

side arrays, individual control of directivities is valuable. A high degree of directivity in the vertical plane with broadside arrays, however, requires a height of several wave-lengths. As the wave-length increases, this height and the support of reflector as well as radiator curtains require fairly massive masts and corresponding foundations. The choice of aerials is influenced to a considerable degree by capital and maintenance costs, and availability of land, as well as by the technical considerations which lead to an overall improvement in the efficiency of the radio communication circuit.

Some of the earlier beam systems were built for very high directivity in the horizontal plane; but experience has shown that this may be overdone, since the reflecting medium is not sufficiently stable and accurate, and conditions can obtain when a transmitted beam, if too narrow, may be deflected right off the receiving aerials.

Similar structures can be used for transmission and reception, but the requirements are not necessarily the same. In general, the maximum forward gain is the chief requirement of transmitting aerials; while at the receiving station it is not so much a high signal-level that is required as a good discrimination of the signal in relation to the prevailing noise-level. During the period of maximum sunspot activity backward round-the-world echoes are troublesome, and aerials should have the maximum front-to-back ratio. Experience shows that this is more easily obtained with broadside arrays. This is true with normal broadside arrays; but even better ratios are possible if the aerial is erected off direction and electrically swung on to the forward direction; the result is that backward radiation is swung away from the great-circle bearing.

In the case of receiving aerials this applies also, but the chief requirement is the correct shape of polar reception diagram rather than gain, at least on wave-lengths greater than, say, 20 metres. With modern receivers the limiting factor above this wave-length is not input-signal level but signal-to-outside-noise ratio. In this case the power inefficiency caused by terminating resistances at the non-fed end of 'end-fire' arrays is unimportant; consequently, relatively simple and cheap aerials of the horizontal fish-bone type are adequate, take up small space, and on a given area of land can be multiplied for diversity reception. This type of aerial can be arranged for almost any degree of compromise between end-fire and broadside.

During the discussion, considerable attention was given to the rhombic aerial system, which has the advantage of retaining a reasonable directivity over a wave-length range of about two-to-one. Some of this versatility is lost when several rhombics are used in series in order to secure greater efficiency, but on the other hand greater control of the vertical radiation can be obtained, and this may be a distinct advantage in some cases.

The relative merits of horizontal and vertical polarization in the emitted radiation were discussed by one speaker, who stated that in some experiments with broadcasting transmitters, horizontal polarization had given the best results. It was agreed that a considerably wider horizontal distribution is used in broadcasting than in point-to-point communication, but not necessarily a wider diagram in the vertical plane, because the vertical angle to be covered is often of the same order in the case of communication services and broadcasting.

The chairman directed attention to the widespread interest aroused by the discussion, which showed that the subject is one of great importance to the engineer responsible either for long-distance broadcasting or point-to-point communication services.

## REVISED FORMS OF THE CALENDAR

COLONEL C. A. GILL has published a small book entitled "The Reform of the Calendar—a Measure of Social Security" (Reigate: Ancient House Bookshop. Pp. 36. 1s.), which contains the proposals for a British Calendar. On p. 26 this Calendar is shown in full, and it agrees with the World Calendar (shown on p. 15), except that the days termed the 365th and 366th days are to be included as an eighth day in the last week of June and December respectively. It is suggested that the 365th day, June 31, should be called Mid-Year Day, and the additional day in leap years, bearing the date December 31, should be called Leap-Year Day.

A prime consideration in fixing the date of bank holidays should be the season of the year when they are most beneficial to the health of the community, and the following proposals are made, the advantages of which will be seen when it is remembered that the first day of each month commences with Sunday. A bank holiday should continue to be associated with Easter, but the date of the Eastertide holiday should have April 9 included. As Easter Sunday falls on April 8 in about 40 per cent of years, this arrangement will increase the length of the Eastertide holidays to four clear days on many years, owing to the inclusion of Good Friday. If Saturday, April 7, and Monday, April 9, were declared bank holidays, the dates of all secular events which now vary annually with the date of Easter Sunday could then take their time from the fixed bank holidays in April. It may be pointed out that April 8 is the date proposed by the World Calendar Association for Easter Sunday—a proposal which may some day materialize.

Other bank holidays which are suggested are Saturday, May 25, and Monday, May 27, irrespective of the date of Whit Sunday. Saturday, June 30, and Mid-Year Day, June 31, if declared bank holidays, would provide a three-day holiday at the end of June, Sunday, July 1, being, of course, included. The bank holiday on the first Monday in August falls on August 6 under the new scheme, and it is proposed to continue with this arrangement, Saturday, August 4, being also a bank holiday. Saturday, September 2, and Monday, September 4, would be bank holidays. As December 25 falls on a Monday, a holiday on Boxing Day with the previous Sunday and half Saturday would provide 3½ days' holiday at Christmas.

Another revised calendar has been proposed by Lieut. Willard E. Edwards under the title "The Edwards Perpetual Calendar" (printed by the *Honolulu Star-Bulletin*, Ltd.). In this, each week begins with Monday, and anniversaries and holidays always fall on the same day of the week. Each quarter has 91 days, and New Year's Day is set apart as a holiday and is followed by Monday, January 1, thus preserving the year of 365 days and the continuity of dates each year. In the case of a leap year, the first day of the second half of the year is Leap-Year

Day, a second holiday apart from any week or month, and is followed by July 1. April 14 is the date for Easter, which is partly in accordance with the Act of Parliament in 1928, providing for the stabilization of Easter between April 8 and 15. Friday, the 13th, is completely eliminated from the Calendar, thus removing the grounds of the superstition that exists concerning this date and day. Sunday becomes the seventh day of the week, and agrees more with the Biblical Sabbath or the psychological conception of the week. All future dates can be computed without the aid of a printed calendar by remembering that the first month of each quarter always begins on Monday, the second on Wednesday, and the third on Friday, the number of days in the corresponding months being 30, 30, 31.

It is claimed that this Calendar not only introduces simplicity regarding anniversaries and holidays, but also removes many complications in the commercial world, as there are 26 working days in each month and 91 days in each quarter.

## FORTHCOMING EVENTS

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

### Saturday, February 19

BRITISH ASSOCIATION OF CHEMISTS (at the Café Royal, Regent Street, London, W.1), at 2.30 p.m.—Twenty-sixth Annual General Meeting.

### Monday, February 21

ROYAL SOCIETY OF ARTS (at John Adam Street, Adelphi, London, W.C.2), at 1.45 p.m.—Dr. E. B. Bailey, F.R.S.: "Natural Resources of Great Britain", 1: "Minerals". (Cantor Lectures, 1.)

ROYAL GEOGRAPHICAL SOCIETY (at Kensington Gore, London, S.W.7), at 5 p.m.—Lady Broughton: "Greenland, Mexico and Yucatan" (Kodachrome Films).

INSTITUTION OF ELECTRICAL ENGINEERS (at Savoy Place, Victoria Embankment, London, W.C.2), at 5.30 p.m.—Discussion on "The Use of Electricity in the Equipment and Testing of Aircraft" (to be opened by Mr. C. G. A. Woodford).

### Tuesday, February 22

ROYAL ANTHROPOLOGICAL INSTITUTE (at 21 Bedford Square, London, W.C.1), at 1.30 p.m.—Dr. Luis Araquistáin: "Some Survivals of Ancient Iberia in Modern Spain".

ROYAL INSTITUTION (at 21 Albemarle Street, London, W.1), at 5.15 p.m.—Dr. J. Ramsbottom: "Fungi and Modern Affairs", 2: "Fungi as Agents of Disease and Destruction".\*

EUGENICS SOCIETY (at the Royal Society, Burlington House, Piccadilly, London, W.1), at 5.30 p.m.—Mr. B. S. Bramwell: "The Order of Merit—the Holders and their Kindred".

INSTITUTION OF CIVIL ENGINEERS (at Great George Street, Westminster, London, S.W.1), at 5.30 p.m.—Mr. V. A. M. Robertson: "The Engineering Evolution of London Transport".

### Wednesday, February 23

ROYAL SOCIETY OF ARTS (at John Adam Street, Adelphi, London, W.C.2), at 1.45 p.m.—Mr. Hugh Lyon: "Education To-day and To-morrow", 5: "The Future and Functions of the Boarding School".

INSTITUTION OF ELECTRICAL ENGINEERS (WIRELESS SECTION) (at Savoy Place, Victoria Embankment, London, W.C.2), at 5.30 p.m.—Mr. B. J. Edwards: "A Survey of the Problems of Post-War Television".

### Thursday, February 24

BRITISH SOCIETY FOR INTERNATIONAL BIBLIOGRAPHY (at the Science Museum, Exhibition Road, South Kensington, London, S.W.7), at 2.15 p.m.—Annual General Meeting: Mr. S. W. Gibson: "The Library and Information Department of a Large Engineering Firm"; Dr. S. C. Bradford: "The Universal Decimal Classification Its Origin and Purpose, Structure and Use".

ROYAL INSTITUTION (at 21 Albemarle Street, London, W.1), at 2.30 p.m.—Sir Jack Drummond: "Food Fads and Food Fallacies".\*

KING'S COLLEGE (in the Department of Electrical Engineering, Strand, London, W.C.2), at 3 p.m.—Mr. S. D. Thorp: "Generator Protection".\*

ROYAL AERONAUTICAL SOCIETY (at the Institution of Mechanical Engineers, Storey's Gate, St. James's Park, London, S.W.1), at 5.30 p.m.—Dr. D. M. A. Leggett and Mr. H. Davidson: "Structural Features of German Aircraft".

BRITISH INSTITUTION OF RADIO ENGINEERS (LONDON SECTION) (at the Institution of Structural Engineers, 11 Upper Belgrave Street, London, S.W.1), at 6.30 p.m.—Mr. C. E. Tibbs: "A Review of Wide Band Frequency Modulation Technique".

BRITISH ASSOCIATION OF CHEMISTS (ST. HELENS SECTION) (in the Lecture Room, Radiant House, Cotham Street, St. Helens), at 7.30 p.m.—Mr. H. Cole: "The Literature of Alchemy".

### Friday, February 25

ROYAL INSTITUTION (at 21 Albemarle Street, London, W.1), at 5 p.m.—Mr. E. Rick Carling: "The Medical and Surgical Achievement of Soviet Russia in War".\*

INSTITUTION OF MECHANICAL ENGINEERS (at Storey's Gate, St. James's Park, London, S.W.1), at 5.30 p.m.—Discussion on "Troubles, Breakdowns and their Cures".

### Saturday, February 26

SCHOOL NATURE STUDY UNION (at the Central Club, Y.W.C.A., Great Russell Street, London, W.C.1), at 2.30 p.m.—Thirty-eighth Annual Conference; at 3 p.m.—Prof. W. B. R. King: "The Evidence of Fossils".

## APPOINTMENTS VACANT

APPLICATIONS are invited for the following appointments on or before the dates mentioned:

SPEECH THERAPIST to serve the Crewe and Cheshire Education Committees jointly—The Director of Education, Education Offices, Imperial Chambers, Prince Albert Street, Crewe (February 29).

HEAD OF THE DEPARTMENT OF MECHANICAL AND AUTOMOBILE ENGINEERING, and HEAD OF THE DEPARTMENT OF ELECTRICAL ENGINEERING, at the Doncaster Technical College—The Chief Education Officer, Education Offices, Wood Street, Doncaster (February 24).

LABORATORY ASSISTANT IN THE DEPARTMENT OF BOTANY—The Secretary, Bedford College for Women, Springfield, Sidgwick Avenue, Cambridge (February 26).

PSYCHIATRIC SOCIAL WORKER (full-time)—The Director of Education, Education Offices, Middlesbrough (February 26).

LECTURER IN MATHEMATICS—The Registrar, Technical College, Sunderland (February 28).

SENIOR LECTURER IN MATHEMATICS—The Clerk to the Governors, South-East Essex Technical College and School of Art, Longbridge Road, Dagenham, Essex (February 28).

WOMAN LECTURER IN THE DEPARTMENT OF EDUCATION, qualified to lecture in EDUCATIONAL HYGIENE—The Registrar, King's College, Newcastle-upon-Tyne (February 29).

ELECTRICAL ENGINEER (to instruct and supervise General Electrical Installation Work, Maintenance and Repairs), and an ELECTRICAL MAINTENANCE FOREMAN (to assist with Installation and Maintenance Work), for a Modern Iron and Steel Works in Turkey—The Ministry of Labour and National Service, Central (Technical and Scientific) Register, Advertising Section, Alexandra House, Kingsway, London, W.C.2 (quoting Reference No. D.765.XA) (March 1).

LECTURER (man or woman) in the DEPARTMENT OF GEOGRAPHY—The Secretary, Bedford College for Women, Regent's Park, London, N.W.1 (March 1).

MONTAGUE BURTON PROFESSORSHIP OF INTERNATIONAL RELATIONS—The Registrar, The University, Oxford (March 4).

ENGINEER AND MANAGER of the Walsall Gas Undertaking—The Town Clerk, The Council House, Walsall (March 6).

LECTURER IN ELECTROTECHNOLOGY in Santa Maria, Chile—The Ministry of Labour and National Service, Central (Technical and Scientific) Register, Advertising Section, Alexandra House, Kingsway, London, W.C.2 (quoting Reference No. D. 763.XA) (March 8).

LECTURER (man or woman) in BOTANY, and a DEMONSTRATOR (man or woman) in BOTANY—The Secretary, Bedford College for Women, Regent's Park, London, N.W.1 (March 8).

PROFESSORSHIP OF CHEMICAL TECHNOLOGY—The Vice-Chancellor, University of Madras, Triplicane P.O., Madras India (March 31, by cable; at the same time advise the Office of the High Commissioner for India, General Department, India House, Aldwych, London, W.C.2).

UNIVERSITY LECTURER IN ANTHROPOLOGY—The Secretary of the Appointments Committee, Faculty of Archaeology and Anthropology, Museum of Archaeology and of Ethnology, Cambridge (April 15).

DIESEL MECHANIC FOR MINING PROPERTY on the Gold Coast—The Secretary, Overseas Manpower Committee, Ministry of Labour and National Service, Alexandra House, Kingsway, London, W.C.2 (quoting Reference No. 310).

ENTOMOLOGICAL FIELD OFFICERS by the Government of Kenya Medical Department—The Secretary, Overseas Manpower Committee, Ministry of Labour and National Service, Alexandra House, Kingsway, London, W.C.2 (quoting Reference No. 1270).

LIBRARIAN of the British Library of Political and Economic Science—The Acting Secretary, London School of Economics, The Hostel, Peterhouse, Cambridge.

WORKS MANAGER for the Sierra Leone Government Railway—The Ministry of Labour and National Service, Appointments Department, Sardinia Street, London, W.C.2 (quoting Reference No. O.S.30).

## REPORTS and other PUBLICATIONS

(not included in the monthly Books Supplement)

### Great Britain and Ireland

The Case for the Abolition of Compulsory Mathematics in University Matriculation Examinations: a Reform of Vital National Importance. By David Brownlee. Pp. 24. (London: The Author, 56 Grange Road, W.5.)

National Smoke Abatement Society. Proceedings of the Eleventh Annual Conference held at the Caxton Hall, London, S.W.1, on 5th November 1943: Measures for Smoke Prevention in relation to Plans for Post-War Reconstruction. Pp. 24. (London: National Smoke Abatement Society.) 1s.

Employment After the War: a Memorandum submitted by the Social Credit Co-ordinating Committee for the consideration of Sir William Beveridge. Pp. 12. (Mexborough: Social Credit Co-ordinating Committee.) 3d.