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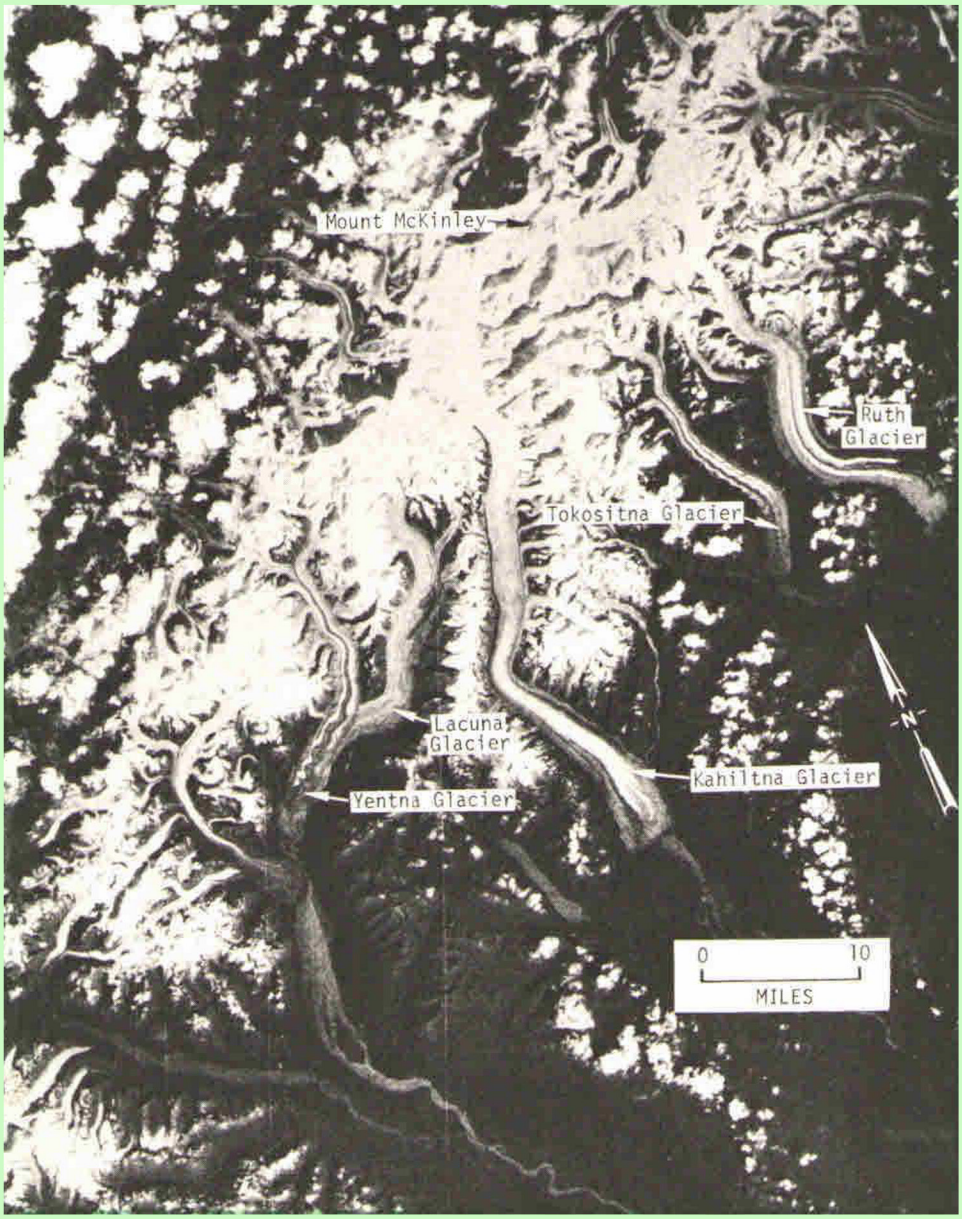


INTERNATIONAL GLACIOLOGICAL SOCIETY

1976

The Society's next special Symposium will be held during the week
12 — 17 September 1976
in Cambridge, England, and will be concerned with the application of fundamental properties of snow and ice to the solution of engineering problems.

See page 15 of this issue of ICE for further details of the

SYMPOSIUM ON APPLIED GLACIOLOGY

ICE

NEWS BULLETIN OF THE

INTERNATIONAL GLACIOLOGICAL SOCIETY

2nd ISSUE 1974 NUMBER 45

CONTENTS

DEATH OF RAYMOND PRIESTLEY. Sir Raymond Priestley, Honorary Member of the Society, died on 24 June 1974 at the age of 87. A geologist, he took part in the Shackleton's 1907-09 expedition and Scott's 1910-13 expedition to the Antarctic. He and Charles Wright (another Honorary Member of the Society) wrote a long report on the glaciology of the Scott expedition. He was Vice-Chancellor of Melbourne University 1935-38 and of Birmingham University 1938-52. He was President of the British Association for the Advancement of Science (1956) and of the Royal Geographical Society (1961-63). His links with the polar world were many, for his two sisters married fellow Antartic scientists Charles Wright and Griffith Taylor, and he was instrumental in founding, with Frank Debenham, the Scott Polar Research Institute in Cambridge. He was made an Honorary Member of the Society in 1959. An obituary will be published in the Journal of Glaciology.

COVER PICTURE. Photograph supplied by U.S. Geological Survey, Department of the Interior. This image, from the first Earth Resources Technology Satellite (ERTS-1) shows surging glaciers in south central Alaska. The Ruth and the Kahiltna glaciers show normal behaviour, flowing slowly at uniform rates, and have straight and uniform medial moraines. The surging glaciers, such as the Tokositna, Lacuna and Yentna, indicate by their "wiggly" moraines that they have undergone alternating periods of near stagnation (up to 50 years) and of very high flow rates (1 to 3 years).

RECENT WORK

ARGENTINA

Several government organizations are doing glaciological research in Argentina:

1. The Instituto Antartico Argentino, address: Cerrito 1248 Buenos Aires, is mainly concerned with the Antarctic; the results of their work is published in the Boletin Antartico. The Chief Scientist is Mr Rene Dalinger.
2. The Dirección de Agua y Energía Eléctrica is mostly concerned with snow survey in relation to run-off forecasts. Address: Administratción General de Agua y Energía Eléctrica; chief of Nivology is Dr R. Vallejos, Lavalle 1551 Buenos Aires.
3. The Servicio Meteorológico Nacional covers research on glaciers; specially are they concerned with one glacier, the Agua Negra, in the San Juan Province. Address: 25 de Mayo 545 Buenos Aires. In charge of the work is Dr B. Colqui.
4. The Instituto Argentino de Nivología y Glaciología (IANIGLA) is a new Institute of the Consejo Nacional de Investigaciones Científicas y Técnicas. It is located in Mendoza. Address: Casilla de Correo 330 Mendoza-Argentina. The work done at the IANIGLA is mainly research on snow and ice. An inventory of the ice-covered and ice-free areas has begun. Researcher and Vice-Director is Dr Arturo E. Corte and Dr Henri Bader is Consultant.

A. Corte

BELGIUM

EXTRA-TERRESTRIAL Mn-53 IN ANTARCTIC ICE

Investigations on that problem form part of a research programme under way at the Université Libre de Bruxelles (Belgium) and at the Centre des Faibles Radioactivités, Gif-sur-Yvette (France).

Detection of Mn-53 is done on pre-1952 snow samples collected on the Eastern Antarctic Plateau in the vicinity of Plateau Station. The measurements were carried out by neutron activation and X-ray spectrometry. It is concluded that the bulk of the Mn-53 found at Plateau Station is associated with interplanetary dust, in which it had been produced by the action of solar protons on iron.

The deposition rate of extra-terrestrial dust-borne iron must be between 1.3 10^{-5} and 1.3 10^{-4}g m^{-2} y^{-1} at Plateau Station. The Belgian team is composed of E. Picciotto, G. Crozaz and J. P. Mennessier.

CHEMICAL COMPOSITION OF BASAL ICE OF ALPINE GLACIERS

A research programme has been undertaken on the distribution of Na, K, Ca, Mg in the basal ice of several Alpine glaciers. Its aim is to provide information on the origin of the different types of ice found in natural subglacial cavities and in tunnels at the glacier-bedrock contact.

The samples are analysed by atomic absorption spectrophotometry at the Université Libre de Bruxelles. One of the main problems encountered in the study of these samples is related to the presence of particles in the ice. Desorption of cations adsorbed on the surface of the particles may completely obliterate results as soon as the particle content is higher than 1 g/kg ice.

Refreezing of interstitial water at the base of the glacier is indicated by the chemical composition.

Four Alpine glaciers have been investigated: Bies and Tsanfleuron in western Switzerland, Capra in Italy and Argentière in France.

The team is composed of R. Souchez, R. Lorrain, M. Lemmens and G. Peeters.

CHEMICAL COMPOSITION OF ICE AT THE BORDER OF THE BARNES ICE CAP (ARCTIC CANADA)

In connexion with the programme carried out by R. le B. Hooke, University of Minnesota, on the Barnes Ice Cap, ice cores are analysed at the Université Libre de Bruxelles by R. Souchez in order to see if superimposed ice, deformed superimposed ice, regelation ice, pleistocene ice and post-pleistocene ice can be chemically differentiated.

R. A. Souchez

ICELAND

After the big enterprise in 1972, viz. the drilling on Bárdarbunga, the Iceland Glaciological Society's activity had to be reduced a lot in 1973, partly because of exhausted funds and partly because of lack of man-power. However, an expedition was sent to Grímsvötn in early June as usual. The aim this time was twofold. One group carried out the usual annual study of changes in the Grímsvötn caldera, and a group of eight persons, led by Magnús Hall-grímsson, civil engineer, carried out a precise levelling of a 41 km line between the trigpoint on Sviahnúkur eystri on the rim of the Grímsvötn caldera (height above sea-level 1722 m) and a trigpoint on the highest part of Kverkfjöll (1936 m) on the northern border of Vatnajökull. A levelling of the same line had been made once before, in June 1961. The repetition of the levelling was financed by the Iceland Public Road Administration. This institution had planned to finish the road across Skeidarársandur in 1974 and it is important to know whether the Vatnajökull ice cap is thickening or not in the Grímsvötn area, as this may influence the frequence and size of the jökulhlaups from the Grímsvötn caldera that flood Skeidarársandur. Comparison between the two levellings showed that the changes were very small, but there is reason to believe that during about the first half of the period between the two measurements the glacier has been thinning and consequently it has thickened somewhat during the second half or so.

Measurements of the longitudinal variation of Iceland's glaciers was carried out as usual, mainly by volunteers, under the direction of Sigurjón Rist. The majority of the glaciers are still receding.

Sigurdur Thorarinsson

ITALY

The "Bollettino del Comitato Glaciologico Italiano" no. 21 was published in 1973.

Its contents include among other articles:

F. Boenzi & G. Palmentola: "New observations on the glacial trails in the Appennino Lucano".

R. Vivian & G. Bocquet: "Glaciolab 72: seven days of observation under an alpine glacier".

C. Lesca & E. Armando: "Determination of superficial and volumetric variations from 1965 to 1970 and control of the speed of the seismic waves propagation on the La Lex Blanche glacier".

C. Lesca: "Determination of the variations of the terminal tongue of the Brouillard glacier by aerophotogrammetric surveys".

C. Lesca: "The expansion of the terminal tongue of the Brenva glaciers on the ground of the photogrammetric surveys of 1959, 1970, 1971".

Reports on the glaciers investigated in 1972.

This Bollettino can be got in exchange or in payment (Lit. 4.000 to be sent to the Comitato Glaciologico Italiano—Via Accademia delle Scienze 5 — Torino).

The 3rd Meeting of the C.G.I. was held in Trento in October 1973. It was organized by Prof. Tomasi, Director of the "Museo Tridentino di Scienze Naturali". About 40 scientists attended the meeting.

The following papers were presented:

S. Belloni: "Lichenometric researches for the date of the moraines in Val Furva and in Val Solda".

A. Desio: "The surge Glacier Kutiah (Karakorum) situation after 20 years from its unforeseen expansion".

C. Lesca: "Topographic precision method for the determination of ice velocity".

C. Lesca: "Analytical photogrammetric method for the determination of ice velocity and its corresponding thickness".

G. Nangeroni: "Problems on the geomorphology of snow".

A. Riccoboni: "Glaciological observations on the Brenta group from the beginning up to now".

G. Rossi: "Volumetric variations of the glaciers of Careser and Marmolada".

G. Zanon: "Valuation problems on the precipitations in a glacial field".

A. V. Cerutti: "2nd Meeting of the International Glaciological Society's Western Alpine Branch, held in Zermatt".

The operation "Glaciolab 73" on the Argentière glacier (Mont Blanc Group) took place in September 1973.

Groups of French, Belgian and English scientists took part in this operation. The Italian team was led by Corrado Lesca. Land photogrammetric surveys with radio-controlled cameras were carried out.

In Autumn 1973 42 operators investigated 158 glaciers with the following results: 25% advancing. 53% retreating, 22% stationary.

For a more exact analysis of the variations, C. Lesca has set up a computer programme that makes it possible to determine the number (or the percentage) of the glaciers in relation with the exposure, the altitude of the front and the surface.

The programme will carry out a complete revision of the data regarding the variations of the Italian glaciers from 1911.

The results so far show that there are great mistakes contained in the tables previously published (for instance in the Bollettino del Comitato Glaciologico no. 14/2 page 5 and no. 16/2 page 17) and in the new volume "Fluctuations of glaciers 1965-1970".
The new statistical analysis confirms a general and gradual tendency for the ice-areas to expand.
The Photographic File—General Catalogue (1974)—has been published. It contains the data of about 5000 photos.
At the 10th International Exhibition of the Mountains, held in Turin from September 29 to October 8, a stand was fitted up with the collaboration of the Institute de Géographie Alpine of Grenoble.

C. Lesca

JAPAN

ANTARCTIC

H. Narita and F. Okuhira, glaciological research group of the 13th Japanese Antarctic Research Expedition (JARE), continued the deep core drilling at Mizuho Camp, 70°42′ S. 44°18′ E, during their wintering. The depth of the drill hole made by the 12th JARE in the last winter was 71 m. Using a thermal drill designed by Dr Y. Suzuki (ILTS, The Institute of Low Temperature Science, Hokkaido University), Narita and Okuhira succeeded in obtaining 147.5 m deep core ice at the rate of 0.2 m/h. These core samples were brought back to Japan to study stratification, density and grain size distributions, hardness, dielectric properties, and the ratio of $^{16}O/^{18}O$. The altitude of Mizuho Camp is about 2196 m a.s.l. and annual mean temperature estimated from snow temperature at 10 m in depth was −35°C. The maximum and minimum air temperatures recorded were −6.4°C and −54°C. A deep snow pit, 20 m in depth, was excavated at Mizuho Camp to study visco-elastic properties, air permeability and metamorphism of annual snow layers.

R. Naruse and K. Yokoyama, the glaciological research group of 14th JARE, made measurements of flow velocity of the ice sheet over Enderby Land during their wintering in 1972-1973. This work constitutes one part of the Enderby Land mass balance research project that was begun in 1968. In 1970-1971, 54 snow stakes covering 200 km between Sandercock Nunataks and Mizuho Camp and 4 square strain grids with side 1 km in length were set by the 10th JARE. The main purpose of the glaciological research group of the 14th JARE was to resurvey accurate positions of these stakes and deformation of the strain grids. In order to do this, they had to give up the deep core drilling at Mizuho Camp because of few staff members. In spite of the difficulty of finding stakes which were set 4 years ago, they found 34 stakes in total and succeeded in resurveying deviations of these stakes from their original positions. The maximum and minimum flow velocities of the ice sheet in Enderby Land were 200 cm/year and 25 cm/year and observed maximum snow accumulation was 50 cm/year. They made radio echo soundings and geomorphological observations of the ice sheet and geodetic and geological surveys of Yamato Mountains. S. Kobayashi (ILTS) observed the structure of katabatic wind profiles at Mizuho Camp, using radio sondes and ultra sonic anemometers. The average height of the temperature inversion and the temperature difference between the snow surface and the inversion were found to be 250 m and 5°C in summer and 600 m and 15°C in winter.

OTHER EXPEDITIONS

The polar sea ice reconnaissances were made by scientists of ILTS under the sponsorship of the Ministry of Education of Japan. Profs. T. Tabata (chief), S. Kinosita, T. Ishida and T. Hujioka measused daily variation of stress and strain in sea ice at Tuktoyaktuk, North West Territory, Canada from 1 to 30 May, 1972. Following this trip, T. Tabata went up to St. Lawrence Island, Alaska, with Drs G. Wakahama and E. Akitaya to measure deformation of sea ice from 3 to 25 March 1973. They found a remarkable variation of stress with a period of 24 hours in sea ice. A research group which consisted of geophysicists, a biologist and a social economist (Dr Kinosita, chief) made observations of frozen ground and plant ecology around Yakutsk, Siberia, USSR, from August to September 1972. This was the first scientific research expedition which was approved by the Soviet Government for Japanese scientists. They studied the relation between plant ecology and alas (a wide depression formed by the melting of permafrost).

FIELD WORK

Prof. K. Higuchi and his colleagues at the Institute for Water Research, Nagoya University, conducted glaciological studies of "Hamaguri Yuki", one of the perenial snow patches in the central Japan Alps, Honshu. Mass balance, albedo, morphology of surface dirt, deformation and rate of creep and permeation of melt water in the snow patch were measured. Many aerial photographs of snow patches were taken in order to publish the atlas of snow patches in central Japan. Higuchi's group also made observations of permafrost at the summit of Mt. Fuji (3776 m a.s.l.). Mt. Fuji is located in a temperate region of Honshu Island, the annual mean air temperature at the summit is below 0°C and allows the

persistence of permafrost there. They studied the relation between the thickness of the active layer of the permafrost and the thermal regime around the summit of Mt. Fuji. A research group of Toyama University, Toyama Prefecture, made observations of deposited snow at Mt. Tateyama (2500 m in a.s.l.) in relation to avalanche formation. The maximum depth of snow recorded was 550 cm in this area. The snow consisted of fine grains until the end of March, but it began to metamorphose from the surface and the bottom and its hardness decreased rapidly. A small basin has been chosen to study the relation between snow melt and run-off in the experimental forest of Hokkaido University. Dr K. Kojima (ILTS) and his colleagues studied the mechanism of snow melt with special reference to micro-meteorological conditions.

AVALANCHES

Toyama University planned to measure the dynamic pressure caused by avalanche flow at Kurobe Canyon, Honshu, in co-operation with scientists of ILTS. About 38 pressure gauges were set on avalanche-dangerous slopes in the Canyon and an automatic recording device of internal stress and creep in snow was installed. These pressure gauges recorded values of the dynamic pressure in the range of 15~65 ton/m^2 in the winter of 1971-1972, and 1.5~6.5 ton/m^2 in the winter of 1972-1973, but the maximum value of dynamic pressure was 139 ton/m^2. Toikanbetsu Avalanche Observatory, which belongs to ILTS, attempted to record movements of a natural avalanche on video tape. The video tape recorder can record automatically movements of avalanches at the rate of 3 frames per second for 12 hours. Since it was almost impossible to predict the time of initiation of an avalanche, the video cammera had to be fixed in the direction of the avalanche slope throughout daytime. Two avalanche movements were recorded in winter of 1972-1973. The maximum flow velocity of a wet snow avalanche was 15 m/sec.

LABORATORY WORK ON SNOW AND ICE

Basic research work on snow and ice were carried out at the following research institutes.

(a) *ILTS* S. Suzuki and D. Kuroiwa: Growth of etch pits and movements of etch channels on the basal surface of ice; Y. Suzuki: Semi-automatic optical analyzer for polycrystalline ice; Y. Mibuno; Studies on ice imperfections by X-ray; K. Tsusima: Shear strength and repeated loading on snow; T. Ishida et al: The rate of turbulent energy dissipation during snow drifting and related phenomena; S. Kinosita et al: Dynamic moduli of frozen ground.

(b) *FUKUI University:* water permeability and frictional coefficient of snow in relation to avalanche occurrence.

(c) *Institute of Snow and Ice Studies, Nagaoka:* Creep velocity of snow lying on a slope covered with grass, measured by means of glide meter designed by this institute. An automatic recording device of snow depth meter, developed by Dr T. Kimiura, using a GaAs-light limiting diode and silicon cell.

(d) *Ice Research Laboratory* (Dr A. Higashi): In this laboratory, mechanical properties of deep core ice from Byrd Station, Antarctica (supplied from NSF) were studied by the method of constant tensile strain rate test. They found that the ease of glide of polycrystalline ice differs with the orientation of the cut of the specimen from the core at the same depth. Fabric analyses of the specimens indicated that this difference could be explained by the basal slip in individual grains, of which occurrence is controlled by the relative dispositions between the preferred orientation of the c-axis and direction of the applied stress. An attempt was made to grow perfect or nearly perfect ice crystals to study mechanical properties of ice from the point of view of solid state physics. A special compression apparatus designed to study dislocation movement in a thin ice crystal was placed on the goniometer of a Lang camera. X-ray diffraction topographs showed that the velocity of dislocation was proportional to the applied stress.

(e) *MURORAN Technical College:* Prof. M. Murozumi and colleagues measured the potassium content in Antarctic snow with the accuracy of ppb, using an isotope dilution mass-spectrometry. This method requires only ten grams of snow as a specimen. The concentration of potassium found in Antarctic snow ranged between 3~11 μg/Kg and the ratio of $^{39}K/^{41}K$ ranged between 0.5~2.4.

INFORMAL MEETINGS ON GLACIOLOGY

Both ILTS Hokkaido University and the Geophysical Institute of University of Alaska (GIUA) have conducted a study on "Metamorphism of snow and its transformation to glacier ice in the Pacific and Arctic regions" as a co-operative research work. This project was approved by both the Japan Society of Promotion of Science and the National Science Foundation of America. An informal review meeting on this co-operative work was held at ILTS from 5 to 9 November 1973. Drs C. Benson, T. Otake, W. Harrison, J. Rogers, L. Shapiro (GIUA) and L. Mayo (US Geological Survey) joined this meeting. D. Kuroiwa and C. Benson outlined results of individual work made by both ILTS and GIUA.

In the session on glaciological observations, data on mass balance, thermal regime, and stratigraphic investigation of snow and firn of the McCall Glacier, Alaska were presented by GIUA. G. Wakahama talked about mechanism of transformation from snow into ice at the McCall Glacier, and C. Benson about aufeis studies at the base of the McCall Glacier. In the session on meltwater, heat and water balance of the McCall Glacier and permeation of meltwater in the glacier body were presented. W. Harrison talked about the thermodynamics and permeability of a temperate glacier and bore hole photography of glacier sliding. G. Wakahama showed an interesting experiment on the artificial formation of superimposed ice. L. Mayo presented long-term ice and water balance studies at the Gulkana and Wolverine Glaciers, Alaska, and South Cascade and Maclure Glaciers. In the session on the structure of glacier ice, L. Shapiro and J. Rogers talked about foliation studies and strain measurements on the McCall and Blue Glaciers, and G. Wakahama and Y. Endo presented the results of strain fabric and texture of glacier ice containing sand and rock fragments. In the session on metamorphism, D. Kuroiwa showed a time-lapse movie of metamorphism of snow and ice sintering. During this meeting, all participants made an enjoyable trip to Dyozankei Hot Springs, Shikotsu Toya National Park.

Four years ago, a research group was organized by scientists of Hokkaido, Nagoya and Ryukyu Universities and Muroran Technical College to study deep core ice from the point of view of solid state physics and chemistry (D. Kuroiwa, chief). Deep core ice samples were supplied from NSF and the Antarctic Division of Australia and JARE. A special budget was provided from the Ministry of Education of Japan to conduct this research project. The final review meeting on this project was held at ILTS 30—31 October 1973. The following subjects were discussed: A. Higashi and H. Shogo (Dept. of Tech., Hokkaido University) talked on mechanical properties of deep core ice obtained at Byrd Station, D. Kuroiwa and T. Kawamura (ILTS) on elastic modulus and internal friction of Antarctic ice and artificially compressed snow, T. Yamada (ILTS) on the relation between sonic wave velocity and texture of core samples obtained at Mizuho Camp Antarctica, S. Mae and K. Yamamoto (Nagoya Univ.) on experimental study of deep core ice under high pressure, D. Kuroiwa (ILTS) on change of dielectric properties of snow under confined compression, N. Maeno (ILTS) on investigations of electrical properties of deep ice core, T. Yamada and T. Hasemi (ILTS) on structure and thermal heat conduction of subsurface snow at Mizuho Camp, M. Murozumi and S. Nakamura (Muroran Techn. College) on chemical analysis of Antarctic snow and deep ice core, Y. Endo (ILTS) on densification of snow in Southeast Antarctica, K. Kizaki (Ryukyu Univ.) on a historical review and related problems of ice fabric studies, M. Kumazawa (Nagoya Univ.) on a theoretical study of ice fabrics, G. Wakahama (ILTS) on the structure and texture of ice cores from the Amery Ice Shelf, Wilkes Dome and Cape Forger, Antarctica, M. Nakawo and S. Tanaka (ILTS and Nagoya Univ.) on the c-axis orientation in ice core obtained on glaciers near Syowa Station, S. Tanaka (Nagoya Univ.) on crystal structure and fabric patterns found in deep core ice, M. Nakawo and G. Wakahama (ILTS) on fabric study of core ice obtained at McCall Glacier, Alaska. These results will be published elswhere.

TWO ORGANIZATIONS ON GLACIOLOGY

The data centre for glacier research, Japanese Society of Snow and Ice, was established in May 1973. The main purpose of the centre is to collect data on glaciers obtained by Japanese scientific expedition parties and mountaineers, and to help their glaciological work. The present address is c/o K. Higuchi, Hydrological Physics, Water Research Institute, Nagoya University, Nagoya, Japan. The National Polar Research Institute was established at 1-9-10 Kaga, Itabashi- Ku, Tokyo, in 1973. The purpose of this Institute is to conduct scientific research expeditions and observations in polar regions. The present director is Prof. Dr Takeshi Nagata. The Institute is composed of two divisions, administration and research. The division of administration is responsible for the planning and operation of Japanese Antarctic Research Expeditions and the research division consists of Geophysics, Glaciology, Biological Ecology and Data Analysis. Prof. K. Kusunoki is in charge of the research section for glaciology. Three data reports and one research paper on JARE are published every year.

Daisuke Kuroiwa

NEW ZEALAND

During 1973/74, glaciological investigations were continued by the Water and Soil Division, Ministry of Works and Development (MWD) Christchurch, and included projects carried out in conjunction with the University of Canterbury and the Department of Scientific and Industrial Research (DSIR).

SEASONAL SNOW

The early part of the 1973 winter was relatively dry and significant accumulation of snow in the alpine foothills did not begin until late July. An unusually heavy snowfall on 5/6 August affected the Canterbury Plains and caused extensive damage and disruption of communications. However, this was an isolated event and snow accumulation in the mountains was below normal for the winter.

Snow courses were monitored by MWD at Lake Tekapo and by the Forest Service at Craigieburn. Investigations to assess the snow melt contribution to the hydro-lakes in the upper Waitaki basin are continuing. Remote sensing techniques appear to provide the best prospects for overcoming the problems of rugged, inaccessible terrain and variable duration of snow cover.

TASMAN GLACIER

Mass balance measurements continued at three index sites representing the névé and the upper and lower parts of the glacier tongue. Winter balance values for 1973 are relatively low and at the end of the 1973/74 balance year, the snow line was higher than normal. Access to the upper measurement site was not possible at that time because of the large number of crevasses exposed in the névé region.

Multispectral photography of the glacier was carried out in May 1974 in conjunction with the Physics and Engineering Laboratory (DSIR). This is part of a series of preliminary investigations of the applications of ERTS data in New Zealand and the camera system which was used covers the same spectral bands as ERTS 1. The only ERTS 1 images of the Southern Alps are a single set taken in December 1973, but it is anticipated that ERTS-B will provide regular coverage.

IVORY GLACIER

(IHD Representative Basin)

Mass balance measurements have continued. Snow accumulation during the 1973 winter was considerably less than in the previous 4 years of record, but spring snowstorms delayed the start of the main melt season. By the end of the balance year, almost no snow remained on the glacier and a negative mass balance of 3.5 m was recorded over a surface area of 0.8 km^2. The terminus has retreated 50 m since 1971.

During November and December 1973, studies of snowpack ablation and microclimate were carried out in conjunction with students from the Geography Department, University of Canterbury. Despite continuous bad weather, a valuable series of detailed observations was obtained at a number of sites on the glacier.

ANTARCTICA

During the 1973/74 summer season the programme of hydrological and glaciological investigations was continued in the "Dry Valleys" region of Southern Victoria Land. This programme is operated with support from Antarctic Division (DSIR) and Lands and Survey Department.

Mass balance measurements were continued on the Jeremy Sykes, Alberich, Heimdall and Meserve glaciers in the Asgard range, Wright Valley. Observations were continued on the Lower Wright glacier, which is the principal source of meltwater for the Onyx river, and were extended across the Wilson piedmont glacier. Further measurements were also carried out on the Packard Glacier in the Victoria Valley. Photographic monitoring of selected glacier termini was extended to include a further six glaciers.

Discharge of the Onyx river was recorded throughout the summer at two locations, one near the terminus of the Lower Wright glacier and one near Lake Vanda. Substantial snowfalls in October and November retarded the start of the melt season and the Onyx river flow did not reach Lake Vanda until December 31, the latest date yet recorded. However, unusually warm conditions prevailed during the remainder of the summer. Inflows to the lake resulted in a net gain of 0.31 m in level compared to a drop of 0.14 m over the 1973 winter. Ten other lakes in the region also showed substantial gains in level over the summer and considerable areas of melting permafrost were visible by the end of January.

Photo-control points were triangulated for mapping the Heimdall and Lower Wright Glaciers and survey markers were established on the Erebus Glacier tongue, Ross Island.

P. W. Anderton

J. K. Fenwick

POLAND

In the Karkonosze Mountain Ridge (Sudetes Mountains) systematic and special actinometric and meteorological investigations were continued (see ICE 41, p. 10) in the region of Mt. Szrenica (1400 m), carried out mainly in the area of the Mountain Branch of the Meteorological and Climatological Observatory of Wrocław University, and in the region of Mt. Sniezka (Snow Mt., 1602 m), carried out mainly in the area of the Observatory of the Meteorological and Water Economy Institute (former State Hydrological and Meteorological Institute). In the Karkonosze, soft rime (a very frequent and very significant component in the water balance) was also taken into consideration.

Outside the Karkonosze, in the Sudetes, snow investigations in the region of Mt. Snieznik were carried out by the Meteorological and Climatological Observatory of Wrocław University.

In the Tatra Massif (Karpathian Mountains) systematic and special snow and meteorological investigations were carried out at the Observatory on Mt. Kasprowy (2000 m) and at several other stations of the Institute of Meteorology and Water economy, and at a Station of the Polish Academy of Science.

GREENLAND

The expedition of 1973 was under the leadership of Dr J. Cegła, associate Professor of Physical Geography of Wrocław University and consisted of seven members. Investigations were concentrated in the region of Nordre Isortok Fiord, mainly on the local mountain glaciation southward of Nordre Isortok Fiord. The programme included: origin of patterned ground, contempory processes of aeolian sedimentation, geomorphology of the snow zone, permafrost, solifluction, rock temperature. Some glaciological and periglacial investigations were carried out also at the front of the inland ice and on its forefield in the region close (northward) to the Söndre Ström Fiord. The Danish Greenland Authorities were very helpful to the Expedition.

SPITSBERGEN

The Geographical Institute of Wrocław University Expedition to SW-Spitsbergen was under the leadership of Dr S. Baranowski, with 10 members, 6 from the Geographical Institute of Wrocław University and others from the Universities of Poznan, Torun, Lublin and the Polish Academy of Sciences in Warsaw. The glaciological-meteorological group (4 members) continued the investigations mainly in those parts of Werenskiold Glacier and its forefield that had been studied in the 4 years of the IGY/IGC (1957-60) and in 1970-72. The measurements of ablation and movement of the Werenskiold Glacier and of the radiation and meteorological elements were carried out at the main station on the forefield of the glacier and at 5 microclimatological stations.

The stereophotogrammetric survey of the end part of Werenskiold Glacier was repeated, for a detailed map, which allows for deductions of changes of glacier front and mass, in comparison to the stereophotogrammetric surveys of the previous expeditions. In 1973 there were also snow-firn investigations in a pit on the Amundsen Ice Plateau.

Morphological, sedimentological and biological investigations (4 members) included: Karst phenomena, chemical denudation, water chemistry (the mineral and thermal springs were listed), plant succession, tundra and peat components (13 peat profile samples were taken for microscopic analysis and fossil tundra were noted on nunataks).

A report on the expedition, written by Dr S. Baranowski, has been published by Wrocław University.

The Polish Spitsbergen Expedition of the Alpine Club in Poznan was under the leadership of Dr R. W. Schramm (13 members). Meteorological and glacier observations were made in NW, middle West and SW Spitsbergen along trajectories across many glaciers, by sledges and skis.

ICELAND

The Expedition of Lódz University in 1972 was under the leadership of Dr S. Jewtuchowicz and Dr L. Dutkiewicz from the Geographical Institute (7 members). The investigations were concentrated on the marginal zone of Kviar-Jokull one of the glaciers flowing from Oreaefa-Jökull and its forefield. The programme included: vanishing and retreating of the glacier; distribution of marginal landforms in front of the glacier; texture-structure of glacial deposits; microforms and processes caused by permafrost; weathering, downwash, solifluction; streams in the marginal zone of Kviar-Jökull and in its foreland; origin of lakes in front of the glacier; meteorological observations in front and on the surface of the glacier (2 km from the front).

At the end of the expedition the leader, Dr S. Jewtuchowicz, had a fatal accident in a river; many research materials were also lost.

GLACIOLOGICAL PUBLICATIONS

The special volume of the Geographical Journal (Vol. XLIV, Part 2, Wrocław 1973), dedicated to the fortieth anniversary of Polish Polar Expeditions, contains: S. Z. Rózycki: Comment on the history of Polish Spitsbergen Expeditions; A.

Kosiba: On the participation of Poles in Greenland research work; K. Birkenmajer: The perspectives of the Polish Polar research expeditions; J. Dylik: L'importance des recherches sur le pergélisol pour la meilleure connaissance des phénomènes périglaciaires en Pologne; S. Baranowski: Polish Spitsbergen Expeditions in 1970 and 1971; J. Cegła: Tentative explanation of the origin of structural grounds in SW Spitsbergen in the light of the hypothesis of systems with reversed density gradient; A. Jahn: Roman Gajda's polar research work; R. Galon: Polish research work in Iceland; Z. Churski: Evolution of the hydrographic system in the Skeidarárjökull forefield (Iceland); G. Wójcik: Solar radiation in Skeidarárjökull forefield (Iceland); J. Czerwinski: Some microrelief elements in the forefield of Breidamerkurjökull (Iceland), and the problem of fluted moraines.

A. Kosiba

Dr Willi Dansgaard

Willi Dansgaard could well be described as a citizen of Copenhagen rather than of Denmark, for he was born and educated and has spent almost all his working life in that city.

Physics was the subject that had interested him most at school, and he specialised in this at the University of Copenhagen, graduating in 1947 at the age of 25. After one year at the Geomagnetic Observatory in Godhavn, Greenland, he spent three years at the Meteorological institute in Copenhagen. His interest in isotope studies grew during this period and was further stimulated by a move in 1951 to the Biophysical Institute, University of Copenhagen. A mass spectrometer was installed for biological purposes, but, to his despair, he found it was impossible to convince the biologists about their need for stable isotope tracers.

It is fortunate, in retrospect, for glaciology that this situation forced him to look for some

geophysical application of the mass spectrometer. A rainy weekend in June 1952 saw him, in desperation, collecting hourly samples of rainwater in his garden. The rain continued for 30 hours, which meant that the household was denuded of all utensils that could be used as containers in what he described as a "rather unscientific-looking way". However, the results quickly changed despair into hope, for they showed clearly the successive isotopic fractionation as the air cooled off during its ascent along the warm front.

At last, Willi was able to gain the interest of others and soon the first world-wide precititation and groundwater survey was initiated. A paper published in 1954 demonstrates oxygen-18 (or deuterium) as a climatic indicator, particularly at high latitudes, and points to the isotopic composition of glacier ice as a means of making paleo-climatic studies.

By 1958, isotope glaciology was sufficiently identifiable as a subject to become a major part of the research programme for the Arctic Institute of North America Greenland Expedition, under the leadership of P.F. Scholander. Willi Dansgaard was a member of the expedition, which extracted ancient carbon dioxide from icebergs for carbon-14 dating. It was this work that led to the nickname: "The Bubble Expedition", although a second nickname could well have been derived from Willi's attempts to demonstrate not only the foolishness of climbing icebergs, but also the ability of oxygen-18 to indicate their sites of formation.

Returning from Greenland, he continued his researches, and in 1961 wrote his doctoral thesis on the isotopic composition of natural waters. In 1962 he was appointed Professor in Mass Spectrometry at the University, where he has developed the Geophysical Isotope Laboratory with a strong team of colleagues. With Henrik B. Clausen he has produced an ice dating method based on silicon-32 as an alternative or supplement to the carbon-14 method. Further understanding of the geographic distribution of stable isotopes was obtained under the joint W.M.O.-I.A.E.A. world-wide precipitation survey.

The recovery of the Camp Century deep ice core in Greenland gave an excellent opportunity to reconsider, mainly with Sigfus J. Johnsen and C. C. Langway, the potentialities and limitations of stable isotope glaciology, particularly stable isotope profiles as paleo-climatic records. These problems have raised considerable discussions, and stable isotope analyses are now being incorporated in several major glaciological projects.

Willi Dansgaard wrote a new chapter in the history of the International Glaciological Society when he organized the 1973 meeting of the Nordic Branch in Greenland—the first time the Society had officially met in polar regions. He was President of the Branch 1973-74, and a member of the Society's Council 1971-74. He has most probably served on the governing bodies of other organizations; he has most probably received recognition of his work; but the acquisition of these biographical details would take longer than did the collecting of rain samples in 1952. He is known to be a television commentator of some experience, for his laboratory has featured in scientific documentaries that have been shown in several countries. His talent for sculpting and painting is less well-known; these are the hobbies that he indulges at the family country cottage in rare moments of spare time. What is certainly known is that he and his group have opened up another dimension in glaciological research.

INTERNATIONAL GLACIOLOGICAL SOCIETY — 1974 ANNUAL DINNER

19 September, in Pembroke College, Cambridge, during the Symposium on Remote Sensing in Glaciology

The College chef excelled himself, greatly to the enjoyment of members and guests.

PRESENTATION OF THE SELIGMAN CRYSTAL TO Dr S EVANS

19 September 1974 at the Society's Annual Dinner

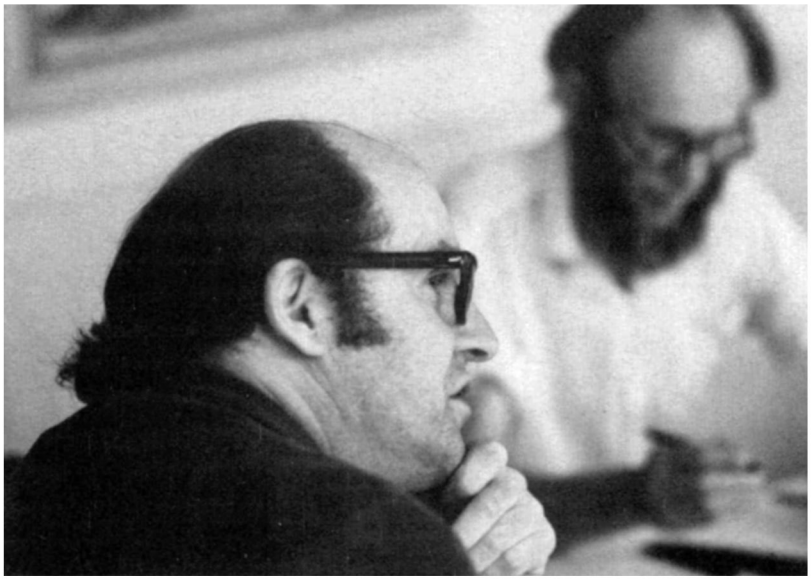
Sir Vivian Fuchs (Past President) | The President (Dr W. F. Weeks) Mrs Gerald Seligman | Dr S. Evans Lady Fuchs | Dr J. F. Nye (Past President)

Dr Evans replies to the presentation speech

Photographs by C. W. M. Swithinbank

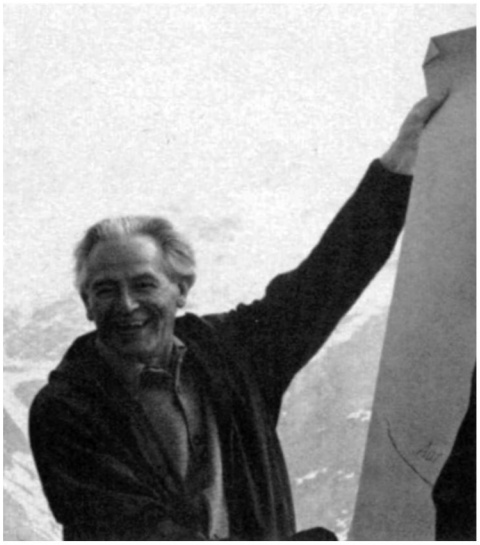
INTERNATIONAL COMMISSION OF SNOW AND ICE

Symposium on Snow Mechanics



— met in
Grindelwald, Switzerland,
1-5 April 1974,
under the Presidency
of Dr J. F. Nye.

The President of the Commission and the Participants listened to lectures indoors .....



H. Hoinkes

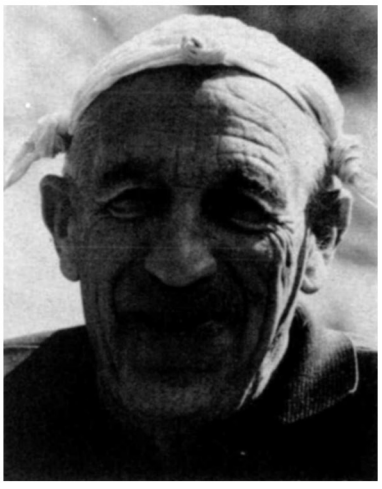
..... and outdoors.

C. Bradley

The sun shone .....

A. Roch

G. Wakahama



..... and everyone took photographs of every one else.

Photographs by E. R. LaChapelle

INTERNATIONAL GLACIOLOGICAL SOCIETY

SYMPOSIUM ON APPLIED GLACIOLOGY

FIRST CIRCULAR

(Cambridge, England, 12-17 September 1976)

A Symposium on Problems of applied glaciology will be held in Cambridge, England, in 1976. Registration will take place on Sunday 12 September and sessions will be held from Monday 13 to Friday 17 September.

TOPICS

The Symposium will be concerned with the application of fundamental properties of snow and ice to the solution of engineering problems, and will include such topics as:

ice forces,

bearing capacity,

strength and deformation of ice,

avalanches,

ice in and on the ground,

ice and snow hydrology,

mechanical properties of ice,

snow handling,

ice accretion on and around structures,

properties of and techniques for producing unusual snow and ice materials used in industrial processes.

PAPERS

The Papers Committee will be happy to consider any paper that combines an engineering problem with the fundamental properties of snow and ice. Details about the submission of summaries and final papers will be given in the Second Circular, to be published in the latter half of 1975.

PUBLICATION

Papers presented at the Symposium will be refereed according to the usual standards of the Journal of Glaciology before being accepted for publication in the Proceedings of the Symposium. The Proceedings will be published by the International Glaciological Society.

FURTHER INFORMATION

You are invited to attend this Symposium and to return the attached form as soon as possible. The Second Circular will give information about accommodation, general programme and preparation of summaries and final papers.

Requests for copies of the Second Circular and enquiries about the Symposium should be addressed to:

The Secretary, International Glaciological Society, Cambridge CB2 1ER, England.

INTERNATIONAL GLACIOLOGICAL SOCIETY

SYMPOSIUM ON APPLIED GLACIOLOGY 1976

Family name .....

First name ..... Title .....

Address .....

.....

.....

I hope to participate in the Symposium, 1976—☐

I expect to submit a summary of a proposed paper—☐

+ without obligation

TO BE SENT AS SOON AS POSSIBLE TO:

The Secretary, International Glaciological Society, Cambridge CB2 1ER, England.

BRANCH NEWS

NORTHEAST NORTH AMERICAN BRANCH 1975

A meeting of the NENA Branch will be held at the Cold Regions Research and Engineering Laboratory starting at 1930 on 14 February (Friday) and ending during the morning of 16 February (Sunday). Further information can be obtained by writing to Dr A. J. Gow, USA CRREL, P.O. Box 282, Hanover, N. H. 03755, USA.

Persons wishing to present papers should submit titles only. The meeting will feature mind-boggling scientific revelations, skiing (including the 2nd Great CAN-AM Glaciological Ski Contest, alpine division), noise making, parties, banquets and fancy balls. Don't miss it. Clearly the ice cube social event of the season!

JOURNAL OF GLACIOLOGY

The following papers have been accepted for publication in forthcoming issues of the Journal of Glaciology:

W. F. Budd:
A first simple model for periodically self-surging glaciers.

W. D. Harrison:
Temperature measurements in a temperate glacier.

W. D. Harrison:
A measurement of surface-perpendicular strain-rate in a glacier.

James D. Robertson & Charles R. Bentley:
Investigation of polar snow using seismic velocity gradients.

J. F. Nye:
Deducing thickness changes of an ice sheet from radio-echo and other measurements.

R. H. Goodman:
Radio echo sounding on temperate glaciers.

G. K. C. Clarke & R. H. Goodman:
Radio echo soundings and ice-temperature measurements in a surge-type glacier.

R. H. Goodman, G. K. C. Clarke, G. T. Jarvis, S. G. Collins & R. Metcalfe:
Radio soundings on Trapridge Glacier, Yukon Territory, Canada.

I. M. Whillians:
Effect of inversion winds on topographic detail and mass balance on inland ice sheets.

S. Martin:
Wind regimes and heat exchange on Glacier de Saint-Sorlin.

Bruce R. Barkstrom & Charles W. Querfeld:
Concerning the effect of anisotropic scattering and finite depth on the distribution of solar radiation in snow.

R. H. Thomas:
Liquid brine in ice shelves.

Lars Ingolf Eide & Seelye Martin:
The formation of brine drainage features in young sea ice.

Cesar N. Caviedes & Roland Paskoff:
Quaternary glaciations in the Andes of north-central Chile.

RECENT MEETINGS (of other organizations)

INTERNATIONAL COMMISSION OF SNOW AND ICE (ICSI)

SNOW MECHANICS

(Grindelwald, Switzerland, 1-5 April 1974)

A Symposium on Snow Mechanics was held in Grindelwald, Switzerland, from 1 to 5 April 1974, sponsored by the International Association of Hydrological Sciences and organized by the International Commission of Snow and Ice. More than 40 papers were presented on topics covering the basic physics and mechanics of deposited and moving snow, including **physical fundamentals, mechanical fundamentals,** and **fluid dynamics.**

Approved papers and discussions will be published in the proceedings of the Symposium by the International Association of Hydrological Sciences. Further information may be obtained from the Secretary of ICSI, Dr F. Müller, Geographisches Institut der ETH, 8006-Zürich, Sonneggstrasse 5, Switzerland.

On pages 13-14 of this issue of ICE appear photographs of some of the participants at the sessions and on the half-day excursion to the viewpoint "First".

RESOLUTION OF THE INTERNATIONAL COMMISSION OF SNOW AND ICE

(unanimously carried at the ICSI officers meeting in Paris, 16 May 1973)

Whereas many nations of the world are now engaged in the production of high-level radioactive materials as a by-product of nuclear energy generation, and
whereas other nations will be engaged in similar activities before the end of this century, and
whereas the inviolate storage or disposal of such materials poses one of the most serious environmental problems that are currently facing mankind and requires the location of suitable Earth "graveyards" that can be isolated from the biosphere for a period of 250,000 years and whereas the ice sheets of Antarctica and Greenland have been proposed as possible disposal sites,
the International Commission of Snow and Ice wishes to draw attention to the need for thorough geophysical investigations aimed at creating a scientific basis for such an ice sheet scheme so that it can be evaluated and properly weighed against alternative methods of storage or disposal.

RESOLUTION IN SUPPORT OF AIDJEX

(passed at the ICSI officers meeting in Paris, 15 May 1973)

RECOMMENDATION

The International Commission of Snow and Ice (IAHS, IUGG) notes the growing economic importance of the High Arctic, and recognizes the importance of expanding scientific understanding of the region in order to achieve a rational balance between the development of resources and the protection of the environment. It therefore welcomes the sound scientific planning, the international cooperation, and the progress made by scientists and government agencies in the United States and Canada in conducting the Arctic Ice Dynamics Joint Experiment, and **recommends** that every possible support be given to ensure the continuation and completion of that experiment.

FUTURE MEETINGS (of other organizations)

SYMPOSIUM ON THE THERMAL REGIME OF GLACIERS AND ICE SHEETS

(Burnaby, B.C., Canada, 8-11 April 1975)

A Symposium on the Thermal regime of glaciers and ice sheets will be held at Simon Fraser University, Burnaby, British Columbia, Canada from 8 to 11 April, 1975.

PAPERS

The following papers have been accepted for presentation:

W. Budd:
Computer modelling of temperate distributions in polar ice sheets. INVITED

W. Budd:
Law Dome temperatures.

C. R. Bentley:
Electrical resistivity profiles and temperatures in the Ross Ice Shelf.

G. K. C. Clarke:
Thermal regulation of glacier surging. INVITED

G. K. C. Clarke:
Thermal regime of Steele Glacier.

D. C. Ford, H. P. Schwartz & R. S. Harmon:
Paleothermometric observations at the Columbia Icefield, Alberta, B.C.

S. S. Gregorian, M. S. Krass & P. A. Shumsky:
The mathematical model of a three dimensional non-isothermal glacier.

R. LeB. Hooke:
Near surface temperatures in the percolation and saturation zones of polar ice-sheets.

T. Hughes:
Convection and possible instabilities in the Antarctic Ice Sheet. INVITED

M. S. Krass
The temperature field of a sub-temperate glacier.

L. Liboutry:
Physical processes in temperate glaciers and in the temperate layer of transitional glaciers. INVITED.

F. Muller & H. Blatter:
On the thermal regime of a high arctic valley glacier.

B. Narod:
A precision resistance measuring bridge in glacier temperature work.

W. S. B. Paterson:
Temperature measurements in the Devon Island Ice Cap and their climatic implications.

C. F. Raymond:
Some effects of bubbles in temperate glacier ice.

G. de Q. Robin:
Reconciliation of temperature-depth profiles in polar ice sheets with past surface temperatures deduced from oxygen isotope profiles. INVITED

G. de Q. Robin:
Is the basal ice of a temperate glacier at the pressure melting point?

H. Rothlisberger:
Pressure fluctuations at the glacier bed.

P. A. Shumsky & M. S. Krass:
The mathematical models of ice-shelves.

P. A. Shumsky:
The sliding mechanism and bottom regimes of glaciers.

R. H. Thomas:
The distribution of 10m temperatures in the Ross Ice Shelf, Antarctic.

G. Wakahama & T. Hasemi:
On the formation of superimposed ice in the accumulation areas of sub-polar glaciers.

G. Wakahama, T. Hasemi & W. Budd:
Formation precesses of three-layered structure of the Amery Ice Shelf, Antarctica.

RECENT WORK

If time permits, a session will be devoted to brief accounts of recent work. Those who wish to contribute to this session should send a title to the organizing committee by 1 April 1975.

PRESENTATION OF PAPERS AND PUBLICATION

In order to ensure that there is ample time for discussion of each paper, authors have been asked to keep to a strict prearranged timing in presenting their papers. If none of the authors of a paper is present, that paper will not be presented at the Symposium, but will be open for discussion.

Extended summaries of accepted papers should be submitted by 15 January 1975. They should consist of 2 or 3 pages of *single-spaced* typescript on 8½ x 11 inch paper or its European equivalent. Copies of these extended summaries will be mailed to all participants at the end of February.

Final typescripts of papers must be submitted by 1 April 1975 in accordance with the Note to Authors which authors will receive. Papers presented at the Symposium will be considered for publication in the Symposium Proceedings, which will consist of a special volume of the Journal of Glaciology. Papers submitted will be further assessed by referees whose opinions will be taken into account in deciding whether a particular paper should be published in the Proceedings, and whether any modifications are required. Papers considered unsuitable for publication, papers published elsewhere, papers whose authors do not submit full manuscripts in time, and papers accepted for the Symposium but not presented there, will be represented in the Symposium Proceedings by a 200 word abstract. Authors, or the authors' institutions, not the Symposium Organizers, will be responsible for payment of page charges to the Journal of

Glaciology. All authors, and all members of the Glaciological Society, will receive a free copy of the special volume.

ACCOMMODATION

It is regretted that a change in University Residences policy makes such accommodation unavailable. Block reservations will be made in nearby hotels and frequent transportation to and from the University provided.

Prices will be approximately $30.00 per day single, including breakfast at the hotel, cafeteria-style lunch and dinner at the University. Deposits of $20.00 are required for booking the above accommodation, returnable if cancellation occurs before 1 March, 1975.

REGISTRATION

The registration fee of $30.00 covers a Spring Thaw Reception, Banquet and all meetings but does not include Proceedings volume. To obtain a Registration Form, please write to R. B. Sagar, at the address given below.

WEATHER

In Vancouver, the mean maximum and minimum temperatures for early April are 10°C and 4°C. The probability of rain is 100%.

ORGANIZING COMMITTEE

G. K. C. Clarke, University of British Columbia; S. J. Jones, Department of Environment, Ottawa; W. H. Mathews, University of British Columbia; W. S. B. Paterson, Department of Energy, Mines & Resources, Ottawa; R. B. Sagar (Chairman), Simon Fraser University; B. G. Wilson, Academic Vice-President, Simon Fraser University.

All correspondence and request for information concerning the Symposium should be addressed to:

R. B. Sagar, Glaciology Symposium, c/o Department of Geography, Simon Fraser University, Burnaby, B.C. V5A 1S6, Canada.

INTERNATIONAL UNION OF GEODESY AND GEOPHYSICS

(16th General Assembly, 25 August—6 September 1975, Grenoble, France)

SYMPOSIUM ON SNOW AND ICE CRYSTALS

An international symposium on Ice and Snow Crystals will be held in Grenoble, France on 27 August 1975. It will be jointly sponsored by IAMAP and the IAHS and will be organized by the International Commission of Cloud Physics jointly with the International Commission on Snow and Ice. Topics for discussion will be concerned with the problems of formation and growth of ice crystals and the environment of water vapor, or liquid water. Specifically five points for discussion are proposed.

SCOPE OF SYMPOSIUM:

1. Attention should be called to the many unknowns in the structure and properties of supercooled water and ice.
2. There is a great need for increased knowledge of the formation and growth processes of ice crystals from water as in lake ice, sea ice, glaciers, and also in hail, and the growth conditions under which various ice crystals and snow crystal habits evolve when growing from the vapor phase. (We still do not know what kind of nucleus makes ice form at 0°C. Maybe in nature it never does!)
3. Problems of ice crystal metamorphis and regeletion in both lake and sea ice as well as in the structure of graupel and hailstones.
4. Scavenging mechanisms for aerosol particles by snow and ice crystals.
5. Finally, there appears to be a pressing need to bring to the attention of the scientific community the lack of any valid theories of ice crystal growth, as neither the Stranski-Kaischev theory nor the Frank screw dislocations theory has been rigorously applied to the ice crystal habit forming process.

Review papers have been planned; one review will be given by Dr C. Frank, the creator of the screw dislocation theory of ice crystal growth.

ORGANIZATION OF SYMPOSIUM:

Convener: Dr Roland List, Department of Physics, McLennan Physical Labs, University of Toronto, Toronto 5, Ontario, Canada

CALL FOR PAPERS

Abstracts for papers (whether invited or contributed) are requested to be sent by 15 January 1975 to the Conference Convener who will acknowledge the receipt. The abstracts should not exceed one page each, and should contain only line drawings. (Desirable page size — 8½ x 11 inches.) They should be suitable for direct reproduction, and must be in French or English. The requirements for projectional equipment shall be stated. Upon receipt the Convener will forward copies to the Secretary of the "lead" Association and to the members of the Programme Committee for screening, selection and programme organization. The final symposium programme with abstracts will be forwarded by the Convener by 10 April to the Association Secretary for his transmittal to the French Organizing Committee before 1 May 1975. The Convener will also notify the authors as to the status of their papers and whether they are to be presented orally (when and within what time) or whether they will be read by title. He will also issue a record circular containing the entire programme (but no abstracts) and other information.

SYMPOSIUM ON WEATHER MODIFICATION

(Modification of clouds and precipitation)

An international Symposium on Weather Modification will be held in Grenoble, France on 5 September 1975. It will be under the joint sponsorship of the International Association of Meteorology and Atmospheric Physics and of the International Association of Hydrological Sciences and will be organized by the International Commission on Cloud Physics of IAMAP.

The subject of the symposium will be the discussion of the scientific background of weather modification with the view of the effects of weather modification in hydrology. It is intended to acquaint the hydrologist with the present status of the state of the art and the possibilities of artificially manipulating precipitation in the form of rain, snow or hail, as well as the possibilities of the physical and statistical analysis of such effects. The meteorologist and cloud physicist would become acquainted with some of the hydrological problems which may arise from weather modification activities such as ground water levels, stream flow, run-off, and the measuring difficulties of the rate of rain and snowfall. The management of the water level of the lakes in water sheds should be illuminated. It is intended to present a few review papers and a few contributed papers for a possible total of 10 to 12 contributions. The following review papers have been scheduled so far.

Professor Krystof Haman, University of Warsaw: "Physical processes of Weather modification."

Dr Eugene Peck, NOAA and a Soviet scientist: "Measurements of rain and snowfall."

Dr W. Ackermann, Illinois State Water Survey: "Scientific hydrological problems re Weather Modification."

ORGANIZATION OF SYMPOSIUM:

Convener: Dr Helmut K. Weickmann, President, International Commission on Cloud Physics NOAA-ERL, PSRB No. 3, Boulder, Colorado 80303, U.S.A.

CALL FOR PAPERS

(As for Symposium on Snow and Ice Crystals—see previous section.)

GLACIOLOGICAL DIARY

1975

8-10 April
Symposium on the thermal regime of glaciers and ice caps. National Research Council of Canada, Simon Fraser University, Vancouver, Canada. (Dr R. B. Sagar, Dept. of Geography, Simon Fraser University, Burnaby, B.C., Canada.) (See p. 18 of this issue of ICE.)

6-7 May
Meeting of Task Force in soil-water problems in cold regions, Calgary, Alta., Canada. Sponsored by Section of Hydrology, American Geophysical Union. (James N. Luthin, Dept. of Water Science and Engineering, University of California, Davis, CA 95616, USA.)

23-25 May
Symposium on Quaternary stratigraphy, York University, Toronto, Canada. (W.C. Mahaney, York University, Atkinson College, Geography Dept., 4700 Keele Street, Toronto, Canada.)

8-13 June
Penrose Conference on Plio-Pleistocene geochronology, Mammoth, California, USA. Sponsored by Geological Society of America. (Lois Elms, Penrose Conference Co-ordinator, G.S.A., 3300 Penrose Place, Boulder, CO 80301, USA.)

26-28 June
National Symposium on precipitation analysis for hydrologic modeling, University of California, Davis. Sponsored by AGU Section of Hydrology. (AGU, 1707 L St., N.W., Washington, DC 20036, USA.)

30 June–2 July
National Symposium on water resources problems in metropolitan areas, New Brunswick, NJ. Sponsored by American Water Resources Association and Rutgers University. (William Whipple, Jr., Director, Water Resources Institute, Rutgers University, New Brunswick, NJ 08903, USA.)

18-20 August
International Symposium on the geochemistry of natural waters, Burlington, Ontario, Canada. Sponsors: Working Group on Geochemistry and Cosmochemistry, the International Association of Hydrological Sciences and Canada Centre for Inland Waters. (Mary E. Thompson, Chairman, Canada Centre for Inland Waters, Burlington, Ontario, Canada.)

18-21 August
International Association of Hydraulic Research Committee of Ice Problems and US Army Cold Regions Research and Engineering Laboratory — Symposium to include ice management and engineering as related to extended season navigation of inland waterways, ice jam control, and effects of sea ice on marine structures. (G. Frankenstein, CRREL, Hanover, N.H. 03755, USA.)

25 August–6 September
XVI General Assembly for the International Union of Geodesy and Geophysics, Grenoble, France. (C.N.F.G.G., 136bis, rue de Grenelle, 75700 Paris, France.)
Symposium on isotopes and impurities in snow and ice, International Commission of Snow and Ice, Grenoble, France, during 1975 General Assembly of I.U.G.G. (Dr Fritz Müller, Secretary ICSI, Geog. Inst. der ETH, Sonneggstrasse 5, Zürich 8006, Switzerland.)

27 August
Symposium on snow and ice crystals, International Commissions on Cloud Physics (IAMAP) and on Snow and Ice (IAHS), Grenoble, France, during 1975 General Assembly of IUGG. (Dr R. List, Dept. of Physics, McLennan Physical Labs., University of Toronto, Toronto 5, Ontario, Canada.) (See p. 19 of this issue of ICE.)

5 September
Symposium on weather modification, International Associations of Hydrological Sciences (IAHS) and Meteorology and Atmospheric Physics (IAMAP), Grenoble, France, during 1975 General Assembly of IUGG. (Dr H. K. Weickmann, International Commission on Cloud Physics, NOAA-ERL, PSRB No. 3, Boulder, CO 80303, USA.) (See p. 20 of this issue of ICE.)

8-13 September
Symposium and Workshops on the application of mathematical models in hydrology and water resources systems, Bratislava, Czechoslovakia. Convened by International Association of Hydrological Sciences with support of Unesco and World Meteorological Organization. (Symposium Organizing Committee, Hydrometeorological Institute, Jeseniova 43, 88532 Bratislava, Czechoslovakia.)

1-8 December
International Symposium on hydrological characteristics of river basins, Tokyo Prince Hotel, Tokyo, Japan. Sponsored by International Association of Hydrological Sciences, organized by Science Council of Japan. (Arnold I. Johnson, USNC/IAHS, U.S. Geological Survey National Center, MS-417, Reston, VA 22092.)

12-17 December
The Second World Congress on Water Resources, New Delhi, India. (C. V. J. Varma, Secretary Indian National Committee for International Water Resources Association, Central Board of Irrigation and Power, Kasturba Gandhi Marg, New Delhi-110001, India.)

14-19 December
Conference on foundations on Quaternary deposits, Norwich, England. Engineering Group of Geological Society of London. (A. B. Hawkins, Dept. of Geology, University of Bristol, Bristol BS8 1TL, England.)

1976

August
23rd International Geographical Congress, Moscow, USSR, (V. Annenkov, Institute of Geography, Academy of Sciences USSR, Staromonetny 29, Moscow 109017, USSR.)

15-25 August
25th International Geological Congress, Sydney, Australia. (Secretary-General, 25th International Geological Congress, P.O. Box 1892 Canberra City, AGT 2601, Australia.)

17-20 August
International Cloud Physics Conference, Colorado Springs, USA. Sponsored by International Association of Meteorology and Atmospheric Physics and International Commission on Cloud Physics: co-sponsored by American Meteorological Society. (H. K. Weickmann, NOAA/APCL, Boulder, CO 80302, USA.)

23-27 August
International Weather Modification Conference, Colorado Springs, CO. Sponsored by International Association of Meteorology and Atmospheric Physics/International Commission on Cloud Physics and Weather modification Panel of World Meteorological Organization; co-sponsored by American Meteorological Society and Academy of Science of Australia. (H. K. Weickmann, NOAA/APCL, Boulder, CO 80302, USA.)

Autumn
International workshop on dynamics of glacier fluctuations and surges, sponsored by ICSI, organized by and held in USSR.

12-18 September
Symposium on Problems of applied glaciology, Cambridge, England. International Glaciological Society. (Mrs H. Richardson, Secretary, Cambridge CB2 1ER, England.) (See p. 15 of this issue of ICE.)

1978

10-13 July
Third International Conference on Permafrost, Edmonton, Alberta, Canada. National Research Council of Canada. (M. K. Ward, c/o National Research Council of Canada, Ottawa, K1A OR6, Canada.)

NEWS

LETTER TO GLACIOLOGISTS FROM THE DIRECTOR OF THE ROSS ICE SHELF PROJECT

The Office of Polar Programs at the National Science Foundation has established a Polar Ice Core Office (PICO) at the University of Nebraska to conduct the common functions of operational planning, development, and procurement of ice drilling equipment, arranging logistic support, and overall coordination of the scientific objectives related to various ice drilling efforts that the Office of Polar Programs is expecting to support for glaciological research over the next decade. These ice-core drilling projects include, but are not limited to, the following:

1. Greenland Ice Sheet Program (GISP)
2. Ross Ice Shelf Project (RISP)
3. International Antarctic Glaciological Project (IAGP)
4. Glaciology of the Antarctic Peninsula (GAP)
5. West Antarctic Ice Stream Project (WISP), and
6. Ice core drilling in high-alpine localities.

Part of our role in this effort is to establish an information center for ice coring. Because of your experience in ice drilling, core studies, supervision of related studies, or anticipated needs for ice coring, we are asking you to supply information according to the outline given below. From your replies, we will be able to disseminate this information upon request, thereby maximizing resources and avoiding duplication.

— Outline your long-range (up to 10 years) plans for ice coring
— Outline your ice drilling plans for individual projects
— Outline your recommendations for ice drilling, even though the drilling is not for your own anticipated projects (locations, depths, etc.)
— Will any of the above require new ice drilling equipment or is existing equipment adequate?
— Give a brief description of your core-storage facilities, if any

— Do you have your own ice-drilling equipment and drilling personnel or must you rely on someone else's expertise and equipment?

— List the kinds of ice-drilling equipment you have on hand—that you are considering acquiring

— What kinds of specialized functions, services, laboratories, equipment, etc. does your institution have? (Isotope analysis lab, particulate lab, ice-testing devices, deep-coring devices, core inventory, etc.)

— Other remarks

In order to provide a workable service for all participants, we will send out similar requests at annual intervals so that the data center will be current.

Sincerely yours,
Robert H. Rutford
Director, Ross Ice Shelf Project,
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135 Bancroft Hall,
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RISP Progress Report No. 4, dated 21 August 1974, may be obtained from the above address.

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BRITISH ANTARCTIC SURVEY

Glaciologist

The British Antarctic Survey requires a Glaciologist (Senior Scientific Officer/Principal Scientific Officer) to work in the Survey's Earth Sciences Division at Cambridge.

The successful candidate will be required to undertake original research and to develop the Survey's glaciological programme.

He will train and supervise junior glaciologists and will direct the work of a small team. There will be opportunities for work in Antarctica for periods of four months or longer.

Candidates should be at least 26 years of age and must have attained PhD level in a glaciological subject; they should also have a good background of classical physics and mathematics.

SALARY SCALES—(Cost-of-living supplements are paid in addition to salary)

SSO — £3157—£4441
PSO — £4227—£5550

Starting salary may be above the minimum. Non-contributory superannuation scheme.

Applications should reach the Personnel Officer, British Antarctic Survey, 30 Gillingham Street, London SW1V 1HY not later than 31 March 1975.

NATURAL ENVIRONMENT RESEARCH COUNCIL

Foister & Jagg Ltd., Abbey Walk, Cambridge