IRISH METEOROLOGICAL SOCIETY

Newsletter

No 10 December 1986

Although the activities of our Society have followed the usual pattern over the past year - AGM, Committee meetings, Annual Guest Lecture, two-day meeting and ordinary lectures - 1986 has been marked by two events of particular significance in the Society's history. The first of these was the replacement of the "old guard" of Sean Tierney, Ray Bates and Dick Breen as President, Secretary and Treasurer, respectively; the second was the holding of the Joint Meeting with the Royal Meteorological Society.

The Annual General Meeting, held in February, elected Aodhagan Roddy, Michael Connaughton and Jim Hamilton as the new President, Secretary and Treasurer; Messrs Tierney and Bates were no longer eligible for election to the Committee and Dick Breen had, regrettably, passed away a short time previously. These three founder-members rendered sterling service to the Society and played major roles in the organisation and implementation of its activities.

The Joint Meeting with the Royal Meteorological Society (Trinity College Dublin 10/11 July) proved to be a most successful event. 84 persons attended, 49 from our Society and 35 visitors from the RMS. Fifteen papers on the subject "Recent developments in weather prediction" were read and discussed. Professor Wayman was host at a most interesting outing at Dunsink Observatory and the social programme included receptions by the Lord Mayor of Dublin and the Provost of Trinity College and a Conference Banquet. The organizers of the Joint Meeting are to be congratulated on their handling of the event.

The Annual Guest Lecture was delivered at Trinity College on 7 November by the renowned pioneer and expert in cloud-seeding techniques, Professor Bernard Vonnegut of the University of New York at Albany. The lecture, which is summarised elsewhere in this Newsletter, was entitled "An assessment of early cloud-seeding techniques in the light of subsequent investigations". In an

easy style and with the aid of slides and practical demonstrations, Professor Vonnegut explained the scientific basis of cloud-seeding and described the evolution of cloud-seeding techniques over the years. While recognising that considerable advances had been made in the field, he pointed out that much remained to be discovered about the precipitation-forming processes in the atmosphere. The quality of Professor Vonnegut's lecture, his fascinating demonstrations of cloud formation and his detailed replies to the many questions during the ensuing discussion - at Trinity College and afterwards at nearby premises - made this a memorable Guest Lecture.

Two lectures were given in the series of ordinary lectures: the first, entitled "The World Meteorological Organization" was given by Michael Connaughton (Irish Met. Service) on 31 January and the second, entitled "Forecasting Snow" by John McNeill (Met. Office, Aldergrove Airport) on 17 October. Both lectures, held at Trinity College, were well attended and were followed by interesting discussions; they are summarised in the following pages. It is planned that three further lectures will be arranged during the Winter/Spring period, one at least, to be held outside Dublin.

It is appropriate, that at this time when the Irish Meteorological Service is celebrating the 50th Anniversary of its establishment, our Society sends its congratulations and best wishes to that Service with which we have, inevitably, very close ties. Ad multos annos.

In conclusion, we take this opportunity of wishing all our members a Happy Christmas and a Prosperous and Peaceful New Year.

Aodhagan Roddy

Aodhagan Roddy
President

Michael Connaughton

Michael Connaughton
Secretary

THE WORLD METEOROLOGICAL ORGANISATION

Michael Connaughton

The World Meteorological Organisation (WMO) comprising 159 Member States, including Ireland, is a specialised agency of the United Nations (UN), that is, it is closely associated with but independent of the UN. Other examples of specialised agencies are the World Health Organization (WHO), the Food and Agricultural Organization (FAO) and the International Labour Organization (ILO). The headquarters of WMO are located at Geneva and there are two Regional offices, one in Asuncion, Paraguay and the other in Bujumbura, Burundi.

WMO was created as a governmental body in 1951 to replace the International Meteorological Organization, a non-governmental body which was established in 1873. Its function is to facilitate international cooperation in all aspects of meteorology and operational hydrology - observations, exchange of data and expertise, research, training and applications to aviation, shipping, hydrology, agriculture and other human activities.

The seven major programmes of WMO are indicated in Figure 1 while the structure of WMO is shown in Figure 2.

Irish scientists have played an active role in WMO activities; many have served on WMO working groups, some have served as Presidents or vice-Presidents of WMO Commissions.

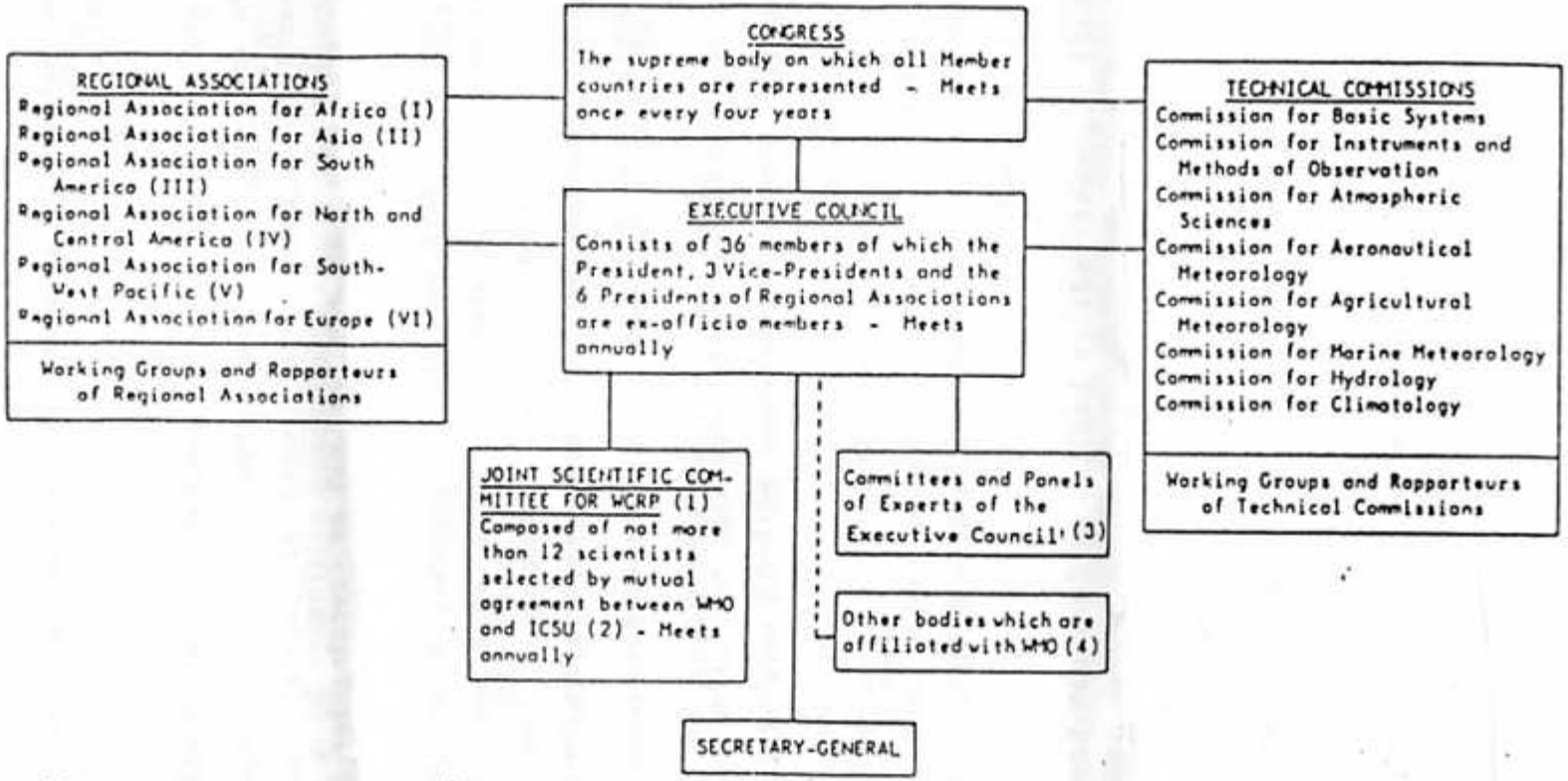
WMO Programmes

1. WORLD WEATHER WATCH	Global Observing System Global Telecommunications System Global Data-processing System
2. WORLD CLIMATE PROGRAMME	World Climate Data Programme World Climate Applications Programme World Climate Research Programme World Climate Impact Programme
3. RESEARCH AND DEVELOPMENT	Weather prediction research Tropical meteorology research Environmental pollution research Weather modification research
4. APPLICATIONS OF METEOROLOGY	Agricultural meteorology Marine meteorology Aeronautical meteorology
5. HYDROLOGY	Data Collection, instrumentation Hydrological forecasting and modelling
6. EDUCATION AND TRAINING	Training events Training publications Fellowships
7. TECHNICAL CO-OPERATION	Assistance projects (UNDP,FT) Voluntary Co-operation Programme (VCP)

Figure 1

Figure 2

ORGANIZATIONAL CHART OF THE WORLD METEOROLOGICAL ORGANIZATION



(1) WCRP World Climate Research Programme
(2) ICSU International Council of Scientific Unions
(3) Committees and Panel of the Executive Council :
- Panel of Experts on Education and Training
- Panel of Experts on WMO Voluntary Co-operation Programme (VCP)
- Panel of Experts on Environmental Pollution
- Panel of Experts on Satellites
- Panel of Experts on Weather Modification
- Working Group on Antarctic Meteorology
- Working Group on Long-Term Planning
- Advisory Committee for the World Climate Applications and Data Programmes

(3) Committees and Panels of the Executive Council (contd.) :
- Selection Committee for the IMO Prize
- Selection Committee for the WMO Research Award for Young Scientists
- Staff Pension Committee
- Joint IOC/WMO Working Committee for the Integrated Global Ocean Services System (IGOSS)

(4) Other bodies :
- WMO/ESCAP Panel on Tropical Cyclones in the Bay of Bengal and the Arabian Sea
- ESCAP/WMO Typhoon Committee

FORECASTING SNOW

J.B. McNeill

The particular problems of forecasting snow in Britain and Ireland were defined.

Early parameters which focussed on partial thicknesses, mainly 1000 hPa - 500 hPa were outlined. Some noteworthy investigations by Coles and Buchanan were described - these also looked at partial thicknesses but closer to the surface, 1000 - 850 hPa, as well as freezing level and surface temperatures.

Boyden parameters were then discussed. Boyden incorporated the 1000 - 850 hPa thickness and related this to a snow probability which is used on the fine-scale UK regional model. Examples of fine-grid model were displayed and another threshold parameter indicated i.e. the 2 degree OW (wet-bulb potential temperature at 850 hPa).

The most recent mesoscale very high resolution model for the British Isles and the snow forecasting technique employed were explained.

A case study from Northern Ireland in January 1986 was discussed. This was related to a slow-moving occluding system which proved to be a very difficult snow situation. Success was achieved through the employment of the latest model techniques.

AN ASSESSMENT OF EARLY CLOUD-SEEDING TECHNIQUES IN THE LIGHT OF SUBSEQUENT INVESTIGATIONS.

B. Vonnegut

After Schaefer discovered cloud seeding, a great deal of time, talent, and money were invested all over the world in trying to answer the question "Does cloud seeding produce more rain?" Because this is not a good scientific question, many of the results of this work have been inconclusive and have contributed rather little to our scientific understanding of how clouds work. The characteristics of cloud and weather systems are so variable that even when cloud seeding experiments appear to produce a definite result, there is little assurance that a similar operation carried out at another place or time would produce the same effect.

Although some cloud seeding operations have given encouraging results and indicate that the process can be economically effective, there are many operations which yield ambiguous results or indicate that the seeding process has decreased precipitation.

If the term "cloud seeding" is defined as the technique for transforming a cloud from supercooled droplets to ice crystals by the use of dry ice or silver iodide, there is no question that cloud seeding works every time. However, the way that cloud seeding alters the subsequent behavior of the cloud is an exceedingly complicated question that undoubtedly depends on a number of variables. Examples of these are where, when, and how the seeding was carried out and factors determining the cloud's behavior, such as the size and concentration of the cloud particles.

Consideration must also be given to the number of natural ice forming and condensation nuclei naturally present, and the dimensions, intensity, and character of the convective motions of the cloud.

Schaefer's discovery of cloud seeding constituted a breakthrough in meteorological science. For the first time it became possible economically to exercise a significant influence over the behavior of large volumes of the atmosphere. The masses and the energies involved in atmospheric processes are so enormous by human standards that it is usually impossible for man purposefully to make any significant changes. With the advent of seeding, it became feasible to transform large volumes of supercooled cloud into ice crystals. This made it possible to produce precipitation particles when and where they would not otherwise have occurred.

Another important aspect of seeding is that it provides a means to release energy into the atmosphere on a large scale that was not previously possible. When seeding material is introduced into supercooled clouds, the energy that is evolved as the latent heat of condensation and freezing is comparable in magnitude to that which would be released if the mass of the seeding particles were turned into energy according to Einstein's equation. Even a greater magnitude of energy can be manipulated by using seeding to control the flux of radiation to or from the surface of the earth. By dissipating stratiform supercooled clouds, it is possible by day to increase the flux of sunlight to the earth, and by night to

increase the flux of infrared radiation from the earth. By creating cirrus clouds in regions of clear air that are supersaturated with respect to ice, it is possible to decrease the flux of sunlight by day and of infrared at night.

It seems probable that seeding is only one of several ways that man may eventually be able to exercise a significant control over the atmosphere with only modest expenditures of effort and energy. For example, recent experiments suggest that it may be possible to influence the electrification of a thunderstorm by introducing small amounts of electric charge into the cloud early in its development.

By trial and error we may be able to develop a limited control over precipitation, and in fact in some cases this appears already to have been achieved. However, in order to realize the full potential of weather modification by seeding and by other techniques, it will first be necessary to develop a far better scientific understanding of the various processes that are taking place in the cloud. For example, we are still surprisingly ignorant of the motions of air in a cloud, the processes causing the formation of precipitation, and the development of thunderstorm electricity.

U.K. and Irish Television forecasters with the Lord Mayor of Dublin at Lord Mayor's reception 11 July 1986.

WEATHER MAGAZINE

The special rate of subscription to Weather magazine for members of the IMS is £12.50 sterling for 1987. Subscribers should forward cheques for the equivalent of this amount to the Treasurer of the IMS, Dr. J. Hamilton, C/O Meteorological Service, Glasnevin Hill, Dublin 9.

ROYAL METEOROLOGICAL SOCIETY CALENDAR

The RMS Meteorological Calender 1987 can be obtained by sending £2.25 sterling, for single copies, or £10.00, for 5 copies, to:

The Executive Secretary
Royal Meteorological Society
James Glaisher House
Grenville Place
BRACKNELL
Berkshire RG12 1BX

RENEWAL OF SUBSCRIPTIONS

The annual subscription for 1987 is due on 1 January. The rate remains unchanged at £8 for Dublin area members and £4 for members elsewhere.

A number of members have neglected to pay their subscriptions for 1986; immediate payment would be appreciated. Please forward cheques, payable to "Irish Meteorological Society" to the Treasurer, Dr J. Hamilton, C/O Meteorological Service, Glasnevin Hill, Dublin 9