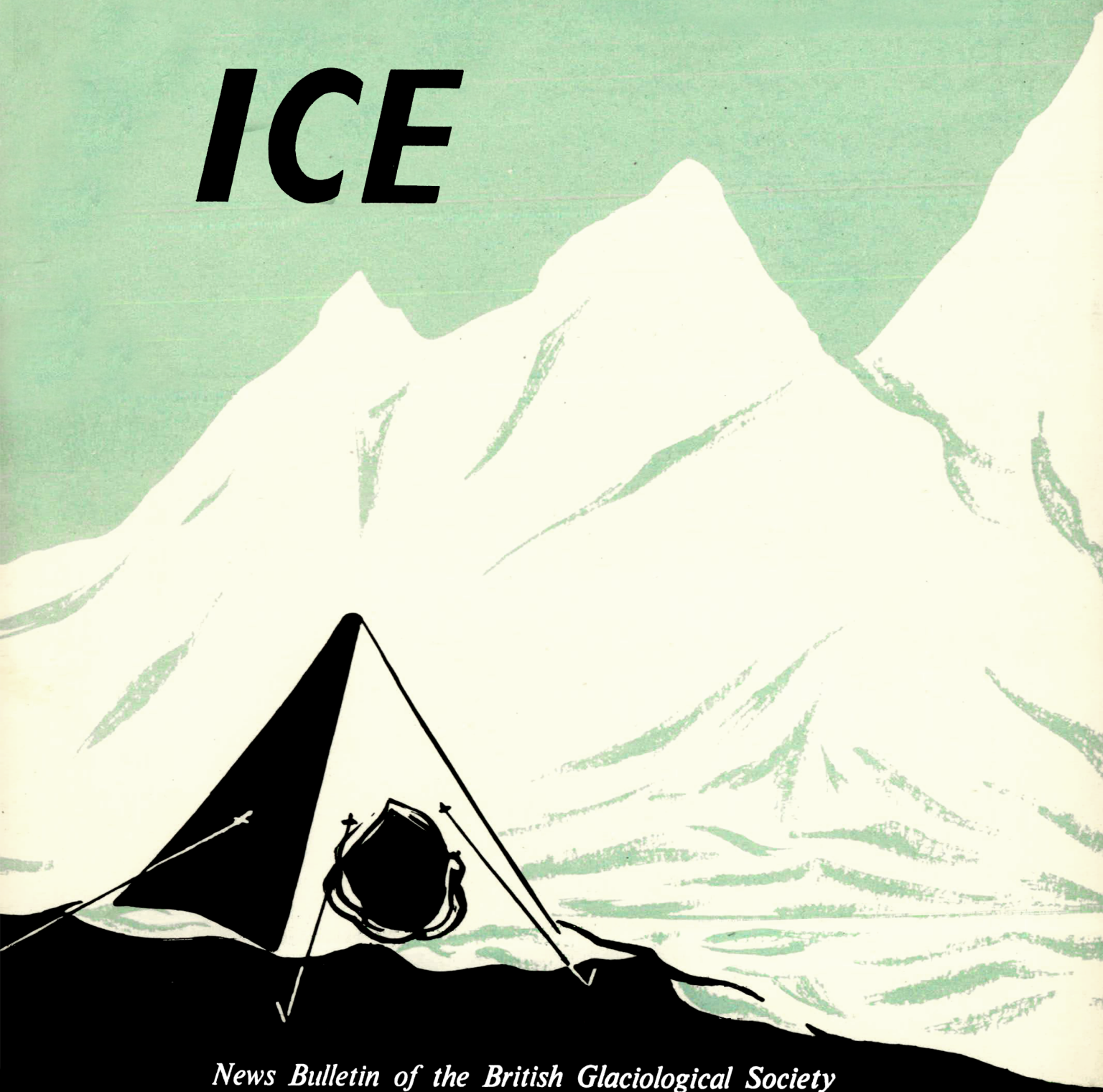


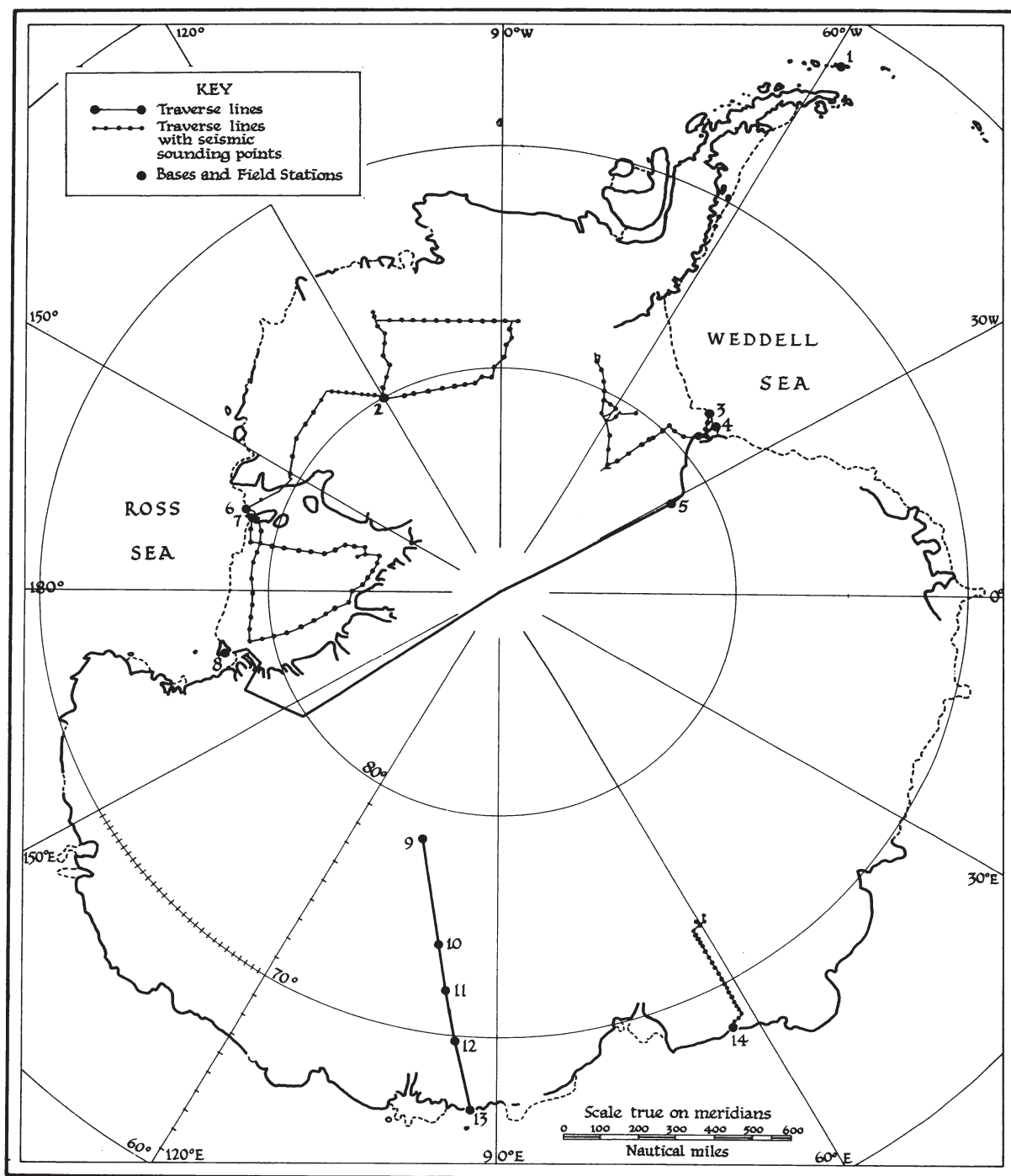
NUMBER 3

JANUARY 1959

ICE



News Bulletin of the British Glaciological Society



Reports on Antarctic glaciology in the I.G.Y. received World Data Centre C, Glaciology, (Cambridge) up to 31 December 1958 cover the areas and traverse lines shown in the above map. Full references will be found in the list on pages 1 - 3.

- | | |
|---------------------|----------------------|
| 1. Admiralty Bay | 8. McMurdo Sound |
| 2. "Byrd" | 9. "Vostok" |
| 3. "Ellsworth" | 10. "Komsomol'skaya" |
| 4. "Shackleton" | 11. "Vostok I" |
| 5. "South Ice" | 12. "Pionerskaya" |
| 6. "Little America" | 13. "Mirnyy" |
| 7. "Camp Michigan" | 14. Mawson |

ICE

News Bulletin of The British Glaciological Society

Number 3

January 1959

INCOME TAX RELIEF. British taxpayers in the Society will be pleased to know that the Commissioners of Inland Revenue have approved the Society for the purposes of Section 16, Finance Act, 1958, and that from 5th April 1959 the whole of the annual subscription paid by a member who qualifies for relief under that Section will be allowable as a deduction from his or her emoluments assessable to Income Tax under Schedule E. All members who are office holders or employees may take advantage of this allowance, provided that their subscription is defrayed out of the emoluments of their office or employment, and provided that the activities of the Society are directly relevant to their office or employment.

Those members who are entitled to claim for themselves the above relief should apply to their tax offices as soon as possible for form P 358 upon which an adjustment of their P.A. Y.E. coding may be claimed.

BEQUESTS TO THE SOCIETY. It may interest members to know the position about bequests. A monetary bequest to the British Glaciological Society, received under the terms of a will, is exempt from estate duties in the United Kingdom so long as the donor lives more than a year after the making of a gift, and so long as a definite sum, and not a named fraction of an estate, is stated. If further information is required, please write to the Secretary.

EQUIPMENT FOR SALE. Further information on the following items may be obtained from the Secretary:- 3 spring clips ("carabiners"); 2m. standard boring rods by Isler (6 or 8 rods); collapsible avalanche sounding rod 3m. long; micro-camera taking 9 x 12 cm. film packs or plates, 42 cm. extension, complete with stand; several stages, including a refrigerated stage; combined snow shovel and spare ski tip; specific gravity balance by Baird and Tatlock with all weights unremovable; specific gravity shell for use with above; wide necked thermos for holding snow samples.

International Geophysical Year

Extension of the period of observations.

The General Assembly of the International Council of Scientific Unions accepted in October 1958 the recommendation of the Scientific Committee for the I.G. Y. that the observational and data collecting activities be conducted during 1959 on the same general plan as in 1957-58 and as may be determined by each National Committee.

Supply and use of I.G. Y. data.

Reports housed in the World Data Centre C, Glaciology (the Society's office in Cambridge), are available for inspection at the centre by bonafide applicants. Copies can also be supplied at prices which cover costs of reproduction and postage. When published use of data is made, due acknowledgement should be given to the original investigator or the source, and to the World Data Centre.

Reports received in World Data Centre C, Glaciology.

The Society, as World Data Centre C, Glaciology, has received reports during the period July - December 1958 from the following places:-

STATION	PROGRAMME	POSITION	PERIOD
"Little America", Antarctica (U.S.A.)	Glaciology, gravity magnetics, seismology, on a traverse of Ross Ice Shelf		October 1957 - February 1958

STATION	PROGRAMME	POSITION	PERIOD
Lemon Creek Glacier, Alaska (U. S. A.)	Glacier observations	58° 22' N. 134° 22' W.	June-September 1957
"Ellsworth," Antarctica (U. S. A.)	Glaciology, seismology, geology, on a traverse of Filchner Ice Shelf		November 1957- January 1958
McMurdo Sound, Antarctica (U. S. A.)	Quaternary glacial geology	77° S. 165° E.	November 1957- January 1958.
"Little America," Antarctica (U. S. A.)	Airlifted geophysical explorations		November 1957- January 1958
Blue Glacier, on Mount Olympus, Washington (U. S. A.)	Winter snow observa- tions	47° 41' N. 123° 46' W.	June 1957 - February 1958
Kilimanjaro, Tanganyika (U. K.)	Glaciological and meteorological observations	03° 05' S. 37° 21' E.	July-September 1957
Mount Kenya (U. K.)	Glaciological observations	0° 09' S. 37° 19' E.	December 1957- January 1958
Grytviken, Falkland Islands Dependencies (U. K.)	Glaciological observations	54° 16' S. 36° 31' W.	January 1957- March 1958
Admiralty Bay, Falkland Islands Dependencies (U. K.)	Glaciological observations	62° 05' S. 58° 24' W.	March 1957- March 1958
Mawson, Antarctica (Australia)	Glaciological observations. Ablation studies		1957 1957
Antarctica (U. S. S. R.)	Glaciological explorations	78° S. -103° E. - Geomagnetic Pole	1957 - early 1958
Tasman Glacier, Southern Alps. (New Zealand)	Glaciological measurements	43° 44' S. 170° 06' E.	April - May 1958
Gangotri Glacier & others (India)	Survey and glacio- logical observations	30° 56' N. 79° 04' E.	June-September 1956
"Camp Michigan," Antarctica (U. S. A.)	Survey, glaciological and meteorological measurements on Ross Ice Shelf	78° 34' S. 163° 57' W.	November 1957- January 1958
"Little America," "Byrd," "Ellsworth"- Antarctica (U. S. A.)	"Oversnow Traverse Programme"- glaciology, meteorology, geology, magnetism, gravity, survey		1957 - 1958

STATION	PROGRAMME	POSITION	PERIOD
McCall Glacier, Alaska (U.S.A.)	Glaciology	69° 18' N. 143° 48' W.	June 1957- June 1958
"Little America," Antarctica (U.S.A.)	Snow accumulation & meteorology on Ross Ice Shelf and Victoria Plateau		November 1957- February 1958
Arctic Ice Floe Station 'A' (U.S.A.)	Thermal budget studies on Arctic pack ice in summer and autumn	80° 50' N.) 160° 30' W.) 83° 40' N.) 162° W.)	June 1957 to December 1957
Fletcher's Ice Island T3, Arctic (U.S.A.)	Glaciology, geophysics, meteorology.	82° 50' N.) 96° 05' W.) 81° 58' N.) 104° 25' W.)	June 1957 to September 1957
"South Ice", Antarctica (U.K.)	Glaciological observations	82° S. 29° W.	February - December 1957

Field Work

U.S.S.R. WORK IN THE ANTARCTIC

During the southern winter of 1958 Soviet parties manned the main base "Mirnyy", "Pionerskaya", "Oazis" (leader, B. Imerekov), "Komsomol'skaya" (leader, M. Fokin), "Vostok" (leader, V. Sidorov), and "Sovetskaya" (leader, V. Babarykin). The record low temperature at the earth's surface was broken several times, both at "Vostok" and "Sovetskaya"; the last occasion was on 25 August 1958, when -87.4° C. (-125.5° F.) was recorded at "Vostok".

Overland operations were started in late September, when a tractor train of nine vehicles left "Mirnyy" for "Pionerskaya". Arriving there on 9 October, the party split into two, one group heading southwards to explore the area between "Pionerskaya" and "Komsomol'skaya", while the other returned to "Mirnyy" for more supplies. On 23 October the main overland party of 22 men left "Mirnyy"; it reached "Komsomol'skaya" on 12 November and there joined up with the first group, which had been doing seismic sounding and other work. This combined group then split in two, one group taking supplies to "Vostok", and the other setting out for "Sovetskaya", which was reached on 29 November. "Sovetskaya", established the preceding season at this point (lat. 78° 24' S., long. 87° 35' E.), was some 600 km. short of the desired site at the Pole of Inaccessibility. With Ye. I. Tolstikov, the leader of the expedition, the party left on 3 December for the Pole of Inaccessibility with four tractors, and after a difficult journey, reached lat. 82° 06' S., long. 55° E. on 14 December and set up the station "Polyus Nedostupnosti [Pole of Inaccessibility]" at an altitude of 3710 m. On 19 December the first aircraft landing was made here.

"Polyus Nedostupnosti" is not to be manned continuously, but is to act as a base for further journeys. Upon the termination of the I.G.Y. it was intended that the stations "Sovetskaya" and "Pionerskaya" should be closed, "Komsomol'skaya" should function at intervals during the summer, and "Oazis" should be handed over to Poland, which was sending a group of scientists under W. Krzemiński with the Soviet relief ships.

Air operations were chiefly in support of the overland parties, but some long-range flights in IL-12 aircraft were made. The leader of the flying group, V. M. Perov, flew to Mawson on 28 September, and to McMurdo Sound, via "Sovetskaya" and the South Pole, on 24-26 October. On 12-15 December he rescued the occupants of a Belgian aircraft which had crashed somewhere in the region of lat. 72° S., long. 27° E.

The two relief ships were delayed in leaving the Soviet Union, so that only the Ob' reached "Mirnyy" before the end of the year (on 30 December).

ARCTIC TERRAIN RESEARCH

One of the responsibilities of the Terrestrial Sciences Laboratory of the Geophysics Research Directorate, United States Air Force Cambridge Research Centre, is the Arctic Terrain Research Programme. The objectives are to identify, map, describe, test and evaluate snow, ice and land areas in the Arctic in order to determine their suitability for landing strips. Chief of the Laboratory is Lieut. Col. Louis De Goes. Research is performed by a small staff of G.R.D. scientists with help from such contractors as the U.S. Geological Survey, the Arctic Institute of North America, Lamont Geological Observatory (Columbia University), Woods Hole Oceanographic Institution, Dartmouth College and Washington University (St. Louis, Missouri). Some research is conducted jointly with the Snow, Ice and Permafrost Research Establishment (U.S. Army), the Hydrographic Office (U.S. Navy), the Quartermaster Research and Engineering Centre (U.S. Army), the Civil Engineering Research and Evaluation Laboratory (U.S. Navy) and the Defence Research Board of Canada. G.R.D. scientists are at present engaged in both the Arctic and Antarctic research programmes of the International Geophysical Year.

Valuable results have been obtained from work on the Greenland ice sheet, on perennially frozen lakes in Greenland and seasonally frozen lakes in Alaska, on the ice shelf and marginal features of Ellesmere Island, on ice-free land in Greenland and Alaska, on sea ice near Labrador and northwest Greenland, and on drifting ice islands in the Arctic Ocean.

CAMBRIDGE WEST GREENLAND GLACIOLOGICAL EXPEDITION 1958

An expedition to the valley glacier Lyngbrae in West Greenland made general glaciological studies in July and August with particular emphasis on ogives. Members of the expedition were: T. A. Henry (leader), R. J. White (deputy leader), D. L. Atherton (quartermaster), A. Morrison, A. R. Archer, and G. S. White.

Lyngbrae is at $66^{\circ} 13' N.$, $52^{\circ} 44' W.$, and flows northwards from the Sukkertoppen ice cap towards Sønder Strømfjord. Wave ogives below the ice fall are more pronounced than any previously studied in detail. A striking feature is that the main ice fall produces a separate wave system on each side of the glacier, and also produces waves supplementary to the primary systems. Over the first four waves of the larger primary system, stakes were drilled into the ice along the estimated line of maximum flow, and surveys made to find differences in strain rates of the ice.

Velocities were measured of isolated points down glacier and of a transverse line near the top of the wave systems. Many features were photographed and a photogrammetric survey was made of the ice fall. Level profiles included two across and one down the glacier. The latter marked the positions of Forbes' Bands. Forbes' Bands were examined, and work on various types of band included experiments with dyes. Ice temperatures were measured with thermocouples to provide the gradients of temperature with depth. The readings show that below its ice fall Lyngbrae is "cold". Ablation of the ice was measured regularly and meteorological readings were taken twice daily. The outwash plain was mapped in detail, and the glacier recession was estimated. Lichens were photographed for Dr Beschel's work of dating moraines. Climbs were made on to the ice cap and up nunataks, and several other glaciers were visited.

CANADIAN ICE SURVEYS

The Geographical Branch of the Department of Mines and Technical Surveys, Ottawa, Canada, has been conducting field studies on sea ice conditions in two areas of importance to Canada, the Eastern Arctic Archipelago, and the Gulf of St. Lawrence.

Since 1956 an observer of the Geographical Branch has accompanied the annual resupply mission to the Arctic by Canadian Government ships. Studies have been made relating the ice distribution to temperature, as well as recording special ice conditions confronting ships in Canada's Eastern Arctic water.

Observations of sea ice conditions in the Gulf of St. Lawrence have been conducted since 1956 from aircraft of the Royal Canadian Air Force. During the current season the Department of Transport actively participated in the project. In addition to the aerial reconnaissance in 1958, a network of shore observing stations was in operation reporting conditions along both the north and south shores of the Gulf of St. Lawrence. The 1958 aerial survey provided an opportunity to observe the expansion and retreat of both the western Gulf ice and Labrador ice entering the Gulf through the Strait of Belle Isle.

Eleven reports covering these investigations have been published by the Geographical Branch to date.

GORNERGLETSCHER GLACIOLOGICAL SURVEY 1959-60

In June 1959 the Gornergletscher Glaciological Survey will begin a thirteen month series of observations on the Gorner glacier above Zermatt. The object of the research is to study the velocity distribution by surveying the movement and distortion of stake patterns from the bergschrund to the tongue at intervals of approximately two weeks throughout the year, and to examine seasonal changes of velocity and strain rates. Observations will also include measurements of firn compression, snow creep, cold wave progression and possibly depth velocity measurements by pipe and inclinometer.

A meteorologist is needed to study the heat balance of the glacier over the period, and surveyors and glaciologists to help with other aspects of the programme. It is proposed to recruit for the Survey on a shift system, each member spending from three to twelve weeks on the glacier before being replaced by another. At any one time there will be three or four members at the glacier. People are particularly needed for the period October - November 1959 and March - May 1960. Observations will continue until July 1960. Cost will be approximately £10 per month for food, plus travel. Anyone interested in taking part in the programme should write to G. R. Elliston at the Department of Geography, Downing Place, Cambridge, England.

International Meetings

THE CHAMONIX SYMPOSIUM 1958

The Symposium, which had been arranged at the I. U. G. G. Meeting at Toronto in 1957 to discuss the Physics and Movement of Ice, was held at Chamonix from 16-24 September 1958 under the auspices of the Commission on Snow and Ice of the International Association of Scientific Hydrology.

Eighty-seven participants signed in at the office. Thirty-six papers were read and some technical films were shown in the evenings. Excursions were made to nearby glaciers. Study of the papers was facilitated by their pre-publication in journal form* through the able exertions of Professor L. Tison, Secretary of the Association, and his staff.

Considerable interest was aroused by a paper on the disposal on the polar ice caps of atomic fission waste products. The Symposium passed a resolution that the Secretary of the International Association of Scientific Hydrology should write to the Secretary of the International Atomic Energy Commission informing him of the discussion and asking if thorough research into the many problems involved would be of value and necessary.

A small ad hoc Committee was set up to discuss various points which arose during the Meeting. The main subject of these discussions was the possibility of the Commission obtaining funds, perhaps from outside the I. U. G. G., in order to increase its efficiency. One of the means proposed was to alter the present loose constitution of the Commission and to make it a corporate body with true membership - the members to pay a small subscription.

It was also proposed that this special meeting of the Commission should be made a triennial event to be held in the second year after the main I. U. G. G. Meeting. Arrangements should be made (impossible this time) for the papers to be available to participants at least two months beforehand so that less time need be spent in presenting them and more time on discussions. The Committee also expressed the hope that set subjects should be chosen for these meetings, leaving complete freedom for papers to be read on any subject at the main I. U. G. G. Meetings.

Copies of the Proceedings* may be obtained from Professor Tison.

* Physique du mouvement de la glace. Union Geodesique et Geophysique Internationale. Association Internationale d'Hydrologie Scientifique Symposium de Chamonix 16-24 Sept. 1958. Gentbrugge, Association Internationale d'Hydrologie Scientifique (61 rue des Ronces), 1958. 394 p. 300 Frs. belges.

The following papers were read before the Commission:

* Read by title.

† Read in absentia.

- | | |
|------------------------------------|--|
| M. Baussart | Essai de détermination par photogrammétrie de la vitesse superficielle d'un glacier du Groenland. |
| R. Finsterwalder | Measurement of ice velocity by air photogrammetry. |
| W. Hofmann | Mesures géodésiques pour l'analyse relative du comportement d'un glacier. |
| L. Garavel, A. Poggi | Comportement des glaciers alpins français depuis 1930. |
| L. Tschaen, A. Bauer | Le mouvement de la partie centrale de l'inlandsis du Groenland. |
| J. A. Jacobs | Geophysical investigations on the Salmon Glacier. |
| L. Lliboutry | Etude préliminaire du Glacier de Saint Sorlin. |
| J. H. Zumberge | Preliminary report on the Ross ice shelf deformation project. |
| * S. E. White | Preliminary studies of motion of an ice cliff, Nunatarssuaq, northwest Greenland 1955. |
| G. A. Avsyuk | Certains renseignements sur le mouvement de la glace dans les glaciers du Thian-Chian. |
| W. H. Ward | Surface markers for ice movement surveys. |
| L. D. Dolgushin | Les particularités essentielles morphologiques et les régularités des mouvements des glaciers de la marge de l'Antarctique oriental. |
| L. Lliboutry | La dynamique de la Mer de Glace et la vague de 1891 - 1895 d'après les mesures de Joseph Vallot. |
| J. F. Nye | A theory of wave formation in glaciers. |
| N. Ulyanov | Mouvement des glaciers. |
| J. Weertmann | Travelling waves on glaciers. |
| † M. F. Meier | Vertical profiles of velocity and flow law of glacier ice. |
| J. W. Glen | The flow law of ice. |
| S. Steinemann | Résultats expérimentaux sur la dynamique de la glace, et leurs corrélations avec le mouvement et la pétrographie des glaciers. |
| U. Nakaya | Visco-elastic properties of snow and ice in the Greenland ice sheet. |
| M. Matchinski | Considérations sur la mécanique de la glace et spécialement des glaciers. |
| D. Tonini | Une extension de la loi de continuité aux glaciers. |
| U. Nakaya | The deformation of single crystals of ice. |
| A. Renaud | Sur la présence et la rôle des impuretés sur les glaciers. |
| P. A. Shumskiy | The mechanism of ice straining and its re-crystallization. |
| * K. Higuchi | Layer structure of ice revealed by etching figures. |
| * S. S. Vyalov | Regularities of glacial shields movement and the theory of plastic viscous flow. |
| C. Agostinelli | Sur le mouvement d'un glacier. |
| † V. N. Bogoslovskiy | The temperature conditions (regime) and movement of the Antarctic glacial shield. |
| J. M. Grove | Some structures associated with rational flow in compound and composite cirque glaciers. |
| B. Lyle Hansen and J. K. Landauer | Results of ice cap drill hole measurements. |
| J. K. Landauer and T. R. Butkovich | |
| † B. A. Borovinskiy | The creep law for ice. |
| C. C. Langway, Jr. | Application des méthodes géophysiques aux investigations du glacier et de la moraine Touyukson. |
| B. Philberth | Bubble pressure in Greenland glaciers. |
| G. P. Rigsby | Disposal of atomic fission products in Greenland or Antarctica. |
| R. P. Sharp and S. Epstein | Fabrics of glacier and laboratory deformed ice. |
| R. Milicamps and M. Lafargue | Oxygen-isotope ratios and glacier movement. |
| * S. S. Vyalov | Présentation d'une méthode électroacoustique originale pour l'étude du mécanisme de l'écoulement et des déformations de la glace sur l'épaisseur d'un glacier. |
| L. Renaud | Regularities of ice deformation (some results of laboratory researches). |
| | Work of the Electricité de France on the Glacier d'Argentière. |

PERIGLACIAL COMMISSION OF THE INTERNATIONAL GEOGRAPHICAL UNION

A meeting of the Periglacial Commission of the International Geographical Union was held at Łódź, Poland from 18 to 30 September. Attending the meeting were delegates from America, Belgium, Canada, Czechoslovakia, France, Germany, Great Britain, Holland, Hungary, Morocco, Poland, Russia and Sweden.

The first three days were devoted to paper reading and short excursions in the vicinity of Łódź to see Periglacial phenomena. From 21 to 30 September, a continuous excursion was made throughout Poland along the following route:- Łódź, Torun, Kartuzy,

Warsaw, Lublin, Krakow, Zakopane, Krakow, Czeszocohowa and Łódź.

This meeting was a unique occasion in the history of the Commission for it was the first time that a reunion was held on such a large scale. It was much appreciated by the delegates since the Poles are among the most advanced workers in this field and therefore could demonstrate much that was new and of great interest. Congratulations must be offered to Professor Dylík and his staff for their faultless organization and the Polish Academy of Science is to be thanked for the generous hospitality offered to the delegates.

Members' News

Dr Colin Bull is leading the Victoria University of Wellington Antarctic Expedition, 1958-1959. The expedition is spending three months in the "dry valley areas" west of the Wright Glacier, South Victoria Land, undertaking geological, glaciological, geophysical and zoological investigations. This is the first ever University field expedition to the Antarctic mainland.

Raymond A. Butler was American observer with the British in Graham Land during the 1957-1958 season.

Sir Vivian Fuchs, leader, Mr David Pratt, chief engineer, and other members of the crossing party of the Trans-Antarctic Expedition have received the first award of the Royal Automobile Club's diamond jubilee trophy: for the year's most outstanding contribution in the whole field of auto-motive transport.

Mr Othmar Gurtner, director and formerly secretary-general of the Swiss Foundation for Alpine Research, died at Zürich on 18th August 1958. He was editor of "Mountains of the World".

W. Kick and Professor F. Loewe are to resurvey by photogrammetry the glaciers in the south and east of Nanga Parbat previously done in 1934 by Professor R. Finsterwalder.

Professor F. Loewe has been appointed U.N.E.S.C.O. expert attached to the Meteorological Service of Pakistan in connexion with the establishment of an Institute of Meteorology and Geophysics at Karachi.

Professor D. Linton has been appointed to succeed Professor Kinvig at Birmingham University. Before taking up his duties in Birmingham he is spending a year on physiographic research in Graham Land.

Dr Maynard M. Miller spent most of the summer in Ellesmere Land organizing the Columbia University Northern Ellesmere Land Expedition 1958. He has also been on the Juneau Icefield setting up new research stations, and working on the Taku-Llewellyn Glacier complex. This was his eleventh expedition to the Juneau Icefield since 1946.

Dr Troy L. Péwé, previously geologist-in-charge, U.S. Geological Survey, Alaskan Branch, has been appointed head of the new department of geology at the University of Alaska. He worked in the McMurdo Sound area of Antarctica during the 1957 - 1958 season, in charge of a glacial geology party for the U.S. I.G. Y. programme.

Dr Hugh Thompson is engaged in mapping the Niagara Peninsula of Southern Ontario and plans to make a re-evaluation of late-glacial and post-glacial processes.

Professor L. Dudley Stamp has retired from active teaching at the London School of Economics in order to devote himself more fully to the work of the International Geographical Union.

Professor L. R. Wager has been appointed Vice-President of the Mineralogical Society.

R. S. Waters was geomorphologist on the Birmingham and Exeter Universities 1958 Spitsbergen Expedition, and investigated late Pleistocene raised marine features and periglacial phenomena on the shores of Ekmanfjord.

The Centre Français d'Etudes Arctiques was opened in Paris in November 1957 under the direction of Professor J.N. Malaurie. The object of the Centre is the social and economic study of Arctic races and regions. Admission to the centre is by selection, and the course of study lasts three years. The centre provides lectures, assistance in research projects, and a section for the publication of original articles, students' theses, reports of national commissions, works of importance in less common languages, maps, photographs, and a classified critical bibliography.

The Centre National de Recherches Polaires was opened in Brussels in December 1958. The centre will organise polar expeditions, study materials and equipment, plan the scientific programmes, and collect and publish data obtained on those expeditions. The President of the centre is Professor J. van Mieghem and the Secretary is Dr L. M. Malet.

Reviews

GLACIERS AND GLACIATION. GROVE, G. K. Washington, Smithsonian Institution, 1910. xii, 231 p., plates, illus., map 25½ cm. An account of existing glaciers and Pleistocene glaciation in Alaska from observations made during the Harriman Alaska Expedition. Fully and very beautifully illustrated. (Presented by Wm. O. Field)

GEOPHYSICS AND THE I. G. Y. Ed. H. ODISHAW AND S. RUTTENBERG. Geophysical Monograph No. 2, Washington, American Geophysical Union, 1958, 210 p., illus., maps, 25½ cm., \$8.00. Contains notes and articles on programmes of research and early results obtained during the International Geophysical Year. Short articles by H. Bader (U.S. polar ice and snow studies), G. Rigsby (Mountain glaciology), L. M. Gould and J. C. Reed (U.S. Antarctic and Arctic programmes respectively), are of more particular glaciological interest although there are many others of wider geophysical import for the glaciologist. (Presented by the American Geophysical Union)

LANDSCAPES OF ALASKA. Ed. HOWELL WILLIAMS. Berkeley and Los Angeles. University of California Press, London, Cambridge University Press, 1958. 148 p., 3 text figures, 6 maps, 23 plates, 26 cm., 37/6d. The text consists of 15 chapters, each written by a well-known authority and dealing with descriptions of many of the features of the State. Of the photographs, those of the Malaspina Glacier, with Mt. Elias (18,000 ft.) Mt. Crillon, Glacier Bay, Yakutat Bay, Mt. McKinley, should be particularly useful in showing the general design of the country. There is a very complete Index. (Presented by the Cambridge University Press)

PHYSICAL STUDIES ON DEPOSITED SNOW. Z. YOSIDA & COLLEAGUES. Sapporo, Japan, Institute of Low Temperature Science, Hokkaido University, 26 cm. This work consists of the collected papers of Professor Yosida and his several colleagues published from 1955 to 1958. The page numbers of the original papers are retained and there is no Index, but it is useful to have these valuable researches united under one cover. (Presented by Prof. Z. Yosida)

THE EXPLORATION OF TIME. R. N. C. BOWEN. London, George Newnes Ltd. 1958, 143 p., 40 figures, 22 cm., 21s. This book deals fully with world chronology as evidenced by physical, chemical, astrophysical, astronomical, botanical, zoological, archaeological, anthropological, geological and meteorological methods. The last two are naturally of most interest to the glaciologist. The geological methods include the calculation of varve and other deposits resulting from ice action, but many other chapters should prove of interest to anyone interested in the history of the Earth. (Presented by Publishers)

THE PLANET EARTH. Ed. D. R. BATES. London, New York, Paris, Los Angeles, Pergamon Press. 1957. 312 p., text figures, 22 cm., 35s. This book was written in response to the widespread popular interest in the International Geophysical Year and, as its name suggests, it deals with every aspect of geophysics. Each subject (there are seventeen) has a chapter to itself written by an expert in that particular branch. The subjects touching most closely the study of glaciology are:- Climate (E. T. Eady), The general circulation of the atmosphere and oceans (E. T. Eady), Ice Ages (E. J. Opik), Meteorology (B. J. Mason). There is a full bibliography but no index, although the differentiation of the chapters compensate for this to some extent. (Presented by Publishers)

DAS EISZEITALTER - GRUNDLINIEN EINER GEOLOGIE DES QUARTARS, ZWIETER BAND. EUROPE, VORDERASIEN UND NORDAFRIKA IM EISZEITALTER. P. WOLDSTEDT. Second Edition, Stuttgart, F. Enke Verlag, 1958, vii + 438 p., 125 illustrations, 24 tables, 24 cm., DM. 69. The second volume of this work deals with the ice cover throughout Europe with a special chapter on the British Isles. Other chapters deal with Asia Minor and the Caspian, Egypt, Libya and north-west Africa. There is a very full bibliography.

A CENTURY OF MOUNTAINEERING 1857-1957. ARNOLD LUNN. London, G. Allen & Unwin Ltd. 1957, 263 p., 24 plates, 24 cm. Development and progress of mountaineering, their literature, the artistic aspects, famous amateurs and guides. (Presented by The Alpine Club).

SCIENTIFIC AND TECHNICAL TRANSLATING AND OTHER ASPECTS OF THE LANGUAGE PROBLEM. Paris, UNESCO, 1957. 282 p., ill., 24 cm. (H.M.S.O. fl). This book, the result of collaboration between over 200 experts from 21 different countries, is the 4th volume of the series Documentation and Terminology of Science. The main subjects dealt with are: 1. Quantitative appraisal of the problem. 2. Qualitative aspects of translating. 3. Methods and organisations for translating. 4. Methods and organizations for making translations available. 5. Language learning for scientists. 6. The possible use of languages internationally understood. 7. Terminology and lexicography. There are four appendices including one on a bibliography of books for technical language study. Every possible aspect of this immense and complex subject is covered by this exhaustive treatise.

FROM THE ENDS OF THE EARTH. AUGUSTINE CORTAULD. London, Oxford University Press. 423 pages, maps, 18.5 cm., 21s. This anthology of the accounts of polar explorers goes back to the very earliest days of the urge of writers and geographers to find out what the regions far from their own countries were like. It is divided into sections describing "The Age of Conjecture", dealing with the earliest writings of Homer, and of the ancient geographers; "The Age of the Vikings"; "The Age of the Merchant Adventurers"; "The Age of the Navy" and finally "The Age of Attainment". In this last the discovery of the South Pole by Amundsen is, rather surprisingly, dealt with only en passant.

An index would have been valuable, although the very complete list of contents at the beginning to some extent counteracts this criticism. It is an absorbing work and well worth reading by glaciologists, showing how their science (among many other sciences) originated and developed.

METEOROLOGY OF THE ANTARCTIC. Ed. M. P. VAN ROOY. Weather Bureau, Department of Transport, Pretoria, South Africa, 1957. 240 p., 8 plates, tables, figures, charts; topographical map in folder. This is one of the best books for details of Antarctic meteorology, and there is much important information of value to glaciologists. The first chapters describe the geographical and hydrographical features, and instrumentation. The universal difficulty is discussed of measuring precipitation when drifting occurs. Most modern work is based on permanent stations, situated on the fringe of the continent, and on whalers. In spite of the small number of stations, useful results have been obtained, for example the effect of the pack ice, Antarctic convergence and sea temperatures on climate and weather, and the formation and passage of depressions. It is also interesting to note that occasional blocking highs, common in the northern hemisphere, also occur.

There are four chapters on the climate of the Southern Ocean, the sub-tropical Antarctic islands, the coast of Antarctica and the Graham Land region; sunshine, radiation, evaporation, precipitation, temperature and wind are the main factors taken into account. Seasonal variations are discussed and illustrated by charts which display great honesty by omitting the central portion of Antarctica except when reasonable conjectures can be made.

There is a chapter on upper air conditions over Antarctica, and one on synoptic meteorology with specific figured examples of actual weather.

The Society's Library

Works received for the Society's Library since May 1958.

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.

The Society is also very grateful for all the valuable publications sent in exchange for the Journal of Glaciology.

Armstrong, T. E.	Mercanton, P. L. (2 items)
Bass, R.	Miller, M. M. (4 items)
Bauer, A.	Nielsen, L. E.
Butzer, K. W. (2 items)	Nishihara, M.
Coachman, L. K.	Nye, J. F.
Court, A.	de Quervain, M.
Davidsson, J.	Ray, L. L.
Davies, J. L.	Roberts, B. B.
Dylik, J.	Robin, G. de Q.
Elliston, G. R.	Rüegg, W.
Falconer, G.	Sabourin, R. J. E.
Fitzpatrick, E. A. (2 items)	Samov, M. M.
Gage, M. (2 items)	Savours, A.
Glen, J. W. (3 items)	Schaefer, V. J. (4 items)
Gold, L. W. (4 items)	Schwerdtfeger, W.
Haefeli, R. (3 items)	Schumacher, N. J.
Hamilton, R. A. (2 items)	Sharp, R. P. (3 items)
Harrison, W.	Swithinbank, C. W. M.
Hawkes, L.	Thompson, H. R. (2 items)
Heinsheimer, G. J.	Ward, W. H.
Hofmann, W. (3 items)	Weertman, J.
Huxley, M.	Werenskiöld, W.
Jennings, J. N. (3 items)	Whitton, J.
Kobayashi, T.	Wolf, P. O.
Kusunoki, K. (2 items)	Yosida, Z. (2 items)
Magun, S.	Zingg, T. (2 items)
Markov, K. K. (5 items)	

Air Ministry

Australian Department of External Affairs
 Canadian Department of Mines and Technical Surveys (6 items)
 C. S. A. G. I. (2 items)
 Defence Research Board of Canada (6 items)
 Expéditions Polaires Françaises (3 items)
 Falkland Islands Dependencies Survey (2 items)
 Geographical Survey Institute Japan
 Japanese Society for Quaternary Research
 Munitalp Foundation (6 items)
 Ministry of Education, Tokyo,
 National Research Council of Canada (3 items)
 Norsk Polarinstitut (2 items)
 Norwegian-British-Swedish Antarctic Expedition (2 items)
 S. I. P. R. E. (12 items)
 Scott Polar Research Institute
 U. S. Aeronautical Chart Service
 U. S. Antarctic Projects Officer (8 items)
 U. S. Board on Geographic Names
 U. S. Navy Hydrographic Department
 U. S. Navy Task Force 43
 Unione Nazionale Antigrandine
 Western Snow Conference

Books Received

Donor	
Prof. MEYNEN	GRAHMANN, R. - Das Eiszeitalter und der Übergang zur Gegenwart. (The Ice Age and the transition to the present). Remagen, Verlag des Amtes für Landeskunde, 1952. 62 p., illus., maps, 21 cm.
Publishers	BOWEN, R.N.C. - The Exploration of Time. London, George Newnes, 1958. 143 p., illus., maps, 22 cm. 21s.
Publishers	ROOY, M. P. van - Meteorology of the Antarctic. Pretoria, Weather Bureau, Department of Transport, 1957. 240 p., illus., maps, 29 cm. 60s.
Publishers	SCHEIDEGGER, A. E. - Principles of Geodynamics. Berlin, Springer-Verlag, 1958. 280 p., illus., maps, 23 cm. DM 4960.
Author	MARKOV, K. K. - Ocherki po geografii chetvertichnogo perioda (Outlines in the geography of the Quaternary). Moscow, Gosudarstvennoye Izdatel'stvo Geograficheskoy Literatury (State Publishing House for Geographical Literature) 1955. 348 p., maps, 22½ cm.
Prof. L.J. TISON	General Assembly of Toronto 3-14 Sept. 1957. Vols. 1, 2, 3 and 4. A.I.H.S. Gentbrugge, 1958. Each vol. 24 cm. 300 Frs belges.
Author	PAL'GOV, N. N. - Sovremennoye oledeneniye v Zailiyskom Alatau (Contemporary glaciation in the Zailiyskiy Alatau.) Alma-Ata, Izdatel'stvo Akademii Nauk Kazakhskoy SSR (Publishing House of the Academy of Sciences of the Kazakhskaya S.S.R.) 1958. 312 p., illus., maps 23 cm.
Purchased	AUROUSSEAU, M. - The Rendering of Geographical Names, London, Hutchinson University Library, 1957. 148 p., 18 cm. 10/6d.

Future International Meetings

INQUA (International Association on Quaternary Research)

News has just reached the Society that, in accordance with the resolution passed at the V International INQUA Congress, held in Madrid and Barcelona in 1957, the VI Congress will be held in Poland, in 1961. On the initiative of the Polish Academy of Sciences, acting in consultation with the Central Geological Board, the Organizing Committee for the VI International INQUA Congress in Poland has been appointed; the President is Władysław Szafer (Vice-President of the Polish Academy of Sciences and Director of the Institute of Botany of the Polish Academy of Sciences in Cracow), the Secretary General is Rajmund Galon (Professor of the University of Toruń), and the Editor in Chief is Jan Dylic (Professor of the University of Łódź).

The Organizing Committee of the Congress propose the following subjects and tasks for discussion at the VI Congress:

1. The establishing of uniform notions concerning glaciations and interglacials, stadials and interstadials, and the Pliocene-Pleistocene boundary line.
2. Methods of research on the Quaternary.
3. Determination of the number of glaciations and their stadials, based on the stratigraphy and geomorphology of the Pleistocene in Poland and in the neighbour countries.
4. Pleistocene nomenclature, particularly the names of glaciations and interglacials.
5. Pleistocene and Holocene climate, in the light of paleobiological, geological and geomorphological researches.
6. The role of glaciectonics and dead ice in the process of marginal forms and inland-ice formation.
7. Quaternary oscillations of sea-level, as visible in the example of the Baltic sea.

The Congress will comprise discussion meetings and a ten-day excursion. The site of the Congress will be in Warsaw and Cracow. The excursion included in the programme of

the Congress will be along the following route: Gdańsk - Bydgoszcz (Toruń) - Łódź - Cracow - Zakopane (the Tatras). Besides that, there are also planned several minor pre-congressional excursions (of a few days' duration each) of regional and specialist character. Exhibitions devoted to the Quaternary in Poland will also be available. The debates will be held in the form of General Assembly meetings, Section meetings, Commission meetings, and Symposia. The first general meeting will be devoted to a presentation of the current state of research on the Quaternary in Poland.

Temporary Membership in the Congress is to be sent on a form (obtainable from the Secretary General) to the Secretary General of the Organizing Committee before 1 March 1959. The second Circular will be sent only to the persons who will have sent their participation in time. Membership and all other correspondence should be addressed to the Secretary General - Prof. Rajmund Galon, Geographical Institute, University, Toruń (Poland).

New Members

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

- Aldridge, R. A., 27 Lower Common South, Putney, London S. W. 15.
 Bratt, G., 20 College Crescent, London N. W. 3.
 Clark, Stewart, 757 Main Street, Edmonds, Wash., U. S. A.
 Colqui, Dr Benito S., Fco. Porterla 1255, Lomas de Zamora FNCR, Argentina.
 De Goes, Lt. Col. Louis, Terrestrial Sciences Laboratory, A. F. Cambridge Research Centre,
 11 Leon Street, Boston 5, Mass., U. S. A.
 Gale, Richard Tyler, 1959 Ticonderoga Drive, San Mateo, Calif., U. S. A.
 Heine, Arnold John, P. O. Box 2901, Wellington, New Zealand.
 Herrigstad, Irving, 2137 Sylvan Way, Bremerton, Wash., U. S. A.
 Holmes, Dr G. William, Alaska Terrain and Permafrost Section, U. S. Geological Survey,
 Washington 25, D. C., U. S. A.
 Hull, Roger, The Little House, Hackthorn, Lincoln.
 Keeler, William S., 3 Tour de Böel, Geneva, Switzerland.
 Keithahn, Edward L., Curator, Territorial Museum, Juneau, Alaska, U. S. A.
 Langway, Chester C., Jr., 1424 Grove Street, Evanston, Ill., U. S. A.
 Larsen, Hans Valeur, 23 Ellevadsvej, Charlottenlund, Denmark.
 Martinelli, M., Jr., Rocky Mountain Forest and Range Experiment Station, Forestry Build-
 ing, C. S. U., Fort Collins, Col., U. S. A.
 Noble, H. M., Plas Dinam, Llandinam, Mont, Wales.
 Ornstein, Wilhelm, Washington University, St. Louis, Mo., U. S. A.
 Post, Austin S., 7375 Champagne Point Road, Kirkland, Wash., U. S. A.
 Riva, André-Maurice, Rue de la Dixence, Sion (VS), Switzerland.
 Rucklidge, John C., St. John's College, Cambridge.
 Rumbold, R., Radiometric and Geophysical Surveys Ltd., Ormond Road, Richmond, Surrey.
 Sagar, R. B., Department of Geography, 139 Pine Avenue, McGill University, Montreal 2,
 P. Q., Canada.
 Schwarzscher, Walther, Geology Department, Queen's University, Belfast, N. Ireland.
 Sherman, R. G., 330 Pearl Street, Boulder, Col., U. S. A.
 Shumskiy, Professor P. A., Staromonietny 33, kv. 29, Moscow W-17, U. S. S. R.
 Sinkler, Miss M., Preston Montford Hall, Shrewsbury, Shropshire.
 Smith, P. M., 316 West Parkwood Avenue, Springfield, Ohio, U. S. A.
 Smythe, C. R., St. John's College, Cambridge.
 Thompson, R. D., 31 Glen Road, Neath, Glam., Wales.
 Van der Can, I., Centre National pour le Campagne Antarctique, 2 Avenue Circulaire,
 Brussels 18, Belgium.
 Victor, Paul-Emile, 22 Avenue de la Grande Armée, Paris 17, France.

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.

