

CHAPTER X

THE WORLD METEOROLOGICAL ORGANIZATION (WMO)²⁵

There was a considerable increase in the activities of the organization in 1954. Although only one of the Regional Associations, that for the South West Pacific, and only one Technical Commission, the Commission for Aeronautical Meteorology, met during the year, other bodies

and working groups were active and some of their activities are described below.

²⁵ For further information concerning in particular the functions and organization of WMO and its activities prior to 1954, see previous volumes of the Yearbook.

The work of the secretariat, for the first time fully staffed on the technical side, far exceeded that of previous years. One of its features was the handling of an increasing number of inquiries from other international organizations, ranging from straightforward requests for meteorological information to questions involving a major investigation. Much time was also devoted to preparations for the Second Congress, scheduled to open in Geneva on 14 April 1955.

Among the publications issued during 1954, some of which are referred to below, was a new series called WMO Technical Notes, seven of which were published during the year.

Work continued on two of WMO's major technical publications, the International Cloud Atlas and World Maps of Thunderstorm Activity. Printing of the former was being started at the end of the year and it was hoped that the latter would be completed during 1955. After consultation with the International Radio Consultative Committee of ITU, it was decided to include in the World Maps of Thunderstorm Activity all the readily available marine data and arrangements were made for its extraction from several millions of punch cards held by the British and German meteorological services.

TECHNICAL REGULATIONS

The draft WMO Technical Regulations, based on proposals made by the different Technical Commissions, were prepared by the secretariat and distributed to permanent representatives for comments. These Regulations contain both "standard practices", which will be mandatory in nature, and "recommended practices", which are intended more for guidance.

ARID ZONE RESEARCH AND DEVELOPMENT

WMO continued to collaborate with UNESCO in the programme for arid zone research and development, with advice being given by a WMO panel of experts and co-ordinated by the secretariat.

WMO Technical Note No. 1, Artificial Inducement of Precipitation—with Special Reference to the Arid and Semi-Arid Regions of the World, was issued. It concluded that the results

to date have been inconclusive and that there is need for further scientific experiments. A working group is now preparing a more extensive report on the whole question of the modification and control of clouds and hydrometers.

STUDIES OF SOURCES AND UTILIZATION OF WIND ENERGY

Information obtained from a number of WMO Members concerning the wind régime in their countries was used as a basis for a report entitled Energy from the Wind, Assessment of Suitable Winds and Sites, which was published as WMO Technical Note No. 4. This report summarizes the general principles of utilization of wind energy and the selection of suitable sites, and refers to general wind circulation, the importance of wind observations and the analysis and application of wind data. The material is presented in such a way as to be immediately useful to engineers and economists concerned with tapping the energy of the wind for such application as the generation of electricity.

INTERNATIONAL METEOROLOGICAL INSTITUTE

The working group set up by the Executive Committee to consider the establishment of an international meteorological institute concluded that such an institute was neither desirable nor advisable. There were, however, weighty reasons for considering the creation of an organization for the collection of data and the co-ordination of meteorological research, possibly by a progressive extension of the Technical Division of the WMO secretariat. These conclusions were noted by the Executive Committee and a new working group was set up to prepare plans for extending the work of the Technical Division.

CLIMAT PUBLICATION

The inquiry conducted by the secretariat to determine the purposes and value of the monthly publication containing CLIMAT and CLIMAT/TEMP data (monthly mean values of pressure, temperature, humidity and other meteorological elements, from both the surface and the upper air) showed that there was world-wide interest in such a publication. The United States Weather Bureau offered to con-

tinue its publication Monthly Climatic Data for the World, which contains these data, and suggested official sponsorship of this publication by WMO as an alternative to WMO's assuming responsibility for a new series. This question will be discussed at the Second WMO Congress.

WATER RESOURCES DEVELOPMENT

In the course of the year the secretariat received a number of inquiries relating to the meteorological aspects of water resources development, and the organization participated in the inter-agency meeting on this subject in August. The matter was reviewed at the fifth session of the Executive Committee, which decided to direct the Secretary-General of WMO to carry out a survey with a view to reporting to the Congress on the policy, principles and future programme of WMO in this field.

WMO is also collaborating with other international organizations concerned with hydrologic questions. In particular, plans are being made for a joint project with the Economic Commission for Asia and the Far East (ECAFE) on the major deficiencies of hydrologic data in the ECAFE region.

AIRCRAFT ICING

The secretariat collected information on experimental research in the icing of aircraft, especially in relation to cloud characteristics. The results of a study of the available material were published as WMO Technical Note No. 3, Meteorological Aspects of Aircraft Icing. After a brief theoretical survey, the report described recent experimental investigations made on board aircraft, especially in Canada, the United States and the USSR. It was pointed out that, owing to instrumental limitations, the results reported should be treated with some reserve. The report concluded by stressing the need for further information, especially from the tropics.

INTERNATIONAL METEOROLOGICAL TABLES

A working group has been studying the question of preparing a new edition of the International Meteorological Tables, first published in 1890. It is proposed that the new

edition be in loose-leaf form, so as to facilitate the completion and distribution of the tables that are more urgently required. A list of proposed tables will be submitted to meteorological services in order to learn their requirements and to find out which of the tables are already in existence.

HORIZONTAL VISIBILITY

Several of the Technical Commissions have considered what is the best method of reporting horizontal visibility when the conditions vary in different directions. The present recommended practice in these conditions is to report the minimum visibility, but a number of countries have announced the successful introduction of a concept called "prevailing visibility" or "visibility index". Until a final decision can be taken on this matter, it was decided to publish in WMO Publication No. 9 information about the procedures now used in different countries.

INSTRUMENTS AND METHODS OF OBSERVATION

A report entitled Enquiry on Actinometric Activity throughout the World was completed by the working group on radiation and distributed by the secretariat. This group held its first meeting at Rome in September in joint session with the Radiation Commission of the International Association of Meteorology.

WMO Technical Note No. 7, Reduction of Atmospheric Pressure, describes the methods used by various meteorological services for reducing pressure observations to mean sea level. The working group on barometry is studying this matter with a view to recommending a procedure for universal adoption.

Five different types of radiosondes were compared near Brussels in November under the auspices of the Belgian Royal Meteorological Institute. A report by Dr. L. M. Malet, of Belgium, on previous comparisons was published as WMO Technical Note No. 5, Diverses expériences de comparaisons de radiosondes.

AEROLOGY

Comparisons of different techniques for locating thunderstorms (sferics) were carried out by the meteorological services of France,

Switzerland and the United Kingdom, with other services collaborating by supplying reports of thunderstorms observed during the period of the comparisons. The results of these experiments will be published in a Technical Note on sferics techniques being prepared by the secretariat.

A working group completed the draft of a report on the various types of aerological diagrams currently used. An earlier report, limited to a preliminary study by Dr. P. Défrise of the results of an inquiry conducted by the secretariat to find out what diagrams are now in use, was published as WMO Technical Note No. 6.

A preliminary report on the desirable density of observation stations for numerical forecasting was prepared by a working group.

CLIMATOLOGY

The Commission for Climatology recommended by postal vote the preparation of a World Climatological Atlas. Such an atlas, it is considered, would be of great use not only to meteorologists but also to geographers, hydrologists, soil scientists, agronomists and economists. The future of this major project will be decided at the Second Congress.

The Working Group on Dynamic Climatology prepared a first report summarizing information on the present state of dynamic climatology (the statistical treatment of weather processes) and listing categories of problems that fall within this field.

The secretariat received information from about 60 countries concerning present practices with regard to the collection of basic weather data and the accessibility of these data to interested workers. This material is now being studied by a working group.

AGRICULTURAL METEOROLOGY

At its fifth session the Executive Committee took follow-up action on the recommendations of the first session, in 1953, of the Commission for Agricultural Meteorology. Among the resolutions adopted was one inviting Members to establish national co-ordinating committees composed of representatives of meteorological, animal husbandry, forestry, hydrological and soil science agencies. In response to a secretariat inquiry, many countries have reported

that suitable liaison machinery already exists or is in the process of being established.

The Working Group on Weather and Plant Pathology Problems submitted a report entitled *The Forecasting from Weather Data of Potato Blight and Other Plants Diseases and Pests*, which gives a comprehensive review, primarily for meteorologists, of existing methods of forecasting plant diseases.

MARITIME METEOROLOGY

Endeavours to reach agreement on the proposed international ice nomenclature were continued by a special working group, and it was reported that some of the Baltic countries that had previously voiced objections have decided to bring their own nomenclatures into line.

An interim report was prepared by the secretariat on the operation during the past two seasons of the scheme for collecting and transmitting weather reports from whaling ships. The chief weakness of this scheme arises from inadequate communications, and measures are being taken to remedy this defect.

WMO Technical Note No. 2, *Methods of Observation at Sea: Part I*, describes the background to the controversy concerning the best method of observing sea surface and temperature. No final conclusion was reached, both the usual methods (by bucket or by the condenser intake) having their advantages and disadvantages.

SYNOPTIC METEOROLOGY

In preparation for the introduction of the new meteorological codes on 1 January 1955, a new edition of Volume B of WMO Publication, No. 9 was prepared containing information about international and regional meteorological codes and national practices.

In co-operation with ITU, WMO gave increasing attention to various problems of meteorological telecommunications, which are of vital importance in the exchange of meteorological information. A study was prepared by the secretariat of the importance to Members of reduced tariffs for meteorological telegrams and lease of circuits.

In preparation for the Fourth North Atlantic Ocean Stations Conference, detailed studies were made of the scientific and operational

value to meteorology of the existing stations. So as to avoid the serious consequences which would result from any substantial reduction of the network, ways and means of using other sources of information were considered. In particular, it was felt that much valuable information could be obtained from more and better observations from aircraft.

An inquiry was carried out on the units used by different countries in their coded meteorological messages for international exchange. The response was exceptionally good and provided a clear picture of the world-wide position regarding the use of different units for height, geopotential and temperature. The possibility of achieving more uniformity in this matter will be considered by the Second Congress.

AERONAUTICAL METEOROLOGY

The first session of the Commission for Aeronautical Meteorology (CAeM) was held simultaneously with the fourth session of the Meteorology Division of ICAO in Montreal during June and July. The decisions taken were discussed at the fifth session of the Executive Committee.

The simultaneous sessions discussed the requirements for upper-air observations to meet the needs of aeronautical meteorology and established a number of general principles as interim guides. Attention was also focussed on the potentialities of sferics networks, automatic weather stations and ground radar for meteorological purposes. A number of decisions were made relating to meteorological phenomena that are liable to jeopardize the safety of aircraft operations, special attention being given to aircraft icing and turbulence. Attention was also given to special methods of forecasting for high-flying aircraft and to the need for periodic surveys of the latest results of such forecasting on the jet stream.

On the basis of a report by a special working group, the CAeM adopted a recommendation concerning the qualifications and training required for personnel employed in aeronautical meteorology.

REGIONAL ACTIVITIES

Plans were made by the secretariat to prepare charts for each region, showing, for each

main and intermediate synoptic hour, the distribution of existing and recommended surface and upper-air observation stations. Such charts were prepared for the first session of Regional Association II. The following are some of the activities of WMO's six regional associations.

Regional Association for Africa (RA-I). The Working Group on Solar Radiation met at Leopoldville, Belgian Congo, and discussed, among other things, comparisons between some of the national standard radiation instruments of the region. The University of Witwatersrand at Johannesburg agreed to free Dr. S. O. Jackson from his duties as professor of geography so that he could devote his full time to the preparation of the Climate Atlas for Africa.

Regional Association for Asia (RA-II). Most of this Association's activity was directed towards preparing for its first session to be held in February 1955 at New Delhi.

Regional Association for South America (RA-III). The need for weather messages from the South Atlantic led to a decision by Brazil to operate an ocean weather station, and three ships have already been equipped for this purpose. The number of ships of the Argentinian Merchant Marine making weather observations on a voluntary basis was also increased.

Regional Association for North and Central America (RA-IV). An informal meeting on meteorological telecommunications in the North Atlantic, attended by experts from the Regional Association for North and Central America and the Regional Association for Europe, was held in Montreal in October. Particular attention was given to the exchange of weather data between the two regions.

The third session of the Eastern Caribbean Hurricane Committee was held at Port of Spain in March. The 22 recommendations adopted concerned particularly the improvement of observation networks and the importance of communications. The meeting also considered the question of research on the formation and movement of hurricanes.

Regional Association for South West Pacific (RA-V). The first session of this Association was held at Melbourne in February. A basic regional observation network to meet international requirements for meteorological information was agreed upon, taking into account proposals by ICAO and the Pacific Science

Association. Steps were also taken to make the system of collecting ships' observations more flexible. To improve the weather data exchanges in the Region, the Association designated three subcontinental transmitters.

Regional Association for Europe (RA-VI). Two ad hoc working groups met at Zurich in May to discuss regional meteorological codes and telecommunications respectively. Particular attention was given to the problem arising from the cessation of the radio-telegraphic transmission of North American weather observations from New York and also to the question of transmission by facsimile and radio-teleprinter.

PUBLICATIONS

In addition to the WMO Technical Notes and the new edition of Volume B of Publication No. 9, already mentioned, other publications issued during the year included final reports of sessions of constituent bodies and numerous supplements to existing publications.

The WMO Bulletin, in a considerably expanded form, continued to be issued quarterly in separate English and French editions.

TECHNICAL ASSISTANCE

Two projects were begun under the regular WMO technical assistance programme. An expert was sent to Haiti to advise the Government on obtaining power from wind, and as a result of his report a request has been made for assistance under the United Nations Expanded Programme of Technical Assistance. In Syria an expert advised the Government on the organization of a national meteorological service. This mission was financed partly from the regular WMO programme and partly from the Expanded Programme; the project itself will be entirely under the Expanded Programme.

WMO's participation in the Expanded Programme during 1954 amounted to approximately \$U.S. 100,000. Bolivia, British East Africa, China, the Dominican Republic, Haiti, Israel, Jordan, Libya, Syria, Turkey and Yugoslavia received experts and/or fellowships or scholarships. The relatively small amount appropriated in 1954 reflects the financial stringencies through which the Expanded Programme has been passing. The main trend during the year was to put increased emphasis

on long-term projects.

Technical assistance in meteorology can be classified into three main types: (1) the development of national meteorological services; (2) short-term missions of experts to instruct meteorological services in the newest techniques, with related fellowships; and (3) independent fellowships for study abroad, when the national service does not warrant the furnishing of expert advice.

So far no programmes of a regional nature have been arranged, but from discussions in Central America and the Middle East there appears to be a demand for seminars on subjects of regional interest and it is expected that such projects will be undertaken in the future.

EXTERNAL RELATIONS OF WMO

A working arrangement was concluded in 1954 between WMO and UNESCO which provides for co-operation and consultation on matters of common interest and for specific agreements on individual projects in meteorology whenever such agreements are mutually desirable.

Consultative status for non-governmental organizations, as created by the Executive Committee of WMO in 1953, was granted to nine organizations in 1954. Most of these are technical organizations interested in meteorology or its applications.

BUDGET

A maximum figure of \$1,273,000 was adopted for the expenditures of WMO during the first financial period, 4 April 1951 to 31 December 1955. A working capital fund was established with the maximum limited to 10 per cent of the expenditures voted. The scale of contributions as per 31 December 1954 is given below.

At its fifth session during August and September 1954, the Executive Committee approved the following supplementary estimates for the 1954 budget, which had amounted to \$US363,000:

REVENUE	
Per General Fund	\$ 38,637
EXPENDITURES	
II Personal services	3,196
III General services	35,441
	\$ 38,637

At the same session the Executive Committee approved the budget given below (in U.S. dollars) in the amount of \$341,668 for the fifth financial year (1 January to 31 December 1955):

REVENUE	
Contributions	\$314,809
Sale of publications	20,000
Per General Fund	6,859
	\$341,668
EXPENDITURES	
I Meetings	\$ 55,638
II Personal services	197,149
III General services	78,857
IV Special projects	3,000
V Other budgetary provisions	7,024
	\$341,668

The following supplementary estimates for the 1955 budget were approved by the Executive Committee at its sixth session:

REVENUE	
Per General Fund	\$ 21,769
EXPENDITURES	
I Personal services	\$ 11,186
II General services	1,607
III Special projects	8,672
IV Other budgetary provisions	304
	\$ 21,769

The proportional contribution of Members for 1955 is as follows:

SCALE OF CONTRIBUTIONS		Units
Members		120
United States		65
United Kingdom		50
France, Federal Republic of Germany		45
USSR		32
India, Japan		30
Italy		25
Argentina, Australia, Brazil, Canada, China		20
Belgium, Netherlands, Pakistan, Sweden, Switzerland, Union of South Africa		18
Spain		17
Ukrainian SSR		15
Egypt, Indonesia, Mexico, Portugal, Turkey		12
Denmark, New Zealand, Philippines, Poland		11
Norway		10
Belgian Congo, Czechoslovakia, Finland, Indochina, Peru, Uruguay, Yugoslavia		9
Byelorussian SSR, British Malaya-Borneo Territories, Romania		8
British East African Territories and Indian Ocean Islands, British West African Territories, French West Africa, Ireland, Venezuela		7
Bulgaria, Burma, Ceylon, Hungary, Thailand		6
Bolivia, Cuba, Greece, Israel, Morocco (French Protectorate), Federation of Rhodesia and Nyasaland		5
Portuguese East Africa		4
British Caribbean Territories, Ethiopia, French Equatorial Africa, Iraq, Syria		3
Ecuador, Iceland, Lebanon, Luxembourg, Madagascar, Portuguese West Africa, Tunisia		2
Dominican Republic, French Cameroons, Guatemala, Haiti, Hong Kong, Paraguay, Spanish Protectorate of Morocco		1
Bermuda, French Oceania, French Somaliland, French Togoland, Netherlands Antilles (Curacao), Netherlands New Guinea, New Caledonia, Surinam, Spanish Guinea Territories		

ANNEX. MEMBERS, OFFICERS AND HEADQUARTERS

(As of 31 December 1954)

MEMBERS OF WMO^a

Argentina	Burma	French Oceania	Italy
Australia	Byelorussian SSR	French Somaliland	Japan
Belgian Congo	Canada	French Togoland	Lebanon
Belgium	Ceylon	French West Africa	Luxembourg
Bermuda	China	Germany, Fed. Rep. of	Madagascar
Bolivia	Cuba	Greece	Mexico
Brazil	Czechoslovakia	Guatemala	Morocco (French Protectorate)
British Caribbean Territories	Denmark	Haiti	Netherlands
British East African Territories and Indian Ocean Islands	Dominican Republic	Hong Kong	Netherlands Antilles
British Malaya-Borneo Territories	Ecuador	Hungary	Netherlands New Guinea
British West African Territories	Egypt	Iceland	New Caledonia
Bulgaria	Ethiopia	India	New Zealand
	Finland	Indochina	Norway
	France	Indonesia	Pakistan
	French Cameroons	Iraq	Paraguay
	French Equatorial Africa	Ireland	Peru
		Israel	

THE SPECIALIZED AGENCIES

Philippines	Spain	Tunisia	United Kingdom
Poland	Spanish Guinea	Turkey	United States
Portugal	Territories	Ukrainian SSR	Venezuela
Portuguese	Spanish Protectorate	Union of South Africa	Uruguay
East Africa	of Morocco	USSR	Yugoslavia
Portuguese	Surinam		
West Africa	Sweden		
Federation of Rhodesia	Switzerland		
and Nyasaland	Syria		
Romania	Thailand		

The official nomenclature as notified to WMO by the Members concerned, which is used to designate some Members in this list, differs in certain instances from the official nomenclature of the United Nations.

MEMBERS OF THE EXECUTIVE COMMITTEE

F. W. Reichelderfer	M. A. F. Barnett	Th. Hesselberg	O. G. Sutton
A. Viaut	S. Basu	J. Lugeon	E. W. Timcke
N. P. Sellick	D. A. Davies	A. A. Solotoukhine	A. Thomson
L. de Azcárraga	H. A. Ferreira	F. X. R. de Souza	

OFFICIALS OF WMO

President: F. W. Reichelderfer.	Deputy Secretary-General: J. R. Rivet.
First Vice-President: A. Viaut.	Chief of the Technical Division: K. Langlo.
Second Vice-President: N. P. Sellick.	Chief of the Administrative Division: V. J. Bahr.
Acting Secretary-General: G. Swoboda.	

PRESIDENTS OF REGIONAL ASSOCIATIONS AND TECHNICAL COMMISSIONS

REGIONAL ASSOCIATIONS		TECHNICAL COMMISSIONS	
I Africa	D. A. Davies	Aerology	J. Van Mieghem
II Asia	S. Basu	Aeronautical Meteorology	A. H. Nagle
III South America	F. X. R. de Souza	Agricultural Meteorology	Juan J. Burgos
IV North and Central America	A. Thomson	Bibliography and Publications	M. Mézin
V South West Pacific	M. A. F. Barnett	Climatology	C. W. Thornthwaite
VI Europe	J. Lugeon	Instruments and Methods of Observation	A. Perlat
		Maritime Meteorology	C. E. N. Frankcom
		Synoptic Meteorology	W. Bleeker

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