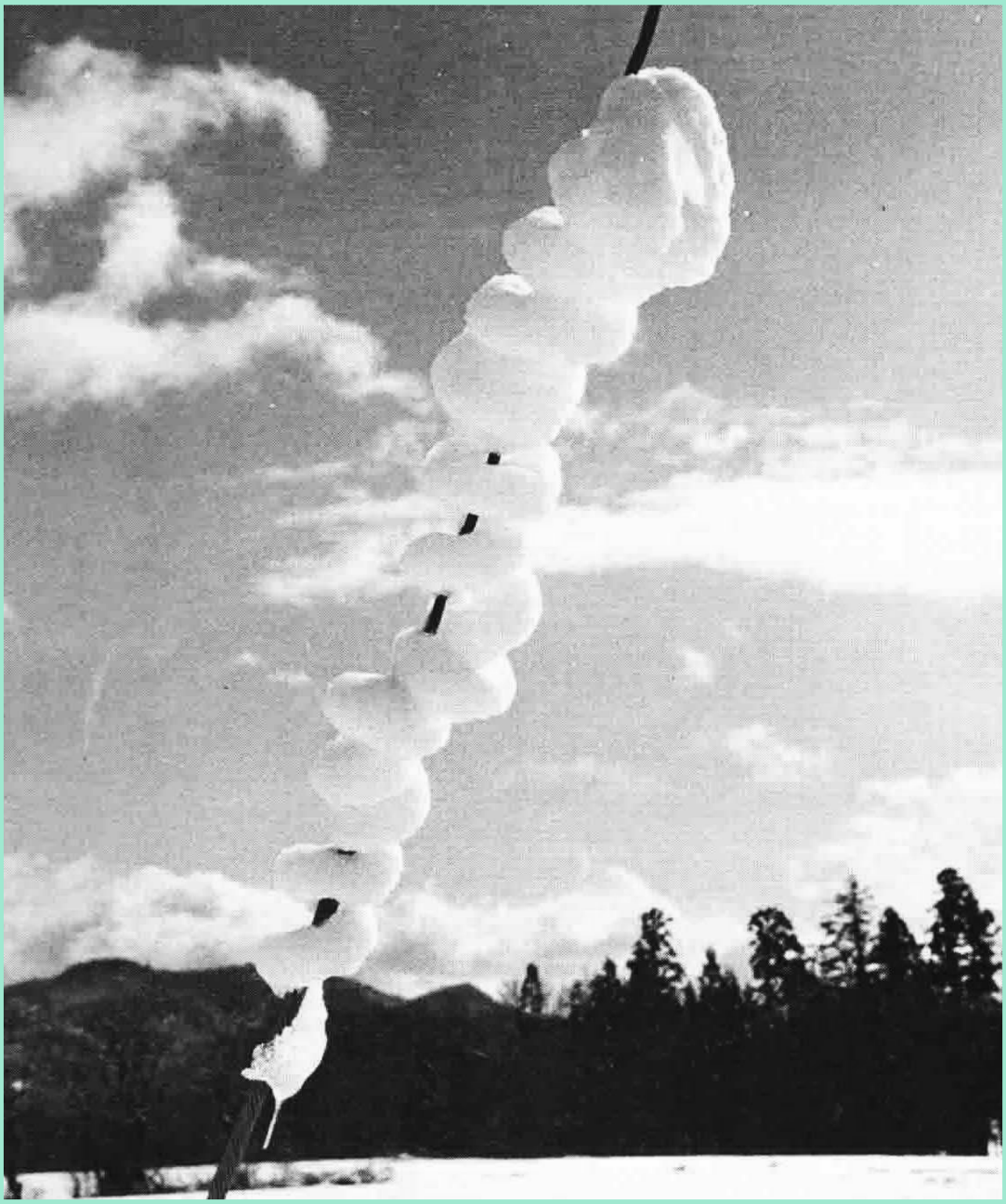
NUMBER 75 2nd ISSUE 1984

ICE



URGENT – AUTHORS!

PREPARATION OF PAPERS FOR THE JOURNAL OF GLACIOLOGY

Please would intending authors note the following new instructions.

Papers, short notes, and letters intended for publication must be typewritten on one side of the paper only, with double spacing and wide margins. The main text should be in English. An abstract not exceeding 200 words should be provided with all papers and short notes. If possible a German and French translation of the title and abstract should be provided. If they are not, the translation will be undertaken by the *Journal of Glaciology.* References should be given in the style used in the *Journal;* a leaflet explaining this system is available on demand. Reference to illustrations should be made by numbering the illustrations consecutively. A list of illustrations and their figure captions should be included with the typescript. Place-names should be in the form officially used (e.g. on maps) in the country in question. Algebraic symbols should be clearly written by hand. Numerical data should be given in SI units or units approved internationally for use with SI. An article on SI units in glaciology appeared in *Journal of Glaciology,* Vol. 7, No. 50, 1968, p. 151-53. Other units, if used, should always be accompanied by SI equivalents. Algebraic symbols for physical quantities should follow the recommendations of the Commission for Symbols, Units and Nomenclature of the International Union of Pure and Applied Physics, further details of which were given in *Journal of Glaciology,* Vol. 6, No. 48, 1967, p. 779.

All illustrations (drawings and photographs) should be submitted at the following sizes: width – 110 mm (1 column) or up to but not exceeding 230 mm, length – up to but not exceeding 335 mm. (These measurements relate to the size of grid sheets used for preparing copy for platemaking at the final reduced size.) Larger sizes cannot be accepted.

Line drawings should be made on white paper or transparent colourless sheets, with strong lines in Indian ink and with lettering of sufficient size to stand the necessary reduction in plate-making. Authors are particularly requested to make sure that lettering on diagrams is consistent with the rules about units and symbols above. The original ink drawings or high quality black and white glossy prints should be sent as well as two copies. Authors wishing to have drawings or photographs returned should notify the Editor at the time of submission of their papers.

The submission of a paper to the *Journal of Glaciology* will be taken to imply that a similar paper has not been submitted elsewhere nor is being considered for publication elsewhere. In certain cases considerations will be given to papers published or to be published in a language other than English, but full details of the other publication and of the copyright position must be given at the time of submission.

The responsibility for opinions expressed in all signed articles rests with their authors. No fixed date can be given for the publication of accepted articles.

ISSN 0019-1043

ICE

NEWS BULLETIN OF THE

INTERNATIONAL GLACIOLOGICAL SOCIETY

NUMBER 75 2nd ISSUE 1984

CONTENTS

We congratulate Dr David J. Drewry on his appointment as the new Director of the Scott Polar Research Institute and look forward to fostering the same warm relationship between the Institute and the Society that existed previously. Dr Drewry, a former Senior Assistant in Research in the Institute, took up his appointment on 1 January 1984. Born in 1947, he graduated at London University (Queen Mary College) in 1969 and, after two season's fieldwork in Antarctica, was awarded a PhD in polar geophysics by Cambridge University in 1973. His subsequent research has concentrated mainly on radio echo sounding of the Antarctic ice sheet, but Dr Drewry has also worked in Greenland, Svalbard, southern Africa and Australia. He was awarded the Sir Henry Strakosh Fellowship in 1974 and the Peek Award of the Royal Geographical Society in 1979.

COVER PICTURE: Photograph from "Snow of Japan - a thing of beauty" by Kihei Takahashi.

CANADA — U.S.A.

RADIO ECHO SOUNDING GLACIERS - MT. WRANGELL, ALASKA
(G.K.C. Clarke, B.T. Prager and G.M. Cross, GPHYS/UBC; C.S. Benson, GPHYS Inst./ALASKA)
In April 1982, Clarke and Benson carried out an airborne radio echo sounding survey of the ice-filled caldera of Mt. Wrangell. The soundings will be used to guide the selection of ice-core drilling sites. The sounding data are now being computer processed and plotted by Prager and Cross. The most remarkable feature of the results is the discovery of several continuous reflecting horizons, presumed to be caused by impurities from past eruptions of the volcano.

AVALANCHES - MOUNT WASHINGTON
(P. Bigras, A. Hébert and Q.H.J. Gwyn, GEOG/ Sherbrooke)
The distribution and prediction of avalanches on Mount Washington have been studied for the U.S. Forest Service.

POLAND

Since the death of Prof. A. Kosiba, the former IGS Correspondent, there has been a gap in reports on Polish polar activities published in ICE. The aim of the present report is to fill this gap with information on the most important events of the last 3 years.

COMMITTEE OF POLAR RESEARCH
This Committee was established within the Polish Academy of Sciences in 1977. Since 1981, Prof. A. Jahn has been Chairman. It supervises, co-ordinates and supports Polish polar activities and supervises and directs the programme of research stations of the Polish Academy of Sciences:

(1) The Antarctic Arctowski Station, King George Island, South Shetland Islands (managed by the Institute of Ecology).

(2) The Antarctic Dobrowolski Station, Bunger Oasis (managed by the Institute of Geophysics).

(3) The Hornsund Station, Spitsbergen (managed by the Institute of Geophysics).

The Committee also co-ordinates Polish university polar research and promotes polar research in general. In 1982, the "Jubilee Session on Fifty Years of Polish Polar Research, 1932-1982" was an important event. It included celebrations of the aniversary following a paper session. The latter was an opportunity for the presentation of papers on Polish polar expeditions from 1932-1982 and the results obtained by them in the earth, biological and geophysical sciences.

NEW PERIODICAL
In 1980, a new periodical entitled "Polish Polar Research" was founded under the auspices of the Polar Research Committee of the Polish Academy of Sciences. The language of the periodical is English, but summaries of all articles are published in Russian and Polish. Papers deal with a wide range of topics; marine and land biology and ecology, geology, glacial geomorphology, glaciology, hydrology, meteorology, geodesy, seismology and magnetism, air pollution, fishing techniques, history of Polish polar exploration, and current reports of expeditions. Geographically the focus is chiefly on regions of present Polish polar activity, i.e. South Shetland Island, Bunger Oasis in Antarctica and Spitsbergen. Four volumes have been published; Vol.1, Nos 1, 2-3 & 4 for 1980, Vol. 2, Nos 1-2 & 3-4 for 1981, Vol.3, Nos 1-2 & 3-4 for 1982 and Vol.4, Nos 1-4 for 1983.

KING GEORGE ISLAND SURVEY
Research begun in 1977 continued at the Antarctic Arctowski Station. Intensive research was conducted in the summer months. But research groups wintered over to carry out standard meteorological measurements and staff the station. Important biological programmes were devised for the summer months. In 1980-1981, a group of 30 persons led by Professor Rakus-Suszczewski participated in the biooceanological programme BIOMASS. Studies were carried out in Bransfield Strait and Drake Passage, i.e. the region investigated by members of the FIBEX expedition. In 1981-1982, a large earth sciences research group, led by Professor Birkenmajer, was engaged in geological mapping at the Arctowski Station. A geological map of King George Island will be compiled soon. The results of Birkenmajer's studies concerning Tertiary glaciations are extremely important and novel. Detailed reports on those studies and research papers, e.g. in geophysics, paleontology and geological mapping, were published in Polish Research in the Antarctic, a special issue of KOSMOS, XXXII, 2(179) 1983. Many of the results of the BIOMASS-FIBEX programme, Feb-March 1981, were published in Polish Polar Research, Vol.3, Nos 3-4, 1982.

UNIVERSITY EXPEDITIONS
Five Polish universities organized research expeditions to Spitsbergen:

Wrocław University, Geographical Institute, 1981-1982, visited the Werenskiold Glacier and Hornsund Region, under Dr H. Chmal. The research programme included glaciology and meteorology (ice movement, mass balance, winter snow accumulation, naled sheets, standard weather observations, thermal air stratification, föhn winds and dust

storms) and geomorphology (geomorphological mapping of old end moraines and coastal terraces, morphology and movement of rock glaciers, frost phenomena and solifluction, directed by Professor A. Jahn). In 1983 the University of Wrocław, with the Silesian University (2 people), continued a glaciological-meteorological study of mass balance and englacial drainage. Besides expeditions to Spitsbergen, Prof.Jahn undertook research in Swedish Lappland (Kebnekajse-Tarfala Station), in 1981 and 1982, on nivation processes, block-slope movement and comparative studies on the active layer.

Silesian University, Department of Karst Geomorphology, 1982 and 1983, visited Hornsund and the Werenskiold Glacier, Brattegdalen, Hans Glacier, Torell Glacier, Aldegonda Glacier under Profesor Pulina and Dr. Jania. A report on their research in 1982 and the preceding years was published in **ICE**, (1983, 71(1), 16-17). In 1983, research focused on the mass balance of south Spitsbergen glaciers, short-term fluctuations of the Hans Glacier front, hydrochemical processes operating in the basin of the Werenskiold Glacier, subglacial and intraglacial drainage systems of the Werenskiold Glacier, and problems related to water supply to the Soviet mines and settlements during the winter in the Isfjord region, in collaboration with their glaciologists and geologists.

N. Copernicus University, Institute of Geography, 1982, worked in Oscar II Land, Kaffiöyra, under Dr G. Wójcik and 5 members. Their research programme covered the origin of glacial landforms with special reference to crevasse fillings, dynamics of meteorological conditions and their spatial differentiation, solar radiation, thermal conditions, transport and mineralization of water in proglacial streams, and morphometry and origin of lake basins at ice margins.

Jagiellonian University, Institute of Geography, 1981, 1982 and 1983, worked in Sörrkappland and Palffyodden led by Prof. Z. Czeppe, Mgr A. Krawczyk with 8 members. The research programme included geoecological mapping, geological mapping with some sedimentological studies in Carboniferous rocks, hydrological mapping, and studies on cryoplanation processes.

Gdańsk University, Institute of Oceanography, 1983. Nine members carried out research on the physical and chemical properties of Hornsund water masses and their horizontal movements, an ecological study of dominant plant and animal species in the Hornsund region, bioenergetics of selected species of algae and marine invertebrates, and the role of seabirds in the exchange of matter and energy in a sea-land system.

THE POLAR CLUB

The Polar Club is affiliated with the Polish Geographical Society. It brings together all Polish polar explorers and mountaineers who organized expeditions to the polar regions and participated in them. Polar symposia, organized by various university centres, are the basic form of scientific activity. In 1981 the 8th Polar Symposium, organized by the Silesian University, was held in Katowice. There were 260 participants, including guests from Great Britain, Czechoslovakia and Norway. In 1982 the "Jubilee Session on Fifty Years of Polish Polar Research, 1932-1982" was held instead of the 9th Symposium. The 10th Polar Symposium was held at N. Copernicus University in Toruń in May, 1983. Two hundred participants, including guests from Great Britain, Norway and Holland, attended the Symposium. A comprehensive volume of the Symposium Proceedings, edited by A. Olszewski and G. Wójcik, has been published. Besides research papers on geology, geomorphology, meteorology, bio-oceanology, hydrology, etc., it provides complete information on Polish polar research, expeditions and regions, from 1970-1982.

SEMINARS AND CONFERENCES

Several seminars and conferences on polar research were organized by universities:

Polar Seminar in Toruń, April 1981, 60 participants, 16 papers and reports on heterogeneous topics,

2nd Polar Glaciological Seminar in Toruń, December 1982, 100 participants, 13 papers and reports. The main topic was glacial processes, mass balance and its components.

7th Speleological School at Międzygórze, February 1983. Session on glaciological problems in cold regions and glacial karst, 30 participants, also from Czechoslovakia, Hungary and the Soviet Union.

Conference "Scientific Results of the Jagiellonian University Spitsbergen Expeditions, 1980-1982" in Cracow, March 1981.

Stefan Kozarski

U.S.A. — CANADA

BARNES ICE CAP, BAFFIN ISLAND, N.W.T.

(R. LeB. Hooke, GEOL/GPHYS, U. of Minnesota)

This programme has been reduced to one of monitoring velocity and mass balance every second year. Measurements are to be made along a 10 km flowline that we have been studying for over 10 years. The first survey under this new programme was done in 1982 and yielded average movement rates and mass balance values for the period since 1980. During the past year these last measurements and those of previous years were systematically analysed to study changes in ice thickness from year to year, and corresponding changes in horizontal velocity. This work is continuing using 1970 as the base year.

Fig.1: New main building (3,956 m^2) of ILTS with a cold laboratory (2,342 m^2) annexed behind it (built in 1968-69).

INSTITUTE OF LOW TEMPERATURE SCIENCE

Sapporo, Japan

In the early 1930s, Dr U. Nakaya, Prof. of Physics in the Faculty of Science, and Dr S. Yanagi, Prof. of Surgery in the Faculty of Medical Sciences, of Hokkaido University, began their respective field studies on snow crystals and death from cold in a mountain hut on the mid-slope (1000 m a.s.l.) of Mt. Tokachi, central Hokkaido.

In order to further the study of these interesting and important subjects, in a cold environment such as that experienced in Hokkaido, a small cold laboratory was then built on the campus of Hokkaido University. It turned out to be the embryo of the present Institute of Low Temperature Science (ILTS). Dr Nakaya, who had been trying in vain to produce artificial snow crystals in his laboratory, completed the experiment as soon as he was able to use the new cold laboratory. His success, using the famous doubled-walled glass tube apparatus, took place on 12 March 1936 (cf. ICE, No.60, 1979). In the next few years, the relationships between the form (crystal habit) of snow and meteorological conditions were clarified by experiments in the cold room. Other research work, including that on window hoar crystals, frost heaving, and electric charge generation due to the friction of ice particles, etc., was initiated here. Meanwhile, at this laboratory, other scientists began studying biological and medical problems of a cold environment such as the freezing processes of living organisms, death from cold, and so forth.

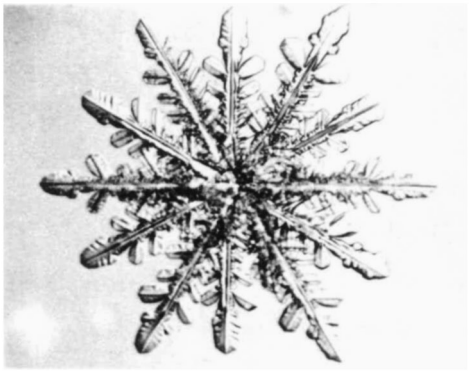


Fig.2: Snow crystal

Recognition of the significance of the pioneering work undertaken by these scientists led to the foundation of ILTS on November, 1941, in Hokkaido University, with the object of conducting basic and applied research into natural phenomena occurring under climatically low temperatures. Six research sections were initially established in the Institute: Physics, Applied Physics, Meteorology, Oceanography, Biology and Medical Science. The first Director was Dr K. Oguma, Dean of the Faculty of Science of the University at the time. The main building and research facilities, including six cold rooms and a cold wind tunnel, were completed in September 1943 (Figure 3). Immediately after the establishment of the ILTS, World War II broke out. At this time the Government took control of all resources with the

Fig.3: Old main building of ILTS (1943-1968)

result that it became extremely difficult to conduct experiments. Another difficulty, that of publishing ILTS's official reports, was caused by the extreme wartime scarcity of printers and printing materials in publishing companies. However, the first volume of the journal "Teion-Kagaku" (Low Temperature Science) was published in 1944 from ILTS. In this we can find papers on many pioneer works, including studies on artificial snow crystals, the mechanism of frost heaving, and the generation mechanism of atmospheric electricity.

Unfortunately, the Meteorological Corps of the Japanese Imperial Army occupied part of the main building of ILTS from April, 1944, until June, 1945. The War mobilized Japanese scientists in various war-related projects and therefore all members of the physical sciences in the Institute were obliged to be associated with two projects: the prevention of icing on aircrafts and the dissipation of natural fog; both these studies were conducted under Dr Nakaya's leadership. Research on these projects was carried out not only by scientists from the ILTS but also by those from the Meteorological Agency and the Army Meteorological Corps.

For the first project, laboratory experiments were conducted using the cold wind tunnel in the ILTS, while field experiments were carried out both on a real aircraft (a Zero fighter) and in the wind tunnel (max. wind velocity: 100 ms^{-1}) using natural supercooled droplets on the top of Mt. Niseko-an-nupri (1308 m a.s.l.). The winter's efforts produced fruitful results on the mechanism of icing, almost comparable to those obtained by Langmuir's group on Mt. Washington, N.H., U.S.A.. A practical deicing technique was also developed for aircraft.

Meanwhile, the second project was undertaken mainly in the Nemuro area in southeast Hokkaido, where a dense sea fog often prevails in summer. The generation, development and structure of the sea fog advecting from the southeast off Hokkaido were widely investigated, and the physical processes of it were clarified. Consequently, several methods were worked out for fog dissipation, comparable to those developed by FIDO (the Fog Investigation and Dissipation Operation) in the U.K. during World War II.

Immediately after the war ended, the Institute entered its most distressful period which lasted from October, 1945, to November, 1946. The building was taken over during this period by the Occupation Forces. All staff of the Institute, trying to continue their work, were forced to borrow space for their research in various other buildings on the campus. Although the building was eventually returned, it was not until the 1950s that various research projects could resume following settlement of the postwar disruption and confusion. Subsequently, some noteworthy results were obtained. They included studies on the physical properties of snow, sea fog and its prevention, the formation of sea ice, long-term weather forecasting, frozen ground, freezing processes of water, freezing processes of living organisms, aeromedical sciences, freeze-drying of biological materials, and the cold preservation of blood.

Northern Japan, inhabited by more than 20 million people, is considered to be one of the snowiest areas in the world. Every winter snow paralyzes railway and highway traffic as well as creating great hardships as a result of inconvenience, damage and disaster due to heavy snowfalls, avalanches and snowdrifts. It is of fundamental importance to disaster prevention, therefore, that the physical properties of deposited snow be well known.

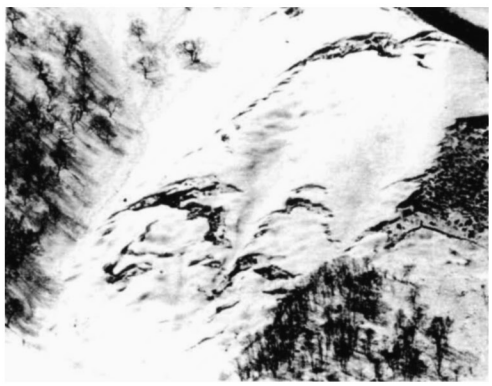


Fig.4: Avalanche problems

Thus efforts have been concentrated on shedding light on these problems since the middle of the late 1950s under the leadership of Dr Z. Yosida. Investigations have covered the thermal, mechanical, acoustic, optical and electric properties of snow in connection with its metamorphism, microscopic texture, structure and free water content. The results obtained have been published in English in various issues of "Contributions from ILTS" by Z. Yosida et al.

The 1960s saw ILTS expanding its activities as follows: a Snow Damage Section was added in 1963 for studying avalanches: a Frost Heaving Section in 1964 for studying the mechanisms of frost heaving due to soil freezing: and a Section of Frost Injury in Plants in 1966. Field stations were built for avalanche and frost heaving studies, in Toikanbetsu in northern Hokkaido in 1965 and in Tomakomai in central Hokkaido in 1972, respectively.

A Sea Ice Research Laboratory (SIRL) was also established in 1965 in Mombetsu, for the study of the drifting sea ice which comes down from the north along the Okhotsk Sea coast of Hokkaido. Three sea ice radars were installed at sites located along the coast, and were simultaneously operated and controlled by SIRL. They helped in studies, under the leadership of Dr T. Tabata, on the motion of sea ice in connection with various oceanographic and meteorological influences.

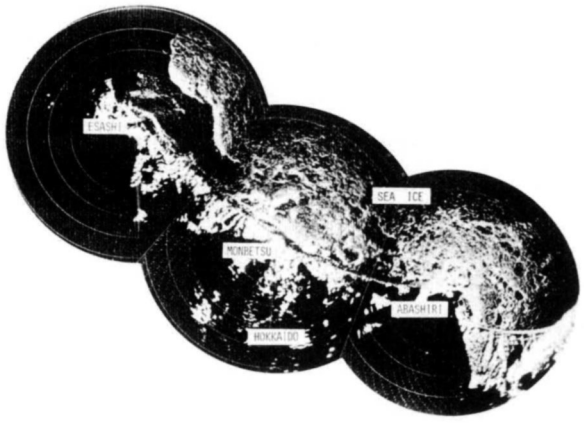


Fig.5: Radar study of sea ice.

On 14-19 August, 1966 an International Conference on Low Temperature Science was held in Sapporo, in commemoration of the 25th anniversary of the founding of ILTS. Participants totalled more than 130 scientists including 52 from ten foreign countries (cf. **ICE**, No.22, 1966: "Proceedings of the International Conference on Low Temperature Science", Vols 1 and 2, 1967). The Symposium on the Physics of Snow and Ice, held during the Conference, was successful and fruitful not only in bringing together up-to-date knowledge but also in providing an opportunity for the continuation of international cooperation and exchange of information among the participants.

After the Sapporo Symposium, field studies were started by the ILTS's staff on the snow cover as well as on glacier ice in Alaska (G. Wakahama et al., 1971-1973), on frozen ground in Arctic Alaska, Canada and Siberia (S. Kinosita et al., 1972-1981), and on sea ice in Arctic Ocean - Bering Sea areas (T. Tabata et al., beginning 1970), in cooperation with scientists of the U.S.A., Canada and the U.S.S.R.

On the other hand, the ILTS welcomed foreign glaciologists and other scientists wishing to devote themselves to the pursuit of their specialties in snow and ice science or engineering problems and interested in discussing and sharing information with the staff. Among them were M. de Quervain, B. Salm, K. Mather, T. Ohtake, C. Benson, G. Wendler, T. Osterkamp, E. LaChapelle, W. Weeks, J. Luthin, G. Guyman, I. Dirmhirn, C. Raymond, Shih Yafeng, and Huang Maohuan. The ILTS is deeply grateful to all of them for stimulating the staff conceptually and methodologically.

Almost every year since 1957 the ILTS has participated in glaciological and meteorological projects of the Japanese Antarctic Research Expedition; these have included glaciological studies in Enderby Land, 1969-1975; Polex-South, 1978-1980; and the East Queen Maud Land Research Project, 1981-1985. In cooperation with the National Institute of Polar Research in Tokyo, a number of glaciological and meteorological studies have been carried out on the Mizuho Plateau, Shirase Glacier and in East Queen Maud Land,

Fig.6: Accumulation studies

including studies on accumulation-ablation processes, ice core analyses, radar echo soundings, dynamic behaviour of the ice sheet, meteorological observations in connection with atmospheric circulation, heat

and mass balance at the ice surface, blowing snow and sea ice formation in conjunction with haline convection.

As the activities of ILTS expanded year by year, the old ILTS building became too small to permit both laboratory experiments and field studies of snow around it. Consequently, a new three-story building was built in a corner of the Experimental Farm of the University, and was occupied at the beginning of May, 1968 (Figure 1).

In the 1970s, two research sections were added to ILTS: a Snow Melt Section in 1970, for studying the mechanism of snow melting and snowmelt runoff, which included a Snowmelt Research Station, built in 1978, for field studies at Moshiri in northern Hokkaido; and in 1973, a Biochemistry Section for studying the overwintering mechanisms of animals and insects using a biochemical approach.

Furthermore, in 1981, another research section, the Solid Precipitation Physics Section, was established to be devoted to the study of the dynamic structure of snowfall, the life cycle of snow-producing clouds and phenomena related to the mechanism of heavy snowfall.

At present, the Institute of Low Temperature Science consists of 12 sections and one research laboratory (SIRL). Of the staff of 90-odd members, 50 are scientists (32 glaciologists and meteorologists and 18 biologists) and the remainder provide technical and administrative support. Prof. S. Kinosita serves as the Director of the Institute. In addition, ILTS is open to graduate students majoring in geophysics and biology.

The twelve research sections and their current activities are as follows:

Physics Section (Head: T. Kobayashi; Members: T. Kuroda, Y. Furukawa, A. Kouchi); the growth and structure of snow crystals, and the structure of ice surfaces.

Applied Physics Section (Head: Y. Suzuki; Members: K. Fujino, Y. Endo, Y. Mizuno); the microwave characteristics of a snowpack, crystal imperfections in ice, and design of an ice core drill.

Meteorology Section (Head: T. Ishida; Members: N. Maeno, R. Naruse, S. Kobayashi); blowing snow, the physical properties of snow and ice, and dynamics of the Antarctic Ice Sheet.

Oceanography Section (Head: N. Ono; Members: M. Wakatsuchi, T. Takizawa); air-ice-ocean interaction, haline convection under growing sea ice, and remote-sensing studies of sea ice.

Snow Damage Section (Head: T. Huzioka; Members: H. Shimizu, E. Akitaya, H. Narita); the mechanism of avalanche release, avalanche motion, and metamorphism of snow.

Frost Heaving Section (Head: S. Kinosita; Members: K. Horiguchi, M. Fukuda); the behaviour of unfrozen water in frozen soil, soil moisture movement during freezing, and permafrost.

Snow Melt Section (Head: K. Kojima; Members: D. Kobayashi, N. Ishikawa); the heat balance at the snow surface, and snowmelt runoff.

Solid Precipitation Physics Section (Head: G. Wakahama; Members: T.Endoh, T. Yamada, Y. Fujiyoshi); snow-forming processes in a cloud,and the mechanism of a heavy snowfall.

Zoology Section (formerly Biology Section, reorganized in 1979, Head: S. Sakagami, with four specialists); frost resistance and the ecology of overwintering insects.

Physiology Section (formerly Medical Science Section, reorganized in 1979, Head: S. Sagisaka, with four specialists); adaptation of the structure of a cell to, and its function in, a cold environment.

Section of Frost Injury in Plants (Head: S.Yoshida, with three specialists); response and adaptation of plants to cold stress, and the mechanism of freezing injury.

Biochemistry Section (Head: H. Chino, with three specialists); metabolic regulation of overwintering animals, and the molecular mechanism of lipid transport in insects.

Sea Ice Research Laboratory (Head: M. Aota; Member: T. Kawamura); movement and deformation of a sea ice field using a network of sea ice radars, physical properties of sea ice and the freezing mechanism of sea water, remote-sensing studies of sea ice, and oceanographic research off the Okhotsk coast of Hokkaido.

ILTS's main research facilities are located on the campus of Hokkaido University in Sapporo. The main laboratory building houses 36 cold rooms (covering a total of 652 m^2), including a room equipped with a wind tunnel (max. wind velocity: 40 ms^{-1}) and another capable of temperatures down to -80°C. ILTS also has a variety of advanced equipment, which includes various X-ray diffraction and high-pressure apparatuses, automatic recorders of avalanche occurrence, a frost heave test system,a neutron diffraction soil moisture meter, a weather satellite receiver, a meteorological radar system, a nuclear magnetic resonance spectrometer, a SEM, and a differential thermal analizer.

We, the members of ILTS, will be pleased to host the upcoming International Symposium on Snow and Ice Processes at the Earth's Surface in September, 1984 in Sapporo. All of us are looking forward to seeing here our old and new friends from abroad.

Gorow Wakahama

INTERNATIONAL GLACIOLOGICAL SOCIETY

SYMPOSIUM ON GLACIER MAPPING AND SURVEYING

SECOND CIRCULAR

26-29 August 1985, Reykjavík, Iceland

The Society will hold a symposium on Glacier Mapping and Surveying, in Reykjavík, Iceland in 1985. Co-sponsors of the event are the Iceland Glaciological Society, the Institute of Meteorology, the National Energy Authority, the National Power Company of Iceland, the Public Roads Administration and the Science Institute of the University of Iceland. Registration will take place on the afternoon and evening of Sunday 25 August and sessions will be from Monday 26 to Thursday 29 August in the University of Iceland. There will be a post-symposium 3-day study tour on 30, 31 August and 1 September to Southern Iceland.

The Council of the Society will meet on Saturday 24 August.

1. PARTICIPATION

This circular includes a booking form for registration, accommodation and travel. The form should be sent to the address given below before 1 May 1985 with the appropriate deposits, as indicated. Registration fees cover organization costs, distribution of preprints of summaries, Welcome Party and Dinner, and a copy of the proceedings volume for those paying the full fee.

Payments should be made in £ sterling

- by cheque payable to: International Glaciological Society Symposium, and sent to the Secretary General; or

- by Bank transfer to: International Glaciological Society Symposium, Account No. 08102112, and sent to the National Westminster Bank Ltd., 56 St. Andrew's Street, Cambridge CB2 3DA, England.

Registration fees:

Participants	£80
Junior Members of the International Glaciological Society	£50
Accompanying persons aged 18 or over	£40

(There is no fee for those under the age of 18, unless they wish to attend the Dinner. Tickets for them may be purchased upon registration on Sunday 25 August.)

For people resident in Iceland, payment of registration fees and deposits may be made in I. Kr. to IGS Symposium, Account No. 1784, Landsbanki Islands, Vesturbaejarútibú, Hasaolabio, Reykjavík.

2. TOPICS

The Symposium will be concerned with the mapping and surveying of snow and ice masses for glacier inventories and for the study of ice dynamics, mass balance, subglacial and surface topography, characteristics and snow hydrology. We invite submission of papers relating to such work under the following topics:

1. Data collection and validation methods (for example, ground surveys, photogrammetry, strain measurements, velocity measurements with automatic cameras).
2. Data processing and modelling.
3. Presentation, analysis and interpretation.

Please note that in 1986 the International Glaciological Society will hold the 2nd Symposium on Remote Sensing in Glaciology, which will pay particular attention to those developments that have occurred since the 1st Symposium in 1974, including mapping from satellites.

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3. ACCOMMODATION

Accommodation has been reserved in a hotel and in a student dormitory. Prices per night per person (including breakfast) will be as follows:

Hotel	single room (with bath)	£40
	twin room (with bath)	£34
Dormitory	single room (without bath)	£26
	twin room (without bath)	£20

These prices are dependent upon inflation and currency exchange rates.

A deposit of £50 must be paid when booking accommodation. This deposit is returnable if notice of cancellation is received before 1 July 1985.

Meals may be obtained at various types of restaurants nearby.

4. TRANSPORTATION

As there are flights to Iceland from many European cities, it is unlikely that a sufficient number of participants will be able to fly from one city to be eligible for a special price. We are therefore not offering a package which includes the flights.

We have, however, planned a special group tour price for the Post Symposium Tour to Southern Iceland (see Section 7.)

Note: A minimum of 40 people is needed to achieve this; with fewer than 40 people, the price will be higher.

5. PAPERS

(i) SUBMISSION OF PAPERS

Those participants who would like to contribute to the Symposium should first submit a summary of their proposed paper in English; this summary should contain sufficient detail to enable the Papers Committee to form a judgement on the likely merit of the proposed paper, but should not exceed three pages of typescript. Summaries must be submitted on paper of international size (A4 - 210 x 297 mm) with wide margins and doubled spaced lines. Summaries should be sent to: Secretary General, International Glaciological Society, Lensfield Road, Cambridge CB2 1ER, England.

Last date for submission of summaries:
1 December 1984

(ii) SELECTION OF PAPERS

Each summary will be assessed by the members of the Papers Committee, acting independently of each other, taking into account scientific quality and relevance to the theme of the Symposium. The Papers Committee will then invite a strictly limited number of papers for presentation and thorough discussion at the Symposium (not necessarily confining themselves to authors who have submitted summaries). It is hoped to notify authors of papers during March 1985.

(iii) DISTRIBUTION OF SUMMARIES

The summaries of the accepted papers will be distributed by surface mail to all participants before the Symposium.

(iv) SUBMISSION OF FINAL PAPERS AND PUBLICATION

The Proceedings will be published by the International Glaciological Society. Papers presented at the Symposium will be considered for publication in these Proceedings, provided they have not been submitted for publication elsewhere. Final typescripts of these papers should be submitted to the Secretary General, International Glaciological Society, Lensfield Road, Cambridge CB2 1ER, England, by 25 June 1985. They should be written in English and prepared in accordance with the instructions that will be sent to authors when they are notified about acceptance of papers for the Symposium. The maximum length for papers will be 6000 words or the equivalent length including any illustrations and maps. The papers will be refereed according to the usual standards of the Society before being accepted for publication. Speedy publication of the proceedings will depend upon strict adherence to deadlines.

Last date for submission of final papers:
25 June 1985

6. SOCIAL EVENTS

(i) WELCOME PARTY

On the evening of Sunday 25 August there will be an informal party with wine and pottrétur (hot meat with salad).

(ii) DINNER

The Dinner will be held on Thursday 29 August. In addition to being the main social event of the Symposium, it will also be the Annual Dinner of the International Glaciological Society.

(iii) LOCAL TOURS AND VISITS

There will be opportunities for participants and their families to book tours for Reykjavík and vicinity when you register on Sunday, 25 August. Visits to local museums and institutes will also be arranged.

7. POST SYMPOSIUM TOUR

The post-symposium tour will travel along the southern coast of Iceland to the glacier outlets which flow south from the ice caps Vatnajökull and Mýrdalsjökull. We hope to include the following features in the tour:

Mýrdalsjökull: hides the volcano Katla (last eruption 1918); Mýrdalssandur formed by jökulhlaups during Katla eruptions; Solheimajökull outlet, advancing for the last ten years.

Vatnajökull: Skeidarársandur, the playground of the jökulhlaups from Grimsvötn, the largest sandur outwash plain in Iceland (1000 km^2), outlets from the ice-covered volcano Oraefajökull (last eruptions 1362 and 1727), Breiðamerkurjökull and the proglacial lake Jökulsárlón.

The itinerary will be as follows:

Friday 30 August - 9 a.m. departure from Reykjavík to Kirkjubaejarklaustur (about 270 km). Overnight at Hotel Edda.

Saturday 31 August - Drive to Skeiðarársandur, Skaftafell National Park and to Breiðamerkurlón. To Kirkjubaejarklaustur. Overnight at Hotel Edda.

Sunday 1 September - From Kirkjubaejarklaustur to Reykjavík, passing by Hjörleifshöfði and visiting Burfell (Hydroelectric Station). Estimated arrival in Reykjavík - 10 p.m. Overnight at Hotel Loftleiðir.

Please note that all flight departures from Iceland to Scandinavia are in the early mornings and to the U.S.A. in the afternoon at about 4 p.m.

The following prices are based on a minimum of 40 participants:

£230 per person in single room
£193 per person in double room
£170 per person in sleeping bag accommodation (sleeping bags not included).

Included in price: 2 nights with breakfast at Hotel Edda, 1 night with breakfast at Hotel Loftleiðir, 3 lunches, 3 dinners, transportation by private coach with English speaking guide as per itinerary.

Please note that above mentioned prices are approximate. The final price will depend upon inflation and currency exchange rates.

8. OTHER TOURS

Anyone interested in visiting Greenland or other parts of Iceland after the Post Symposium Tour may make arrangements through Ferdaskrifstofa Rikisins (Iceland Tourist Bureau). Please write to the Secretary General of the International Glaciological Society as soon as possible, so that information can be sent to you.

9. LOCAL ARRANGEMENTS COMMITTEE

Helgi Björnsson (Chairman)
Elfas B. Elfasson
Haukur Tómasson

10. PAPERS COMMITTEE

G. Østrem
Helgi Björnsson (Chairman)
W. Haeberli
C.F. Raymond
A. Weidick
R.S. Williams

11. SYMPOSIUM ORGANIZATION

H. Richardson (Secretary General, International Glaciological Society)

General information about the Symposium may be obtained from:

The Secretary General,
International Glaciological Society,
Lensfield Road, Cambridge CB2 1ER, England.
Tel. Cambridge 355974

Detailed information about arrangements in Reykjavík may be obtained from:

Helgi Björnsson,
Science Institute,
University of Iceland,
Dunhagi 3, Reykjavík, Iceland

Registration, Accommodation, Post-Symposium Tour

SYMPOSIUM ON GLACIER MAPPING AND SURVEYING
26-29 August 1985

Mail to: Secretary General, International Glaciological Society, Lensfield Road, Cambridge CB2 1ER, England - BEFORE 1 May 1985. See below for methods of making payment.

A. REGISTRATION (please type or print in black ink)

. . . . . / . . . .
(family name) (initials)

Address . . . . . .
. . . . . .
. . . . . .

Accompanied by (indicate age if under 18)

Name. . . . . .

I send registration fee/s as follows:
(i) Participants (£80 each) . . . . . £
(ii) Junior Members (£50 each) . . . . £
(iii) Accompanying persons (£40 each) . £
(There is no registration fee for accompanying persons under the age of 18.)

TOTAL REGISTRATION FEE/S. . . . . £

*B ACCOMMODATION
Please reserve accommodation at hotel / dormitory

the nights of . . . . . .
for . . . . . people

I send £50 deposit per person . . . . . £

* Single * Twin * Sharing with . . . . .

*C POST-SYMPOSIUM TOUR
I wish to book . . . places on this tour and send £20 deposit per person . . . . . .

TOTAL PAYMENT. . . . . £

* delete as appropriate

METHODS OF MAKING PAYMENT

By cheque payable to: International Glaciological Society, and sent to: Secretary General, International Glaciological Society, Lensfield Road, Cambridge CB2 1ER, UK

By Bank transfer to: International Glaciological Society Symposium, Account No. 08102112*, and sent to National Westminster Bank Ltd., 56 St. Andrew's Street, Cambridge CB2 3DA, England.

* Note: it is important to include the account number in your instructions to your bank because the Society has several accounts.

For people resident in Iceland:
In I.Kr. to IGS Symposium, Acct. No. 1784, Landsbanki Islands, Vesturbaejarútibú, Hasaolabio, Reykjavík.

SYMPOSIUM ON REMOTE SENSING IN GLACIOLOGY

FIRST CIRCULAR

6-12 September 1986, Cambridge, England

The Society will hold a symposium on remote sensing in glaciology in Cambridge, England, in 1986. Registration will take place on Sunday 7 September and sessions will be held from Monday 8 to Friday 12 September in the University of Cambridge.

In the same week,the 50th anniversary of the founding of the Society will be celebrated.

TOPICS

The Symposium will be concerned with the application of remote sensing to the measurements of glaciological parameters. It will include such topics as:

(1) data acquisition (field, aircraft, satellite surveys);
(2) remote sensing instrumentation (field, aircraft, satellite);
(3) analysis and interpretation of data (conventional photo- or image-interpretation, digital image analysis, computer-assisted analysis);
(4) presentation of data (regional,satellite image and other thematic maps, atlases, data archiving).

PAPERS

The Papers Committee will be pleased to consider any paper on topics 1, 2, 3 and 4. Details about the summaries and final papers will be given in the Second Circular, to be published in the summer of 1985. Dates for submissions are firm ones and must be adhered to. The Committee may decide to invite review papers on some of the topics if submitted contributions do not give sufficient coverage.

PUBLICATION

The Proceedings of the symposium will be published by the Society in the **Annals of Glaciology**. Papers will be refereed according to the Society's usual standards before being accepted for publication.

SESSIONS

Sessions will take place on Monday, Tuesday, Thursday and Friday(8, 9, 11, 12 September). Plenary sessions will take place in the University Chemical Laboratory, Lensfield Road, next door to the Scott Polar Research Institute, in which the Society's office is located. Poster sessions will be held in King's College, where our accommodation has also been booked.

50th ANNIVERSARY CELEBRATIONS

To mark the Society's Golden Jubilee, Wednesday 10 September will be devoted to invited papers covering the various aspects of snow and ice research, with special reference to their development during the past half-century. In the evening a special Banquet will be held. Members of the Society who do not wish to attend the Remote Sensing Symposium will be very welcome at this day's events. Booking forms for the Banquet will be circulated to all members in the normal way.

There will also be a Golden Jubilee Tour to Switzerland, on which members not participating in the Symposium will be welcome subject to the availability of places.

A separate circular about these 50th anniversary events will be sent to all members in 1985.

ACCOMMODATION

King's College has been booked, some rooms with bathroom attached, others sharing a bathroom between about four single rooms. The Banquet and some other social events will also take place in King's, as well as poster sessions.

FURTHER INFORMATION

You are invited to attend the symposium and to return the attached form as soon as possible. The Second Circular will give information about registration fees, accommodation, general programme, preparation of summaries and final papers. Requests(*) for copies of the Second Circular should be addressed to the Secretary General, International Glaciological Society, Lensfield Road, Cambridge CB2 1ER, England.

*Note: Members of the International Glaciological Society will automatically receive a copy.

SYMPOSIUM ORGANIZATION

IGS Headquarters Office (contact - H. Richardson, Secretary General).

INTERNATIONAL GLACIOLOGICAL SOCIETY
2nd SYMPOSIUM ON REMOTE SENSING, 1986

Family Name . . . . . .

First Name. . . . . .

Address . . . . . .

. . . . . .

. . . . . .

* I hope to participate in the symposium in 1986 [ ]

* I expect to submit a summary of a proposed paper on Topic No. [ ]

* I am interested in the Golden Jubilee Tour to Switzerland [ ]

* without obligation

TO BE SENT AS SOON AS POSSIBLE TO:
Secretary General, International Glaciological Society, Lensfield Road, Cambridge CB2 1ER, England.

The following papers and short notes have been accepted for publication in the first issue of the **Journal** for 1984 (No.104):

G. Holdsworth:
Glaciological reconnaissance of an ice-core drilling site, Penny Ice Cap, Baffin Island.

J.A. Dowdeswell, D.J. Drewry, O. Liestøl and O. Orheim:
Radio echo-sounding of Spitsbergen glaciers: problems in the interpretation of layer and bottom returns.

R. Jacobel and C. Raymond:
Radio echo-sounding studies of englacial water movement in Variegated Glacier, Alaska.

C. Harris and K. Bothamley:
Englacial deltaic sediments as evidence for basal freezing and marginal shearing, Leirbreen, southern Norway.

R. Raiswell and A.G. Thomas:
Solute acquisition in glacial melt waters. I. Fjallsjökull (south-east Iceland): bulk melt waters with open-system characteristics.

A.G. Thomas and R. Raiswell:
Solute acquisition in glacial melt waters. II. Argentière (French Alps): bulk melt waters with closed-system characteristics.

R. Raiswell:
Chemical models of solute acquisition in glacial melt waters.

S. Hibberd:
A model for pollutant concentrations during snow-melt.

P.A. Mayewski, W.B.Lyons, N. Ahmad, G. Smith and M. Pourchet:
Interpretation of the chemical and physical time-series retrieved from Sentik Glacier, Ladakh Himalaya, India.

D.K. Lieu and C.D. Mote, Jr:
Experiments in the machining of ice at negative rake angles.

M. Sharp:
Annual moraine ridges at Skálafellsjökull, south-east Iceland.

J. Krüger and H.H. Thomsen:
Morphology, stratigraphy, and genesis of small drumlins in front of the glacier Mýrdalsjökull, south Iceland.

Instruments and Methods:

R.C. Metcalf:
Field pH determinations in glacial melt waters.

Short Notes:

W.M. Stockton, T.E. DeLaca and M.J. DeNiro:
Stable isotope analysis of a submarine ice cliff at Explorers Cove, McMurdo Sound, Antarctica.

M.J. Hambrey:
Sedimentary processes and buried ice phenomena in the pro-glacial areas of Spitsbergen glaciers.

A. Jahn:
"Sun spirals" on melting snow.

J.M. Smith:
Experiments relating to the fracture of bedrock at the ice-rock interface.

H.A. El-Nakhal:
Possible late Palaeozoic glaciation in the central parts of the Yemen Arab Republic.

The following articles have been processed and will be published in the second or third issues of the **Journal** for 1984 (No.105 or No.106):

P. Kruss:
Terminus response of Lewis Glacier, Mount Kenya, to sinusoidal net balance forcing.

R.LeB. Hooke:
On the role of Newtonian energy in maintaining subglacial water conduits at atmospheric pressure.

J. Krüger:
Clasts with stoss-and-lee form in lodgement tills: a discussion.

D.B. Larson:
Shock wave studies of ice under uniaxial strain conditions.

L.W. Morland, G.D. Smith and G.S. Boulton:
Basal sliding relations deduced from ice sheet data.

G.S. Boulton, G.D. Smith and L.W. Morland:
The reconstruction of former ice sheets and their mass balance characteristics using a non-linearly viscous flow model.

P.H. Robinson:
Ice dynamics and thermal regime of Taylor Glacier, South Victoria Land, Antarctica.

R.P. Shaw and R.R. Rumer:
Interaction of Stokes' edge waves with nearshore ice formation.

J.R. Potter, J.G. Paren and J. Loynes:
Glaciological and oceanographic calculations of the mass balance and oxygen isotope ratio of a melting ice shelf.

R.J.Thwaites, C.J.L. Wilson and A.P. McCray:
Relationship between bore hole closure and crystal fabrics.

B. Yarnal:
Relationship between synoptic-scale atmospheric and glacier mass balance in southwestern Canada during the International Hydrological Decade 1965-1974.

B. Ross:
A model investigation of the interannual sea ice variability in the Beaufort Sea.

J.R. Keys and K.L. Williams:
Rates and mechanisms of iceberg ablation in the d'Urville Sea, Antarctica.

R.J. Rogerson:
Measured readvance of a debris-covered glacier terminus in the President Range, Yoho National Park, British Columbia.

H. Conway and J. Abrahamson:
Air permeability as a textural indicator of snow.

T. O'D. Hanley:
A field study of rough shore-fast sea ice.

D.J. Furbish and J.T. Andrews:
The use of hypsometry to indicate long-term stability and response of valley glaciers to changes in mass transfer.

H. Conway and J. Abrahamson:
Snow stability index.

K.C. Jezek and C.R. Bentley:
A reconsideration of the mass balance of a portion of the Ross Ice Shelf.

R.L. Shreve:
Glacier sliding at subfreezing temperatures.

R.A. Souchez and J. Jouzel:
On the isotopic composition in δD and $\delta^{18}O$ of water and ice during freezing.

M.S. Krass:
Ice on the planets of the Solar System.

Instruments and Methods:

R.W. Lee, J.H. Currier, P.N. Lim and E.M. Schulson:
A procedure for testing polycrystalline ice in uniaxial tension.

B.R. Koci and K.C. Kuivinen:
The PICO lightweight coring auger.

Short Note:

M.O. Jeffries:
Milne Glacier, northern Ellesmere Island, N.W.T.: a surging glacier.

The following articles have been accepted for publication in the **Journal** and are now being edited:

E.A. Patterson:
A mathematical model for perched block formation.

N.S. Gunderstrup and B.L. Hanson:
Bore-hole survey at Dye-3,south Greenland.

T. Green, III:
The natural oscillations of an ice-covered channel.

W.G. Nickling and L. Bennett:
The shear strength characteristics of frozen coarse granular deposits.

J.M. Reynolds and J.G. Paren:
Electrical resistivity of ice from the Antarctic Peninsula.

B.B. Fitzharris and I.F. Owens:
Avalanche tarns.

E.M. Shoemaker and L.W. Morland:
A glacier flow model incorporating longitudinal deviatoric stresses.

Instruments and Methods:

M. Daley and S. Kirby:
Thin sectioning and surface replication of ice at low temperature.

E. Moor and B. Stauffer:
A new dry extraction system for gases in ice.

R.E. Davis and J. Dozier:
Snow wetness measurement by fluorescent dye dilution.

W. Haeberli and W. Fisch:
Electrical resistivity soundings of glacier beds - a test study on the Grubengletscher, Wallis, Switzerland.

Short Note:

P. Duval and L. Lliboutry:
Superplasticity owing to grain growth in polar ices.

NORTHEASTERN NORTH AMERICAN BRANCH MEETING (NENA)

1-3 March 1985, l'Auberge Cheribourg, Magog, Québec, Canada

The next biennial meeting of the NENA Branch will be held in l'Auberge Cheribourg, Magog, Québec at the beginning of March, 1985. It is hoped that this central location will make it possible for many U.S. and Canadian members to attend. Magog is only 3 minutes from the ski resort of Mt. Orford. Registration will take place on the afternoon of Friday, 1 March. The total cost, including registration and full board and lodging will be approximately CAN$145, based on double occupancy. Titles and a CAN$25.00 deposit should be sent to Dr Stephen Jones by 1 December 1984. A one-page abstract will be required by 1 February 1985. For further information contact:

Dr Stephen J. Jones,
Institute for Marine Dynamics,
Montreal Road Laboratories, Building M-22,
National Research Council of Canada,
Ottawa, Ontario, K1A OR6, Canada

FUTURE MEETINGS (of other organizations)

VIIth SYMPOSIUM ON THE PHYSICS AND CHEMISTRY OF ICE

1-5 September 1986, Grenoble, France

The VIIth Symposium on the Physics and Chemistry of Ice will be held in Grenoble, France, on 1-5 September 1985.

TOPICS

1. Structures
   - Lattice dynamics
   - Cubic and dense ices
   - Clathrates, hydrates
2. Defects in ice
   - Diffusion
   - Electrical properties
   - Mechanical properties
3. Solid phase transformation in ice systems
4. Surface structure and properties
5. Applied ice physics and chemistry
   - Ice in the solar system and interstellar space
   - Ice in glaciology and meteorology, properties of snow
   - Cryobiology

PAPERS

Details of the submission of abstracts and final papers will be given in the second circular. English and French will be the official languages at this symposium.

SCIENTIFIC COMMITTEE

Dr J.W. Glen	Dr W.C. Maklin
Prof. A. Higashi	Prof. J. Perez
Dr C. Jaccard	Dr P.L.M. Plummer
Prof. B. Kamb	Prof. J.P. Poirier
Dr J. Klinger	Dr J.-M. Warman
Prof. L. Lliboutry	Dr E. Whalley

ORGANIZING COMMITTEE

P. Duval, J. Klinger, C. Lorius, J. Ocampo | Laboratoire de Glaciologie, C.N.R.S., Grenoble

J. Perez, J. Tatibouet, R. Vassoille | Groupes d'Etudes de Métallurgie Physique et de Physique des Matériaux, INSA, Villeurbanne

FURTHER INFORMATION

Those requiring additional information should contact:

The VIIth Symposium on the Physics and Chemistry of Ice,
Laboratoire de Glaciologie,
B.P. 68 / 38402 Saint-Martin-d'Hères Cedex,
France

GLACIOLOGICAL DIARY

1984

12-14 September
CICE Workshop, Ice Forces on Structures. Lakewood, Colorado. (Intera Technologies Inc., Golden Hill Office Centre, Suite #C-360, 12600 W. Colfax Avenue, Lakewood, Colorado 80215, USA)

20-21 September
British Branch, International Glaciological Society. University of Aberdeen, Aberdeen, U.K. (C. Gemmell, Department of Geography, University of Aberdeen, St. Marys, High Street, Old Aberdeen, AB9 2UF, U.K.)

3-5 October
Symposium on Meteorology and Oceanography of North American High Latitudes, 1984 Arctic Science Conference, 35th Alaska Science Conference. Anchorage,Alaska, U.S.A. (S.Bigler, National Weather Service,P.O.Box 23, Anchorage, Alaska 99513, U.S.A.)

17-19 October
CRREL/ARO Workshop on the Interaction of Microwaves with the Seasonal Snow Cover. Cold Regions Research and Engineering Laboratory, Hanover, New Hampshire, U.S.A. (Dr S.C. Colbeck, CRREL, 72 Lyme Road, Hanover, New Hampshire 03755, U.S.A.)

24-27 October
International Snow Science Workshop: a Merging of Theory and Practice. Aspen, Colorado, U.S.A. (ISSW Conf. Comm., c/o Mountain Rescue - Aspen Inc., Box 4446, Aspen, Colorado 81612, U.S.A.)

6-9 November
Arctic Offshore Technology Conference & Exposition. Calgary,Alberta, Canada. (AOTC, #101 - 3009, 23 Ave. S.W., Calgary, Alberta, T3E 0J3, Canada)

1985

17-22 February
Mechanics and Properties of Ice, Offshore Mechanics and Arctic Engineering Symposium. Dallas, Texas, U.S.A. (Dr D.S. Sodhi, CRREL, 72 Lyme Road, Hanover, New Hampshire 03755, U.S.A.

1-3 March
NENA Branch, International Glaciological Society. Magog, Québec, Canada. (Dr S.J.Jones, Inst. for Marine Dynamics, National Research Council, Ottawa, Ontario, K1A 0R6, Canada)

28 April - 1 May
IAWPRC International Conference on Water and Ice Pollution in Arctic Regions. Yellowknife, N.W.T., Canada. (K. Charbonneau, Conference Services Office, National Research Council of Canada, Ottawa, Ont., K1A 0R6, Canada)

1-3 April
Workshop on Snow Property Measurement. Lake Louise, Alberta, Canada. (P.A. Schaerer, Division of Building Research, NRC, 3904 West Fourth Avenue, Vancouver, B.C., V6R 1P5, Canada)

5-7 August
The Fourth International Symposium on Ground Freezing. Sapporo, Japan. (ISGF 85, Institute of Low Temperature Science, Sapporo 060, Japan)

21-23 August
The Paleoenvironmental Reconstruction of the Late Wisconsin Deglaciation and the Holocene, 7th York Quaternary Symposium. University of Lethbridge, Alberta, Canada. (Dr R.W. Barendregt, Department of Geography, University of Lethbridge, 4401 University Drive, Lethbridge, Alberta, T1K 3M4, Canada)

26-29 August
Symposium on Glacier Mapping and Surveying, Reykjavik, Iceland. (Secretary General, Inter. Glaciological Society, Lensfield Road, Cambridge CB2 1ER, UK)

6-13 September
8th International Conference on Port and Ocean Engineering under Arctic Conditions, POAC 85. Narssarssuaq, Greenland. (Danish Hydraulics Institute, Agern Allé 5, DK-2970 Hoersholm, Denmark)

16-19 September
Hydraulic Effects at the Glacier Bed and Related Phenomena. Interlaken, Switzerland. (Dr A. Iken, Versuchsanstalt für Wasserbau, Hydrologie und Glaziologie, ETH-Zentrum, CH-8092 Zürich, Switzerland)

September
ICSI Symposium on Glacier Mass Balance, Runoff, Water Storage in Glaciers and Climate. Alma Ata, U.S.S.R. (Prof. V.M. Kotlyakov, Inst. of Geog., USSR Academy of Sciences, Staromonetny Street 29, Moscow 109017, U.S.S.R.)

1986

February
IHP 6th Northern Research Basins Workshop:River Ice Measurement Techniques. Houghton, Michigan, USA. (Dr B. Goodison, Atmospheric Environment Service, 4905 Dufferin Str., Downsview, Ont, M3H 5T4, Canada)

1-10 July
I.A.H.S. 2nd Scientific General Assembly. Budapest, Hungary. (Dr A. Szöllösi-Nagy, VITUKI, H-1453 Budapest, Pf 27, Hungary)

30 August - 5 September
VII Symposium on Physics and Chemistry of Ice. Grenoble, France. (VII Symposium on Physics and Chemistry of Ice, Laboratoire de Glaciologie,BP 68,38402 Saint Martin-d'Hères Cedex, France)

7-12 September
Symposium on Remote Sensing in Glaciology, 50th Anniversary of the International Glaciological Society. Cambridge, England. (Secretary General, International Glaciological Society, Lensfield Road, Cambridge CB2 1ER, UK)

1987

31 July - 9 August
12th Congress of the International Union for Quaternary Research. Ottawa, Ontario, Canada. (J.J. Clague, Program Comm., Geological Survey of Canada, 100 West Pender Street, Vancouver, British Columbia, V6B 1R8, Canada)

9-25 August
General Assembly of the International Union of Geodesy & Geophysics (IUGG). Vancouver, Canada. (Prof. P. Melchior, Observatoire Royal de Belgique, Avenue Circulaire 3,B-1180 Brussels, Belgium)

NEW MEMBERS

Bruce B. Bettis, 3250 Greenway Place, Colorado Springs, CO 80917, U.S.A.

Chun-Chao Chou, Isotope Laboratory A-020, Scripps Institution of Oceanography, University of California, San Diego,La Jolla, CA 92093, U.S.A.

C.W. Cruickshank, University of East Anglia, School of Environmental Sciences, Norwich NR4 7TJ, U.K.

Alan L. Dick, British Antarctic Survey, Madingley Road, Cambridge CB3 OET, U.K.

Carolyn Driedger, 3724 S.D Street, Tacoma, WA 98408, U.S.A.

R.P. Emanuel, U.S. Geological Survey - WRD, 1209 Orca Street, Anchorage, AK 99501, USA

J. Gregory, 42 Mallowdale Close, Hulme, Manchester M15 5HP, U.K.

M. Gubitosa, Department of Geology and Geophysics, University of Wisconsin-Madison, 1215 West Dayton Street, Madison, WI 53706, U.S.A.

A.K. Higgins,Geological Survey of Greenland, Øster Voldgade 10, DK-1350 Copenhagen K, Denmark

B. Holmqvist, Sellerigången 2, S-611 45 Nyköping, Sweden

N.F. Humphrey, Geology Department AJ-20, University of Washington, Seattle, WA 98195, U.S.A.

P.M. Kelly, Climatic Research Unit, School of Environmental Sciences, University of East Anglia, Norwich NR4 7TJ, U.K.

R.J. Kelly, School of Mathematics and Physics, University of East Anglia, Norwich NR4 7TJ, U.K.

R.J. Kodybka, 164 Breezehill Avenue, Ottawa, Ontario, K1Y 2H8, Canada

M.A. Lange, Alfred-Wegener-Institute for Polar Research, Columbus Center, D-2850 Bremerhaven, Federal Republic of Germany

Ingrid Lohmann, Würzburger Ring 33, D-8520 Erlangen, Federal Republic of Germany

Wm Berry Lyons, Department of Earth Sciences, University of New Hampshire, Durham, NH 03824, U.S.A.

Kendal Mcguffie, Department of Geography, Roxby Building, P.O. Box 147, Liverpool L69 38X, U.K.

Kelvin Michael, Geography Department, University of Tasmania, GPO Box 252C, Hobart, Tasmania, Australia 7001

Hideaki Motoyama, Institute of Low Temperature Science, Hokkaido University, Kita 19, Nishi-8, Sapporo 060, Japan

Robert Mulvaney, British Antarctic Survey, High Cross, Madingley Road, Cambridge CB3 OET, U.K.

Fumihiko Nishio, National Institute of Polar Research, 9-10 Kaga 1-Chome, Itabashi-ku, Tokyo 173, Japan

Johannes Oerlemans, IMOU, Princetonplein 5, Utrecht, Netherlands

J.W. Reeder, State of Alaska, Division of Geological and Geophysical Surveys, Pouch 7-028, Anchorage, AK 99510, U.S.A.

P.E. Rook, 63 Deanscroft Avenue, Kingsbury, London N.W.9, U.K.

H. Saeki, Department of Civil Engineering, Hokkaido University, Kita-13, Nishi-8, Kita-ku, Sapporo 060, Japan

B. Schreiner, Saskatchewan Research Council, 30 Campus Drive, Saskatoon, Saskatchewan S7N 0X1, Canada

R.A. Stewart, Department of Earth Sciences, Iowa State University, Ames, Iowa 50011, U.S.A.

P.K. Wall, "Beltrees", Occupation Lane, Oakworth, Keighley, West Yorks BD22 7LB, U.K.

J.A. Williamson,21 Chatsworth Road, Kilburn, London NW2, U.K.

INTERNATIONAL GLACIOLOGICAL SOCIETY

Lensfield Road, Cambridge CB2 1ER, England

DETAILS OF MEMBERSHIP

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ICE

Editor: Simon Ommanney

This news bulletin is issued to members of the International Glaciological Society and is published three times a year. Contributions should be sent to Mr C. S. L. Ommanney, Snow and Ice Division, National Hydrology Research Institute, Environment Canada, Ottawa, Ontario, K1A OE7, Canada.

Annual cost for libraries, etc. and for individuals who are not members of the Society: Sterling £8.50.

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Printed by Foister & Jagg Ltd., Abbey Walk, Cambridge, England