled and edited by a committee of the Division of Earth Sciences, National Research Council, Washington, D.C., consisting of R.F. Flint (Chairman), Roger B. Colton, R.P. Goldthwait and H.B. Willman. The base plan was prepared from the U.S. Geological Survey Map of the United States, 1958.

As its title implies it deals with the territory bounded by the Rocky Mountains, the Canadian borderland, Long Island, the northern Appalachians and the unglaciated country roughly along the 37th parallel. Eleven different colours show the various deposits - glacial drifts and moraines. Other markings include direction of ice flow, and striations. The map is published in two sections, east and west, each measuring 3' 6" x 3' 0". The west section gives detailed notes grouped by States, and the east section gives the sources of data. As a comprehensive view of the former ice cover of this vast territory, this map is wholly admirable. The work that has gone to its compilation must have been enormous.

The price of the whole map is $6.00, and it can be obtained from the Geological Society of America, 419 West 117th Street, New York 27.

New Members

New members of the Society since January 1960 are:
Bibby, H. Mason, Fellside Cottage, Chapel Stile, Ambleside, Westmor.
Carlson, Dr William S., President, University of Toledo, Toledo 6, Ohio, U.S.A.
Clark, P.N., Imperial College Union, Prince Consort Road, London S.W.7.
Claus, Albert C., 105 N. Lancaster Street, Mount Prospect, Ill., U.S.A.
Cleator, J.A., 62 View Road, Rainhill, Liverpool, Lancs.
Connally, Gordon, Department of Geology, Michigan State University, East Lansing, Mich., U.S.A.
Dempsey, H. Stanley, 1717 Winfield Avenue, Indianapolis 22, Ind., U.S.A.
Edwards, K.A., 8 Goldsboro' Avenue, Marton, Blackpool, Lancs.
Evans, Dr S., Scott Polar Research Institute, Lensfield Road, Cambridge.
Farman, J.C., c/o F.I.D.S., 4 Millbank, London S.W.1.
Fordham, Derek, 22 Maclean Road, Honor Oak Park, London S.E.23.
Francis, Henry S., Jr., 1754 P Street N.W., Washington, D.C., U.S.A.
Gillis, William T., Department of Botany, Michigan State University, East Lansing, Mich., U.S.A.
Grimshaw, C.K., Ramwells, Windy Harbour Lane, Bromley Cross, Bolton, Lancs.
Hallett, J., Meteorology Department, Huxley Building, Imperial College, South Kensington, London S.W.7.
Kelly, M.R., Department of Geology, The University, Birmingham 15.
LaChapelle, Edward R., Department of Meteorology and Climatology, University of Washington, Seattle 5, Wash., U.S.A.
Platt, C.M.R., Royal Technical College, P.O. Box 30197, Nairobi, Kenya.
Prather, Barry, 807 East Capitol, Ellensberg, Wash., U.S.A.
Reid, John R., Department of Geology, University of Michigan, Ann Arbor, Mich., U.S.A.
Rhodes, C.C.J., Knossington Grange, Nr. Oakham, Rutland.
Searle, D.J.H., Department of Geography, The University, 341 Bristol Road, Birmingham 5.
Stuart, Alfred W., Ohio State University, Institute of Polar Studies, 125 South Oval Drive, Columbus 10, Ohio, U.S.A.
Trent, Dee D., 4413 W.59th Place, Los Angeles 43, Calif., U.S.A.
Vondra, Carl F., 4245 Miller Street, Omaha 7, Nebraska, U.S.A.
Wetmore, Clifford M., Department of Botany, Michigan State University, East Lansing, Mich., U.S.A.

BRITISH GLACIOLOGICAL SOCIETY

c/o Scott Polar Research Institute, Lensfield Road, Cambridge

President and Honorary Editor of the Journal of Glaciology G. SELIGMAN

Secretary: MRS. H. RICHARDSON

DETAILS OF MEMBERSHIP

Membership is open to all who have scientific, practical or general interest in any aspect of snow and ice study. Forms for enrolment can be obtained from the Secretary. No proposer or seconder is required. Annual subscription rates are as follows:

Private members—	Sterling:	£2 0s. 0d.
	U.S. dollars:	$6.00
Junior members (under 23)	Sterling:	15s.
	U.S. dollars:	$2.40
Institutions, libraries—	Sterling:	£2 10s. 0d.
	U.S. dollars:	$7.30

(The dollar rates include Bank conversion charges)

Further details may be found in the Journal of Glaciology, published in March and October.

I C E

Editor: MRS. H. RICHARDSON

This news bulletin is issued free to all members and subscribers of the British Glaciological Society, and is published in January and July. Contributions should be sent to Mrs. H. Richardson, c/o Scott Polar Research Institute, Lensfield Road, Cambridge, to arrive not later than the 15 November and 15 May.

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