

started by the Fraunhofer Institut, of Freiburg-im-Breisgau, Germany, for the purpose of producing daily maps of the Sun showing photospheric and chromospheric details and coronal intensities for λ 5303.

Among the observatories contributing chromospheric data are those of Freiburg, Kodaikanal, Wendelstein, Tokyo and Sydney. The coronal data are provided from the observatories of Climax, Sacramento Peak, Pic du Midi, Kanzelhöhe and Wendelstein. Istanbul, Potsdam, Arcetri and the German and Swedish stations on Capri also contribute material. The reduction of data and production of the daily maps are carried out at Freiburg and the printing is by a half-tone process to a scale of 15 cm. of the solar diameter. Conventions are used to show the areas occupied by calcium *plages* of low, intermediate and high intensity, and the shapes of dark filaments and limb prominences are shown, all against a background of lines giving heliographic co-ordinates. Limb coronal intensities and the positions and Zurich types of the sunspot groups are shown schematically. The aim is to produce these maps at intervals of two weeks with a delay of two weeks from the date of the latest map. Only a small number of gaps are expected to occur throughout the year.

These maps will provide a series for reference which with regard to the chromosphere should be more valuable than all other similar information published elsewhere. It remains to be seen how well the standards of indicating the various phenomena fluctuate from day to day and deviate from the initial standards over long periods of time. The possibility of such variations must be kept in mind when investigating solar-terrestrial relations, and it would be interesting to know if any special safeguards have been adopted in the present instance, where quantitative assessment apparently takes no part in the stages prior to publication. It certainly seems possible to draw quantitative information from these maps in a satisfactory manner; but it is the responsibility of the person who uses the information to make sure that it is inherently suitable for his purpose. Only the considerable task of collecting the raw material and making it available has been taken for him.

P. A. WAYMAN

B.B.C. ENGINEERING MONOGRAPHS

THE *B.B.C. Quarterly*, which has been issued since April 1946, ceased publication in the autumn of 1954, and in order to provide a vehicle for the publication of technical papers of the type hitherto included in this journal, the British Broadcasting Corporation has recently issued the first four of a series of "B.B.C. Engineering Monographs", about six of which will be produced every year (annual subscription £1); each monograph will deal with a technical subject within the field of television and sound broadcasting and will describe work that has been done by the Engineering Division of the Corporation, including, where appropriate, a survey of earlier work on the same subject. The series will also contain, from time to time, selected reprints of articles by B.B.C. authors that have been published in technical journals.

The first monograph, "The Suppressed Frame System of Telerecording", by C. B. B. Wood, A. V.

Lord, E. R. Rout and R. F. Vigurs, summarizes the fundamental and practical aspects of a telerecording system using standard 35 mm. film. The recording cycle consists of exposure during one whole television frame while the film is stationary in the gate, followed by pulldown of the film during the next, or suppressed, television frame. Thus the picture photographed on the film corresponds to a $202\frac{1}{2}$ line structure; but with the use of spot-wobble to broaden the lines, the recording is found to give an acceptable picture when the film is re-scanned by the standard 405 lines in the teleciné machine. Three photographs accompany the description of the equipment; and the results of tests have shown that the construction of an apparatus of this type using standard film-transport mechanism has been fully justified.

No. 2 in the series is a paper on "Absolute Measurements in Magnetic Recording" by E. D. Daniel and P. E. Axon, and describes work carried out in the B.B.C. Research Department to establish methods of measuring the absolute sensitivity of the component parts of the recording-reproducing system. Another contribution from the Research Department is the third monograph, that on "The Visibility of Noise in Television", by R. D. A. Maurice, M. Gilbert, G. F. Newell and J. G. Spencer. This describes a comprehensive investigation of the effect of random noise on a television picture, its dependence on the non-linearity in the relevant portions of the transmission channels and the visibility of the noise as a function of frequency. The third part of this monograph comprises four photographs illustrating the effect of noise on a television picture for four values of the signal-to-noise ratio.

The fourth monograph is entitled "The Design of a Ribbon Type Pressure-Gradient Microphone for Broadcast Transmission", by D. E. L. Shorter and H. D. Harwood. This describes work leading to the development of an improved studio microphone for both sound and vision broadcasting, with a greatly reduced weight and volume and an extension in the range of uniform frequency-response.

Summaries of recent patent applications by the B.B.C. are also included in two of the monographs, each of which is issued in a distinctive two-tone blue cover. It is likely that the series will be of interest and value to engineers engaged in broadcasting and telecommunications generally both in Great Britain and overseas.

THE METEOROLOGICAL OFFICE ANNUAL REPORT FOR 1954-55

THE annual report for 1954-55 of the Director of the Meteorological Office* records another year of steady progress and of honest endeavour by the Office to meet the ever-increasing demands for its services. There appears to be little need for special comment regarding two of its main functions: the provision of meteorological services for civil and military aviation, for shipping, for the general public by television, radio, telephone and through the Press, for special customers such as the railways, electricity and gas undertakings, farmers, river and road

* Annual Report of the Director of the Meteorological Office, presented by the Meteorological Committee to the Secretary of State for Air, for the Year April 1, 1954, to March 31, 1955. (M.O. 594.) Pp. 68. (London: H.M.S.O., 1955.) 2s. 6d. net.

engineers; and the collection, distribution and publication of meteorological data. These routine duties, which do not often reach the headlines (except when a forecast goes badly wrong on a Bank Holiday!), but which assume an ever-increasing importance in modern society, bear heavily on the Meteorological Office, which is under-staffed, poorly housed and under-financed. The total annual budget of the Office is less than £3 million—little more than the cost of a modern bomber. This is not a large sum on which to carry out its multifarious activities at home, to meet its overseas and international commitments, to develop new instruments and improved techniques and to undertake an extensive programme of research in meteorology and geophysics.

It is, of course, largely by the quality and scope of its research that the vitality and scientific reputation of such an organization must be judged. Considerable progress has been made during the past few years, and the present report shows that this has been maintained. There have been encouraging developments in the study of numerical forecasting with the aid of electronic computers, and it has recently been announced that the Office is to have a machine of its own. The Meteorological Research Flight has continued its investigations on the distribution of water vapour and ozone and the occurrence of clear-air turbulence at high altitudes, and into the structure and constitution of clouds. Progress was made in the measurement of solar radiation and in the development of the new radar-sonde. Some attention has also been given to the possibility of increasing rainfall by cloud-seeding, and preliminary field-trials have been started on Salisbury Plain.

The pace of all this work has necessarily been limited by the availability of personnel, and the Director stresses that the continued shortage of scientific staff and the high turnover-rate (about 20 per cent per year) of assistants are matters of some concern. The total number of scientific officers on the staff of the Office is only 155, not all of whom are actively or mainly engaged on research. More serious still, only four new officers were recruited during the year—barely enough to compensate for losses through retirement and resignation. How to attract sufficient numbers of high-quality physicists and mathematicians into a field which, after all, has great opportunities for research, is perhaps the main problem facing the Meteorological Office at the present time. One welcomes, therefore, the continued and extended co-operation between the Office and the universities, both of which have a responsibility for ensuring that Britain is not left behind in the great expansion now taking place in atmospheric physics.

B. J. MASON

PHYTOPLANKTON OF LAKE TANGANYIKA

FOR one who is not conversant with all the recent work in the biological study of lakes, there is much of interest in the volume by L. van Meel, entitled "Le Phytoplancton", one of a series of reports of the Belgian Expedition (1946-47) for the "Exploration Hydrobiologique du Lac Tanganika" (Institut Royal des Sciences Naturelles de Belgique, Bruxelles, 1954. 4, Fasc. 1. A, Texte (pp. 681); B, Atlas (pls. 76)). Likewise it will be particularly

interesting to all those whose experience is limited to small temperate lakes. On the other hand, the title does not prepare the reader for the table of contents, which shows that geobotany, geochemistry and geophysics of all the central and eastern African lakes (and of nineteen in particular) fill pp. 7-250. The next two hundred and twenty-five pages are devoted to a list of the algae of these lakes, and the third section dealing with the ecology of the plankton occupies one hundred and seventeen pages, the phytoplankton of Lake Tanganyika being covered in thirty-four. This indicates that a more suitable title should have been chosen for a volume which is mainly a compilation of the available information of certain aspects of these African lakes, with the additional information collected by the Expedition about the phytoplankton of Lake Tanganyika. As a compilation, it will be a most useful book of reference to many, and the information gathered together here about any one lake will provide the basis for a fuller and more searching investigation of it. The contribution by British workers to our knowledge of these lakes is clearly brought out.

The size of Lake Tanganyika is one of its most striking characters. It is the second largest of the African lakes, with a volume approximately half that of the North Sea. It is also very deep (1,470 metres in the deepest trough), being exceeded only by Lake Baikal. These facts, together with its situation near the equator and the protection given by high land from the full force of the south winds, are some of the factors combining to preserve the stratification of the water and to reduce mixing to a minimum. It is stated to have greater thermal stability than any other lake, the variation in temperature at two hundred metres being less than 5/100 deg. throughout the year. The water is clear and well oxygenated down to a depth of 40-100 m., depending on the place and season, but from 100-225 m. to the bottom (the equivalent of three-quarters of the volume of the lake) there is no oxygen but an abundance of sulphuretted hydrogen. This is the result of the stratification (scarcely ever disturbed at these depths) and the reason for the statement that a total 'turn-over' would have disastrous consequences. It is supposed that even a partial 'turn-over' may not take place annually.

Tanganyika is a diatom lake, and in his investigations van Meel found no new species in the phytoplankton. The new information concerns rather the geographical distribution of the algae, chiefly at the surface. The plankton of the bays is much richer than the pelagic plankton, which is poor in species (*Oocystis*, *Nitzschia*, *Anabaena*, *Anabaenopsis* being the common genera) rather than in individuals. During the Expedition's stay, the volume of plankton, however, was poor throughout most of the year, but an increase occurred in October 1946, at the end of the dry season. The permanent stratification of the deepest layers of water would appear to be an obvious reason for the poverty of the plankton, as the author suggests; but van Meel considers the inhibiting effect of light on chlorophyll to be an added reason. This would seem to control its position in depth in the Lake rather than its quantity. A certain amount of sampling at different depths leads to no obvious conclusions. With a small amount of plankton in such a large body of water, it is possible that its distribution is uneven due to currents and micro-stratifications. One set of readings appears to show a correlation with the diurnal movement of the zoo-