

## INTERNATIONAL UNION OF GEODESY AND GEOPHYSICS

THE Eighth General Assembly of the International Union of Geodesy and Geophysics, and of its seven constituent associations, was held at Oslo during August 19-28. The opening assembly, held in the large hall ('Aula') of the University of Oslo, was attended by the King of Norway and the Crown Prince. The Government of Norway and the municipality and the University of Oslo extended the most generous hospitality to the Union. A large amount of careful preparation had been done by the Norwegian Organising Committee under the chairmanship of Prof. H. Solberg, secretary of the Academy of Science and Letters.

Owing to the state of health of the president, Prof. Helland-Hansen, of Norway, the duties of president were carried out by the senior vice-president, Prof. N. E. Nörlund, of Denmark. The general secretary of the Union is Dr. J. M. Stagg, of the British Meteorological Office. The Council of the Union consists of one delegate from each country; the British member of the Council was Prof. J. Proudman. There were more than five hundred delegates and guests from about forty countries. The largest party was the British, numbering nearly eighty, of which about half were delegates appointed by the Royal Society; but the party from the United States exceeded seventy. This was the first ordinary General Assembly since the War; a small, purely administrative Assembly had been held at Cambridge in 1946, and this enabled the Oslo delegates to devote the maximum amount of time to scientific discussion. Evening lectures by Dr. M. A. Tuve, of Washington, and by Dr. S. Thorarinsson, of Iceland, the latter showing a remarkable colour film on the recent eruption of Mt. Hekla, were much appreciated. Prof. Vening Meinesz, of Holland, was elected president of the Union for the period 1948-51. An invitation from Belgium to hold the next General Assembly at Brussels in 1951 was gratefully accepted.

The Union expressed its gratitude for the very considerable financial assistance which it has received from Unesco. The major part of this has consisted of grants in aid of the permanent scientific services which are sponsored by the Union; the largest individual grant for 1948, £3,000, is in aid of the International Seismological Summary, the staff of which is housed at Kew Observatory. But many of the officers of the Union received Unesco grants in aid of their travelling expenses to and from Oslo.

A very valuable feature of the Assembly was the excursions, and it was on these that the warm-hearted hospitality of the Norwegians reached its height. It is the common experience of those attending international conferences that the personal contacts made on such excursions are, even from the point of view of the advancement of science, the most valuable part of the whole proceedings. Most delegates and guests accepted invitations to visit the district around Lillehammer on August 22. After the Assembly, forty delegates enjoyed a most entertaining and instructive visit to the hydro-electric works at Rjukan as the guests of Norsk Hydro. The meteorologists and oceanographers took part in excursions which met far up the Sogne Fjord, and from this point they were conveyed to Bergen in five research vessels, four of them Norwegian and one Scottish.

The hospitality of the municipality of Bergen formed a fitting close to a memorable occasion.

*Association of Geodesy.* The work of the Association of Geodesy was distributed over five sections. In the Section on Triangulation there was much discussion on methods of measuring long distances, including triangulation between non-intervisible ground stations by radar and by the observation of flares dropped from aircraft. Consideration was also given to the proposal to extend the Central European Net to Western Europe. In the Section on Geodetic Levelling, deliberations were mainly devoted to refinements in the practice and theory of geodetic levelling and to the methods of research into those problems of tectonics on which levelling is capable of throwing light. The Section on Geodetic Astronomy gave consideration to co-operation with the International Unions of Astronomy and of Telecommunications. An interesting and important report on the activities of the Royal Observatory was received from the Astronomer Royal.

In the Section on Gravimetry it was noted that since 1939 the rapid development of static gravimeters has brought them into general use, not only for geodetic purposes but more especially for geological prospecting by oil companies. As a result, the quantity of gravity material accumulating in some areas is more than can be conveniently handled in geodetic work. It was decided that the Association should set up a Gravity Bureau. In the Section on the Geoid, attention was given to deviations of the vertical, to geoidal rise and deflexions, and to the application of methods of differential geometry to geoidal determination. There was a heated discussion on the 'co-geoid-fictitious level surface of the earth' after the removal of effects of compensated topography.

Both the president of the Association, Mr. W. D. Lambert, of Washington, and its secretary, Prof. P. Tardi, of Paris, were re-elected.

*Association of Seismology.* This Association benefited from the fact that a preliminary meeting had been held at Strasbourg in 1947. Without world-wide co-operation the progress of seismology would have been extremely slow. A notable example of such co-operation is the International Seismological Summary, for which the Association is responsible; significant measures for increasing the usefulness of the Summary were agreed upon at Oslo. A special session of the Association was devoted to recent researches on the seismicity of the earth. One of the sessions was devoted to the study of the seismic results of the large explosions at Heligoland, Burton-on-Trent, Haslach and Soltau, and to the results of seismic prospecting in France, Spain and the United States.

The president, Dr. R. Stoneley, of Cambridge, and the secretary, Prof. J. Rothé, of Strasbourg, were re-elected.

*Association of Meteorology.* In his presidential address to the Association of Meteorology, Prof. S. Chapman made a strong case for an International Meteorological Research Organisation to link together the various meteorological research bodies throughout the world, and to serve as a clearing house for ideas. A strong impression was created by the discussion

on rain-making by artificial means. Other important contributions included the following: a theory of selective unstable waves in an atmosphere described by the boundaries of the tropopause and the earth's surface, a subject which is connected with the formation of short-lived cyclones; fundamental problems in the study of radiation; the density of the high atmosphere as determined by the motion of meteorites; the need for more observations of water vapour and of helium in the high atmosphere; antarctic meteorology; jet streams; and the possibilities of statistical forecasting. Mr. A. W. Brewer exhibited an automatically controlled frost-point hygrometer, based on the design which he and Dr. Dobson had evolved, and gave an impressive account of the water vapour content above the tropopause. Prof. Byers showed a film exhibiting in slow motion the records of radar reflexion from rain during thunderstorms over Florida.

Prof. J. Bjerknes resigned the office of secretary and was elected president; Prof. J. van Mieghem was elected secretary.

*Association of Terrestrial Magnetism and Electricity.* The discussions of this Association included the following subjects: the influence of solar activity on terrestrial magnetism; air-borne magnetic surveys carried out in the United States and in Britain, which show great promise for the near future; the origin of the earth's magnetism; diurnal variation of the horizontal force near the magnetic equator; detection of rapidly moving ionic 'clouds', observed during ionospheric storms; and the use of V2 rockets for the exploration of the upper atmosphere.

Owing to the absence of the president, Dr. J. A. Fleming, of Washington, the chair at the early meetings was taken by Prof. J. Coulomb, of Paris; Prof. S. Chapman, of Oxford, was then elected president, and presided at the later meetings. The secretary, Dr. J. W. Joyce, of Washington, was re-elected.

*Association of Physical Oceanography.* A change of emphasis as compared with those at earlier Assemblies was shown in the meetings of the Association of Physical Oceanography. Previously, most attention was given to the distribution of temperature and salinity in the oceans and to the deductions regarding water-movements, etc., which could be drawn from such distributions. On this occasion, most attention was given to observations of oscillations in the sea, including surface-waves, turbulence and storm-surges. The change reflects a result of the War, which prevented ocean-going expeditions and turned attention to problems associated with the landing of troops on beaches. For the first time, British oceanographers took a prominent part in the presentation of papers.

Most of the standing scientific committees of the Association, including those on mean sea-level, ocean bottom, weather ships and technical handbook, were reappointed, while a new one on bibliography was set up. The president, Prof. H. U. Sverdrup, of Oslo, was re-elected. Prof. J. Proudman, of Liverpool, resigned the secretaryship, and Prof. H. Mosby, of Bergen, was appointed to succeed him.

*Association of Vulcanology.* In the absence of the president, Prof. Michel-Lévy, of Paris, owing to ill-health, the Association of Vulcanology met under the chairmanship of one of the vice-presidents, Prof. B. G. Escher, of Leyden. His address was on the asymmetrical shape of the earth's surface and its effect upon the volcanism of the earth and the

moon. Contributions included reports dealing with volcanic activity during the past decade, in Japan, Kamchatka, the East Indian archipelago, Guatemala, the West Indies, Africa, Iceland, Etna, Vesuvius, and elsewhere. Few vulcanologists attended the meeting, which is largely to be ascribed to the coincidence in time of the International Geological Congress in London.

Two new objects were brought forward, and to these particular attention was given. A commission was set up under the chairmanship of Prof. L. Glangeaud for the purpose of studying the extinct volcanoes of the world with special reference to the relations between geological time and the changing composition of the magmas concerned. A long-standing policy of the Association, for which funds have been accumulated over a number of years, is the publication of a catalogue of the active volcanoes of the world, and a conference was held on the scope of the catalogue, and its compilation and publication. Prof. B. G. Escher, of Holland, was elected president, and Prof. F. Signore, of Italy, was re-elected as secretary.

*Association of Hydrology.* The work of the Association of Hydrology was spread among the four commissions: limnology, potamology, underground water, snow and glaciers. The Limnology Commission dealt with the balance-sheet of a lake, with statistics of lake-level and with the movement of water in lakes; the Potamology Commission with evaporation, with precipitation-recording methods, and with transport of solid material in Nature and in the laboratory; and the Underground Water Commission with infiltration, with variations of level in springs, and with hot springs in general.

The Commission on Snow and Glaciers, in addition to the set themes, dealt, *inter alia*, with suggested classifications of snow, and with the alternative methods of observation and reporting which are now in use in the United States and Switzerland. The report on glacier variations was the first to be made by the new permanent committee which was established at Washington in 1939 to carry on the work of the long-established Commission Internationale des Glaciers. The statistical data up to now have dealt solely with the changes of position of the glacier snouts; but in future it is planned to include three-dimensional surveys of selected glaciers. There was an exhibition of glaciological films. It was decided to reduce the number of commissions to three: underground water, lakes and rivers, snow and ice.

The Association met under the chairmanship of Prof. G. Slettenmark, of Sweden, who had been appointed acting president after the death in 1947 of Prof. O. Lüttschg, of Switzerland. The secretary, Prof. F. Diénert, of France, died shortly afterwards, and his place was filled by Prof. A. M. Vibert, of France, as acting secretary. At the close of the Assembly, Mr. Merrill Bernhard, of the United States, was appointed president, and Prof. L. Tison, of Belgium, was appointed secretary.

A joint meeting of the Associations of Seismology, Meteorology and Physical Oceanography was devoted almost entirely to thirteen papers on microseisms, recent developments in this subject showing how profitable has been co-operation between workers in the different sciences. The Union Committee on Continental and Oceanic Structure was replaced by a Joint Inter-Association Committee on the Physics of the Earth's Interior.

J. PROUDMAN