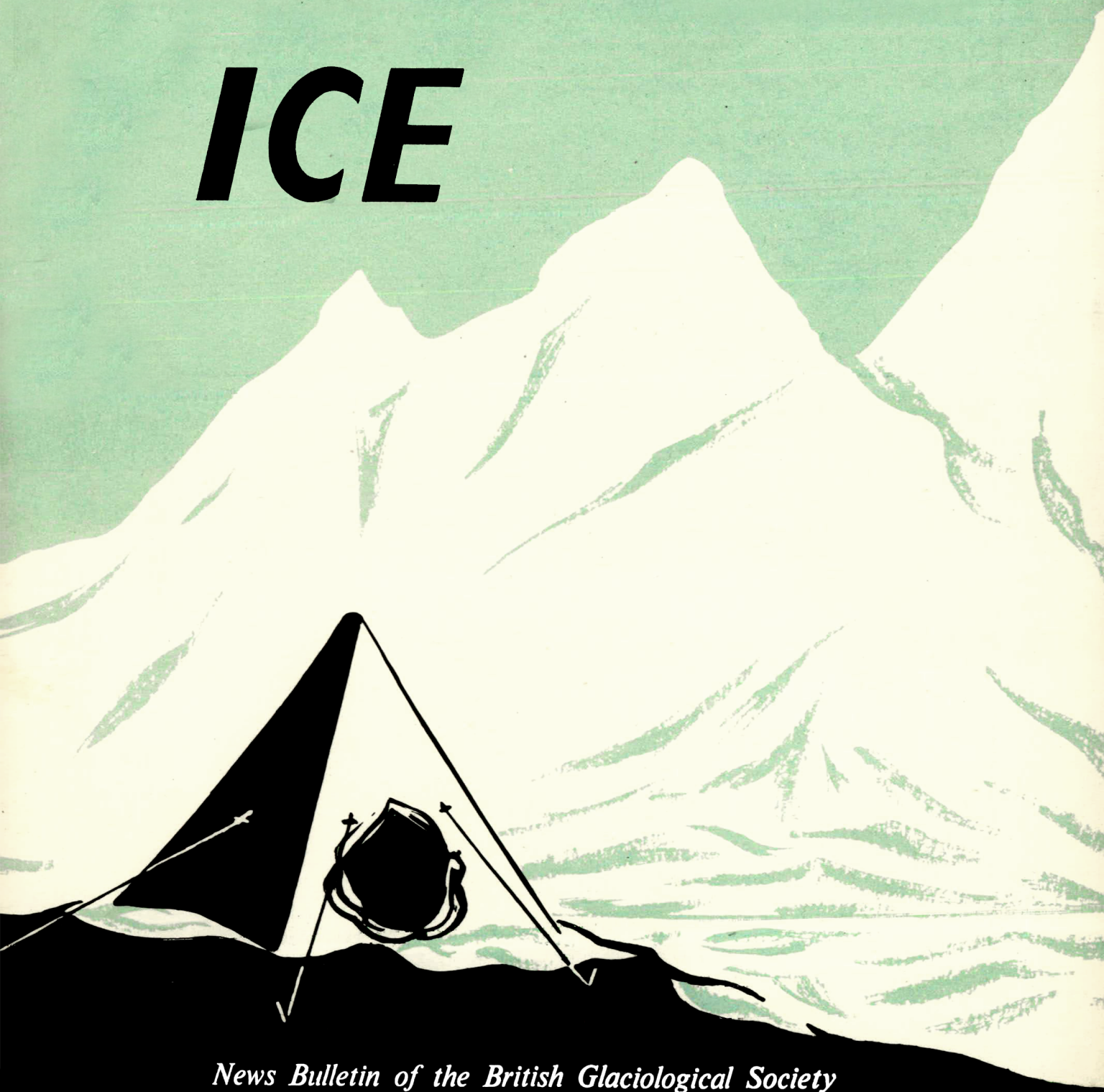


NUMBER 2

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ICE



News Bulletin of the British Glaciological Society



The Scott Polar Research Institute, Cambridge, where the office of the British Glaciological Society is housed. (See article inside back cover).

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EQUIPMENT FOR SALE. Members who wish to sell surplus equipment may advertise in Ice. The charge will be 5/- (or \$0.75 if paid in U.S. dollars) for three lines. Name and full address must be given. Advertisements should be sent to the Editor of Ice.

INDEX TO VOLUME 2 OF THE JOURNAL OF GLACIOLOGY. This has now been published; all members and subscribers who have placed orders should soon receive their copies. The main author of the Index is John A. Heap, who has worked long and hard on a complicated and wearisome job. We would like to express our thanks both to Mr Heap and to the many others who have helped in compiling the Index.

SUBSCRIPTIONS. This cri du coeur comes from your worried Secretary. There are several members who have still not paid their 1958 subscriptions, or even those for 1957. Those members who are not fully paid up by the end of 1958 will NOT receive Journals in 1959.

THE CLASSIFICATION OF GLACIOLOGICAL SUBJECTS. For some years J. W. Glen and B. B. Roberts, representing the British Glaciological Society and the Scott Polar Research Institute respectively, have been preparing, and negotiating international agreement on, a revision and extension of the sections of the Universal Decimal Classification relating to glaciological subjects. The new sections, in particular 551.32/.34, 624.139 and 624.14, are published in "Extensions and corrections to the UDC", Series 3, No. 3, (F.I.D. Publ. No. 248/3 : 3), The Hague, International Federation for Documentation, February 1958.

A roneoed statement of the full schedule of interest to glaciologists ("Classification of snow, ice, frozen ground, and related subjects", Scott Polar Research Institute, Cambridge, 6 May 1958, 58p.) is being issued with the agreement of the British Standards Institution, copyright holders of the Universal Decimal Classification in the United Kingdom. A limited number of these are available for distribution, and may be obtained from the Secretary of the British Glaciological Society for the cost of postage (1s.).

INTERNATIONAL GEOPHYSICAL YEAR

The Society, as World Data Centre C, Glaciology, has so far received reports from the following places:-

Station	Programme	Position		Period
Northern Ellesmere Island Operation Hazen (Canada)	Glaciological observations	89° 71°	49' N. 18' W.	8 May - 8 August 1957 and 2 May 1958 -
Tasman Glacier (New Zealand)	Glaciological observations	43° 170°	44' S. 06' E.	21 June - 6 November 1957.
Southern Alaska (U. S. A.)	Glaciological observations	60° - 143° -	64° N. 150° W.	June - September 1957.
Alaska and Mount Olympus, Washington (U. S. A.)	Glacier photogrammetry and mapping			June - September 1957.
Cascade Mountains (U. S. A.)	Glaciological observations	48° 121°	N. W.	11 July 1957 - 27 May 1958.
Byrd Station, Antarctica (U. S. A.)	Antarctic drilling	80° 120°	00' S. 01' W.	16 December 1957 - 26 January 1958.

FIELD WORK

The following accounts are a selection from the many we have received. The Editor will be pleased to receive contributions from other countries for publication.

CANADIAN OPERATION HAZEN. 1957 - 1958 (NORTHERN ELLESMERE ISLAND). This operation in the Lake Hazen region of Northern Ellesmere Island has been organised as part of the Canadian I.G.Y. programme. During the Summer of 1957 the party was led by one of our members, G.Hattersley-Smith.

A hutted base camp on the shore of Lake Hazen and a camp on the Gilman Glacier at about 3,500 ft. were established by aircraft in April - May 1957. Measurements of accumulation and ablation were made from the glacier snout at 1,300 ft. to the highest part of the ice cap, which maintains a height of 6,000 - 6,500 ft. over a wide area. Mount Oxford, reported as being 9,000 ft. high by the Oxford University Expedition in 1935, was found to be only about 7,300 ft. high. Seismic profiles were shot on the glacier at intervals of 1 to 2 miles from a distance of 15 miles from its snout. Other studies included micrometeorology, glacier temperatures, crystal structure and flow measurements.

MAKERERE COLLEGE RUWENZORI RECONNAISSANCE. December 1957 - January 1958. This reconnaissance was carried out by four members of the Makerere staff including F.P.Henderson as Leader and Geologist, and J.B.Whittow as Glaciologist. A base camp was established at 13,000 ft. and a camp close to the Elena Glacier at 14,800 ft. A preliminary survey was made of the Elena Glacier, a list compiled of the Ruwenzori glaciers, orientated photographs taken from marked sites for comparison with earlier photographs, and estimates made of glacier area, volume, altitude, and regime. A complete report is filed in the Society's office in Cambridge.

GLACIOLOGY IN THE NEW ZEALAND ALPS. The New Zealand Geological Survey has started a programme of regular observations of accumulation, motion, and ablation on the Tasman Glacier. The first visit was in June 1957 when R.P.Goldthwait supervised the placing of stakes and the digging of snow pits, and some initial surveying. Since then two further visits have been made, in late October 1957 and April 1958, at what was intended to be the end of the 1957 winter accumulation period, and the end of the 1957-58 summer ablation period. Unfortunately, in the last summer precipitation was unusually heavy, both as late winter and late summer snow, and as heavy rain at high altitudes in mid-summer. Thus in the névé the 1957 snow pack, hardened by summer rain, was by April 1958 already covered by several feet of snow, and there has been unusually deep channelling on steep sections of the glacier ice by surface streams during heavy rain storms.

It is evident though, that both thickness of accumulated snow in the névé and loss of surface ice by ablation at lower levels is greater each year than was originally expected. It has not been practicable so far to sample more than one year's snow at a time in snow pits because of the great depth of snow cover each year, and poles drilled into the ice at lower altitudes will have to be sunk deep to be preserved during heavy ablation periods.

After experience has been gained and techniques suitable for New Zealand conditions have been worked out on the Tasman, it is hoped to extend regimen studies to two contrasting glaciers on the west and east side of the Alpine chain.

AMERICAN GEOGRAPHICAL SOCIETY, I.G.Y. PROJECTS. The American Geographical Society, as well as acting as World Data Centre A in Glaciology, is directing several glaciological field projects, and some information on the progress of these projects is included in a duplicated report from that Society dated December 10, 1957.

This group has concentrated on those glaciers which have been studied previously, and the work has consisted mainly of surveying, record photography, botanical dating of recession and of previous advances and firn line elevation determination. Glaciers worked on include Portage, Oxyria, Raven, Spencer, Bartlett, Trail, Black Rapids, Canwell, Castner, Gulkana, Muldrow, Tazlina and Matanauska Glaciers and the glaciers of Prince William Sound. In all 18 terminal surveys were made.

PHOTOGRAMMETRIC STUDIES OF SELECTED ALASKAN GLACIERS. This project has as Principal Co-ordinator Charles B. Hitchcock, the Director of the American Geographical Society, and as Technical Advisor O. M. Miller. The Field personnel in 1957 were A. S. Post, Leader, J. B. Case, Photogrammetrist, R. D. Long, Assistant.

Large scale maps (at 1 : 5000 and 1 : 10000) were prepared of selected glaciers with contour intervals on the glaciers of 5 m. The field data required for maps of Worthington Glacier in the Thompson Pass area, Polychrome Glacier, McKinley Park and West Gulkana Glacier in the Delta River area were completed during 1957, both from ground photography and from air photographs (taken by the U.S. Navy).

GLACIER DYNAMICS ON THE BLUE GLACIER, MOUNT OLYMPUS, WASHINGTON. The Field Personnel in the Summer of 1957 included C. S. Benson, M. F. Meier, and R. P. Sharp. Sufficient information has been compiled from seismic surveys on several profiles to give a reasonably good representation of the shape of the trough in which this glacier lies. Preliminary data on surface flow velocity suggest a maximum velocity in the centre line of about 15 cm. per day. Ablation here was close to 30 cm. of ice per week during August, and was surprisingly uniform over the entire Glacier below the firn limit. Two bore holes were driven into the ice, one to a depth of 122 metres and the other to 222 metres; inclinometer surveys will be made for several years to come. Exploratory studies of ice fabrics and surface features were made, and stratigraphic studies of firn completed in two pits, one on the lower Blue Glacier and one on the snow dome.

Other projects in the United States I. G. Y. programme include

- (a) A detailed study of the McCall Glacier in the Brooks Range of Alaska with a view to climatological interpretation; a programme directed by the Arctic Institute of North America.
- (b) A detailed study of the Blue Glacier in the Olympic Mountains, Washington, with particular emphasis on regimen and micro-meteorological studies; this is directed by R. E. Church and E. La Chapelle is Senior Scientist.

There are also projects for the investigation of glacier fluctuation in the Cascades and Sierra Nevada, and, of course, the work of S. I. P. R. E. in Greenland, of the Juneau Ice-field Research Project and the Arctic drifting stations and Antarctic stations, all of which are directed by other organisations than the I. G. Y. Committee, but from which data will come to the British Glaciological Society in our capacity as World Data Centre C.

SOVIET GLACIOLOGICAL INVESTIGATIONS FOR THE I. G. Y. The Soviet Union, according to information issued just before the start of the I. G. Y., planned to have twelve glaciological stations in operation - nine in the Arctic and three in the Antarctic. These were expected to be located as follows.

Arctic.

Bukhta Tikhaya (80° 20' N., 52° 48' E.), a long-established polar station in Zemlya Frantsa-Iosifa. It is not known which glaciers in the area are to be studied.

Russkaya Gavan' (76° 11' N., 62° 57' E.), also a long-established polar station, in Novaya Zemlya. The intention was to work in particular on Lednik Shokal' skogo, a glacier on which work was done in 1932-33 by M. M. Yermolayev.

Khibiny (67° 43' N., 33° 15' E.), south of Murmansk. There is an existing weather station here.

Polyarnyy Ural (64° 30' N., 58° 50' E.), where a new station was to be set up. Several glaciers have been discovered in this region since 1952, and some work has been done on them. Another was discovered in 1956 some 50 miles south of the station, and this is the most southerly glacier yet found in the Urals.

Mus-Khaya (62° 30' N., 141° E. approx.), a mountain in the upper Indigirka region. Glaciers were discovered here in 1939. The station, which is primarily meteorological, was set up in 1956 at a height of 2,000 m.

Zagorsk (56° 30' N., 38° E.), outside Moscow. There is an existing weather station here. El'brus (43° 25' N., 42° 30' E.), the peak in the Caucasus where there has been a glaciological station for some years.

Lednik Karabatkak (42° N., 78° E. approx.), in the Tyan'-Shan' mountains south of Ozero Issyk-Kul'. Work has been done on this glacier since 1944, and a new station was to be built.

Lednik Fedchenko (39° N., 72° E. approx.), in the Pamirs. There has been a weather station half way up the 70 km. long glacier since 1932. It was proposed to build two glaciological stations: one in the firn zone, at about 5,000 m., and the other at the terminal moraine.

Antarctic

Mirnyy (66° 37' S., 93° E.), the coastal station of the Academy of Sciences' Antarctic Expedition. A bore-hole was sunk 370 m. into the ice just south of Mirnyy, and much work has been done on the surrounding ice sheet, the Shackleton Ice Shelf, and the ice-free area known as "Bunger's Oasis" not far away.

Vostok (78° 27' S., 87° 35' E.), was established on the inland ice sheet in December 1957 at a height of 3,500 m.

Sovetskaya (78° 24' S., 87° 35' E.), also on the inland ice sheet, was established in February 1958 at a height of 3,700 m. This is a temporary location for the station, and it is hoped to move it in the 1958-59 season a further 600 km. S. W. to the location originally planned at 82° S., 55° E. approx. - the "Pole of Relative Inaccessibility" area.

The planned programme at these stations was normally to include observations of regime, temperature gradients, run-off, structure, thickness, movement, snow cover and geomorphological action. At Khibiny and Zagorsk there are no glaciers, so these stations are presumably included for the purpose of snow cover investigations. At the Antarctic stations there is greater emphasis on ice features not found at the Arctic stations and on ice thickness. There has been a large mobile glaciological party in the 1957-58 season, led by P.A. Shumskiy, and this obtained many field observations, including nineteen seismic soundings between Mirnyy and Pionerskaya, a support station 375 km. inland.

FALKLAND ISLANDS DEPENDENCIES SURVEY. During 1957 glaciological observations for the I.G. Y. were carried out at South Georgia and at Admiralty Bay, King George Island. The programme was directed mainly towards gaining information on the economy and activity of glaciers during the budget year, their relationships with meteorological events, the fluctuations in glacier behaviour over the past 50 years, the climatological setting and the glacial regime.

At South Georgia J. Smith and R.A. Brown worked mainly on a small corrie glacier and on the Hamberg Glacier, a valley glacier, situated near Grytviken on the north coast of the island. In addition to mapping both glaciers with some accuracy they were able to obtain data on ablation, accumulation, discharge and calving, temperature profiles at various sites for the whole year and glacier surface movement. It was concluded that both these glaciers are temperate. Accumulation at various heights was also studied on the Esmark Glacier by pitting. A number of glaciers were surveyed in some detail with a view to studying snout movement and calving. A gazetteer for South Georgia has been compiled, giving the name, type and area of each glacier. J. Smith was able to devote some time to Quaternary studies which have revealed valuable information on the climatic fluctuations since the Pleistocene glacial maximum.

At Admiralty Bay, in the South Shetland Islands, a small corrie glacier and an outlet valley glacier were studied by H.M. Noble. Both glaciers were surveyed in detail in connexion with surface movement observations. Accumulation and ablation information was obtained in addition to the temperature profiles. It was found that the front of the West Stenhouse Glacier advanced 100 metres during the budget year. The position of the glacier front was surveyed at frequent intervals during advance and after calving. It is believed that both these glaciers are temperate types.

Accumulation and ablation observations are now carried out at all stations in the Falkland Islands Dependencies as an integral part of the meteorological programme.

Full details of the work referred to above will be available in due course.

During 1958 the glaciological programmes at South Georgia and Admiralty Bay will be continued, and some preliminary observations will also be made at Hope Bay, north-east Graham Land.

EXPEDITION GLACIOLOGIQUE INTERNATIONALE AU GROENLAND. We have received news of the work done during 1957. Professor R. Finsterwalder is President of the expedition, Dr B. Fristrup is Vice-President, M. P-E. Victor is Leader and Professor A. Bauer is Secretary. During preparatory work in the Alps members of Professor Cagniard's applied physics laboratory measured the telluric currents and took electrical soundings on the Glacier de Saint Sorlin, using new methods which will be of value to the expedition. On the Aletschgletscher, under the direction of Professor Kobold, a tellurometer was successfully used for measuring distance. Professor Lichte and Dr Hofman have improved methods for determining altitude. Professor Renaud experimented further with his radio-active tritium method for determining annual accumulation.

In Greenland, reconnaissances during 1957 produced maps and aerial photographs of the routes from Søndre Strømfjord to the inland ice sheet, of the working zones for the expedition, of the crevassed areas connected with these working zones, and of the movement and iceberg formation of the 20 glaciers flowing out of the inland ice sheet into the Disko Bugt and Umanak bay.

CAMBRIDGE SOUTH-EAST ICELAND EXPEDITION 1957. The report of the expedition's work has now been published, and a copy sent to the Society's Library.

TRANS-ANTARCTIC EXPEDITION. The Society sent telegrams of congratulation to the expedition on its achievements. We plan to give a dinner in London in honour of Sir Vivian Fuchs and those mainly concerned with glaciology, on a date to be announced later.

Glaciological work of the Trans-Antarctic expedition comprised studies of precipitation and snow drift at Stations Shackleton and South Ice with observations on stratifications, density, crystal orientation and temperature to a depth of 15 metres in a dug pit and to a depth of 45 metres in a bore hole. Notes on glacial geomorphology were made in the Shackleton Range of mountains.

On the journey across the continent, seismic soundings were recorded at intervals of 30 to 50 miles with values of gravity observed at seismic and intermediate stations. Height control was by aneroid barometer correlated with the synoptic situation deduced from I.G. Y. Station Meteorological reports. The bore hole for the seismic shot (which ranged from 2 to 11 metres) was used for observations on snow stratification, density, grain size and temperature. Sastrugi types and orientation were noted.

OXFORD UNIVERSITY MOUNTAINEERING CLUB STORSTEIN EXPEDITION, 1957. This expedition, which we reported briefly in the last issue, has sent to the library of the Society copies of its general and glaciological reports, the map which they made of the glacier they studied, and a series of 22 photographs. The main glaciological work was to record the present position and appearance of the small glacier flowing south from the Storsteinsfjell massif, south of Narvik and at lat. $68^{\circ} 14'$ N. long. $17^{\circ} 50'$ E. Moraine cover and ice bands on this glacier are described in detail, and a short run of ablation measurements was made near the snout. The retreat of the snout during this period was also measured. Weather conditions for this period are listed.

INTERNATIONAL MEETINGS

PERMAFROST RESEARCH MEETING. On 27 March, 1958, a private meeting was held in Ottawa under the auspices of the National Research Council's Associate Committee on Soil and Snow Mechanics to review the present status of permafrost research in Canada. About thirty attended the meeting. American visitors were all experts in this field and included A. L. Washburn who had just returned from I. G. Y. work in the Antarctic. Current permafrost research work was reviewed and future plans of the N. R. C.'s Division of Building Research were reviewed. It is hoped that a paper, based upon this meeting, may shortly be submitted to the Journal of Glaciology.

SYMPOSIUM ON THE BEARING STRENGTH OF ICE. 40 scientists and engineers from Canada and the United States attended a symposium held in Ottawa on 16 and 17 April. Field practice and theory related to the bearing strength of ice were discussed.

Two methods of predicting the bearing strength of an ice sheet are in use today. One method is empirical, using past experience gained in the field as a basis for prediction. Papers presented on the preparation and use of log dumps on frozen lakes and rivers showed the vast amount of practical knowledge that has been accumulated by the pulp and paper industry in Canada.

The second method of predicting ice bearing strength requires a knowledge of the distribution of the load on the ice and the mechanical properties of the ice. This approach is necessary when estimating the safe ice thickness required for landing aircraft or when the situation requires that the safety factors be reduced to a minimum. There was much discussion on papers which dealt with methods of measuring the elastic properties and strength of ice in the field. Model studies of elastic plates on elastic foundations were outlined and a theoretical paper presented on the deflection of the narrow infinite wedge on an elastic foundation.

The influence of vehicle speed on bearing strength considerations was discussed and the meeting recommended that a questionnaire be prepared on which to record pertinent information related to the failure of an ice sheet under load. These forms would be distributed to all groups who operate on frozen lakes and rivers.

The papers presented at the meeting are to be published and made generally available. Further information can be obtained by writing to the Secretary, Associate Committee on Soil and Snow Mechanics, National Research Council, Ottawa, Canada.

MEETING FOR GLACIOLOGY AND HIGHER ALPINE RESEARCH. OBERGURGL - 18 - 25 AUGUST 1957. This Meeting was held with a programme similar to that of two years ago, but this year it was in special relation to the planned International Glaciological Expedition to Greenland. There were 50 participants. About 20 lectures were given dealing with the following subjects:- The geographical, geological and meteorological problems of glaciers and the high mountains; the latest results of Himalaya and Karakorum expeditions; the recent advances of the glaciers in north-western United States; traces of the Ice Age in High-Semien in Ethiopia; methods of periglacial research and the physical aspects of ice movement.

Professor A. Bauer reported on the French polar expedition to Greenland and to Terre Adélie from 1949 until the present day with special reference to the aerial investigation of the great Jakobshavn Glacier in western Greenland. Professor A. Renaud explained his new methods of ascertaining the age of ice by the C_{14} method and other physical-chemical researches on glacier ice.

Several excursions to the glaciers in the neighbourhood were also made in order to show and explain the methods of photogrammetric glacier research.

ARCTIC SEA ICE CONFERENCE, EASTON, MARYLAND, 1958. The United States National Academy of Sciences - National Research Council convened a conference on arctic sea ice at Easton, Maryland, on 25 - 27 February 1958. The conference was attended by over 80 participants from nine countries, and it was the first time that this subject had been discussed by so large and representative an international gathering.

Sessions were arranged as follows:

Distribution and character of sea ice

Chairman: Dr T. E. Armstrong (Scott Polar Research Institute, Cambridge).

Distribution and character of sea ice in the European Arctic, by Dr F. Nusser (Deutsches Hydrographisches Institut, Hamburg).

Classification of Arctic ice and its distribution in the Soviet sector of the Arctic, by A. A. Kirilov (Arkticheskiy Nauchno-Issledovatel'skiy Institut, Leningrad).

Present glacialization of the Arctic, by Prof. G. A. Avsyuk (Institut Geografii, Moscow).

An ice atlas of the North American Arctic, by Dr C. W. M. Swinbank (Scott Polar Research Institute, Cambridge).

Sea ice observing and reporting techniques

Chairman: Dr Helge Thomsen (Dansk Meteorologisk Institut, Copenhagen).

The present situation of sea ice observation in Japan, by Prof. K. Kusunoki (Institute of Low Temperature Science, University of Hokkaido).

Arctic ice observational methods, by Prof. A. F. Laktionov (Arkticheskiy Nauchno-Issledovatel'skiy Institut, Leningrad).

Sea ice observing and reporting technique in the Baltic, by Dr B. Rodhe (Svenska Meteorologiska och Hydrologiska Institut, Stockholm).

Aerial ice observing and reporting, by Dr H. V. French (U.S. Navy Hydrographic Office, Washington).

The utilization of aerial photographs in sea ice forecasts, by Dr G. Teleki (U.S. Navy Hydrographic Office, Washington).

Physics and mechanics of sea ice

Chairman: Dr E. R. Pounder (McGill University, Montreal).

Preliminary results of thermal budget studies on arctic pack ice during summer, by Dr N. Untersteiner (University of Washington, Seattle).

The structure of sea ice - a progress report, by Dr W. F. Weeks (Washington University, St. Louis).

Physical and mechanical properties of arctic ice and methods of research, by I. S. Peschanskiy (Arkticheskiy Nauchno-Issledovatel'skiy Institut, Leningrad).

Composition of sea ice and its tensile strength, by Dr A. Assur (Snow, Ice, and Permafrost Research Establishment, Chicago).

Studies on visco-elastic properties of sea ice, by Prof. T. Tabata (Institute of Low Temperature Science, University of Hokkaido).

Model for determining sea ice properties, by D. L. Anderson (Geophysics Research Directorate, Boston).

Sea ice formation, growth and disintegration

Chairman: Prof. G. A. Avsyuk (Institut Geografii, Moscow).

On the growth rate of sea ice, by Prof. A. G. Kolesnikov (Moscow University).

Estimation of sea ice formation and growth, by Dr L. S. Simpson (U. S. Navy Hydrographic Office, Washington).

On the formation and growth of sea ice, by Prof. T. Tabata (Institute of Low Temperature Science, University of Hokkaido).

Solar radiation as the chief component of the heat balance of the arctic ice, by G. N. Yakovlev (Arkticheskiy Nauchno-Issledovatel'skiy Institut, Leningrad).

Drift and deformation of sea ice

Chairman: Col. J. O. Fletcher (U. S. Air Force)

The movement of ice in the Arctic Ocean, by Miss I. M. Browne and A. P. Crary (Geophysics Research Directorate, Boston).

Arctic ice drift, by P. A. Gordiyenko (Arkticheskiy Nauchno-Issledovatel'skiy Institut, Leningrad).

A theory on the steady drift of sea ice due to wind on the frozen sea, by T. Fukutomi (Institute of Low Temperature Science, University of Hokkaido).

Sea ice prediction techniques

Chairman: J. J. Schule, Jr. (U. S. Navy Hydrographic Office, Washington).

Methods used in the ice service of the Baltic, by Dr E. Palosuo (Havsforkningsinstitutet, Helsingfors).

Continuity aids in short range ice forecasting, by W. I. Wittman (U. S. Navy Hydrographic Office, Washington).

In addition, the following papers were read outside the sessions listed above:

The Baltic Sea as an object of ice studies, with the Arctic Sea as a reference, by Dr I. Hela (Havsforkningsinstitutet, Helsingfors).

Economics of surface transportation in sea ice, by Rear-Admiral C. W. Thomas (U. S. National Committee for the I. G. Y., Washington).

Ice and the icebreaker: a study in types of ice encountered in icebreaker operations, by Capt. O. A. Peterson (U. S. Coast Guard, Cleveland).

The National Academy of Sciences hopes to publish the transactions of the conference later in the year.

SYMPOSIUM ON THE PHYSICAL ASPECTS OF ICE MOVEMENT. The Symposium will be held in Chamonix, France, from the 16 - 24 September 1958. Many members of the Society expect to attend, including the President, the Secretary and several Committee members. Professor P. A. Shumskiy, recently appointed the Society's correspondent for the U. S. S. R., also hopes to attend.

NEWS

L.C.W. Bonacina has been awarded the Hugh Robert Mill medal and prize of the Royal Meteorological Society.

Sir Vivian Fuchs has been awarded the Special Gold Medal of the Royal Geographical Society. The last occasion on which such a medal was awarded was in 1910 when it was given to Robert E. Peary, of the U.S. Navy, the first man to reach the North Geographical Pole; previous British recipients were Capt. R. F. Scott, R.N. (in 1904) and Sir Ernest Shackleton (in 1909). Sir Vivian has also been awarded a Clasp to the Polar Medal, and, among many other honours, has been elected a member of the Athenæum Club under the rule which empowers the Committee to select persons of distinguished eminence in science, literature, the arts, or public service.

J. T. Hollin is now Chief Glaciologist at "Wilkes" Station, Antarctica.

K. Kusunoki was a member of the summer party of the Japanese Antarctic Research Expedition, which established an observation station on Ongul Island in the Lutzow-Holmbukta of the Prins Harald Kyst.

R. F. Leggett, Director of Building Research, N.R.C. Canada, has been appointed Vice-President for North America of the International Society of Soil Mechanics and Foundation Engineering.

Professor D. Linton delivered the Presidential Address on "The everlasting hills" in the Geology Section of the British Association for 1957.

Hal Lister has received a Clasp to the Polar Medal for his work on the Trans-Antarctic Expedition.

M. M. Miller has been appointed Senior Scientist for Research in the Department of Geology at Columbia University in the City of New York, where he will study the ice cap and ice shelf in Ellesmere Land and his continuing programme in the Alaskan Coast Range.

A. G. MacGregor has been elected a Councillor of the Royal Society of Edinburgh.

Professor N. E. Odell delivered two lectures in the new Geological Institute of Oslo University on the geology and geography of New Zealand, and attended the Golden Jubilee dinner of the Norsk Tinder-klub.

Miss M. M. Sweeting will spend the academic year 1958/59 as a lecturer in the Geography Department of the University of Canberra, Australia.

Sir George Simpson, K. C. B., F. R. S., has been elected an Honorary Member of the Royal Meteorological Society.

Jon Stephenson has received the Polar Medal for his work on the Trans-Antarctic Expedition.

H. Wexler is the Chief Scientist U.S. - I.G. Y. Antarctic Program National Academy of Sciences, Washington, D.C.

Walter A. Wood was elected President of the American Geographical Society in 1957.

The Society has received, through the courtesy of the American Geographical Society, a few unbound copies of Problems of Polar Research for distribution to members. This is a series of papers published in 1928 (see further details under "Books received"). Members can obtain a copy of this work on remittance of 2/6d to cover postage and packing. Application should be made to the Editor - Journal of Glaciology, Little Dane, Biddenden, Kent.

REVIEWS

PRINCIPES DE GLACIOLOGIE STRUCTURALE. LA PETROGRAPHIE DE LA GLACE COMME METHODE D'ÉTUDE GLACIOLOGIQUE. P. A. SCHOUMSKY. Traduction par J. PIETRESSON DE SAIN-AUBIN et A. BAUER. Annales du Centre d'Études et de Documentation Paléontologiques, No. 22, 1957, 309p. 124 figures. 10,000 F.fr.

This is a translation of *Osnovy Strukturnogo Ledovedeniya ...* by P. A. Shumskiy. The original Russian book was reviewed in the *Journal of Glaciology* Vol. 3, No. 21, 1957, p. 78, by one of the translators, and a full list of the contents can be found there. The book presents a very useful survey of the structure of all the natural forms of ice, particularly from the point of view of grain size, shape and orientation and of inclusions of air or foreign matter. Although the writing is now six years old, there can be no doubt of its value today, containing as it does so much information on the Russian work in this field. The method Shumskiy advocates will undoubtedly be most important in future developments of glaciology, and this book is obviously destined to be the first reference in many future papers. For these reasons all western glaciologists are much indebted to the translators and the publishers for making this work available in a western language. The translation is scientifically very good, and no important ambiguities have arisen in translation.

The price is very high, especially for a paper-covered book, produced by the near-print process, without alignment of the righthand margins, and with all the illustrations at the back.

There are several annoying technical points, for example chemical formulae are incorrectly printed (H^2O instead of H_2O) and the symbols for crystallographic space groups are not those familiar to western crystallographers. Many of the algebraic symbols used still have suffices related to the Russian terms to which they apply, for example, most readers will not understand why *vz* is used as a suffix to indicate air, and *vd* to indicate water, unless they know that the Russian words are *vozdukh* and *voda*, while even those who know that the Russian for specimen is *proba* may be mystified by the use of the suffix πp . The bibliography is divided into two parts without explanation, and the first, which is for Russian authors, is in Russian alphabetical order, which will certainly confuse those who know nothing of the language; also, while it is no criticism of the translators that many of the papers referred to are not in the bibliography at all, it is unfortunate that many of them after two transliterations look almost unrecognisable - examples that the reviewer has noted include Megow, Fauler, Tatton, Pointing, Moos and Zeitz. There are also instances of miscopying from the Russian; the Russian term *naledy*, introduced on p. 109, is misspelled on its first two appearances, and it does not help in finding references when McConnell is once spelt Connell and elsewhere McConnell. Finally the very useful subject index in the original has been replaced by an author index, which, though useful, is no substitute.

These points are all comparatively minor, and certainly do not affect the reviewer's strong recommendation to buy the book; they have been listed in the hope that similar annoying faults will be avoided in any future translations from the Russian.

J. W. G.

THE QUATERNARY ERA. PROFESSOR J. K. CHARLESWORTH. Edward Arnold, London, 1957. 2 volumes, 1,700 p., 326 figures, 32 plates, £16. 16. 0. This monumental work, a solo effort over thirty-five years, will be for many years an indispensable work of reference for all interested in snow and ice. It is impossible to review this magnificent publication in a brief space. Volume I is in two parts: 'Glaciology' (land ice and sea ice) and 'Glacial Geology' comprising the processes of erosion and deposition associated with ice masses, and periglacial phenomena.* Volume I is thus also wholly within the field of physical geography.

* Readers may be referred to Dr Sandford's excellent review of these physical aspects in the *Geographical Journal*, CXXIII, 1947, pp. 517-20.

Volume II covers all aspects of the Quaternary era. It is generally accepted that the Pleistocene must be defined directly or indirectly in terms of a major world-wide climatic change which, though foreshadowed earlier, coincided with the onset of widespread glaciation. A general lowering of temperature and pronounced displacement latitudinally of the world's climatic zones dominated plant and animal populations and the activity of man himself for well over half a million years. An appreciation of these changes as continuing to the present is also relevant to the fields of the historian, economist and statesman.

A particularly welcome feature of the author's approach is his emphasis on the historical development of ideas, which is well supported by bibliographical references.

It is probable that in no field of scientific study is the literature problem more acute: the author's list of journals is well in excess of 200. One result of the book should be a reduction of the growing tendency to rediscover facts and principles recorded long ago, and that would surely gladden the author greatly.

It is unlikely that any one individual will ever again attempt the task which has here been so brilliantly accomplished. Congratulations to the author must be accompanied by a feeling of deep gratitude - not unmixed with awe - that will be shared by all who peruse these excellently produced volumes.

DAS GESICHT DER ERDE. BROCKHAUS-TASCHENBUCH DER PHYSISCHEN GEOGRAPHIE. (THE FACE OF THE EARTH, POCKET-BOOK OF PHYSICAL GEOGRAPHY). Ed. E. Neef, F.A. Brockhaus, Leipzig, 1956. 980 p., 19 cm. DM. 17.90.

This work gives in comparatively small compass a complete history of the development of the Earth - its many climates, its hydrology, the course of orogenesis, vegetations and the like. In spite of its 980 pages, it is of pocket size, and the print, to preserve this feature, is all too small. The geological section is an important feature and also that devoted to the origin of life and the development of Man.

At the back is a summary of all that might be called physical geography in its widest sense, and much of it should be valuable to glaciologists for that reason.

Many authorities have contributed to the various sections and several have been written by Professor E. Neef, who is also Editor of the whole work. The Index is sadly inadequate for a work covering so many subjects.

VOM GROSSEN EISZEITALTER. EDITH EBERS. Berlin, Springer-Verlag, 1957. 138 p., 77 illus. 18.5 cm. DM 7.80.

This is the sixty-sixth volume of the popular science series Sammlung Verständliche Wissenschaft, published by the Springer-Verlag under the guidance of Dr K. von Frisch. In its small size is packed much of the story of the Pleistocene and its merging into the Holocene. Its chief object is to describe the glaciological and glacial geological phenomena of the periods.

The existence of the ice cover and its geomorphological influences, more particularly in Europe and North America, are described in some detail. The chapter is headed "The ice cover in Europe, America and the rest of the world" but, actually, the detail is confined to America and Europe.

The rest of the book, as is to be expected, only summarizes briefly the development of the plant and animal world of the Pleistocene and the emergence of Man.

The book is admirably clear and anyone conversant with German, but not too conversant with the subject, would benefit by reading it. A translation into English might be a profitable venture.

PRESIDENT'S REPORT FOR 1957

(delivered at the Annual General Meeting, 5th May 1958)

The best gauge of our position at the end of 1957 is the circulation of our Journal, which goes to members and to libraries and institutions. There are also some "Free and Exchange" issues which bring us certain advantages.

The figures at present are as follows:-

Members	394
Libraries and Institutions	426
Free and exchange	56
Total	<u>876</u>

This shows an increase of about 50 from the figures in my Report for 1956. In that Report I said that we had eliminated all the "dead wood" in the form of members who had not paid their subscriptions. Unfortunately, there has been still more "dead wood" and we have had to strike off recently an additional 70 names for non-payment of subscriptions.

This falling away may be due partly to the increase in the subscription, but I think another cause is the change in the character of our Journal to one which has now little popular appeal. We could wish, however, that members dropping out would notify us of their intention. I think you will agree that, in spite of these withdrawals (there have also been 6 announced resignations) the increase in our circulation is satisfactory.

Nevertheless, the urgent need remains to increase our membership still further and I again appeal to all who hear or read this Report to help. We, for our part, are not remaining idle in this. We have increased the number of lectures held in various centres. We have changed to a more lively news bulletin, Ice, admirably edited by our Secretary, which we are now sending to all who take in the Journal, instead of only to members as was previously the case.

Our most important action, however, has been to place ourselves in touch with the Nuffield Foundation, which has now given us a Grant of £250 to be devoted to various schemes for increasing our membership. Our thanks are due to the Foundation and to Dr Frank Morley, who has been most helpful and understanding; also to Dr B. B. Roberts, who has acted on our behalf in the negotiations which have produced this encouraging result.

The Journal of Glaciology is now in its 3rd Volume and we are always trying to improve it. In this we feel in a somewhat stronger position owing to the slightly more promising financial situation and to economies we have been able to effect by changing our printers. I cannot promise any big developments yet but we shall now be able to accept one or two articles in each issue of greater length than has been possible heretofore. The Journal has been handicapped, and has lost valuable contributions from important authors, due to the not entirely justified belief - rather widespread in the U.S.A. - that we could only publish very brief papers.

During 1957 there were nine meetings of the Society in London, Oxford, Cambridge and Birmingham. We hope that we shall add to this list of venues, and shall be glad to hear from any centres, such as those in the West Country, Northern England or Scotland, at which interest would justify our arranging for lectures.

The Library is kept very busy as its caretaker (I will not call him "librarian") knows all too well. Journals of former years are accumulating rather too heavily for storage in a private house. It would be a great help to me if some of these could be stored elsewhere. The whole of the present library arrangement is, of course, only temporary until the Society

Donor	BOOKS RECEIVED (continued)
Bauer, A.	SHUMSKIY, P. A. - Principes de glaciologie structurale. Annales du Centre d'Études et de Documentation Paléontologiques, Paris, No. 22, 1957, 309 p., 27 cm. 10,000 fr.
American Geographical Society	Problems of polar research. Ed. W. L. G. Joerg, New York, American Geographical Society Special Publication No. 7, 1928, 479 p., illus., maps, 26.5 cm. (A series of papers by 31 authors).
Publishers	LAW, P. and BECHERVAISE, J. - ANARE, Australia's Antarctic outposts. London, Oxford University Press, 1958, 152 p., illus., maps, 29 cm. £2. 5. 0.
Publishers	Brockhaus-Taschenbuch der Physischen Geographie. Das Gesicht der Erde. Ed. E. Neef. Leipzig, F. A. Brockhaus, 1956, 980 p., illus., maps, 19 cm. DM. 17.90.
Ministry of Education, London	Scientific and technical translating and other aspects of the language problem. Paris, UNESCO, 1957, 282 p., 23.5 cm.
Revue Canadienne de Géographie	Bibliography of New Quebec. Canada, Department of Trade and Commerce, Geographical Service, 1955, 321 p., 25 cm.
Publishers	Annuaire Hydrologique de la France. Paris, Société Hydro-technique de France, 1956, 251 p., illus., maps, 27 cm.
Publishers	From the ends of the earth: An anthology of polar writings, by Augustine Courtauld, London, Oxford University Press, 1958, 423 p., 18.5 cm. £1. 1. 0.
Publishers	HAPGOOD, C. H. - Earth's shifting crust: A scientific key to many of earth's mysteries. New York, Pantheon Books Inc., 1958, 438 p., 21.5 cm. \$6.50.
Author	PAULY, K. A. - The cause of the great Ice Ages. New York, (privately printed), 1957, 60 p., illus., 22.5 cm. (A few copies of this work are available on application to Mr Karl A. Pauly, 1925 Union Street, Schenectady 9, N. Y.)
Publishers	Geographisches Taschenbuch 1956/57. Ed. E. Meynen. Wiesbaden, Franz Steiner Verlag, 1956, 498 p., maps, 17 cm.
Author	BERTRAM, G. C. L. - Arctic and Antarctic. Cambridge, W. Heffer & Sons Ltd. 1957, 123 p., illus., 24 cm. £1. 1. 0.
Purchased	Bibliography and Index of geology exclusive of North America, Vol. 21, 1956, Washington, Geological Society of America, 1958, 845 p., 25 cm. £2. 16. 0.

NEW MEMBERS

New members of the Society since January 1958 are as follows:

- BERG, THOMAS E., Science Hall, University of Wisconsin, Madison 6, Wisc., U.S.A.
 BENDER, JAMES A., 2129 Glenview Road, Wilmette, Ill., U.S.A.
 BUCHER, PROFESSOR, c/o Dept. of Geology, Columbia University, New York City, N. Y.
 U.S.A.
 CURRIE, DONALD H., 16 Elm Street, Halifax, Nova Scotia, Canada.
 DUNBAR, MISS MOIRA, Geophysics Section, Defence Research Board, Ottawa, Ont., Canada.
 EDWARDS, J. I., 7 The Grove, Pontypridd, Glam.
 FITZPATRICK, E. A., Department of Soil Science, University of Aberdeen, Meston Walk,
 Old Aberdeen, Scotland.
 FRIEDENWALD, ROBERT L., 1750 10th Street, Boulder, Col., U.S.A.
 HALBERT, A., Hightown, Melkridge, Nr. Haltwhistle, Northumb.
 HALBERT, S., Ashcroft, Haltwhistle, Northumb.
 HARWOOD, T. A., Defence Research Board, Dept. of National Defence, Elgin Street, Ottawa,
 Ont., Canada.
 KEELER, CHARLES M., 364 Reist Street, Williamsville 21, N. Y., U.S.A.
 MORRISON, CHARLES C., RFD Green Pond, Rockaway, N. J., U.S.A.
 OWEN, JOHN H., The Nuffield Foundation, Nuffield Lodge, Regent's Park, London N. W. 1.
 PARRY, J. T., 60 Park Road, Meols, Hoylake, Cheshire.
 RUNDLE, ARTHUR S., The Leylands, Moorwoods Lane, Owlbar, Sheffield.
 SCHNEIDER, ALLAN F., Dept. of Geology, State College of Washington, Pullman, Wash.,
 U.S.A.
 SCOTT, GEORGE, 4 Bastle Road, Foulden, Berwick-on-Tweed.
 SIPLE, DR PAUL A., 131 North Jackson Street, Arlington 1, Va., U.S.A.
 SMITH, E. J., Snow and Avalanche Research Unit, Glacier, B. C., Canada.
 VEYRET, PROFESSEUR PAUL, Faculté des Lettres, 3 Place Docteur Girard, Grenoble,
 Isère, France.
 WEINMAN, JAMES A., Sterling Hall, c/o Physics Dept., University of Wisconsin, Madison 6,
 Wisc., U.S.A.
 WILLIAMS, P. F., University College, Durham.

SCOTT POLAR RESEARCH INSTITUTE

The idea of a centre for polar research and information was born, appropriately enough, during a blizzard on the slopes of Mount Erebus in the Antarctic in 1912. Little progress could be made until the 1914-18 war was over, and the trouble was to find the funds to make a start. There was a balance left from the Mansion House Fund raised for the benefit of the relatives of Scott's Pole Party and it was set aside, somewhat vaguely, for Polar Research.

With the valuable support of Dr Hugh Robert Mill and Sir Arthur Shipley this balance was applied for and the Trustees were finally prevailed upon to hand over the sum (about £10,000) in trust to the University of Cambridge for the erection, endowment and maintenance of a Captain Scott Polar Research Institute, specifying also that £6,000 should be set aside for the building.

The Institute was duly inaugurated in May 1926 but at first there were lean times for the infant Institute, the Director and his Secretary-Assistant having to do the best they could with an annual income of less than £600 for all purposes until the Second World War began. A grant from the Pilgrim Trust enabled the Committee of Management to erect the present building in 1934. Stated briefly the purpose of the Institute was to be a repository of the records of past expeditions, to afford all the assistance in its power to future ones, to gather a library and a museum of equipment and give facilities for polar research. These aims have expanded somewhat as funds increased but in the main they have remained the same as originally contemplated.

Two events of importance may be mentioned, the inauguration of the Institute's journal, the Polar Record, in 1930 which did much to spread a knowledge of its activities, and the establishment, in 1946, of the Society of Friends of the Polar Institute whose contributions have considerably enlarged the scope of those activities.

Owing to the increasing importance of the polar regions since the second world war, and the consequent growth of the activities in the Institute which have needed staff and funds, it was decided to make the Institute a Sub Department within the Department of Geography of the University of Cambridge as from the beginning of 1957. The former aims of the Institute remain unchanged, while in addition it is hoped to bring the Institute into the main stream of University teaching and research. This more formal relationship with the University has now put the Institute on a more stable financial basis, and it is hoped that this recognition will also increase the opportunities offered to young graduates who are anxious to do active field research in the polar regions.

Since 1952, the office of the British Glaciological Society has found a home in the Institute, and it is hoped that this happy and useful association with the Society will continue for a long time.

F. D. and G. de Q. R.

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*.

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.