

both the meteorological and radio aspects of the whole investigation.

As the various items of all this work reached appropriate stages, reports were prepared and issued as confidential or secret documents under the restrictions of war-time conditions. But the value of the research from the point of view of the scientific world has now been considerably enhanced by the fact that many of the results obtained have been placed on permanent record in the form of published papers. In the first place, the propagation of ultra-short waves formed the subject of one of the sessions of the Radiolocation Convention of the Institution of Electrical Engineers held in March 1946. The resulting papers and lecturettes were published in a special number of the Institution's *Journal* (93, Part IIIA, No. 1, 1946). This Convention was followed in April of the same year by a Joint Conference held by the Physical and the Royal Meteorological Societies, at which the various aspects of the influence of atmospheric conditions on the propagation of radio waves was discussed in considerable detail; and in *Nature* of June 29, 1946 (157, 860), Prof. P. A. Sheppard gave a detailed account of this Conference and of the various papers presented at it.

The report of the latter Conference has now been published by the Physical Society as a special volume entitled "Meteorological Factors in Radio-Wave Propagation" (price to non-members 24s. including postage). This volume contains the full text of the ten papers read at the meeting, together with eleven other papers describing work on various closely related subjects. Dr. J. A. Saxton gives an account of the experimental determination of the dielectric properties of steam for frequencies between 3,000 and 20,000 Mc./s. (wave-lengths 1.5–10 cm.). The results of such measurements were used to estimate the amount of attenuation to be expected, due to atmospheric water vapour, in the transmission of these waves through the lower atmosphere. The estimated values of such absorption are found to be reasonably consistent with those obtained from theoretical considerations. In four subsequent papers the same author, in one case jointly with J. A. Lane, has studied experimentally and theoretically the anomalous dispersion of water in the centimetre wave-range. The results of this work have provided a detailed knowledge of the refractive index and absorption coefficient of liquid water over a wave-length range from 10 cm. down to a few millimetres, and of the variations of these quantities over the temperature range 0°–40° C.

In a paper entitled "Observations of Unorthodox Radar Vision in the Vicinity of New Zealand and Norfolk Island", Dr. F. E. S. Alexander presents and analyses many observations of anomalous wave propagation obtained by the operators of radar stations on wave-lengths of 10.5 and 150 cm. Another paper, by J. A. Ramsay, describes the results of further observations made at radar stations using wave-lengths of 1.25, 3 and 10 cm. The conditions of propagation were studied at a nominally fixed range, by raising the reflecting target to known heights above the sea by means of a balloon. The results confirmed the prediction, made on theoretical grounds, that anomalous propagation would be experienced on a wave-length of 1.25 cm. to a much greater extent than on 10 cm.

The remaining papers deal with various aspects of the vertical gradient of refractive index in the atmosphere and its effect on the propagation of the

very short radio waves under consideration. Dr. G. G. Macfarlane describes a method of deducing the refractive index gradient in a stratified atmosphere from radio observations: while G. A. Bull has provided a note on errors in the measurement of the refractive index consequent upon errors in the meteorological measurements from which the index is deduced. Using information provided by published weather charts, supplemented by some special measurements made in Great Britain, Dr. A. C. Stickland has studied the average condition of the atmosphere as a refracting medium for the propagation of radio waves. From this empirical study, it is shown that the average refractive index of the lower atmosphere varies logarithmically with height, the actual radius of curvature of the path of the waves increasing linearly with height above the earth's surface.

In a field of investigation such as this, where the meteorologist and radio scientist meet on common ground, it is clearly desirable that there shall be some agreement on the definition of what may be termed a 'standard atmosphere', to which both theoretical and experimental investigations may be referred. It is therefore very appropriate that the publication now under review should include a paper by A. C. Best entitled "A Standard Radio Atmosphere for Microwave Propagation". The author discusses three possible definitions of standard atmosphere, one of which is already in use for aeronautical purposes; but he suggests that the final choice of definition for the standard radio atmosphere must be made by the radio investigator rather than by the meteorologist.

All the work described above represents the conclusion of a very satisfactory and highly successful series of investigations initiated and conducted under war-time conditions. It demonstrates the ability of a large body of scientific workers and Service personnel to plan and conduct in an efficient manner a very complicated research programme in the laboratory and in the field. In spite of the varying interests of the many individuals concerned, they worked together as an enthusiastic team and were inspired in the main by two British Government committees. One of these was under the chairmanship of Sir Edward Appleton, who at the end of his introductory paper to the joint Conference mentioned above acknowledges with pleasure the collaboration he received from its members. He also states that his committee, or, to give it the full title, the Ultra-Short Wave Panel of the Ministry of Supply, had the good fortune to work in close collaboration with the U.K. Joint Radio Meteorological Committee, under the chairmanship of Sir Nelson Johnson, and also with the U.S. Wave Propagation Committee under the chairmanship of Dr. C. R. Burrows. R. L. SMITH-ROSE

## RELEASE OF INFORMATION ON ATOMIC ENERGY

TWO lists of British reports on atomic energy, which had been 'declassified' and made available for purchase through H.M. Stationery Office, P.O. Box 569, Cornwall House, London, S.E.1, were announced last year (*Nature*, March 22, p. 411, September 27, p. 445). The following further twenty-three reports have now been released and should, wherever possible, be ordered by B.D.D.A. number; if this is given, no other identification is needed.

It is hoped that, in the future, reports will be supplied to H.M. Stationery Office as and when they are declassified, and no special announcements will be made; information as to the latest reports available would then be obtained from the regular announcements from H.M. Stationery Office.

B.D.D.A. No.	Report No.	Title and Author(s)	Date	Price
99	Br. 10	Organic derivatives of U. N. Haworth		2s. 8d.
100	Br. 18	Uranyl fluoride. Miscellaneous notes. Note No. 8. The adsorption of atmospheric moisture by anhydrous UF <sub>6</sub> . A. M. Roberts	Feb. 16, 1942	2s. 0d.
101	Br. 174	Investigation of the Pressure-density relationship for the hexafluoride of U at 49.2° C. C. B. Amphlett and L. F. Thomas	Feb. 28, 1942	2s. 0d.
102	Br. 27	Uranyl fluoride. Miscellaneous notes. Note No. 18. The true and packing densities of anhydrous UF <sub>6</sub> . A. M. Roberts, B. G. Harvey	Mar. 30, 1942	1s. 4d.
103	Br. 36	The reduction of UF <sub>6</sub> by hydrogen. J. Ferguson	May 14, 1942	4s. 0d.
104	Br. 182	Pressure density relationship for UF <sub>6</sub> at 50° C.; revised figure for (20/27) - 50°. C. B. Amphlett	June 30, 1942	2s. 0d.
105	Br. 186	The vapour pressure of UF <sub>6</sub> from 12° to 50° C. C. B. Amphlett	June 30, 1942	2s. 0d.
106	Br. 187	Determination of the vapour density of UF <sub>6</sub> at room temperature. C. B. Amphlett and L. F. Thomas	June 30, 1942	1s. 4d.
107	Br. 222	The analysis of gaseous fluorine, Part I. The determination of total and free fluorine. A. F. Williams	Sept. 14, 1942	7s. 4d.
108	Br. 188	Determination of the ultraviolet absorption of UF <sub>6</sub> vapour. A. E. Martin and C. B. Amphlett	Nov. 30, 1942	2s. 0d.
109	Br. 166	Gland experiment. H. S. Arms	Jan. 20, 1943	8s. 8d.
110	Br. 167	Experiments on the pressure dependence of heat conductivity concentration meters. A. F. Brown	Mar. 1, 1943	6s. 8d.
111	Br. 242	Absolute calibration of a neutron source. O. R. Frisch	June 1943	5s. 4d.
112	Br. 280A	Remarks on some physical properties of uranium metal. F. E. Simon	Aug. 16, 1943	8s. 0d.
113	Br. 281	The viscosity of gaseous fluorine. Critical literature survey. Rudge and Southam	Aug. 23, 1943	6s. 0d.
114	Br. 315	Notes on Br. 44 "On the Correction for Self-Absorption in $\beta$ -Ray Measurements", Broda, Gueron and Kowarski, 1942. N. Feather	Aug. 16, 1943	6s. 0d.
115	Br. 425	Determination of U <sup>235</sup> content of enriched uranium samples. E. Bretscher and E. B. Martin	Nov. 3, 1943	2s. 0d.
116	Br. 307A	Memorandum on American tests on fluorocarbon lube oils. J. R. Park	Mar. 16, 1944	1s. 4d.
117	Br. 516	A hard valve pulse analyser. M. L. Poole	May 7, 1944	12s. 0d.
118	BI. 37	Stability of solutions of UCl <sub>4</sub> in alcohol, acetone, and water. C. B. Amphlett	May 31, 1944	2s. 0d.
119	Br. 673A	The analysis of nitrogen - argon mixtures. P. A. I. Tahourdin	Dec. 7, 1945	4s. 8d.
120	Br. 718A	The tensile properties of uranium at elevated temperatures in the $\alpha$ -range. National Physical Laboratory	Mar. 4, 1946	1s. 4d.
121	Br. 775	Preliminary creep tests on 99.8% aluminium at 300°, 350° and 400° C. British Non-Ferrous Metals Research Association	July 1947	6s. 8d.

## FORESTRY IN TRINIDAD AND TOBAGO

THE present forest policy for the Colony of Trinidad and Tobago has had several predecessors. The Annual Forest Administration Report for the Year 1946, written by Mr. John Carter, acting conservator of forests, starts with a statement on the present forest policy formulated in 1942 and now formally accepted by the Government and the Secretary of State for the Colonies. Briefly summarized, it is as follows: (a) Permanent reservation by the Crown of suitably situated areas of forest of a total acreage sufficient to supply the objects aimed at, both direct and indirect. (b) Management of reserved forests on the basis of a sustained yield. (c) The fullest utilization of the forest products, based on the correct forest management and the most economic utilization of imported lumber. (d) Organised research in all branches of forestry. (e) A fully trained staff, both gazetted and subordinate, and the education of all classes of the community to understand the benefits of forestry. (f) The encouragement of, and assistance to, private forestry. (g) Co-operation between forestry and other land interests with the object of bringing into force a sound land utilization policy.

These are good clauses in a correct forest policy. They have been enunciated on more or less similar lines many times in the past in the British Empire. It would appear from the action being taken both in the Empire and outside it in other parts of the world that Governments generally have become conscious of the serious dangers which are threatening their populations through wasteful utilization of the forest resources, involving possible wood famines in certain regions of the globe, and seriously increasing erosion and degradation of soils and interference with water supplies and rainfall.

The present report describes the steps being taken in carrying out the resolutions on the above heads of policy. The report then continues with details on the actual work carried out during the year. Among other points the question of game preservation and the difficulty of control in the close season is mentioned: and also that negotiations were continued with the Trinidad Field Naturalists Club with a view to the formation of a zoological society which would undertake to establish and maintain a zoological 'garden'. It is interesting to note that a site of about 6 acres in the Royal Botanic Gardens has been made available for the proposed zoo, and the Government has agreed to hand over to a zoological society when it is formed the funds standing to the credit of the Wild Birds Fund, and an annual grant equal to the amount collected for hunting licences.

## FORTHCOMING EVENTS

(Meetings marked with an asterisk \* are open to the public)

Monday, January 26

ROYAL SOCIETY OF ARTS (at John Adam Street, Adelphi, London, W.C.2), at 4.30 p.m.—Dr. C. H. Andrewes, F.R.S.: "The Common Cold" (Cantor Lecture).

UNIVERSITY COLLEGE LONDON (in the Physiology Theatre, Gower Street, London, W.C.1), at 4.45 p.m.—Dr. Ernest Baldwin: "The Comparative Biochemistry of Respiration and Metabolism". (Further Lectures on February 2, 9, 16, 23 and March 1.)\*

MANCHESTER LITERARY AND PHILOSOPHICAL SOCIETY (in the Reynolds Hall, College of Technology, Manchester), at 5.30 p.m.—Sir George Thomson, F.R.S.: "Determinism in the Physical World" (Joule Memorial Lecture).\*