

REGENT'S
PARK

S. JOHN'S
WOOD

PARK ROAD

MARYLEBONE

BAKER
ST.

REGENT'S
PARK

D G W A R F
E R D.

EDGEWARE
RD.

M A R Y
L E B O N E
R O A D

BROADCASTING

PADDINGTON

P O A D

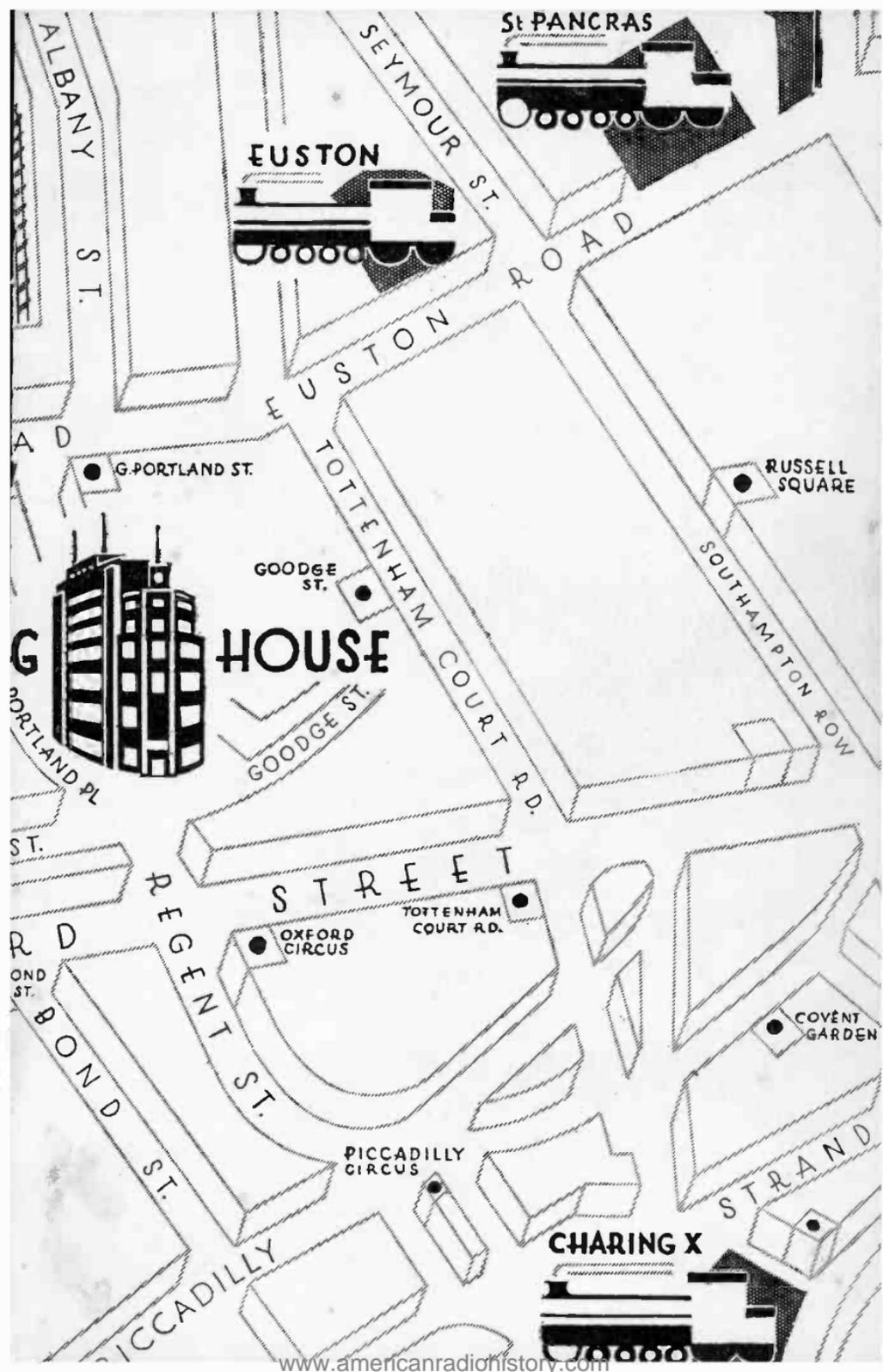
WIGMORE

O X F O R D

H Y D E

P A R K

PARK LANE

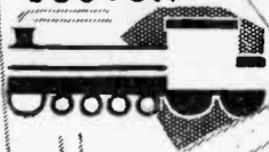
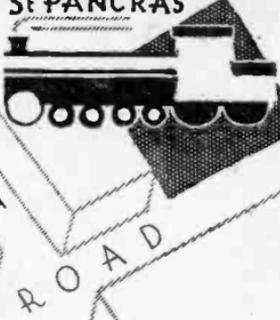


St PANCRAS

EUSTON

ALBANY ST.

SEYMOUR ST.



ROAD

EUSTON

G. PORTLAND ST.

RUSSELL SQUARE

GOODGE ST.

HOUSE

GOODGE ST.

TOTTENHAM COURT RD.

SOUTHAMPTON ROW



G

PORTLAND PL

ST.

REGENT STREET

OXFORD CIRCUS

TOTTENHAM COURT RD.

BOND ST.

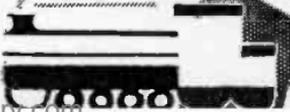
COVENT GARDEN

PICCADILLY CIRCUS

CHARING X

STRAND

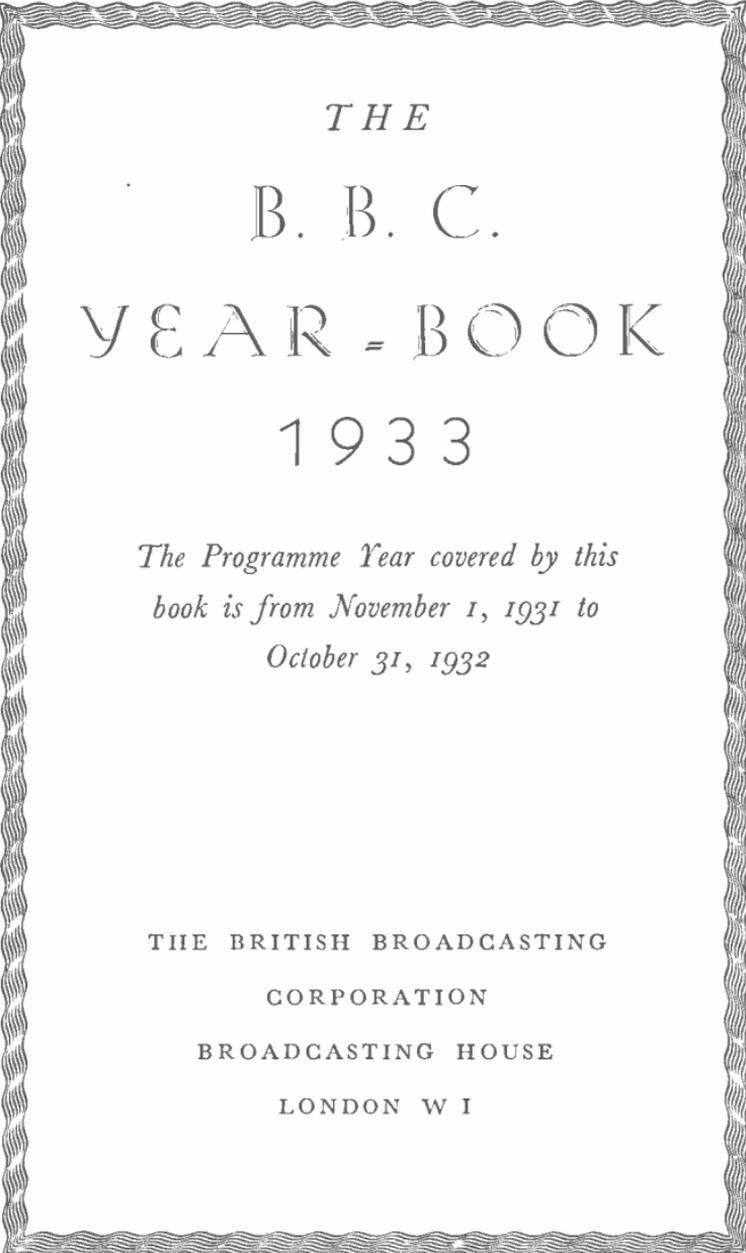
PICCADILLY



From Bill

to Reg

Xmas 1932



THE
B. B. C.
YEAR - BOOK
1933

*The Programme Year covered by this
book is from November 1, 1931 to
October 31, 1932*

THE BRITISH BROADCASTING
CORPORATION
BROADCASTING HOUSE
LONDON W I

Readers unfamiliar with broadcasting will find it easier to understand the articles in this book if they bear in mind the following :—

(1) The words “Simultaneous(ly) Broadcast” or “S.B.” refer to the linking of two or more transmitters by telephone lines for the purpose of broadcasting the same programme ; *e.g.* the News Bulletins are S.B. from all B.B.C. Stations.

(2) The words “Outside Broadcast” or “O.B.” refer to a broadcast outside the B.B.C. studios, not necessarily out-of-doors ; *e.g.* a concert in the Queen’s Hall or the commentary on the Derby are equally outside broadcasts.

(3) The B.B.C. organisation consists, roughly speaking, of a Head Office and five provincial Regions—Midland Region, North Region, Scottish Region, West Region, and Belfast. The Head Office includes the administration of a sixth Region—the London Region—which supplies the National programme as well as the London Regional programme. The provincial centres supply the Regional programme for their own Regions. The words “Region” or “Regional” refer throughout the book to this system of organisation.

PRINTED & MADE IN ENGLAND
BY RICHARD CLAY AND SONS LIMITED
BUNGAY, SUFFOLK

CONTENTS

TEN YEARS OF BROADCASTING	PAGE 9
Ten Years of Technical Progress	41

	PAGE		PAGE
The B.B.C.'s Constitution	51	Rediffusion	69
Advertising on the Wireless	59	Wireless Exchanges	71
Broadcasting and Advertising	61	Listeners' Societies	73
The Broadcasting Service in Wales	65	The Wireless Industry	77
		Licences in Great Britain	85
		World Licences	88

BROADCASTING HOUSE

The Architecture	91	The Organ	107
The Ventilating Plant	101	Decoration of the Studios	115

PROGRAMME SECTION

Notes of the Year	131	School Broadcasts	185
International Broadcasting	139	The Broadcast Pulpit	187
The Time Signals	143	A Vesper Hymn	194
Voice Records	145	First Morning Service	197
The "Microphone Voice"	147	Future Developments in the North	199
Auditions	149	Some Midland Outside Broadcasts	203
The London Orchestras	155	The Welsh Programmes	207
The Music Library	161	Broadcasting in Northern Ireland	211
The New B.B.C. Dance Orchestra	165	Events of the Year	215
Development in Drama	171		
How the News is Chosen	177		
Group Listening	181		

SCOTLAND

Notes	227	The Scott Centenary	247
Problem of Distribution	231	Scottish Orchestral Music	249
Scottish Regional Station	235	The Scots Vernacular	251
The Early Days	241	Frae a' the Airts	255
A Policy of Centralisation	245		

	PAGE		PAGE
<i>THE EMPIRE</i>		Broadcasting in the Em-	
Notes	259	pire	291
Empire Broadcasting	263		
Programmes for the Em-		<i>INTERNATIONAL</i>	
pire	267	Notes	299
The Empire Station at		The Year at Geneva	305
Daventry	275	The Madrid Conference	309
Receiving the Empire		The Relation of Govern-	
Station	285	ments to Broadcasting	313
Recorded Programmes		Broadcasting in Russia	318
for the Empire	289		

TECHNICAL SECTION

Notes	323	The Control Room Am-	
The New Daventry	331	plifiers	391
Ultra-short Wave Broad-		S.B. Developments	401
casting	337	Adjusting Receivers for	
The Power Rating of		Different Wavelengths	407
Transmitters	347	Reception for Groups and	
The Tuning Note	353	Schools	415
Short-wave Relays	357	Electrical Interference	421
Acoustics of the Studios	363	The Tramway Problem	429
Microphones	371	Television in 1932	441
The Dramatic Control			
Panels	385		

APPENDIX

B.B.C. Addresses	450	List of European Stations	461
Visits to the Studios	451	List of Short-wave	
B.B.C. Transmitters	451	Stations	466
Weather Forecasts	452	Taking Sets Abroad	468
The Radio Circle	452	Balance Sheet and Ac-	
S.O.S. Rules	454	counts	469
The Time Signals	455	Buyers' Guide	472
Forthcoming Concerts	456	List of Illustrations	475
The B.B.C. Orchestras	457	Index	477
The B.B.C. Chorus	459	Calendar	480
Some B.B.C. Books	460		

THE BRITISH BROADCASTING
CORPORATION



Board of Governors

The Rt. Hon. J. H. Whitley
Chairman

The Rt. Hon. Lord Gainford
Vice-Chairman

Harold G. Brown, Esq.

M. J. Rendall, Esq., C.M.G., LL.D.

The Viscountess Snowden

Director-General

Sir J. C. W. Reith

Head Office

BROADCASTING HOUSE, LONDON, W.1



Sport and General

THE KING AND QUEEN LEAVING BROADCASTING HOUSE AFTER THEIR
VISIT ON 7 JULY 1932

TEN YEARS OF BROADCASTING

ON July 7th, 1932, the visit of their Majesties the King and Queen to Broadcasting House, the B.B.C.'s new London headquarters, set the seal on ten years of British broadcasting. On November 14th and the following days the B.B.C. celebrated its actual tenth anniversary with a week of special programmes. The purpose of the present article is to review the B.B.C.'s career as objectively as possible.

On May 4th, 1922, the Postmaster-General, Mr. F. G. Kellaway, announced in the House of Commons that it had been decided to authorise regular broadcasting in Great Britain.

Long and delicate negotiations were still, however, to take place, and it was not until October 18th that the form of Company was officially agreed by the radio manufacturers and the Post Office. The British Broadcasting Company was registered on December 15th, 1922, but its licence to broadcast was not issued till January 18th, 1923. It was retrospective, however, and gave permission to broadcast as from November 1st, 1922. Broadcasting had actually begun officially in London on November 14th from the station 2LO, loaned by the Marconi Company and operated under their auspices until the end of the year. On the following day, the Company took over the existing stations at Birmingham and Manchester under similar arrangements with the Western Electric Company and the Metropolitan Vickers Company. In the last week of December, with the appointment of a General Manager and other officials, the B.B.C. organisation began to take effect, and the company began its public service career which the Corporation has continued since January 1st, 1927.

The essential constituents of a broadcasting system are *programmes*, *transmission* (dealt with in the next article) and, thirdly, *constitution* and *management*, the last-named being understood to cover on the one hand external policy, viz. relations with the public, the professions and industries concerned or affected, the Government, and other broadcasters: and on the other, internal policy, viz. co-ordination of effort, allocation of resources, and planning of development. The term "management" covers, of course, the control exercised by the Board of Directors or Governors as well as that exercised by the executive

officials. Before one settles the constitution of any service or business one must have at least a general idea of the purpose that it is meant to fulfil. But in 1921-1922 even a general idea was difficult to formulate. The situation was that broadcasting, hitherto practised for the love of the thing by a few scientific amateurs, had leaped into considerable popularity in the United States, and was spreading to Europe under the impulsion of some urge that might be either a whim of the moment or the sign of a real social necessity. In America the pace of the movement had been too hot for careful thought and planning.* Although the first important and sensational broadcast had been one of political news, and educational broadcasting of a sort was done here and there as early as 1921, the field was at once captured by the combined forces of handy-fingered Youth and recreation-seeking Labour, for whose demands the radio trade set itself to cater on purely commercial lines. This was not in the least surprising. Most, even among thoughtful men, were satisfied to think of "radio" as a solution of the great problem of how to occupy the leisure of a population that worked for short and intense hours on uninspiring series-production. Moreover, communications not being, in America, a public service, the national authority was not obliged, as in Europe, to take a standpoint in the matter. In Great Britain, on the contrary, the Post Office was in a position to regulate broadcasting from the first, and indeed under the constitutional necessity of doing so. Even thus, the line of least resistance might well have been to allow commercial broadcasting for entertainment alone with some form of competition, but it chose otherwise and, looking at the future as well as the present, it adopted unequivocally the principle of putting broadcasting in the hands of a single and undivided organisation with public service as a motive.

This decision was of fundamental importance not only for British Broadcasting, but for European practice in general. It marked the intention to make broadcasting, as a public service, subserve a public need. What precisely that need was,

* The first true broadcasting station in that country, KDKA, of the Westinghouse Company, opened on November 2nd, 1920; six hundred stations were in existence by the end of 1922 and fourteen hundred by the end of 1924.



LORD GAINFORD

Chairman of the original Company and Vice-Chairman of the Corporation.

would presumably emerge from experience. Meantime the management would be in the hands of a Board with a Chairman appointed by the Government and the other Directors by the wireless manufacturers. Its non-commercial character would be ensured by the limitation of profits to a fixed dividend, by the prohibition of advertisement, and by the fact that the principal source of revenue would be a share of the licence fees to be collected by the Post Office from listeners. This last was a new device, but how appropriate it was to the special conditions of broadcasting is shown by the fact that it has been imitated in almost all European countries, in the British Dominions, and in Japan.

A further source of income for the Company was to be the levy of royalties on sets and components sold to the public. To that end it was made one of the conditions of the listener's licence that his set should bear a standard "B.B.C." mark. This system, which had as its objects the patriotic one of excluding foreign sets and components and the purely commercial one of discouraging the home constructor for the benefit of the manufacturers of complete sets, was a failure. The Postmaster-General had indeed already authorised the issue of an "experimenter's" licence for the genuine experimenter, but the latter was soon indistinguishable from the ordinary home constructor. A confused situation thereupon arose, a Parliamentary Committee of Inquiry ("the Sykes Committee") was assembled, and before the Company was a year old it had itself decided to abolish the royalties as from July 1st, 1924.* The Company's share in the ordinary licence revenue was correspondingly increased and its partial dependence on the wireless trade diminished.

The Company's own policy† of public service had in fact made this inevitable from the first. The Sykes Committee, which was not expected to report in a sense favourable to the

* A minor relic of these difficulties existed until 1926 in the exclusion of advertisement of certain "components" from *The Radio Times*.

† Evidenced not only in programmes but also in finance. The Company provided the permanent assets as well as current expenses out of revenue and accumulated a reserve for the repayment of the capital to its shareholders at par, in addition to a considerable contribution to the Exchequer.

Company, in fact recommended an extension of the licence for two years. It did not confine itself to unravelling the licensing tangle, but was able to review broadcasting as a whole. It recognised the immense social and political possibilities of the medium and the success with which, so far, the Company had met its responsibilities and used its opportunities, and it encouraged a considerable extension of the services hitherto provided, both as to the areas covered and as to the programme matter given.

One of its recommendations, carried into effect immediately, was the establishment of relay stations to supplement the eight "main" stations of the original scheme.* Another, not destined to be realised for some years, was the removal of restrictions on the news bulletins which the Post Office, at the instance of the Press, had imposed on the Company at the outset.

Thereafter the British broadcasting system remained unaltered until the Company's licence expired on 31 December, 1926. But within the old framework development was continuous; so that, when the second, or "Crawford," Committee of Enquiry sat in 1925-6, it was almost a foregone conclusion that it would report in favour of a national broadcasting authority taking over the staff, system, and plant, as a going concern. This was effected on January 1st, 1927, when the "Corporation" replaced the "Company," the change being scarcely perceptible to the staff or to the public. The shareholders were eliminated by being repaid at par; the assets were transferred to the Postmaster-General and by him to the new body. The trade Directors were replaced by Governors appointed by the Crown.

The constitution as granted by the Charter is probably familiar in a general way to listeners and has been described in previous issues of the Year-Book. Its actual workings do not lend themselves to review and discussion in so brief a space as is

* The ninth main station, Belfast, was opened in October, 1924, and eleven relay stations at various dates between autumn of 1923 and autumn of 1924. The high-power station 5XX at Daventry, which had an experimental predecessor at Chelmsford, represented a later stage in the implementing of this demand for complete coverage, and after its opening in the summer of 1925 the percentage of population covered rose from the original 1923 figure of 40 to 80. In British practice "coverage" has always implied easy reception on simple sets.

available here. It must suffice to say that its basic principle, that broadcasting should be operated on a national scale, for national service, and by a single national authority, has justified itself, and that any modifications, arising out of experience, that might be suggested when the time comes for revision (1936) would be in the direction of further affirming rather than qualifying that principle.

THE MANAGEMENT

The management provides the machinery whereby a constitution designed for a given purpose effects (or fails to effect) that purpose. In the B.B.C., management has had two advantages—that of continuity of purpose and practical continuity of constitution, and that of continuity of direction in the person of the Chief Executive. His immediate subordinates, too, with few exceptions, have from seven to nine years' service. The formal organisation—the “genealogical tree” of branches, departments, etc.—has undergone considerable development. Head Office was originally divided into Programme, Engineering, and Secretarial (*i.e.* administrative) branches. To these was added at the end of 1924 a branch for public relations and publications, now known as “Information and Publications.” The administrative side was divided in 1926 into two branches for general administration and finance respectively. The Programme branch, of course, expanded again and again, and by 1932 the “spoken word”—talks, education, news, etc.—had become so important and the volume of its work so great that a regrouping was considered necessary, under which “Talks” became a separate branch, while the old Programme branch continued to deal with music, drama, entertainment, and the common services relating to the building-up, fitting-in, and execution of the programmes considered as a whole. The Engineering branch, whose field and functions were clear from the outset, has undergone comparatively little internal change from the point of view of organisation; and its functions are readily classifiable under the major headings of “Maintenance” (*i.e.* the day-to-day running of the technical service), “Research” or “Development,” “Stores,” and “Buildings.” The heads of these six principal branches—Administration, Engineering, Information, Programmes, Finance, and Talks—



LOCKING UP AT SAVOY HILL FOR THE LAST TIME—14 MAY 1932

constitute, under the Director-General and his deputy, the Controller, a body known as the Control Board, which meets weekly and has so met since earliest days. Finally, there are two independent departments, "Foreign" and "Empire," formed in 1928 and 1932 respectively, whose duties are self-evident. All these subdivisions are not to be regarded as watertight compartments; in actual working the system depends on "horizontal" liaisons almost as much as on "vertical."

The Board of Governors consisting of a Chairman and four other members, all appointed for a term of years by the Crown, is the body to whom the Charter is granted, and on whom responsibility finally rests.

THE PROVINCIAL STATIONS

The organisation of the stations themselves has, of course, followed the development of the service as a whole, and notably that of the "S.B." (simultaneous broadcasting) system. It has been mentioned that the original plan provided for eight or, with Belfast, nine stations, and in early days these were entirely self-contained from the programme point of view, except that the general news bulletins were common to the whole. From May 1923 S.B. became a regular practice, but it was not yet possible to do justice to musical transmissions over long lines, and the autonomy of the provincial stations was scarcely affected; (London station itself was not absorbed into the "Head Office" organisation until November 1927). But during 1924 the system of relay stations was brought into effect, and it was the London programme that constituted the bulk of the output of these stations. And in the next year Daventry 5XX, with its long wave and (for the time) high power, almost automatically assumed a national rôle. Gradually, therefore, the idea arose of presenting every listener with the choice between a "national" and a "regional" programme. As is well known, the sequel was the building of a number of twin high-power transmitters so placed as to give "national" and "regional" alternatives. Certain main stations became regional centres, while others and the relay stations ceased one by one to transmit, and the organisation of the stations and their relation with Head Office underwent considerable modifications.

The tendency of these was frankly one of centralisation, and,

as may be imagined, its progress was not unaccompanied by controversy. Strong arguments could be, and have been, put forward for both centralisation and considerable regional autonomy—a sign both of the expansion of broadcasting and of the complexity of the issues it has raised—and the question does not admit of a simple and clear-cut answer. Very generally it may be said that, from the point of view of organisation, the solution will lie in a greater degree of executive management by the centre, balanced by increased influence of the regions in that centre. The problems are not peculiar to this country; all great broadcasting systems have had to deal with them in one form or another. As it stands at present, the organisation of a British Regional Station is built up on a Regional Director who controls the regional programmes, is the agent of the Corporation in his area for nearly all purposes, and is responsible to the Chief Executive, though most of his business is transacted with the heads of Branches at Head Office. His staff is partly general and partly specialised, and besides his main studios and offices he controls the studios which have been maintained in certain places formerly served by local stations. In a few cases where technical considerations make it difficult to give the standard service from the Regional transmitters, local stations have been maintained as such, and, though under the Regional authority, have certain programme powers of their own.

GROWTH OF BROADCASTING

Such, in brief general terms, are the constitution and organisation of British broadcasting as evolved to meet the needs that have grown and the relations that have changed in these ten years. It may be appropriate at this point to review the growth in the number of licensed listeners, as a measure of the success so far achieved. The following are the figures:—

December 31st, 1923	.	.	.	580,380
„ „ 1924	.	.	.	1,140,119
„ „ 1925	.	.	.	1,645,207
„ „ 1926	.	.	.	2,178,447
„ „ 1927	.	.	.	2,395,174
„ „ 1928	.	.	.	2,628,392
„ „ 1929	.	.	.	2,956,736
„ „ 1930	.	.	.	3,411,910
„ „ 1931	.	.	.	4,330,735
„ „ 1932 (estimated)	.	.	.	5,000,000

Such figures are impressive. Only one country employing a licence system can show a higher percentage of listeners to population—namely, Denmark, and there the problems are simpler. Even in America, though broadcast listening is “free” there, the census of sets disclosed a percentage not much greater than the British. It would not be claimed that this numerical prosperity alone and by itself proves the success of the service, any more than full public houses amount to a sufficient argument against liquor reform. But at least it proves the acceptableness of the service.

Quantity, no doubt, has had much to do with the prestige that the B.B.C. has acquired. The growth of licence figures has falsified any expectation, expressed or tacit, that broadcasting would prove ephemeral. But it did not of itself prove that broadcasting was not a toy, for toys also sell by the million, nor that it was something more than a means of whiling away time, for recreation and relaxation have an appeal not to forty but to ninety-nine per cent. of the people. The recognition that broadcasting possesses a social rôle of the first importance came from other considerations as well. Firstly, the quantitative support of the public spelt revenue to the broadcaster, and revenue meant careers for artists and support for important artistic institutions threatened by the march of events. But more important were the powers and responsibilities attaching to the spending of this revenue, and if these were reasonably exercised and faithfully discharged, the controlling body could not but acquire a high prestige. On the background of recreative entertainment, not less necessary to the community here than in America, there grew up a veritable cultural mission.

MUSIC

Music, naturally, was the field in which this first took effect. Masses of the population to whom great music had been practically inaccessible made its acquaintance, and the errand-boy whistling his Bach theme became a symbol not of the vulgarisation of Bach, nor of the conversion of the unmusical, but of the fact that he who had ears to hear would not henceforth lack opportunity.

It cannot be said that the artistic world was quick to perceive this, the real significance of the errand-boy (though there were

some conspicuous exceptions even in the early days). It preferred, naturally perhaps, to regard broadcasting as something inevitable, but profoundly regrettable. An important factor in its conversion was the consistent stress laid on artistic requirements in the B.B.C.'s engineering practice and researches—a matter, incidentally, in which British broadcasting may claim to have led the world.* It is largely as a result of this that broadcasting has come to occupy its proper place in the music lover's outlook.

As to the choice and execution of the music itself, of whatever genre, practice is governed by three main principles: (*a*) the different kinds of audiences must be satisfied; (*b*) the music must be, in each kind, the best; (*c*) standards of performance must, in each kind, be as high as possible. With regard to (*a*) the chief point to note is that, although over the week, or the evening, "something for everybody" is the ideal, this is sought for not by making particular musical programmes serve general purposes, but by treating each as an artistic entity addressed to a definite class of listener, the number of such programmes being governed more or less by the estimated proportions of the different classes among listeners. As to (*b*) and (*c*), the listener must judge as to whether the standards have been attained; but allusion may be permitted to the fact that once the broadcaster assumes responsibility, as he must in practice, for the quality of performance (as distinct from transmission and the selection of works), he is necessarily led to form his own organisations for most of the ensemble work in each category. Hence the B.B.C. Symphony Orchestra of 114 players, subdivisible into various combinations: the B.B.C. Theatre Orchestra of 24; the Wireless Military Band of 36; the B.B.C. Dance Orchestra; the B.B.C. Chorus of 230 amateurs; and the panel of professional singers known as the Wireless Chorus, with the Wireless Singers as its nucleus. This policy of course does not exclude the engagement of outside combinations of all sizes from symphony orchestra to light trio; in one branch of music at least—namely, opera—studio performances have become definitely less numerous than relays from Covent Garden and elsewhere. On the other hand, there are several valid reasons for some of the above B.B.C. musical

* As an instance, the B.B.C. was the first broadcasting organisation to replace engineers by musicians for "controlling" music.

organisations giving public performances as incidental to the production of the broadcasts.

DRAMA AND VAUDEVILLE

The case of broadcast drama and vaudeville is more complicated. In music, taste in selecting works and executants, and faithfulness in transmitting the art as it stands, were requirements that, however difficult to meet, were obvious, and success was bound to confer prestige. In "Productions," on the contrary, the old art-forms of the stage proved almost completely inapplicable to the new medium, and a fresh start had to be made. This fresh start involved on the one hand the encouragement of original writing for the microphone and the thoroughgoing adaptation of stories, novels, and stage plays, and on the other the development of a peculiar technique of presentation. On the creative side, considerable strides have been made in this country in the last few years, but broadcast drama has not yet, in general, attracted playwrights with established stage reputations. One consequence of this is the appearance in the B.B.C. programmes of a fairly large number of translations of the work of foreign radio-dramatists. On the side of presentation, on the contrary, British practice is probably the most advanced in the world. Yet these advances have in their turn brought new dangers. At one stage of development, experiments with the machinery of the medium (dramatic control panel, multiple-studio technique and, at an earlier stage, realism in noise effects) occupied all the ingenuity of the dramatic producer. But this stage was as valuable as it was perilous, and happily it was realised in time that the first essential in a broadcast drama is simplicity and that the technique of production must be the servant, never the master, of the material which is to be presented.

Still more difficult has been, and is, the problem of vaudeville. Verbal wit, alone and unsupported, has never greatly appealed to British audiences, and broadcasting cannot transmit to the listener the violent and irresistible appeal that devices such as the false nose, the slipping trousers, the crushed top hat, or the upset chair, possess for the eye, nor yet the grace or the cleverness of dancing. Further, of all artists, comedians probably most need the stimulus of the crowded hall, for which the

“studio audience” is a poor substitute. Lastly, a great deal of humorous material that is accepted readily enough in the music-hall is out of place as listened to in the home. In the presence of such difficulties, all that variety of items, ingenuity of presentation, and the introduction of celebrities and novelties, can do, scarcely alters the fact that broadcasting is not the ideal medium for the comedian. Here too, then, the future depends on the development of an art peculiar to broadcasting, and this in its turn depends on the discovery of creative writers and artists suited to the purpose.

THE CHILDREN'S HOUR

The Children's Hour was in existence before the B.B.C., which took up and developed something already initiated in the earliest experimental broadcasting from Writtle and elsewhere. The institution is, of course, immemorially old; the “pause in the day's occupations known as the Children's Hour,” as Longfellow puts it, when between tea-time and bed-time mothers read, sang, and told tales to the children, has a character of its own which broadcasting was bound to recognise and to which it was equally bound to try to make its contribution. Naturally, therefore, the Children's Hour programme has changed little since the beginning. Its ingredients were, and are, quiet and recreative amusement, the presentation of beauty in music, drama, and poetry, the discreet and agreeable introduction of a little information and an occasional precept. It possesses no form other than that of its own nature; its success hinges chiefly on the temperamental suitability of those who manage it and perform in it; and the reality of its appeal to boys and girls is demonstrated by the fact that some eighty thousand children are enrolled in the various “Radio Circles” of the country.

TALKS

The other great function of broadcasting *vis-à-vis* the public—namely, that of providing the informative, educative, and like services comprised under the label of “the spoken word”—did not emerge so definitely at first, although visions of the future were present in some minds from the outset. Certainly there were services, such as news, critiques, and religious broadcasting, which came into existence almost as soon as the enter-

tainment programmes * and won immediate appreciation. But educational and informative broadcasting in their earliest phases were modest tentatives, yielding some positive and much negative experience, and only very gradually engaging the sympathies and co-operation of eminent individuals as studio speakers.† And the (more or less mythical) professor discoursing on earthworms became a popular symbol of this side of broadcasting no less than the Bach errand-boy of the other. The part of the spoken-word programme that was probably most generally appreciated was "the news," with its associated running commentaries and eye-witness accounts, but in this domain progress was restricted throughout the existence of the Company by the conditions imposed in the licence. By 1927, however, a new and genuinely bilateral agreement was made with the news agencies and associated interests.

Another difficulty of the early years was the prohibition of talks on controversial subjects; this too was eventually removed, but in the meantime an event had occurred that was decisive of the future prestige of broadcasting.

During the critical days of the General Strike in 1926 the B.B.C. was to all intents and purposes the sole means whereby the community was kept informed at frequent intervals of the march of events. The service was not commandeered by the Government—as it could have been under the terms of the licence—but was requested to continue operations in its own name, and this fact placed upon the Company (still, be it remembered, a nominally commercial organisation) a very grave responsibility, on the one hand towards the authorities who were, for the moment, endowed with dictatorial powers, and on the other hand towards the public, who trusted to the fairness of the B.B.C. Its discharge of this responsibility was in most quarters regarded as successful. And henceforth there was no question in anyone's mind as to the importance of the broadcast word as a social factor. In the first place, the universality of the medium was proved. Secondly, the reactivity

* News bulletins and religious broadcasting from December, 1922; critiques from June, 1923.

† Sir Oliver Lodge, February 20th, 1923; Lord Birkenhead, May 1st, 1923; H.R.H. Princess Alice, Countess of Athlone, May 2nd; the Archbishop of Canterbury, December 31st, etc. Outside broadcasts of important public speeches began in the autumn of that year.



"SAVOY HILL" DURING THE GENERAL STRIKE OF 1926
when the public, generally, first recognised the national importance of broadcasting

of the public was tested as the former somewhat jejune news service could never have tested it. Further, it was shown that the divorce of "news" and "talks" was unnatural and that broadcasting could not give full social value until these were correlated, which was impossible while the restrictions on news and controversy remained in force. It was this experience chiefly that added final weight to the recommendations of the Crawford Committee that the constitutional position of the service should be placed beyond cavil, that the news service should be expanded and that controversial topics should be admitted under proper guarantees of fairness.

Such advances took time to achieve, but the subsequent history of the various departments of the Talks branch is one of a continuous development in the direction pointed by these experiences, and of increasing public support for that development. As landmarks in its course may be noted the removal of the ban on controversy in March 1928 and the announcement of the War Loan conversion simultaneously, and in identical terms, in the House of Commons and at the microphone in June 1932. Not datable enough to be called a landmark, but unmistakable in its moral, is the fact that the spokesmen of great political parties, speaking as heads of these parties, are now willing and even anxious to figure in the Talks programme, while some independent statesmen have come to consider that a denial of opportunity to broadcast on political matters is tantamount to the suppression of free speech. And if so much has become possible in a field of such passionate actuality as politics, it is not surprising that more has been achieved in fields just as real and just as contentious, but admitting of more prolonged preparation of the ground. In these fields (of which the "Points of View" and "Science and Religion" talks may be taken as typical) broadcasting can render some of its most important services to the community; but service is freedom and *vice versa*. Freedom has not been attained without incurring the attacks of those who fear free speech; nor, on the other hand, has prudence in its exercise failed to evoke criticism from those of the opposite tendency. Apart from limitations inherent in the nature of the medium, the B.B.C. cherishes the ambition of obtaining still greater freedom at the microphone. But it must be remembered that broadcasting is still serving its apprenticeship, and in this

domain, unlike that of art, an experiment is liable to create a precedent. To be too far ahead of public opinion may be just as wrong as to lag too far behind it.

BROADCASTS TO SCHOOLS

Problems of a different kind were presented by the more strictly educational work of broadcasting to schools and to adult students. The chief question, especially in the case of schools, was of fitting broadcasting into the general educational system, and the answer, or rather the answers, were only found by the process of trial and error.* The landmarks in the process, in the case of schools, were the loan in 1924 of an official of the Board of Education to study and assist school broadcasting, the detailed and critical investigation in 1927 of results in Kent (selected as a test county), and the appointment in 1928 of a Central Council for School Broadcasting drawn from national and local Education Authorities and from bodies representative of the teaching profession, with some nominated members chosen by the B.B.C. The first term of office of this Council expired recently, and its report made on that occasion constitutes a review of experience and an estimate of possibilities which all interested in the subject of education should read. If a generalisation from this report were permitted, it would be that achievement has been considerable, and that definite functions have been found for broadcasting in school education, but that many local authorities and teachers are still unconvinced and unwilling, especially in present conditions, to spend money on equipment. Thus, while qualitatively it can be claimed that B.B.C. school broadcasting—the first in the world—is at least as good and as well organised as any, quantitatively it is received by a lower percentage of schools than are its equivalents in Germany and the United States.

ADULT EDUCATION

As applied to broadcasting, the term “adult education” is difficult to define. On the one hand, every talk, and even item

* The first broadcast definitely addressed to schools was probably that by Sir Walford Davies in April, 1924, but French lessons given by M. Stéphan had begun two months earlier.

of news, that is of more than passing interest, is informative, "educative" in a wide sense, and, on the other, the broadcasting medium is only partly adaptable to the handling of classroom subjects, and wholly unsuited to the classroom manner. These limits are obviously so wide that broadcast adult education has always interlocked with general talks policy. Very roughly it may be said that its business has been to look after the "cultural," and that of general talks to provide for the "actuality" side, but even this distinction breaks down in individual instances. But a fixed point is provided by the existence of the Central Council for Broadcast Adult Education. This was formed at the end of 1927, under the chairmanship first of Lord Sankey (afterwards Lord Chancellor) and now of the Archbishop of York, and its membership is drawn from various bodies representing the public authorities, the universities and the voluntary adult educational movement, with in addition a number of "nominated" members chosen by the B.B.C. as experts in particular fields. The Council advises as to programme content and speakers, but its chief work lies in the organisation of the listening end, in particular the study-groups which are springing up in all parts of the country. Hence within the ensemble of informative talks, adult educational broadcasts may be correctly (but not very helpfully) defined as those transmissions which in content and form are more particularly designed for the needs of adult study-groups.

SPECIAL SERVICES

Space allows of no more than an allusion to the time signals, weather forecasts, S.O.S. messages and communiqués of various kinds, which constitute a group of services that the public nowadays almost takes for granted, so much so that its reactions manifest themselves chiefly when the procedure is modified in some way or another. Not an unimportant public service of this kind is the weekly appeal on Sunday evenings for some charity, in the administration of which the B.B.C. is helped by an Appeals Advisory Committee.

RELIGIOUS BROADCASTING

Religious broadcasting, as already mentioned, began in the first months of the Company's existence, and experience has

justified and confirmed the view held even thus early as to its importance in the ensemble of service that broadcasting has to render to the community. The simple religious address of those first days soon developed into the Studio Service; this again was supplemented by the outside broadcasts of services from churches. To these were added in the course of time, first a mid-week service and then a short daily morning service; other services and religious programmes, occasional or regular, find their places in the schedule; and lastly, there is the Epilogue, a form rather of meditation than of service, by which the Sunday evening's programme is closed on a note in harmony with the day. Such, in brief, is the record, but there are few departments of the B.B.C.'s work in which on the one hand so many obstacles have been met, and on the other the public response is so clear and categorical. No useful purpose would be served by attempting any description of the former here; it will suffice to say that each of the Christian churches (subject of course to the condition that it possesses a large membership) now has, and welcomes, its opportunities of conducting services and preaching to the nation (or the "region" as the case may be), either from the studio or from its own places of worship, and that the Religious Advisory Committees have reached a considerable measure of practical agreement as to what constitutes a non-sectarian Christianity that can be preached to a Christian country of many confessions. As to the public response, the expression "categorical" is strictly justified, for—apart from the special case of the Children's Hour—no part of the programme evokes direct response from so many listeners.

Here perhaps is the most appropriate place for a word as to what is called the "Sunday policy" of the B.B.C. The bases of that policy are (*a*) dedication of certain Sunday hours to religious broadcasts, (*b*) abstention from broadcasting, religious or other, during normal church hours, and (*c*) the preservation, so far as broadcasting can operate to preserve it, of the character of the "British Sunday." The policy pursued under each of these headings has encountered strong opposition, and, equally, has met with strong support. It is probably common ground that, while many would like Sunday to be more secular, few want it to be more noisy; but beyond that lies an infinity of nuances of opinion, in the midst of which the B.B.C. can but

pursue a course dictated by its view of its public responsibility. Inspection of a typical Sunday programme of to-day will sufficiently indicate what that course is—and, incidentally, may serve to dispel certain hitherto accepted illusions.

PROGRAMMES IN GENERAL

The components of the broadcast programme have now been reviewed individually. It remains to say something as to their integration in a general structure. The work of “programmes” may be broadly classified as consisting in (1) building, (2) organisation, and (3) presentation.

Programme-building as a definite activity had to be born of experience. Each station at first made its own programmes according to its resources, its ideas of what would suit its own conditions, and the experience of other stations. Gradually ideas became more and more definite, until, with the opening of the second Daventry transmitter, 5GB, in 1927, it became possible and necessary for each programme to be planned with careful regard to the other programmes which would be executed simultaneously with it. This, however, was only a beginning, and, though the provision of alternatives is now general, programme-building is still (perhaps always will be) far more of an art than an exact science. Experience has, nevertheless, disclosed some fixed points, and these may be briefly set forth here:—

(1) There is no such thing as the “mean listener”; the public falls into many different groups, each consisting at any given moment of persons of like taste and mood. Therefore (*a*) the day’s programme should contain “something for everyone,” and (*b*) in the scheme for a week or longer each genre should be represented proportionately to its intrinsic importance and the strength of its following.

(2) Alternatives imply, hour for hour, contrasted matter. Even though the National Programme is not itself primarily built to be a continuous artistic unit, it has sufficient unity to make it necessary for the other, or Regional, programme to be more discontinuous, as read from top to bottom; the explanation of a Regional item lies, to some extent, in the item parallel to it on the other programme. But this idea of contrast has itself evolved with experience. The most obvious contrasts, such

as that between talk and music, are now somewhat discredited ; a light orchestral concert, for instance, may be a better alternative to chamber music than a serious talk would be ; talks, too, can contrast with talks. Moreover, extremes do not contrast well ; an extreme should be balanced by a mean.

The reconciliation and combination of these two principles obviously depend on the flair and experience of the programme-builder, who, in addition, has to take into account the fixity of outside-broadcast dates and certain long-term arrangements made by the Corporation itself (*e.g.* the symphony concerts).

Lastly, as to presentation. Here, as is inevitable and most desirable in a growing art, there have always been considerable differences of opinion. At one end of the scale is the American type of announcer, who is, as it were, the active and pervading host of a party to which artistic guests contribute, and at the other the correct and impersonal reader of weather forecasts. In between, we have the impressive narrator and the not too obtrusive *compère*. The B.B.C., for its part, adopted, and has held to, a policy of strictly impersonal announcing. But even within the limits of this policy some flexibility is possible and is achieved. The announcing personnel is not all of one type, and persons other than the announcers themselves (*e.g.* a dramatic producer) may, and do in varying degrees, directly participate in "presentation." The present procedure is regarded as more or less satisfactory, but not ideal ; yet, with the wide range of material that comes up for presentation to the public, it has always been, and possibly always will be, difficult to find a single formula to cover all needs.

PUBLIC RELATIONS

So far it is the development of the broadcasting service itself that has been considered, more or less from an internal standpoint. Relations with the Government have been necessarily touched upon to some extent already. They are not capable of exact definition, but the situation is simpler to-day than it was in the days of the Company. According to the recommendations of the Crawford Committee, the Corporation was established with considerable circumstance of responsibility and autonomy. Obviously the B.B.C. is not a Government Department, nor under the Government. Frequently questions in

Parliament with respect to some detail of its procedure have been declined on the score that such are within the Corporation's jurisdiction. It is conceivable, however, that questions of major policy importance might, in certain circumstances, be debated in the House, and a decision conveyed to the Corporation. This is, however, most unlikely to happen, except in the improbable event of the Corporation misbehaving itself either negatively or positively. While there is obviously, however, the possibility of public control on a major issue, neither Parliament nor the Government would interfere in internal matters of management and in the day to day administration of the Service. Although a clause in the licence admits of the Postmaster-General even instructing the Corporation to do or not to do a specific thing, no Government Department has at any time endeavoured to dictate to the B.B.C., nor so to act as if the B.B.C. would automatically follow its advice.

THE ENTERTAINMENT INDUSTRY

On the existing entertainment world the impact of the newcomer was bound to be very disturbing. It was not clear at the outset whether broadcasting would supplant or would supplement public entertainment, or whether it would develop art-forms of its own or would depend on those already in being. Short of experience, it was impossible to assess in money terms either fair profits for those for whom broadcasting represented an extension of market, or reasonable indemnity for those whose interests might be damaged. Moreover, there was the ever-growing gramophone industry to complicate any picture that might be formed of the situation.

From the point of view of promoters and managers there were two problems: that of the studio performance and that of the "outside broadcast" microphone placed in their concert halls and theatres. Both, of course, kept people at home who might have attended public performances, but it was only on the second that they could expect to have a direct influence. Their attitude to outside broadcasts was therefore determined largely by their view of the publicity value of broadcasting to themselves, and for this view data were lacking. Thus for several years things remained indefinite, and it was only in 1925 that the first real crisis occurred in which promoters—in this case the

Theatre Managers' Association—acted as a body in opposition to the claims of broadcasting. The agreement then arrived at, not without difficulty, was the first of a number of settlements of this kind. It cannot of course be said that such conflicts of interest can ever be fundamentally settled (otherwise than by overriding legislation, as in Italy and Russia), but amicable compromises must suffice in the workaday world, and the situation to-day, as the programmes themselves sufficiently indicate, is substantially one of co-operation between realists, each meeting, so far as he can, the requirements of the other.

COPYRIGHT

In the case of composers and authors the attitude taken towards broadcasting was similarly and inevitably ambiguous. On the one hand, many disliked it on artistic grounds; these grounds have been removed little by little as the technique of transmission and reception has improved, until now only a very few "die-hards" remain aloof. The majority, on the other hand, were concerned simply with the protection of their copyrights and the negotiation of profitable fees. Although it was not until 1927 that occasion arose for the High Court to declare that broadcasting constitutes a "public performance," dealings with authors and composers had throughout been based on this common-sense and equitable principle. The great majority of authors and composers are grouped for purposes of copyright negotiations in two societies, the Authors' Society and the Performing Right Society; the Music Publishers' Association also comes into the picture. With these bodies agreements were made in 1923, and these have been revised from time to time. Settlement of performing right claims is thus in the main a routine matter; though, as not all authors and composers are members of the societies, the right to perform certain music (notably operas and cantatas) has to be negotiated from case to case. It should be added, however, that in this field at any rate, problems multiply rather than simplify themselves; no sooner was the relation of composer to broadcaster fairly well settled than the relation of both, together and severally, towards the listener began to come to the fore. For instance, what commercial use, if any, may the listener make of what he hears? Are loudspeakers in public

therefore, the progress that has been made in cordial relations with the artists has been an evolution of outlook rather than a sequence of facts, and it is therefore impossible here to give an account of it. But it may be summarised as a process of adjustment on the artists' side, due to their realisation of the position of broadcasting in the social scheme and their final and natural acceptance of its artistic worthiness.

THE CONCERT INDUSTRY

More definite are the relations with artists in their corporate groupings, as orchestras, opera companies, etc. on the one hand, and as trade unionists on the other. In the first the important stages are easily recorded, though they were not so easily achieved. The first was the beginning, in January 1923, of the association with the British National Opera Company, which lasted during the greater part of the ten years under review. The first British performance of "Kitesh" staged by the B.B.C. at Covent Garden in March 1926, was a turning-point rather in the musical history of the B.B.C. itself than in relations with other musical organisations, but the formation of the National Orchestra of Wales, and still more the undertaking of the famous Queen's Hall Promenade Concerts, which were threatened with extinction, amounted to nothing less than a recognition that the B.B.C. had become the principal focus of organised musical effort in Britain. Henceforth recourse to the B.B.C. became the obvious expedient of musical organisations, which, however fine their record of past achievement, were falling upon evil days. The idea of an obligation to indemnify thus gradually gave way to that of a responsibility for supporting. This patronage exists in different nuances, ranging from fairly complete control to something hardly more than liaison, but its details cannot and need not be catalogued here; its latest manifestation took the form of a Governmental subsidy to the Covent Garden Opera Syndicate to enable it, *inter alia*, to meet B.B.C. requirements at the B.B.C. price. The process has not, however, been necessary in the case of drama and vaudeville; on the one hand, both these arts are developing forms special to broadcasting, which therefore needs the ordinary product less, and on the other, the theatre and the music hall had retained their hold on the British public to a far

greater extent than had symphonic and chamber music. The choral singing movement has always been on a different footing; it is essentially amateur, and its roots lie in the people themselves, and the rôle of the B.B.C. has been one of stimulation and heightening of standards, and not of assumption of responsibilities. The "National" (now called the "B.B.C.") Chorus illustrates this fact. Formed in 1928, it is selected from the best and most enthusiastic members of the choral societies available in London.

RELATIONS WITH THE PRESS

In the 1930 Year-Book the attitude of the Press towards broadcasting was characterised thus, "It cannot be described as ever having been cordial, although it has fluctuated between definite hostility and mere watchfulness." This will suffice as a summary of affairs up to that date, and might with modifications hold good to-day. Realist considerations, however, are weighing more and more with the Press in proportion as experience demonstrates the importance, and also the special nature, of the place that broadcasting has come to occupy in society—and incidentally the danger to Press interests that would be involved in changing over from public-service to sponsored broadcasting. The recent tendency therefore is for hostility of the Press on its own behalf to give way to active, but by no means invariably informed and responsible, criticism on behalf of the listener's interests as it sees them.

THE WIRELESS TRADE

A few words as to relations with the wireless trade. The old Company was founded by the trade and its interests naturally received due attention from the Board which was drawn from it. (The word "due" must be understood as an acknowledgment of its public spirit, for under the commercial constitution it might readily have happened that undue regard was paid to these interests.) When this direct representation ceased with the establishment of the Corporation, an advisory committee was set up to represent wireless interests, and certain officials of the Corporation were designated to maintain regular touch with the manufacturers, traders, and the wireless amateurs.

THE PUBLIC

Meantime the B.B.C. had taken measures of its own to obtain touch with the public. Apart altogether from the correspondence which, valuable as it is, has never even begun to rival the American "fan mail" in quantity, and the innumerable personal contacts that the Corporation's officials make from day to day with callers, critics, public servants, Members of Parliament, Municipal Authorities, deputations, etc., the B.B.C.'s own publications form the chief and most necessary link with the listener. *The Radio Times* (founded in October 1923) reaches roughly one in every two listeners. It seems, therefore, to be as necessary to the listener as it is to the Corporation. A somewhat unexpected consequence of the popularity of this and other B.B.C. publications has been to give the revenue a very necessary background for expenditure on developments that in a commercial concern would be met out of capital. Briefly, of the listener's 10s. about 5s. is retained by the government on various accounts and about 5s. goes in programmes, routine engineering services, and administration. Now, approximately 1s. per listener is needed for capital expenditure on development, and this is balanced by the 1s. profit earned by publications. *World-Radio* (founded in 1926) provides the principal foreign programmes in summary form as well as technical articles carrying the authority of the B.B.C. In the current year it has become the official organ of the Empire Broadcasting Service. *The Listener*, the main object of which is to preserve the most important of the broadcast talks in a permanent form, has taken its place among the serious weekly reviews, differing mainly from them in its catholicity of subject, its exclusion of party politics, and its inclusion of pictorial illustration of a high standard. Lastly, series of pamphlets are published as auxiliaries to the broadcast programmes, the School and the Talks pamphlets being the most important.

So far as to the public in general. To keep touch with the public under its various special aspects and its special groupings—the Lancashireman, the Scotsman, the Welshman and the Ulsterman as such, the devotees of sport and those of symphony, the religious communities, the political movements, the "good causes," the followers of theatre and film, the

reader, the student—a fairly complete but quite fluid and personal system of relationships has been built up by the Head Office of the B.B.C. and the Regional and other Station Directors. Some of these relationships, however, have taken concrete form as Advisory Committees, of which the Religious and the Music are the most important. (The semi-executive educational Councils have been mentioned already.) And here perhaps is the most appropriate place for a brief and general statement of the attitude that has been taken by the Corporation towards nationalisms, localisms, and sectional and minority interests.

NATIONAL v. SECTIONAL INTERESTS

The first principle is that the unit which it is sought to serve is Great Britain and Northern Ireland. Hence, on the one hand, no attempt has ever been made to attract a Continental audience (although in practice British stations, notably Daven-try 5XX, have a very considerable following abroad). And, on the other hand, engineering and programme policy alike have set themselves to link all transmitters into one system and to weave all programme sources into one fabric. The first problem therefore is basically one of "coverage." The ideal will not be reached until coverage is 100%; it approximates to this figure already, but does not reach it. It is an illustration of the difficulties of broadcasting administration that some local discontents arise because the locality has an inadequate share in the national system, while others are due to alleged want of regard to local interests and tastes in the programmes, and yet others are a mixture of the two. But coverage is in itself a technical problem, hard to solve indeed but self-contained once the unit of service has been settled. It was chiefly because national coverage was inadequate in the early days that local stations assumed such importance and became objects and symbols of local pride and patriotism as they did. In step with the gradual nationalisation of the network, local autonomy has declined, and the improvement of "coverage" is seen to lie in improving the system as a whole, and not in adding parts to it.

The second principle is that the general needs of the community come before the sectional. This is easy enough to implement so far as certain general services and events and items of obvious national importance are concerned.

The third principle is that of impartiality and balance, with which must go a realist as well as an idealist judgment of values. Something has already been said as to these factors in connection with practical relations, but one has to live within the machine itself to realise how numerous are the organised causes and interests within our national community. To these, in every instance, quantitative criticism needs to be applied as well as qualitative—in other words, points of view which appeal to hundreds must usually be denied microphone facilities in favour of those whose probable audience is in tens or hundreds of thousands. For every concession creates precedents, every controversial utterance must if possible have its answer, and (what is more) every actual or alleged “boost” of any interest with which others compete gives rise to claims on their part for like opportunities. But quantitative criteria are not the only ones. Deliberately, little or no allusion has been made in this article to social and cultural ideals; it is sufficiently well known that they exist and that ideals are a necessary concomitant of responsibilities as serious as those of a national broadcasting service. And whatever the ideal happens to be, it must determine qualitative valuation. As often as not qualitative valuations operate not as a reinforcement but as a check to quantitative, and *vice versa*, and the practical working outcome is the familiar broadcasting rule “always try to give the public something a little better than what it thinks it wants.”

INTERNATIONAL RELATIONS

If another aspect of broadcasting needed to be looked at through idealist eyes it was the international. For practical purposes, international broadcasting has not, until recently, come to be world-wide. As understood from 1923 to 1930 it meant European regional broadcasting, and the problem of reconciling general and particular, difficult enough within one national system, is incomparably more so when each component is endowed with full sovereign powers and has at its back a long history of strife and self-defence, and when, further, different languages and different political régimes and different outlooks complicate the relations. But technical necessities, the interference of a station in country A with stations in B.C.D. . . ., imposed co-operation as early as the end of 1924, and in the

spring of 1925 a European Conference held at Savoy Hill established the International Broadcasting Union (U.I.R.). Over seven years this organisation can show a record of growing effectiveness; at the time of writing its semi-official status in technical matters is recognised by the Governments of Europe, and its advice and co-operation are being sought by various organs of the League of Nations in matters appertaining to international relationships generally. As between the broadcasters themselves the Union has succeeded in setting up relations of camaraderie and co-operation that no one would have dared hope for at the outset, linkages that would be still more fruitful but for the wave of suspicious nationalism that is passing over Europe. Line and wireless linkage for local relaying are developing at a rapid rate in all countries.

The chief landmark in this regard was the world broadcast of the opening of the Naval Conference in January 1930, in which some 242 stations all over the world participated.

From this point onward, the story is one of more and more frequent liaisons and relays. It is recorded elsewhere that one month in 1932 witnessed no less than one hundred cases of international relays.

Side by side with transoceanic relaying there is growing up a distinct, yet cognate, service of transoceanic broadcasting for direct reception by the short-wave listener. In this field the B.B.C. was an early experimenter, but until the current year delays, not of its making, have prevented its passage from the experimental to the "service" stage. The subject of Empire broadcasting—certainly the most important development during the current year—is dealt with under the various aspects later in this book. Here it may simply be put on record that the building of the new Daventry station, with its array of transmitters, waves, and directional and omni-directional aerials, is practically complete. By the time these lines appear in print, the phase of "testing on the air" will have begun. Is it inappropriate in closing a review of ten years of broadcasting on the national plane, to suggest that the next ten years may witness at least a comparable development on the international?



Barratts

GEORGE ROBEY IN THE STUDIO AT MARCONI HOUSE

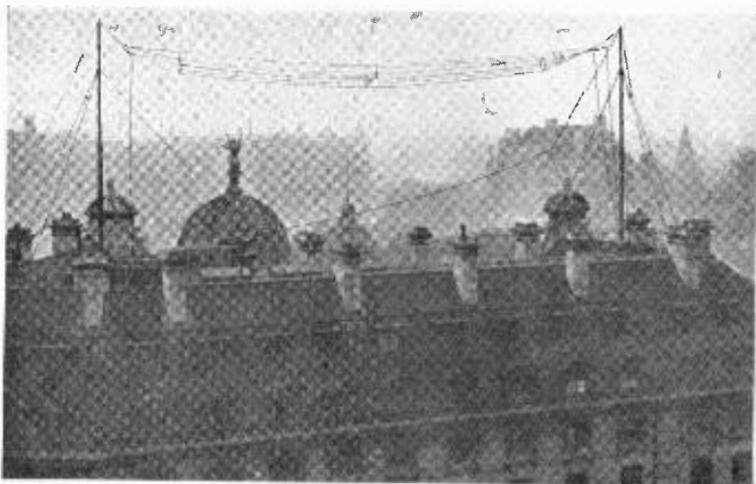
TEN YEARS OF TECHNICAL PROGRESS

ON THE introduction of regular broadcasting in Great Britain comparatively little was known as to the power required to cover a definite area at sufficient strength for regular reception by the public. Previous experience was mainly concerned with commercial and service stations, operated by skilled personnel. In general it may be said that a vastly greater power has been found to be necessary than was originally estimated.

THE SYSTEM OF DISTRIBUTION

The first scheme of distribution consisted of eight so-called main stations, those at London, Birmingham, Manchester, Newcastle, Glasgow, Aberdeen, Cardiff, and Bournemouth. The transmitter in each case supplied approximately 1 kW to the aerial, and the effective service range was between 20 and 30 miles, varying with the nature of the country and the wavelength used. These eight stations, put into operation between November 1922 and October 1923, provided an adequate service for the thickly populated districts in which they were situated, but it was soon found that there were several districts almost equally dense in population, which were entirely outside the area in which good reception could be obtained on a regular day or night basis.

At that time most of the programmes were supplied locally from studios and points situated near to the transmitters. It was not considered practicable or economic to introduce a large number of additional main stations each originating its own programme, and tests were made to see whether it would be possible to extend the supply of programmes to additional stations by means of telephone line connections with existing centres. These tests were successful, and resulted in the establishment of eleven relay stations, working on low power (approximately 12 kW in the aerial), situated in Sheffield, Plymouth, Edinburgh, Liverpool, Leeds, Bradford, Hull, Nottingham, Dundee, Stoke-on-Trent and Swansea. Each of these cities was equipped with a studio so that the origination of programmes locally was possible. These stations were put into operation between November 1923 and December 1924.



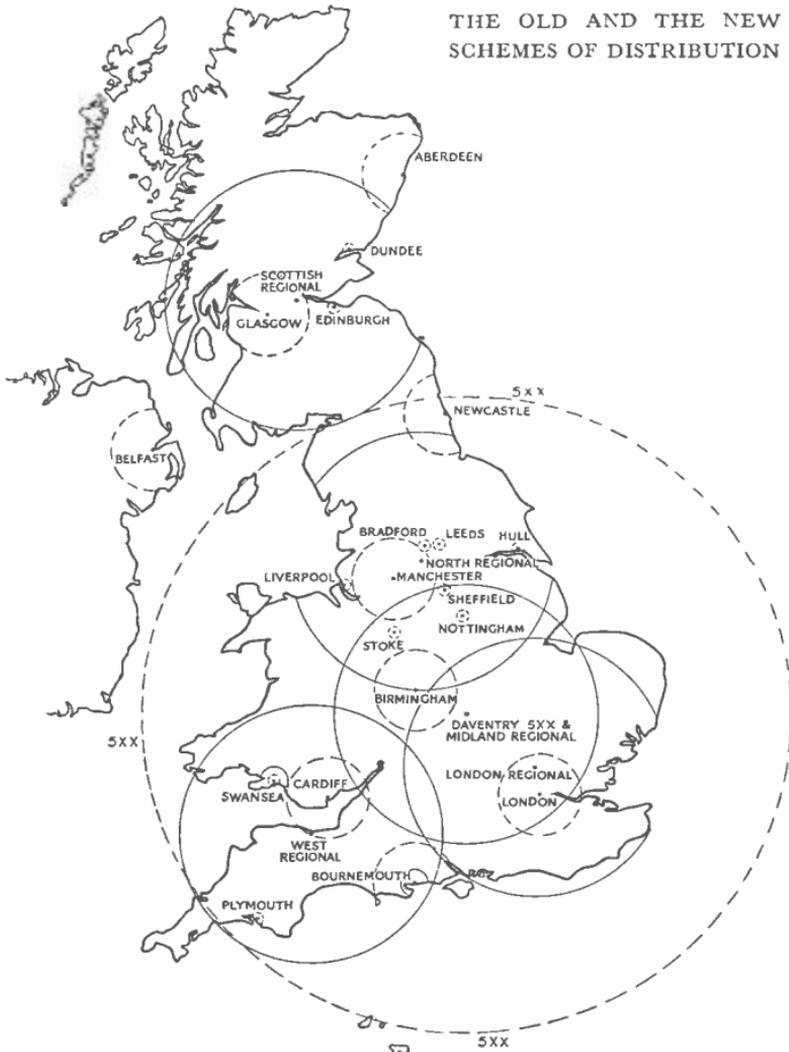
Barratts

THE ORIGINAL LONDON STATION, 2LO, AT MARCONI HOUSE

However, during 1924 a demand arose for a service for the country districts and towns not served by main or relay stations. Experiments were therefore begun to see whether successful broadcasting could be carried out on a "long" wavelength, which by the use of high power could be made to serve a much greater area than was possible on the "medium" (300-500 metres) band of wavelengths then in use. Accordingly, an experimental station, working on 1600 metres, was established in July 1924 at the Chelmsford works of the Marconi Company, the power being approximately 15 kW in the aerial. There was soon no doubt of the success of this experiment, and the Chelmsford Station was replaced in July 1925 by a permanent long-wave high-power station, known as 5XX, at Borough Hill, near Daventry. This station employed the same wavelength, with a power in the aerial of 25 kW. In the meanwhile it had been decided to serve Northern Ireland by a ninth main station, working on a medium wave and a power of 1 kW; this was situated in Belfast, and was opened in September 1924.

In April 1925, the London Station was moved from Marconi House to the roof of Selfridge's store in Oxford Street, and the power increased to 2 kW. Thus at the end of 1925 the service

THE OLD AND THE NEW SCHEMES OF DISTRIBUTION



The old scheme of distribution is shown in dotted outline.

The new scheme (except the new Daventry, 5XX) is shown in full outline.

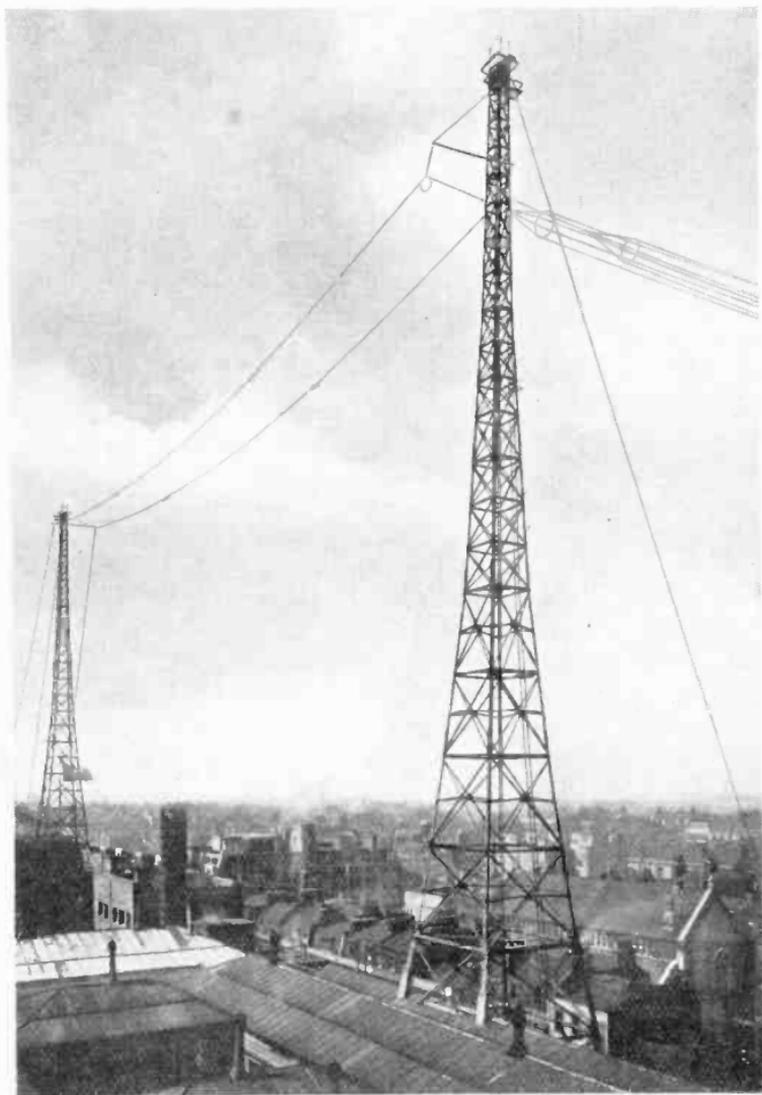
It is anticipated that the new Daventry will provide a service to the whole of the British Isles under normal conditions.

The circles on the above map are only comparative representations of the service areas of the various transmitters, since in practice these areas never turn out to be true circles, as the strength of the transmission varies according to the type of country over which it has to travel.

was given by eight main stations of 1 kW, and one of 2 kW, eleven relay stations of approximately 12 kW, and a long-wave high-power station of 25 kW.

As far back as 1924 it became evident that the number of wavelengths available for broadcasting throughout Europe would be insufficient for the needs of all countries, and in consequence during that year the idea arose that it might be possible to work several stations on a single wavelength. Experiments to that end were made in 1925, and during 1926 four of the relay stations were adapted to this method of working, but the accuracy maintained by each station was only of the order of 100–200 parts in a million, which resulted in the area served by each station being very considerably curtailed. During 1927 and 1928 further experiments were made with comparatively elaborate apparatus, capable of maintaining the frequency of each station accurate to within approximately 10–15 parts in a million, and with this more satisfactory standard of common-wave working having been reached, ten low-power stations were eventually put to work on the same wavelength.

In 1925, also, a scheme was evolved for a system of regional broadcasting by high-power stations situated in the more populous districts. The proposal was to erect high-power stations near London, in the Midlands, the industrial North, the West country, and in Scotland. Each station was to contain two transmitters, sending out two contrasting programmes at sensibly equal strength, so as to make the problem of selection between them as simple as possible from the technical point of view. Some difficulty was experienced in obtaining the Government's agreement to this scheme, but at the beginning of 1926 permission was obtained to erect a high-power medium-wave station at Daventry, which, in conjunction with the long-wave station already in existence there, would give a service of alternative programmes on an experimental basis over a radius of approximately 80 miles. The radius served by the long-wave station was, of course, greater than this, but the limit of the area served by two programmes was determined by the strength of the new station, which became known as 5GB. After successful tests had been made, this station was opened for regular service in August 1927.



THE SECOND 2LO TRANSMITTER, ON THE ROOF OF SELFRIDGE'S
STORE IN OXFORD STREET

At about this time—namely, in June 1927—the B.B.C. appointed a committee, under Dr. W. H. Eccles, F.R.S., to approve, reject, or modify, the scheme of twin regional transmitting stations. In detail the scheme provided for the erection of one station approximately 15 miles north of London, and a similar station in the Pennines between Manchester and Leeds to serve the industrial areas of the North of England. For Scotland a station was to be built between Edinburgh and Glasgow, and to serve the West of England and Wales a fourth station was to be situated on the Somerset coast. The alternative service to the Midlands was to be provided by the two existing Daventry stations.

The committee of experts reported favourably on the scheme, and eventually the Government's permission was obtained to proceed. Construction of the London Station therefore began in July 1928, and the station was put into operation on a single programme basis for public reception in October 1929, and on a dual programme basis in March 1930. This was followed by the station for the North Region, which was fully introduced in July 1931, and that for Scotland in September 1932. It is anticipated at the time of writing that the station for Wales and the West of England will be complete in March 1933.

It was never expected, however, that these five twin stations could cover the whole of the territory served by the B.B.C. with a reliable service, and the scheme allowed for low-power stations at Aberdeen, Newcastle, Bournemouth, and Plymouth. In addition, the Government's permission has now been obtained to increase the power of the long-wave station to approximately 100 kW, in order that the service to the districts falling outside the range of the Regional Stations may be improved. Plans are also in hand for increasing the power of the Belfast Station. Future improvements in the scheme of distribution will depend on developments in the international wavelength situation.

THE WAVELENGTH PROBLEM

It has already been mentioned that in 1924 it became evident that the steady increase of the number of broadcasting stations on the continent of Europe was likely to constitute a grave problem, in the near future, from the point of view of mutual interference.

It was observed that if two stations, each employing a power of the order of only 1 kW, were working on wavelength channels so separated that an audible beat was set up between the carrier waves of the two stations, severe interference resulted, even though the distant station might be a thousand miles away. At that time there was no officially standardised band of wavelengths for broadcasting, the existing International Convention having been drawn up prior to the introduction of broadcasting. In general, the Post Office authorities of the various countries had assigned waves between 200 and 550 metres, with a few stations working between 1000 and 2000 metres, of which the Daventry Station was one; but there was no organisation to regulate these wavelength channels on an international basis. Consequently, the B.B.C. invited the other European broadcasters to a conference in London in March 1925, and the outcome of this was the formation of the International Broadcasting Union. Several further conferences led to an International Plan for the allocation of wavelengths to be used by individual organisations, prepared at Geneva in November 1926, and adopted by at least a majority of organisations responsible for broadcasting in Europe.

This plan met with a considerable measure of success, but it was not adhered to strictly by all countries. At the same time, as progress continued, stations sprung up which were not catered for. In 1927 the International Radiotelegraph Convention of Washington allotted the wavebands of 200-545 metres and 1340-1875 metres for the use of broadcasting stations. Parts of these bands, however, were shared with other services.

In January 1929, a new plan of allocations was prepared by the Union at Brussels, which had as its object the bringing up to date of the original Geneva Plan. This plan also attained some measure of success, but it was not universally adhered to. Consequently, in June 1929, a conference of European Governmental representatives was convened at Prague, and the resulting Prague Plan was eventually agreed to by the majority of Governments. This plan at least prevented chaos developing in the ether owing to the increasing number and power of the stations. The outstanding difficulty at the present time is caused by the fact that there are too few long-wave channels to satisfy the needs of Europe generally. For this and other



THE LARGEST STUDIO AT SAVOY HILL ("NO. 1")

reasons, it is anticipated that there will be a further conference on the same basis as that held at Prague, in the spring of 1933, following on the meeting of the International Radiotelegraph Convention in the autumn of 1932 at Madrid (see p. 309).

STUDIO TECHNIQUE

In parallel with development on the transmission side it has been necessary to develop the design of studios and the apparatus associated with them—namely, microphones, amplifiers, and control systems. When the London Station started regular broadcasting, there was one 20 ft. × 20 ft. studio situated in Marconi House. The next step was a move to Savoy Hill, which permitted the gradual construction of some nine studios, the biggest of which measured 45 ft. × 26 ft. The latest step has been the construction of Broadcasting House, which was complete and in full operation in June 1932. This building contains twenty-two studios, the largest of which, the Concert Hall, measures 106 ft. × 42 ft.

In the early days the practice was to prevent entirely the reflection of sound from the walls of the studio, in order to avoid what was then considered unpleasant reverberation. The presence of this reverberation is now, however, considered essential for good reproduction, and the unpleasantness of the early days was mainly due to deficiencies in microphones and associated apparatus, and in the receiving apparatus used by listeners. Thus, gradually, the amount of sound-absorbing material in studios has been reduced and its acoustic suitability improved, until a stage has been reached to-day which allows of the scientific design of a studio to give equal reverberation time at all the important audio-frequencies, predetermined and arranged to suit the dimensions of the studio and the purpose for which it will be used.

Similar development has also taken place in connection with the whole of the rest of the plant used for broadcasting, which includes speech-input equipment and telephone-line connections (the latter rented from the Post Office), as well as the transmitters themselves.

From the earliest days the B.B.C. has continually laid the greatest stress on high quality of reproduction, and has, in fact, been a pioneer amongst other broadcasting authorities in this

respect. This has entailed the careful control of depth of modulation, to the extent of reducing the strength of reception of stations of given power, as compared with similar stations which modulate more deeply at the expense of quality.

In the provinces, studios and plant have been developed on the same principle. At the present time up to date studios and equipment exist in Manchester and Edinburgh, while studios on modern lines, with entirely new equipment, are in course of construction at Birmingham, Cardiff, Belfast, Glasgow, Leeds, and Bristol. The guiding principle in the design of the whole of the B.B.C. technical plant has been to produce quality which shall make possible the appreciation of the higher forms of music and dramatic art.

TELEVISION

Since 1926 the B.B.C. has taken all practicable steps to make use of modern development in television, and after a long period of entirely experimental transmissions a series of television transmissions on the Baird system has been instituted from the new headquarters at Broadcasting House. This may be described as one step beyond the purely experimental stage. At the same time, every opportunity of improving technique is being taken. Future progress must depend on this.

SHORT-WAVE TRANSMISSIONS

The possibility of supplying broadcast programmes direct to overseas Dominions and Colonies was under consideration as early as 1926, and in November 1927 experimental transmissions were instituted from the Chelmsford Works of the Marconi Company, in order to determine whether the somewhat indifferent quality of reception available from such transmissions was acceptable to listeners overseas. These transmissions met with some success, and resulted in the decision in November 1931 to build a short-wave station (see pp. 275-283) for the transmission of regular programmes to the Dominions and Colonies. Future development will, of course, depend on the success of this station, although the service need no longer be regarded as experimental.

THE B.B.C.'S CONSTITUTION

By LORD ALLEN OF HURWOOD

THE MODERN WORLD is faced by an ever-increasing degree of complexity in all its problems. None the less we can take hope from the fact that science has become our ally. Science has come to our rescue not only as an instrument by which we can solve particular problems, but as a means of enabling us to do our thinking more efficiently.

And so it is that we are developing the capacity of considering ideas more objectively and therefore putting them into practice less dogmatically. We are for instance less fettered than we used to be by the instinct of extreme nationalism, since now we see that it is only by international action that we can solve many of our difficulties. But it is worth remembering that an outlook which has become international from sheer necessity may produce as good or even a healthier state of mind than one which has become so owing to propaganda or moral conviction.

Similarly the necessity of the age in which we live and the speed with which our problems overtake us have compelled us to recognise the value of another idea, namely, that the State may be safely resorted to as an instrument of efficient co-ordination. A conviction arrived at in this way is a better preliminary to the manner in which we use the State than would be mere partisan belief in favour of nationalisation. It means that we employ the State less rigidly and more tentatively. We shall think and act pragmatically instead of dogmatically. Public opinion is now prepared to give experimentalists their head because there is the drive of necessity in the background and because the electors now feel more secure against doctrinaire politics.

At such a critical moment in the development of thought and political practice the constitution of the B.B.C. has claimed our attention. It has provided a bridge over which all sections of opinion have been able to cross without evil consequences into the world of state enterprise, but it has at the same time placed a barrier across the path of doctrinaire advocates of extreme nationalisation. It is especially notable that the

field in which the B.B.C. has to function should be the most delicate of all for state enterprise, for it is concerned with the organisation of propaganda and opinion. If it has been legitimate in the past to fear the hand of the State in straightforward activities such as the organisation of transport, it is certainly legitimate that we should be especially vigilant when the State intervenes in the organisation of propaganda and thought.

The B.B.C. is an instance of a nationally owned and controlled activity. The electors from time to time choose their representatives in Parliament, and Parliament has created a monopoly under the control of a separate Corporation to which a charter has been granted, giving it the rights and responsibilities of broadcasting. These rights are actually defined to the Corporation in the form of a licence from the Postmaster-General, who acts as the representative of the Government, which is in turn dependent upon the authority of Parliament.

It is true that Parliament reserves to itself an ultimate power in case of need to take over the direct control of broadcasting ; and it is also true that authority is taken in the licence whereby the Government can require the Broadcasting Corporation to broadcast anything that a government department desires and abstain from broadcasting anything which the Government of the day, subject to parliamentary control, wishes to prevent. At first sight these powers may seem very complete and formidable, but in accordance with other experience of the working of the British constitution, these rights have rarely been exercised, and in fact the independent authority of the Broadcasting Corporation has been left practically unfettered in the day to day development and control of the function entrusted to it.

We have here a new illustration of the singularly skilful manner in which the British race seems to develop the art of government. The unwritten British constitution, with the King at its head, has grown from stage to stage without logically and rigidly operating its legal powers and rights, and this is exactly what has happened in the case of the new governmental experiment of a nationally owned constitution for broadcasting. Parliament actually retains the ultimate power through the Government to control the B.B.C. in the same way

that the King has theoretical powers in the State ; and yet in neither case has practice permitted a rigid carrying out of a constitutional authority which technically exists.

The Corporation itself is controlled by a Board of Governors, who are nominated for a period of years by the Government of the day. The Governors then appoint a Director-General* to whom is entrusted the executive organisation of broadcasting. And just as the popularly elected Parliament rarely intervenes through its Government to control the Corporation, so the Governors of the Corporation have shown their wisdom in extending wide powers and freedom to the Director-General and his staff in the execution of an approved policy.

The success of such a constitution for broadcasting depends, as does that of the British constitution, upon the theory of a balance of powers in which one element of authority checks the other. The Legislature from which emanates all authority is in both cases the popularly elected Parliament ; the Executive, in the political world, is the government of the day, and in the broadcasting world, the Director-General and his staff. If we may carry the parallel a step further, it may roughly be said that the Judiciary which interprets the law in the body politic, finds its partial equivalent in the Board of Governors of the B.B.C., which stands between the Legislature and the Executive. By this subtle balance of power, interpreted in a truly British manner, authority is ultimately retained by the elector, whilst the value of initiative is secured through the process of delegation from Parliament to the B.B.C. The dead hand of the State is kept in the background, as would not be the case, if the B.B.C. were directly controlled by a government department ; and thus freedom from party political control, the right of free experiment, and the drive of initiative are ensured through the independent position of the Corporation and its staff.

In order to explain the special value of this constitutional experiment, it may be as well to remind ourselves of what in fact consists the nature of broadcasting.

Broadcasting has to provide amusement, and here standards of public taste are involved. It has to distribute information, and

* Except the first Director-General, who was nominated in the Charter.

here questions of variety and impartiality become important. It has to offer instruction and opportunities for discussion, and here the problems of high quality, tolerance, and fair-mindedness are at stake.

What other instrument for the exercise of such responsibility and power could have been found, preferable to the constitution of the B.B.C.?

A commercially-owned newspaper is perhaps the nearest approach to an instrument with similar objects. But in so far as most newspapers are commercial propositions they are in danger of considering public taste and opinion from a dividend-making point of view. No one would pretend that a newspaper, pursuing the object of private profit for an individual owner, has produced responsible and impartial propaganda, whereas the B.B.C., although under the authority of a democratically elected parliament, has preserved a very high degree of toleration in propaganda, irrespective of the varying party complexion in the British Parliament.

Moreover a private newspaper company, even if it were deprived of any commercial objective, would still be liable to unchecked personal idiosyncrasies, personal ambition, or exclusive propaganda. The dangers from a misguided use of such power by a private institution are on the whole greater than the dangers of a rigid exercise of power by the Government of the day, owing to the safeguards provided by the licence and charter issued to the B.B.C. If one attempts to visualise some constitution in which the risk of a misguided exercise of authority might be encountered, that risk is less in the case of a publicly controlled corporation, because there exists in the background the ultimate check of a popularly elected parliament. On the other hand, a private company, even supposing it were not pursuing profit like a newspaper, might develop dangerous tendencies of another kind, unless it was responsible (even though only indirectly) to a popularly elected parliament. Its very isolation, for instance, might lead it to become rigid and pontifical in its own way, in spite of its being free from the danger of state or governmental dictatorship.

There is this further point—that the B.B.C. is a monopoly. The right of broadcasting is denied to any person other than the



SIR JOHN GORDON NAIRNE, BART.
Governor of the B.C. 1927-1931

B.B.C. itself. It may not be realised at the outset how a monopoly can turn out to be the surest method of securing variety of opinion. Competing newspapers, by virtue of their competition, specialise on exclusive points of view, represented by their owners in relation to specific groups of public opinion. In so far as the B.B.C. is a monopoly, it is compelled to spread its net very widely in order to meet many points of view and provide a legitimate expression for a large variety of opinions. Readers of newspapers can only be sure of receiving those opinions which each competitive owner offers to them. If they wish to hear other opinions they must take other papers, and very few people are intellectually alive enough or rich enough to care to do this. The monopoly character of the B.B.C. makes variety of opinion available from one source with comparatively little initiative on the part of the listener.

Consequently the monopoly character of the B.B.C. is making a very notable contribution to the art of thinking amongst the public. Even though it may be true that only a minority of listeners tune-in to listen to points of view with which they may differ, yet that minority increases every year; and the B.B.C. has placed the stamp of reputability and authority on the fact that truth is many-sided. Imperceptibly, but with increasing swiftness, this is likely to make the public think more efficiently. Discussion will gradually become second nature to the vast majority of the citizens, and in the end more good will result from people knowing how to think than from the mere possession of knowledge itself.

It would thus seem that the present constitution of the B.B.C. offers a more reasonable hope than any other of securing—save perhaps in the rarest crisis—the best of all worlds, for it ensures an element of responsiveness to popular checks, the most varied expression of opinion, freedom from the exclusive propaganda of over-zealous pontiffs or parties, and the opportunity of initiative.

A state department alone is in fact too political or too cautious or too much encumbered with administrative machinery to conduct public utilities. A private commercial undertaking has to pay too much regard to financial considerations, and cannot, owing to competition, eliminate waste or ensure planned foresight by operating on a sufficiently large scale.



READING THE NEWS IN THE EARLY DAYS (*cf.* p. 179) *Barratts*

A completely detached non-commercial corporation may become in its own way as authoritarian as a state department and not even be as sensitive to public taste. The B.B.C. has amply fulfilled the trust committed to it in the words of its charter. It is a "public corporation acting as Trustees for the national interest."

Perhaps, without knowing it when it was first formed, the B.B.C. may also prove to be a new British experiment for the preservation of democracy. The complexity of the modern world has tended to bring the method of democracy into disrepute, and hasty thinkers in many countries have thrown overboard government by elected persons in favour of dictatorship. The constitution of the B.B.C. may prove of permanent value as a half-way house between these two extremes. It is increasingly clear that it is impossible for elected persons, subject to popular passion, to be suitable for the direct control of complicated functions. That is so, not only because they are elected political representatives and are not competent for such a task, but equally because those tasks must have a continuing policy, and not be at the mercy of abrupt changes of opinion in the community.

As the art of government becomes more and more complicated, the individual elector can do little more than express

a general opinion at rare intervals on the Government of the day. If because of this he tries to hug power jealously by vain struggles to keep control over every activity directly through Parliament, he may in the end paralyse initiative without in fact preserving liberty. And yet it is clear that in the successful working of certain public utilities the mere fact of their complexity must require a greater measure of co-ordination and planning than is possible in a world of private enterprise. And so the dreaded State has to intervene. Dictatorship might solve some problems, but only to create others; and it would in any case be hostile to the growth of enlightenment, free discussion, and vitality, which are to be seen in the new democracy.

It would be in vain for this new democracy to seek to save itself from the dictatorship of an individual ruler by stultifying all initiative through the more heavy-handed dictatorship of the State machine. We can therefore only avoid dictatorship, secure co-ordination, and preserve initiative, by holding fast to the principle of election and yet permitting it to find its fulfilment in the procedure of delegated authority. This new method also rules out most of the dangers of lobbying and vote-catching which might result if Parliament itself were to become directly responsible for the conduct of an increasing number of social and economic activities that ultimately affect the voter or the consumer.

Moreover the B.B.C. has shown still further wisdom by keeping contact with its "consuming" public by setting up advisory bodies on many subjects involving public taste and education which may represent to it needs and opinions that should be known and consulted. By this means it has intensified its contact with the public, and yet can avoid a fatal surrender to any procedure of direct control which would involve log-rolling and lobbying.

Finally the B.B.C. has proved conclusively and with popular support a theory that has long been held in some quarters, though never before demonstrated, namely, that it is profitable to believe that democracy desires what is good and of high standard. The B.B.C. has created a great tradition of public service and has won the highest esteem for the manner in which it has exercised the stewardship entrusted to it.

ADVERTISING ON THE WIRELESS

By SIR CHARLES HIGHAM

I AM ENTIRELY OPPOSED to sponsored programmes, and although I believe that eventually radio advertising in England will take its own place amongst media for selling goods, I think it will be in self-defence. If practically every other country takes to using the radio for telling the world the merits of their goods, whilst we remain silent upon ours, we have to take into consideration the idea of foreign competition on a very broad scale. But I do not think that such competition need be anticipated as yet.

At the present time, I am opposed to radio advertising from two quite definite points of view. First, from the listener's, whose reaction to the programme would naturally influence my second, the advertiser's point of view.

If I buy a wireless set, I pay an annual licence fee to be entertained, not instructed as to what goods I ought to buy. Were a canvasser or a commercial traveller to force his way into my house and thrust his goods upon me, I should consider it an unwarrantable intrusion. But I consider it no worse than that I should be expected, when I switch on my radio receiver to hear the entertainment to which I am entitled, to have to listen to a similar salesmanship. The obvious argument is, that I have no need to listen. I can switch off. But why should I? What have I bought a radio for? What do I pay a licence fee for? Not to "switch-off" but to "switch-on,"—to whatever form of *entertainment* appeals to me.

Another small, but nevertheless irritating, detail—I do not wish to hear a programme "by the courtesy of" anyone. I don't want it given me as a favour when I know very well it is my due.

With the listener holding this point of view, it is hardly to be expected that the advertiser's verdict will be a favourable one, as every listener is a potential customer.

The advertiser or the advertising agent, who if possible must be still more careful in choosing his media, has neither the guarantee that the sales talk, which follows the "sponsored programme," will be listened to (it is more than likely that as



DR. M. J. RENDALL (LEFT), A GOVERNOR OF THE B.B.C., AFTER OPENING
THE SCOTTISH NATIONAL RADIO EXHIBITION AT EDINBURGH

soon as it begins, the listener will switch off), nor the knowledge that the people who *do* happen to be listening are the people to whom his product appeals, nor the assurance that even if they are, they are not being antagonised by the method of approach.

As an advertising agent of twenty-five years' standing, any one of these objections would be sufficient for me to recommend my client to spend his money elsewhere. Advertising success cannot be built on such hit-or-miss methods. Every penny of the advertising appropriation must be directed to the right people, at the right time, in the right way. In the Press, where I spend 95 per cent. of my clients' appropriations, I can achieve all these ends. But "on-the-air" I haven't the slightest guarantee that I am achieving any of them.

BROADCASTING AND ADVERTISING

By FILSON YOUNG

ALL BROADCASTING is advertising in the highest sense of the word. It is the making known, as widely as possible, of what the broadcaster has to impart, whether it be entertainment, spoken thought or argument, information, opinion, or creative art in the form of music or literary composition.

But in thus identifying the terms advertising and broadcasting, we must be careful to make one profound distinction. Advertisement must be divided into two quite different classes: advertising for the public benefit, in order to make some truth or desirable thing known; and advertising for private benefit, in order to make as large a number of people as possible do or buy something which will result in profit to the advertiser. Preaching the gospel is an example of advertising in the one sense; placarding the name of some brand of pills or soap is advertising in the other sense. The British Broadcasting Corporation confines itself to the first kind of advertising; with the second it has from the beginning decided to have nothing whatever to do, in spite of the obvious financial benefits to be derived from a different policy. In this it differs from most broadcasting organisations; and this difference has resulted in the development of a programme policy which has given it an exclusive and dominating position among the world's broadcasting agencies. Under its charter the B.B.C. is free to accept "sponsored" programmes from outside sources, and to acknowledge publicly their origin—in which acknowledgment lies the commercial value of the advertisement. This is, in fact, constantly done by the B.B.C. in its Outside Broadcasts. It is impossible to broadcast anything without advertising something or somebody, if it is only the music performed, or the performer or speaker who is broadcasting. The only way to separate broadcasting from advertising would lie in the adoption of a policy of absolute anonymity, in which neither the title of any music performed, nor the name of any artist or speaker should be revealed to the public. Such a policy would be, of course, absurd, and has never been contemplated.

Broadcasting, then, is publicity in its extreme form. But note

here another profound distinction between two kinds of publicity. In the one case the publicity given to the thing advertised, and the money received in payment for it, form the originating cause and purpose of the broadcast. It may be a Beethoven symphony; but the reason why it will have been broadcast at that particular time is that Mr. X. wished to call attention to the fact that he manufactures and wishes to sell (let us say) bedsteads. The public would not spontaneously be interested in, or attend to, the mere statement of that fact. But it is interested in attending to a Beethoven symphony; and while its attention is thus captured, and before, as an invisible company, it has time to disperse, it is told about Mr. X. and his bedsteads, and that it is indebted to them for the fine performance to which it has just listened.

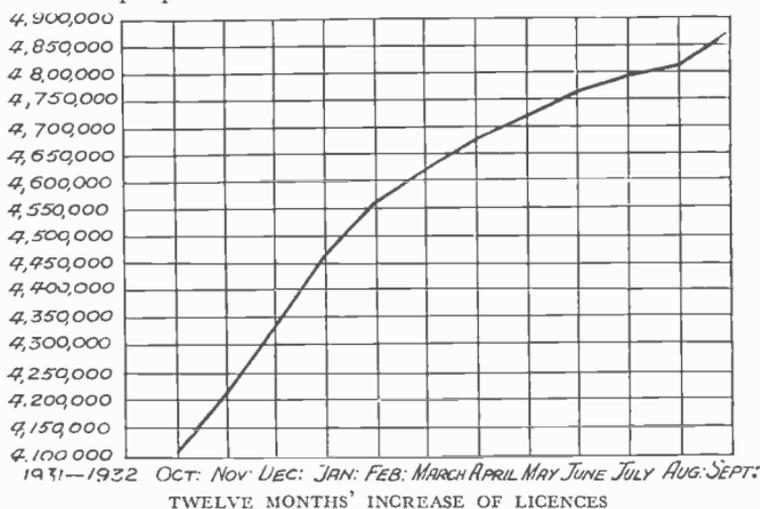
In the other case the publicity given to the thing broadcast or the person broadcasting is, so to speak, a by-product; it is not an originating cause; and it therefore has no influence whatever on the determination of what shall be broadcast. Herein lies the profound distinction, to which I have referred, between broadcasting as a disinterested public service, and broadcasting as a commercial enterprise. Many people argue that there is essentially no distinction at all, and that provided the matter broadcast is good, its origin or the method by which it is paid for is of no importance. To say that is to ignore completely the force and value of the motive or impulse behind any public, or indeed private action. If you think of the ether as a huge hoarding to be placarded by matter for the public to see and read, you will realise at once that its benefit or its detriment to the public depends entirely on who controls it and decides what shall be placarded. However eminent the artists employed by the advertiser to attract attention to his goods, however sumptuous the bribe, so to speak, offered to the public to induce them to think about soap or bedsteads, the motive behind it is not the intention to benefit them. If you think motive is of no importance, and that the results of any action are the same whatever the nature of the impulse behind it, you will not consider this argument a good one. But I am glad to say that the B.B.C. has from its first beginnings taken the idealistic view of its responsibilities; and so has never sold to others either the choice or the direction of its programmes.



THE SOWER, BY ERIC GILL

A symbol of broadcasting in the Entrance Hall at Broadcasting House

It is sometimes argued that the public would benefit by the sale of programme time to outside interests which would be able to give better and more expensive programmes than the organisation could afford out of an income limited by the sale of licences. That may be true of other countries; it is not the case in England, where the honesty of the public makes direct taxation an enormous source of revenue. I think it is true to say that the B.B.C. is never hampered or limited as to programme material by financial considerations, or that by spending twice as much it could make its programmes twice as good, or even any better. Above a very low limit, quality in art is not a question of price. The good painter or musician must be paid enough to enable him to live and to have been trained; but he will not paint or play twice as well if you double his fee. So in regard to the quality of broadcasting programmes, the power of money, which is determinative up to a certain limit, does not operate beyond that limit. There could be no benefit to British broadcasting from an increased revenue from advertising, provided the Government makes no further inroads on the revenue provided by the sale of licences. But there would be a distinct loss in prestige and, as I believe, in quality, if the unity of motive and the disinterested public policy now prevailing were to be modified by the farming-out of programme time for purposes of commercial advertisement.



THE BROADCASTING SERVICE IN WALES

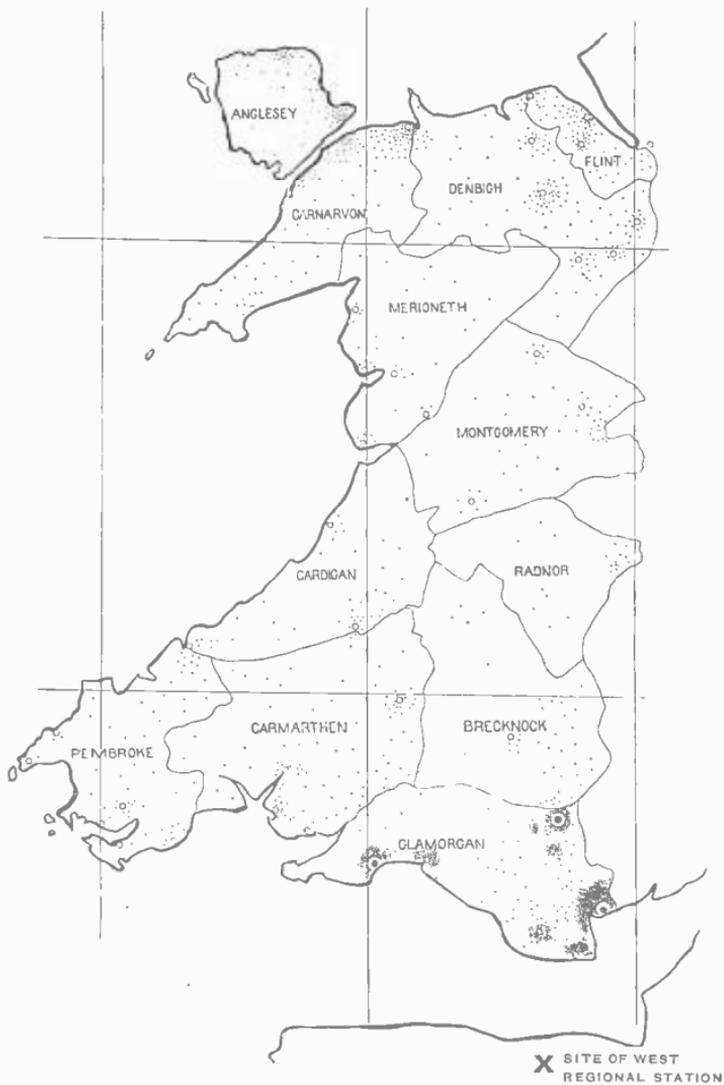
BROADCASTING IN WALES has always presented problems to which no ideal solution can be applied. A country with very ancient national traditions and with a national language far from dead, its total population is only about double that of a city such as Glasgow. This is bad enough, but, to make matters worse, the population is concentrated at the two ends and divided by great tracts of mountains as desolate as the Scottish Highlands. Had it been possible to lay out the country for broadcasting rather than broadcasting for the country, no real problem would have existed at all. One would have flattened out the land and concentrated the big towns in the centre. Unfortunately, facts must be faced as they stand, and they could hardly have been less accommodating. There are about 100,000 licence-holders in all, and of these more than half live in one county—Glamorgan. Most of the remainder are in Carmarthen in the south, and Caernarvon, Denbigh and Flint in the north. This disposes finally of any idea of putting down a transmitter in the middle of the country. By so doing, it might be possible to give a good broadcasting service to three or four counties with some 5000 listeners in all, but the remaining ninety-odd thousand in the south and north would get little or nothing. These areas of dense population would be too far away and the mountains would trap most of the signals, for medium-length waves do not travel well in hilly country. One is therefore forced reluctantly to accept a situation whereby Wales cannot be considered technically in one piece. There must be two pieces at least. Ideally, then, there should be two transmitters, one for the south and one for the north, with the sparsely populated centre getting something from each. But there are not sufficient available wavelengths for this to be done.

Broadcasting itself has only been given very limited bands of the ether on which it may work, and Europe is now full of transmitters, each tending to tread on another's toes. Already there are too many for perfect receiving conditions, and more would produce a completely unworkable state of affairs. Something very like chaos was being reached when the International Broadcasting Union was set up at Geneva to deal with the

situation, and to allocate to the various nations an equitable number of wavelengths. Chaos was averted, but the B.B.C. found itself with only nine medium waves and one long wave, that of Daventry 5XX. It has now some 5,000,000 licence-holders to serve with these. Had it not been for that long wave from Daventry, with its great range, no satisfactory service could have been given to so vast and diffuse a body of listeners. In distributing the remaining nine, claims both national and numerical had to be considered. Wales with its own culture and its own language could not be thought of merely in terms of the number of its licence-holders—actually less than one-thirtieth of the total. Yet 1,000,000 or more listeners elsewhere could no more fairly be sacrificed in the interests of this minority, important minority though it might be.

These problems have not always been sympathetically understood by Welsh listeners. The claims of Wales are appreciated by the B.B.C., but it is hoped that similar consideration will be shown to the B.B.C. in its attempts at solving the problem of serving 5,000,000 listeners with ten wavelengths.

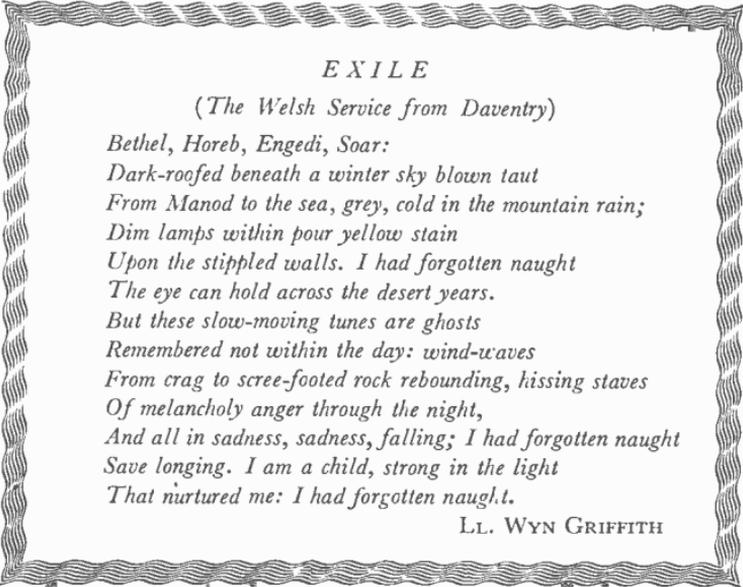
In the past, Wales has been primarily dependent for programmes of national colour on the Cardiff and Swansea stations. These are very limited in range, but are set down in the areas of densest population. Here both Welsh and West-country programme material has been broadcast regularly. Welsh artists have been drawn from all over the country, and the Welsh language has been frequently heard in religious services, talks, and plays. There have been continued efforts to stimulate further national activity in music and literature, but these cannot be said to have met with unqualified success. The general depression in trade has hit South Wales harder than most places, and bad times do not encourage new ventures. The National Orchestra of Wales could not be continued. If such a body is to be truly national it must have support from its own people, yet only £2000 could be found for it there against the £28,000 already contributed by the B.B.C. The support was simply not forthcoming. For the past three years, moreover, the B.B.C. has offered prizes at the Royal National Eisteddfod for a wireless play in Welsh and for one in English dealing with Welsh life. So far these prizes have not been awarded, as no play was submitted which approached the necessary standard.



MAP SHOWING THE DENSITY OF POPULATION IN WALES IN RELATION TO THE NEW WEST REGIONAL TRANSMITTER. EACH DOT REPRESENTS 1000 PEOPLE

This is depressing reading, though it does not follow that what has happened in these bad times will set the pace for the future. The technical future, at least, is going to be so much better that, if the ideal could not be obtained, a very large step forward has been made. The new Regional transmitter at Watchet will give a really adequate service to the South of Wales, and it is hoped, will reach out towards the North. Three-quarters of the listeners in the country will hear this transmitter, which will have ample opportunities for the broadcasting of all that is particularly significant to Welsh people. In the North, a further 10,000 in Flint and Denbigh will also have a choice of two programmes, being within the effective range of the North Regional transmitter at Moorside Edge. No one can yet say exactly how many listeners must still depend on Daventry 5XX as their main source of programme, but this number will be relatively extremely small, and their claims will not be forgotten.

The critic may answer that, after all, the solution of the Welsh broadcasting problem is only a compromise. No one enjoys a compromise less than the B.B.C., but when compromise is inevitable, let it be the best possible and let it be carried out with the greatest degree of mutual co-operation and understanding.



E X I L E

(*The Welsh Service from Daventry*)

*Bethel, Horeb, Engedi, Soar:
Dark-roofed beneath a winter sky blown taut
From Manod to the sea, grey, cold in the mountain rain;
Dim lamps within pour yellow stain
Upon the stippled walls. I had forgotten naught
The eye can hold across the desert years.
But these slow-moving tunes are ghosts
Remembered not within the day: wind-waves
From crag to scree-footed rock rebounding, hissing staves
Of melancholy anger through the night,
And all in sadness, sadness, falling; I had forgotten naught
Save longing. I am a child, strong in the light
That nurtured me: I had forgotten naught.*

L. L. WYN GRIFFITH

R E D I F F U S I O N

THE REDIFFUSION of broadcast programmes to the public by loudspeaker or other means is a matter of so much concern to a number of interests that sooner or later opportunity will be made to get the Courts to decide as to the extent to which such rediffusion is governed by the law of copyright. In spite of the absence of precedent there is reason to assume that unauthorised rediffusion will be held to infringe copyright, for the reason that it involves the use of intellectual property which, by a principle of law, is not freely available, even when its use is not for the purposes of direct or indirect commercial gain. In fact Mr. Justice McCardie, when delivering judgment in *Messager v. The British Broadcasting Company, Ltd.*, gave the following *obiter dictum*:—
“It is, I think, reasonably clear that a person who gives to a public audience a performance made audible and effective to them by means of a receiving instrument in the place where that public is assembled together may be liable for infringement of copyright.”

The principal forms of rediffusion are (1) loudspeakers operated in public establishments such as hotels, cafés, public-houses, etc., for the entertainment of clientèle, (2) publication of news items taken from the wireless reports and commentaries, and (3) loudspeakers used in shops for demonstrating wireless sets. The last is perhaps the form of rediffusion to which least objection is taken, as the use made of the broadcast material is not for entertainment purposes, and the prosperity of the wireless trade is to the advantage not only of the community at large but also of those who might have reason to object to other forms of rediffusion. In the first two cases commercial gain is indubitably the main object, and therefore it is not surprising that those owning and controlling copyright material on which the success of rediffusion depends should resent the free use of such material for the benefit of others.

A large proportion of the copyright music in B.B.C. programmes is controlled—so far as its public performance is concerned—by the Performing Right Society on behalf of various composers, authors, and publishers, and up to the end of 1931 the licence held by the B.B.C. from the Society extended to the public rediffusion of works in the Society's repertoire. When,

however, the question of the licence for 1932 arose, the Society insisted on themselves being at liberty to deal with the re-diffusion question, and thus the B.B.C. licence was restricted to the reception of the Society's repertoire for listeners' domestic and private use. Many rediffusers will therefore find it necessary to take out the Performing Right Society's licence or risk an action being brought against them for infringement.

The public rediffusion of news is strongly objected to by the News Agencies, and it cannot be denied that there is justification for their attitude when one considers the costly and efficient organisation necessary for the provision of an adequate news service to the public. Obviously there is the danger of newspaper sales being affected when sporting results and other important news items are made public either direct through loudspeakers or by other means immediately after transmission.

In addition to the Performing Right Society and the News Agencies there are many other individual owners of copyright concerned and, of course, the B.B.C. itself, as owner of the copyright in many programme items, running commentaries, eye-witness accounts, and in the programmes as entities.

Apart from the purely copyright aspect of the matter, the B.B.C., relying as it must on its revenue from licences, may very reasonably question the equity of the public rediffuser being able to use its programmes for the same small annual fee as is paid by the private listener.

WIRELESS EXCHANGES

WIRELESS EXCHANGES are of comparatively recent growth. They have arisen to meet the needs of people who for some reason or other do not wish to purchase a wireless set or who happen to suffer from interference in reception of a kind which is difficult to eliminate. There are, according to recent figures, over one hundred exchanges, and the subscribers exceed 50,000, and are steadily increasing. The importance of wireless exchanges in the broadcasting system is therefore clear.

Wireless exchanges are well-known abroad, particularly in Holland. In Germany, a country ever alive to the importance of national propaganda, the programmes of wireless exchanges are restricted to items taken from the programmes of German broadcasting stations. In the United Kingdom, although to many this limitation might seem desirable, the Postmaster-General has not included it among the conditions for a wireless exchange licence. There are four outstanding limitations imposed on wireless exchanges by the Postmaster-General:

- (1) Wireless exchanges are not allowed to originate their own programmes;
- (2) The Postmaster-General can prohibit the relaying of programmes transmitted by any specified station;
- (3) The wireless exchange is prohibited from receiving payment or any other consideration for relaying any programme or item transmitted by a foreign broadcasting station;
- (4) The wireless exchange is prohibited from relaying to its subscribers any speech of a political or controversial character broadcast in English from a foreign station.

The wireless exchange system is at present being developed entirely by private enterprise. The Postmaster-General has, however, decided to limit the scope of each separate wireless exchange company to a maximum of 100,000 subscribers drawn from areas with an aggregate population of not more than 2,000,000. No wireless exchange company has any monopoly within a particular area. This, of course, may discourage technical development.

The particular aim of a wireless exchange is to provide clear

and constant reception without technical worry, and a service on easy payment terms which extends the advantages of wireless to those without much capital.

It is especially suitable for schools, institutions, blocks of flats and in areas subject to electrical disturbance or at a great distance from a broadcasting station.

The system, however, contains within it forces which if uncontrolled might be disruptive of the spirit and intention of the B.B.C.'s charter. The persons in charge of wireless exchanges have power, by replacing selected items of the Corporation's programmes with transmissions from abroad, to alter entirely the general drift of the B.B.C.'s programme policy. They can transmit amusing items from the British programmes and replace talks and other matter of informative or experimental value by amusing items in programmes from abroad and so debase their programmes to a level of amusement interest only. The B.B.C. has always provided entertainment for its listeners, but it has set its face resolutely against devoting its programmes entirely to amusement. This policy has been upheld by public opinion over years of development ; and has already resulted in an acknowledged improvement in public taste. Those in charge of wireless exchanges have power also to discriminate amongst the broadcast talks, relaying those of one political colour and suppressing others.

With the small exchanges of the past no great danger could be foreseen. The matter assumes a different complexion, however, when exchanges controlled by large companies with a heavy capital are already allowed "for the present" 100,000 subscribers each. Each exchange may increase to the stature of a B.B.C. in miniature, and furthermore the possibility must be visualised of several enlarged exchanges being merged under a single financial control. Concerns with sufficient capital would be in a position to buy time on the several Continental stations which will sell it, and produce their own programmes abroad on the existing American system.

The growth of wireless exchanges upon present lines must be viewed with concern by all who realise the power of broadcasting and who value the policy and achievements of the B.B.C.

LISTENERS' SOCIETIES

EVEN in these days of enlightenment in matters connected with broadcasting it will, no doubt, come as a surprise to many listeners to learn that there are societies which exist to further their interests and perform organised services on their behalf. Ignorance of these amenities is due to the fact that the organisations which perform them are in every case public-service non-profit-making concerns with a low rate of subscription, which makes the cost of extensive propaganda prohibitive.

The purpose of this article is to describe the services which the three societies operating on a national basis offer in return for the subscription which each demands of its members. Two of these are primarily concerned with listeners to broadcast programmes, while the third caters for the amateur wireless engineer.

THE RADIO ASSOCIATION

This society was the first to come into existence, in the very early days of broadcasting. Its Head Office is at 22, Laurence Pountney Lane, London, E.C. For a fixed annual subscription of six shillings a year the Association undertakes the following principal services on behalf of its members:—

Set Maintenance. All over the country the Association has investigated the *bona fides* and technical qualifications of dealers in wireless and, from resultant data, built up a "panel" of certified "doctors" who are recommended as capable of dealing with all the ordinary ailments to which listeners' receivers are subject. On enrolment, the member is informed of the name and address of the nearest "panel-dealer" on whom he is entitled to call for four free visits a year. These visits are for the purpose of adjustments only and are not intended to cover major repairs or the replacement of faulty components. Visits to the member's home in excess of the four are subject to a fixed charge of two shillings and sixpence per visit.

Insurance. Membership of the Radio Association carries with it the free insurance of the member's wireless set and associated apparatus against the risk of damage by lightning up to a maximum of £25 for any one claim.

Advice. Members may receive free advice on technical

matters connected with the operation of their sets by addressing inquiries to the Head Office in London. The technical service is under the direction of the eminent scientist Professor E. Fournier d'Albe. Advice on legal matters and on all questions of interest to listeners is also given free of charge to members.

Technical Section. A technical section of the Association has been formed to promote and encourage practical and theoretical wireless engineering. Particulars of the conditions of admission for Fellows, Members, Student Members, etc., may be obtained from the Honorary Secretary on application.

THE WIRELESS LEAGUE

This society was formed in 1925. It took its present form in 1928, when its constitution was altered to permit of the absorption of the activities of another similar organisation.

Membership is divided into two classes, namely, Full Members and Associate Members. The subscription for Full Membership is one guinea per annum, and for Associate Membership, two shillings per annum. The office of the League is at 12, Grosvenor Crescent, London, S.W.1.

The following services are offered:—

Personal Technical Service (available to Full Members only). Full Members are entitled to receive, free of charge, six visits a year from a member of the League's technical staff for the purpose of adjusting components and circuits and effecting minor repairs to their sets. Replacements, major repairs, and battery charging, are not included in this free service, but any work required outside its scope is made the subject of a detailed report by the visiting technical representative. Visits are restricted in duration to one hour.

Insurance (available to all Members). Membership of the League confers the following insurance benefits on the member:—Cover against damage to receiving sets, aerials, and accessories, by fire, lightning, or theft, up to the actual value of the apparatus with a limit of £50 for any one set, and £100 for any number of sets owned by a Full Member, and a limit of £25 for any one set and £50 for any number of sets owned by an Associate Member. Cover against damage to aerials by storm in the case of Full Members only (with a limit of £5). Cover against legal liabilities to third parties

in respect of injury to persons or damage to property, in connection with wireless receiving sets, with a limit of £500 for any one claim in the case of Full Members, and a limit of £250 for any one claim in the case of Associate Members.

Advice. The League gives free advice to all its members on any technical matters connected with the science of wireless and any legal or general questions which may affect them.

Registration of Dealers. The Wireless League in co-operation with the Radio Society of Great Britain has compiled a register of competent radio dealers to whom, in the opinion of the joint committee of the two bodies, members may turn with confidence both for purchases and repairs.

THE INCORPORATED RADIO SOCIETY OF GREAT BRITAIN

This is the doyen of societies of organised amateurs. It caters for quite a different type of wireless enthusiast. Its members are drawn from among those who look further than broadcasting for their interest in wireless. The society was formed in 1913, and after passing through rapid stages of evolution, was granted a charter, becoming an Incorporated Society in 1926. Without the pioneer work of the pre-broadcasting enthusiasts it is doubtful whether the amateur transmitters and their receiving confreres would ever have held a recognised place in wireless. The Incorporated Radio Society of Great Britain has established itself not only as the guardian of their interests in Great Britain, but also as the centre of an elaborate and carefully controlled system of communication between transmitting and receiving amateur enthusiasts all over the British Empire. There are several forms of membership with subscriptions ranging from twelve shillings and sixpence to one guinea per annum, and those amateur wireless engineers who seek to enhance the enjoyment of their hobby will be well advised to get into touch with the Honorary Secretary, whose address is 53, Victoria Street, London, S.W.1.

Trade Associations and Technical Societies

BRITISH RADIO VALVE MANUFACTURERS'
ASSOCIATION

59, Russell Square, London, W.C.1.

Secretary : H. Howitt.

INCORPORATED RADIO SOCIETY OF GREAT
BRITAIN

53, Victoria Street, London, S.W.1.

Hon. Secretary : John Clarricoats.

INSTITUTE OF WIRELESS TECHNOLOGY

72, Oxford Street, London, W.1.

Secretary : H. J. King.

INSTITUTION OF ELECTRICAL ENGINEERS
(WIRELESS SECTION)

Savoy Place, London, W.C.2.

Secretary : P. F. Rowell.

TELEVISION SOCIETY

4, Duke Street, London, W.C.2.

Secretary : J. G. Denton, M.I.E.E.

RADIO MANUFACTURERS' ASSOCIATION

Astor House, Aldwych, London, W.C.2.

Secretary : D. Grant Strachan.

RADIO WHOLESALERS' FEDERATION

Bloomsbury Mansions,

26, Hart Street, London, W.C.1.

Secretary : J. Macfarlane.

WIRELESS RETAILERS' ASSOCIATION OF
GREAT BRITAIN AND NORTHERN IRELAND

1, Mitre Court, London, E.C.4.

Secretary : Capt. H. A. Bain.

THE WIRELESS INDUSTRY

By LESLIE McMICHAEL, A.M.I.E.E., F.INST.R.E.

Chairman of the Radio Manufacturers' Association

THE WIRELESS INDUSTRY, after a period of growth of only some ten years, must now be counted amongst the foremost industries of this country. Surely no other industry in the history of this country can show anything like such amazing progress over so short a period of time.

When we look back to the year 1922 and remember that the total number of licences issued during that year was only some few thousands, and that now the figures have risen to nearly five millions, it is sufficient to give a clear indication of the importance of broadcasting and the wireless industry in the British Isles. The popularity of wireless has been greatly strengthened by the close co-operation of the manufacturers, as represented by the Radio Manufacturers' Association and the B.B.C. There exists, and has existed over the past years, a liaison between the wireless industry and those responsible for the broadcasting service, which has been instrumental in giving to the public radio instruments best suited to provide the maximum benefit from the programmes broadcast.

Such changes in design of instruments have taken place over the past ten years that one can hardly believe that the primitive crystal set of ten years ago, or the cumbersome and complicated valve receiver of five years ago, with its multitudinous control knobs, are in reality so closely related, through careful and well-considered stages, to the compact, self-contained, and easily handled receivers of the present day.

No one cause has been responsible for this progress. Valves have been elaborated and improved technically, almost out of recognition in a decade, and incidentally considerably cheapened in price. The screened-grid valve, the pentode, and the mains-heated valve, are each responsible for important progress in the direction of easier distance getting, better and greater output, and the ability to work receivers from the electric mains.

One of the difficulties of the manufacturers of this country, and this has definitely retarded progress, has been the differing

voltages of mains-supply current and the fact that so many areas of the country are still on the old-fashioned Direct Current system. Manufacturers have necessarily hesitated to devote much research work to, or show much interest in, manufacturing apparatus for Direct Current, for without question within a short time this type of current will entirely disappear, and with the greater use of the "grid system" of high-voltage Alternating Current supply throughout the country we may look forward to a standardisation of electric mains current to the householder which will be an immense help in the direction of further progress.

Both the B.B.C. and the British radio manufacturers have always aimed at a very good standard of quality of tonal reproduction, and their joint efforts have resulted in a high standard to-day, a standard which I am glad to say is now being demanded by the buying public.

The combined gramophone and wireless receiver, known as the radio-gramophone, is a product of the last few years, and is rapidly gaining in favour. It allows for gramophone records, which are now all electrically recorded, to be electrically reproduced, and permits of variation and regulation of tone and volume not hitherto possible by mechanical reproduction.

With the ether becoming more and more overcrowded the problem of selectivity of receiving apparatus becomes necessarily important to the radio manufacturer if he is to satisfy the user. He is, however, successfully holding the balance between really good selectivity, that is the ability to tune out interfering stations of near wavelength, without impairing the quality of reproduction by cutting the "sidebands" of the modulation.

The portable receiver, either in leather case or in cabinet form, may be described as a typical British product and for many years past there has been an enormous vogue for this handy type of instrument, both for use in the home and for travelling. Strangely enough, in America and on the Continent it finds little favour.

Loudspeaker design has undergone revolutionary changes, the loudspeakers of 1922 with their weird and wonderful metal horns now look ludicrous when compared with the compact moving-coil or moving-iron-cone loudspeakers of to-day; while the reproduction of the modern loudspeaker, covering

THE GROWTH OF THE NATIONAL RADIO
EXHIBITION AT OLYMPIA

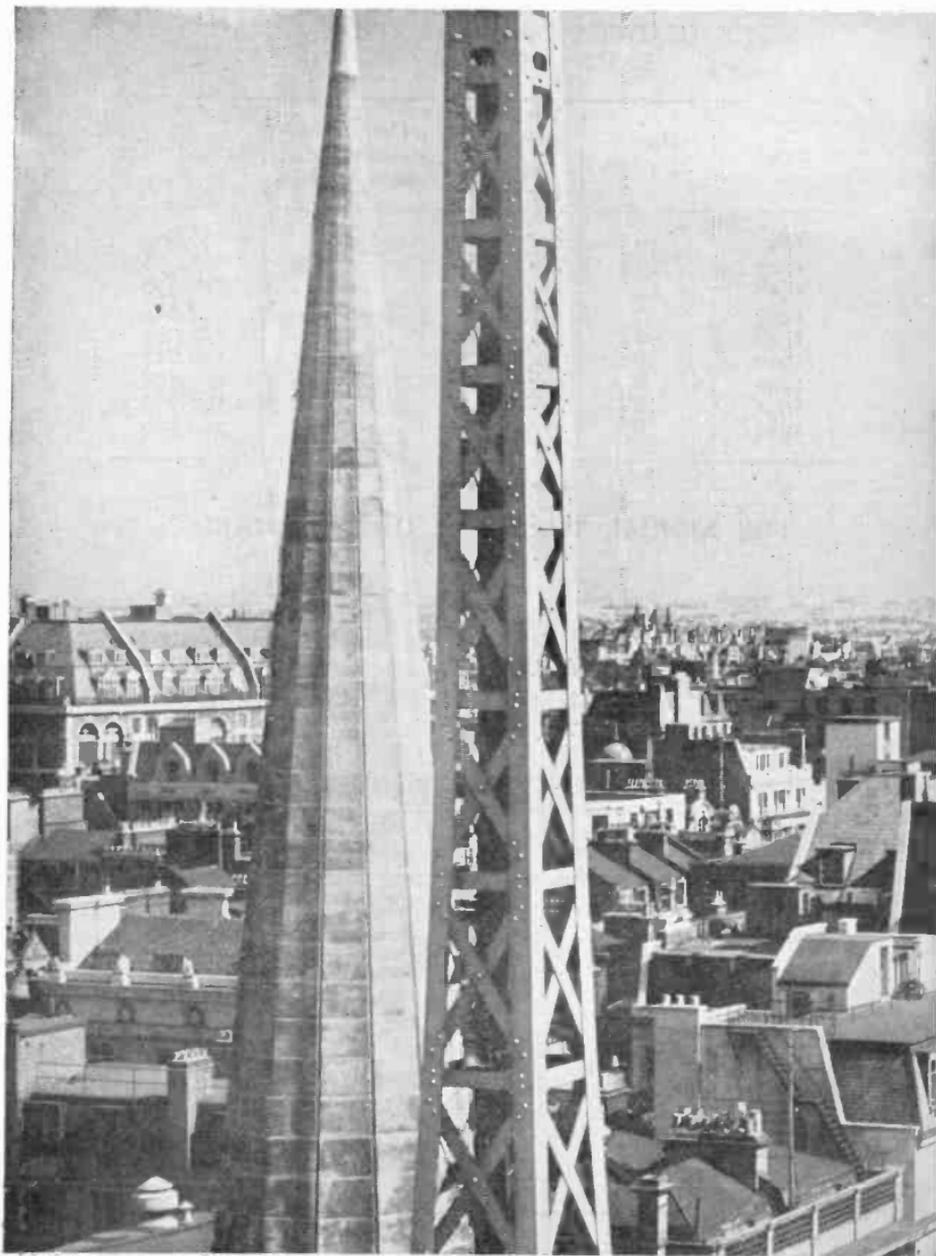
Year.	Days' duration.	Stand area, sq. feet.	Demonstration room area, sq. feet.	Attendance.
1924	10	11,700	nil	46,000
1925	10	15,000	nil	54,500
1926	13	34,053	nil	116,570
1927	7	34,642	nil	99,375
1928	7	40,445	nil	123,593
1929	10	42,177	7,006	140,627
1930	8	54,464	8,769	161,128
1931	8	70,993	15,129	198,070
1932	8	74,154	19,368	180,750

THE ANNUAL TURNOVER OF THE WIRELESS
TRADE

1926	£7,800,000
1927	9,500,000
1928	10,800,000
1929	15,000,000
1930	19,700,000
1931	29,800,000

TYPES OF RECEIVERS PRODUCED IN 1931.

Number of Valves.	Production Figures.	
	Mains.	Batteries.
Two	107,900	164,750
Three	230,000	52,650
Four	84,050	168,850
Multi-valve	36,250	53,850
Home constructors' kits	—	298,450
Radio-gramophones	61,400	—
Totals	519,600	738,550
	1,258,150	



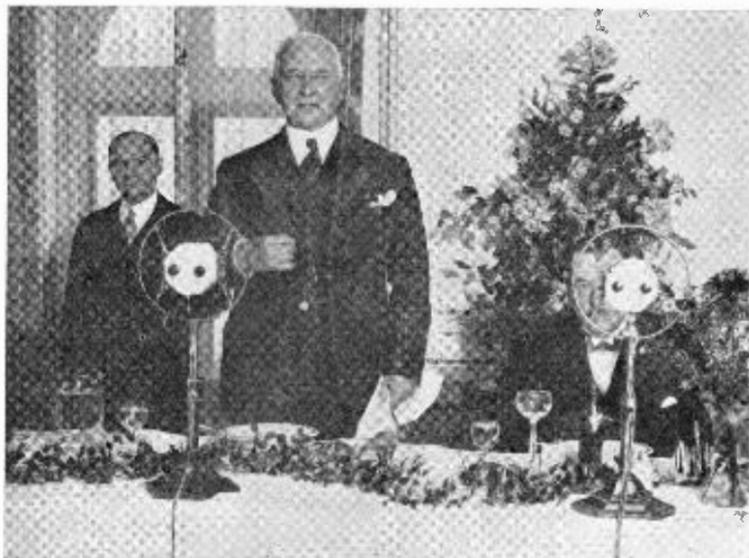
THE VIEW FROM THE ROOF OF B

A photograph taken with an "infra-red" camera, showing the Crystal Palace on the sky-line, and in the foreground the spire of All Souls' Church and the mast on



BROADCASTING HOUSE, LOOKING SOUTH

Big Ben and Victoria Towers of the Houses of Parliament in the middle distance. In the left the Clock Tower of Broadcasting House rise side by side.



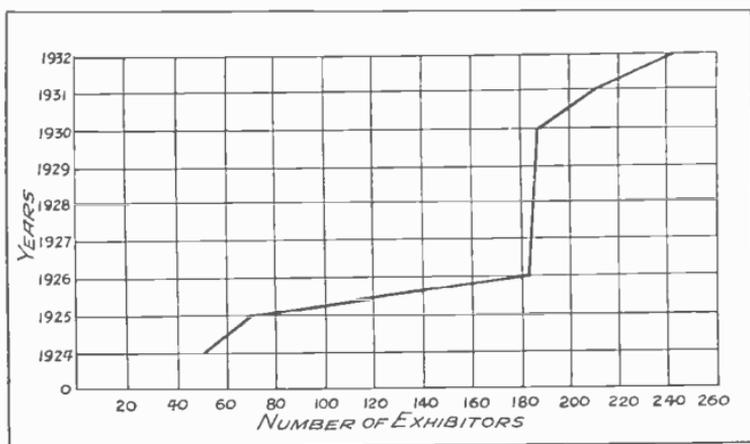
Allied Newspapers

MR. J. H. WHITLEY, THE CHAIRMAN OF THE B.B.C., SPEAKING AT THE LUNCHEON INAUGURATING THE NORTHERN WIRELESS EXHIBITION AT MANCHESTER

almost the entire band of frequencies broadcast, has brought reception to a pitch of excellence hardly considered possible only a few years ago.

The British Broadcasting Corporation, second to none of all the broadcasting services of the world, has kept pace with the march of events in no uncertain manner. From the original tiny 2LO station to the magnificence of Broadcasting House, from a few hours of broadcasting a week to hundreds of hours, from one station to an intricate network and chain of many stations all over the British Isles, from a tiny orchestra of a few performers to one of the largest and finest orchestras in the world; this is a record of which the B.B.C. has reason to be proud and without which this great industry could not have been built up.

The inauguration of the new short-wave station at Daventry late in 1932 was keenly awaited by the wireless industry. The experimental short-wave station at Chelmsford had served its

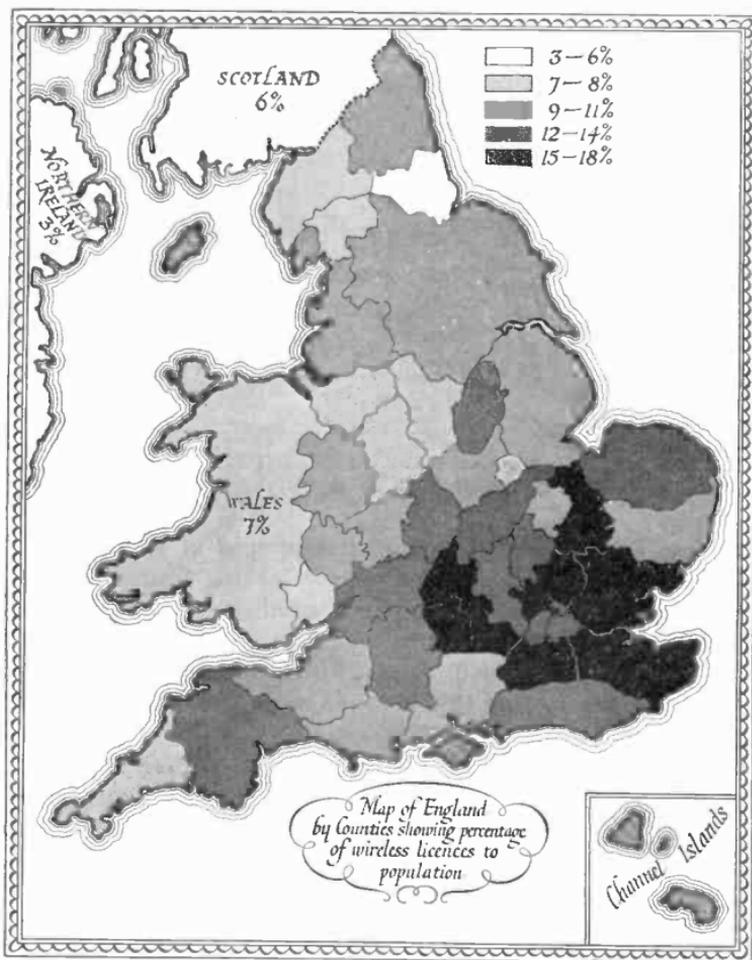


A BAROMETER OF THE WIRELESS TRADE: THE NUMBER OF EXHIBITORS AT OLYMPIA

purpose and whetted the appetites of tens of thousands of Britishers overseas who were eagerly looking forward to the start of the permanent short-wave transmissions. British manufacturers will see that British apparatus is available for use overseas by listeners who will delight in hearing programmes and news from the Mother Country, thanks to the initiative of the B.B.C.

I believe, however, that the progress and importance of the wireless industry to-day will be considered small when comparisons are made a few years hence.

If manufacturers keep up with the trend of progress as they have in the past, and the B.B.C. give us still more and still better programmes, the licence figures will continue to increase for many years to come, for broadcasting has a firm hold on the people of this country whether viewed from the entertainment or education angle.

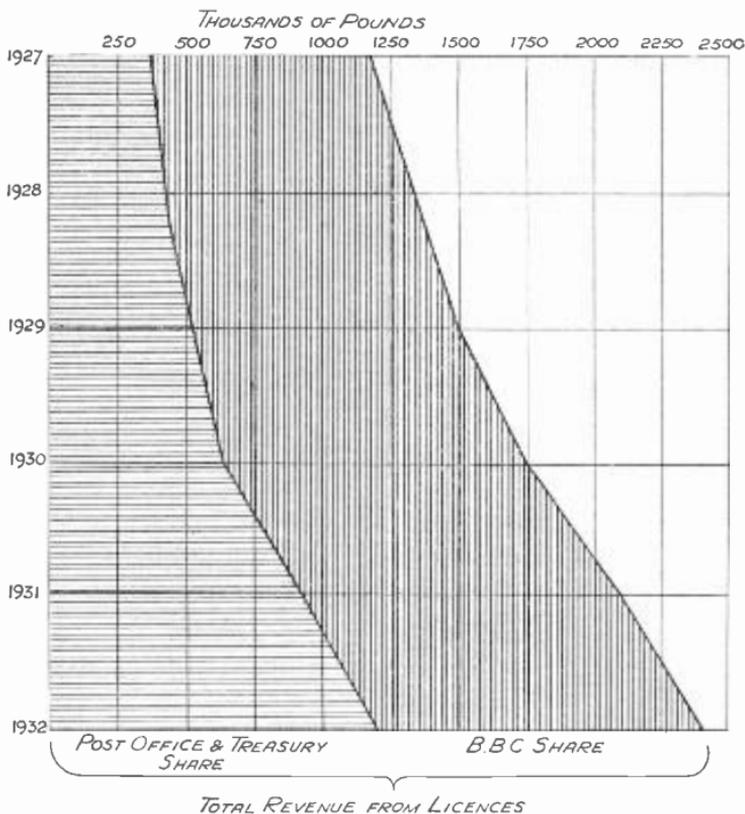


PERCENTAGES OF LICENCES TO POPULATION AS
AT AUGUST 31ST, 1932.

	Licences.	Population.	%.
Bedfordshire . . .	31,189	220,474	14
Berkshire . . .	45,250	311,334	16
Buckinghamshire . . .	34,110	271,565	13
Cambridgeshire . . .	32,566	217,709	15
Cheshire . . .	76,178	1,087,544	7
Cornwall . . .	24,999	317,951	8
Cumberland . . .	18,357	262,897	7
Derbyshire . . .	53,670	757,332	7
Devonshire . . .	87,435	732,869	12
Dorset . . .	26,606	239,347	11
Durham . . .	66,563	1,485,978	4
Essex . . .	256,030	1,755,240	15
Gloucestershire . . .	94,399	785,656	12
Hampshire . . .	133,063	1,102,515	11
Herefordshire . . .	11,307	111,755	10
Hertfordshire . . .	73,477	401,159	18
Huntingdonshire . . .	5,791	56,204	10
Kent . . .	181,065	1,218,565	15
Lancashire . . .	553,011	5,039,097	11
Leicestershire . . .	63,400	541,794	10
Lincolnshire . . .	67,487	624,553	11
Middlesex . . .	227,308	1,638,521	14
Monmouthshire . . .	30,748	434,821	7
Norfolk . . .	51,765	504,846	12
Northamptonshire . . .	50,447	361,273	14
Northumberland . . .	73,538	756,723	10
Nottinghamshire . . .	85,468	712,681	12
Oxfordshire . . .	31,337	209,599	15
Rutland . . .	1,327	17,397	8
Shropshire . . .	25,409	244,162	10
Somerset . . .	46,165	475,120	9
Staffordshire . . .	107,154	1,431,175	7
Suffolk . . .	38,079	401,114	9
Surrey . . .	176,163	1,180,810	15
Sussex . . .	96,763	770,078	13
Warwickshire . . .	199,870	1,534,782	13
Westmorland . . .	4,502	65,398	7
Wiltshire . . .	36,936	303,258	12
Worcestershire . . .	47,717	420,156	11
Yorkshire . . .	467,791	4,389,465	10
London County Area . . .	546,457	4,396,821	12
	4,023,803	37,789,738	11
Isle of Man . . .	4,890	49,338	9
Channel Islands . . .	9,203	93,061	10

SCOTLAND, N. IRELAND, AND WALES

	Licences.	Population.	%.
Aberdeen and Kincardine	23,282	340,294	7
Angus	19,798	270,190	7
Argyllshire	3,173	63,014	5
Ayrshire	16,330	285,182	5
Banffshire	1,948	54,835	3
Berwickshire	608	26,601	2
Bute	984	18,822	5
Caithness	781	25,656	3
Clackmannan	1,471	31,947	5
Dumbartonshire	3,770	147,751	3
Dumfriesshire	4,394	81,060	5
Edinburgh	49,043	526,277	9
Fife and Kinross	15,782	283,715	6
Haddington	2,642	47,369	5
Inverness-shire	2,529	82,082	3
Kirkcudbright	1,396	30,341	4
Lanarkshire and Glasgow	104,492	1,585,968	12
Linlithgow	2,220	81,426	3
Morayshire	2,198	49,099	4
Orkney	719	22,075	3
Peebles	735	15,050	5
Perthshire	6,592	120,772	5
Renfrewshire	16,162	288,575	6
Ross and Cromarty	1,095	62,802	2
Roxburgh	2,683	45,787	6
Selkirk	2,602	22,608	11
Shetland	606	21,410	3
Stirlingshire	11,929	166,447	7
Sutherland	388	16,100	2
Wigtownshire	1,961	29,299	7
	302,313	4,842,554	6
Anglesey	1,308	49,025	3
Brecknockshire	1,567	57,771	3
Caernarvonshire	15,481	120,810	12
Cardiganshire	2,767	55,164	5
Carmarthenshire	11,328	179,063	6
Denbighshire	9,951	157,645	6
Flintshire	7,083	112,849	6
Glamorganshire	93,007	1,225,713	8
Merionethshire	2,147	43,198	5
Montgomeryshire	3,822	48,462	8
Pembrokeshire	5,128	87,179	6
Radnorshire	1,311	21,314	6
	154,900	2,158,193	7
Northern Ireland	42,102	1,256,561	3



Note: the revenue for the years 1922-1926 (total £2,925,000—B.B.C. £1,768,000, Government £1,157,000) is not included in the diagram, owing to complications arising from a different financial year and (in the first year) royalties on receiving sets.

LISTENING STATISTICS FOR THE CHIEF BROADCASTING COUNTRIES OF THE WORLD

Country.	Licences.	Population.	%.
Denmark . . .	476,794	3,550,651	13.4
Great Britain . . .	4,821,436	44,790,485	10.7
Sweden . . .	588,077	6,140,408	9.6
Austria . . .	478,352	6,722,395	7.1
Holland . . .	548,390	7,920,388	6.9
Germany . . .	4,119,531	64,500,000	6.4
Switzerland . . .	190,827	4,066,400	4.7
Danzig . . .	17,660	407,317	4.3
Hungary . . .	332,693	8,734,205	3.8
Iceland . . .	4,100	109,500	3.7
Norway . . .	110,840	3,000,000	3.7
Belgium . . .	271,579	8,150,000	3.3
Finland . . .	116,850	3,658,125	3.2
Czecho-Slovakia . . .	425,794	1,726,158	2.9
Latvia . . .	43,618	1,900,045	2.3
Estonia . . .	16,125	1,107,059	1.4
Irish Free State . . .	29,464	2,971,992	1
Poland . . .	286,641	32,900,000	.9
Italy . . .	233,254	42,158,817	.6
Lithuania . . .	12,385	2,392,983	.5
Roumania . . .	88,671	19,456,000	.5
Yugoslavia . . .	52,083	12,984,923	.4
Spain . . .	48,050	24,059,605	.2
Union of South Africa . . .	39,610	1,828,175	2.2
U.S.A. . . .	12,078,345	122,918,596	9.8
Canada . . .	523,100	10,353,778	5
Mexico . . .	50,300	14,324,280	.4
Japan . . .	1,103,548	65,032,672	1.7
Australia . . .	350,661	6,500,000	5.4
New Zealand . . .	71,686	1,516,218	4.7

BROADCASTING HOUSE





Alfred Craske

THE SOUTH FRONT AND MAIN ENTRANCE
in the shadow of All Souls' Church

THE ARCHITECTURE

By PROFESSOR C. H. REILLY*

ONE OBVIOUSLY cannot get very far in appreciating any building until one knows not only vaguely the purpose of the building, but something definite about the programme to which the architect had to work in making his design. Without this knowledge one can merely judge his creation as one sees it in the street, an ornament or otherwise to its surroundings or, if important enough, to the town as a whole. In these days of transition, however, even that is a little difficult. An ornament implies something ornamented and the ornament as part of a scheme of decoration. The point at once arises as to whether the building in question is to be considered as part of the scheme of decoration of the street as it stands at present and to be judged accordingly, or as part of some future scheme. If the latter we are in obvious difficulties. The most we can really expect in a new building, such as that of the B.B.C., placed in an area where in the past there has been a very powerful scheme, but where no new scheme is as yet in existence, is a certain neighbourliness which will make the building consort fairly well with both its present neighbours and its new ones when they arise. This, if important, is admittedly a little vague. We will return to it later. It points, however, once more to the special need to-day (when the traditional ways both of building and of expressing ourselves in our buildings are changing, and rightly changing, in sympathy with our different ways of living), of understanding the programme put before the architect by the promoters. As part of that programme one must realise, what is not always easy to do in a town, the shape of the site and the restrictions it has placed on the designer by its outline and by any rights of lights over it of neighbouring property.

The programme in this case was a unique and inspiring one, a problem indeed to fire the imagination of the architect and everyone else concerned. The main portion of it, in impressiveness, if not in required cubic contents, was the provision of a mass of insulated concert halls and studios, from which

* Professor of Architecture in the University of Liverpool. (Reprinted from *The Listener* of 13 July, 1932.)

music and messages of every kind would be sent out world-wide, and that not as the effort of private enterprise as in some other countries, but as representing the nation. That, at any rate, is how that part of the programme would appeal to the architect, seeking, as he must always do, to give the noblest possible expression to his client's building. Subsidiary to this central function of the new building, but actually occupying a great deal more floor space, was ordinary office accommodation for the six hundred odd persons in one way or another organising this new and exciting public service. Such office space, of course, like nearly everything else, is capable of fine architectural expression, but it will be admitted at once that it does not offer a new or unusual programme. It is indeed the programme which most of the buildings in the central areas of all large towns are designed to answer. This office accommodation, therefore, should not be permitted, if the site were sufficiently large, to overwhelm the more distinctive portion of the building. That it has not entirely done so in the new B.B.C. building is a great tribute to the architect, Colonel G. Val Myer. In spite of having to wrap his studio block completely round with offices, so that externally the most distinctive portion of his structure does not show at all except for the short length of plain walling with seven small roundels in it at the top of the Portland Place front and the three small steel receiving aerials on the roof, he has certainly managed to give to his building a different air from that of the ordinary office block, and to suggest that it serves some new purpose. His building does not look, fortunately, like an ordinary Government office, nor an ordinary block of offices, nor a hotel. One is arrested by it and certainly, if one did not know, would ask what it was. We will leave it at that for the moment.

Let us return to the part of the programme involved in the site. It is an oddly shaped site rather like a lopsided potato or sausage balloon tapering to a roughly rounded nose facing down Regent Street, with a long bulging side to Portland Place and a straight one to the back street. At the end opposite the rounded nose the site is cut off sheer by the adjacent property. Its length is about 200 and its width in the middle is about 120 feet. It is very significant, both of the amount of accommodation the architect had to fit on to this site and of his consequent

difficulties in properly articulating and expressing its various functions, that he has had to fill the site completely from end to end and side to side, save for a small area for neighbourly accommodation at the truncated end. He has not been able to allow himself any of the ordinary lighting courts a building of this width would call for. Except for his external layer of offices, therefore, his building has had to be lighted and ventilated artificially, and very well it has been done. To get everything in he has had, in addition, to carry his building up everywhere to the full height the London Building Act permits. If one had to fill a sack entirely full with any substance, one would obviously have considerable difficulty in arranging in addition expressive folds in the sacking, if that were one's object too, as it must always be with the architect. A further difficulty of this site was that it was commanded by rights of light by the buildings in the back street. This is the reason why the end of the new building looking down Regent Street is so unbalanced at the top. One side has been sheered off as it were by the windows in the buildings opposite. How the directors of this great enterprise, with a future no one can foretell, but one certainly of increasing not decreasing activity, came to choose such a site it is a little difficult for an outsider like myself to understand. One would have thought that they would have made every effort to have obtained a free open site instead of a restricted street one, a site, that is to say, where their building could have expanded upwards and outwards, as best suited its peculiar character. No doubt in the central position required it would be difficult to find such a site, though one nearby at once jumps to the eye for so unique an occasion. It is the site which used to be suggested for that unfortunate ghost of a dream the National Theatre, a site in Regent's Park itself facing directly down the great avenue of Portland Place, the widest street in London. There the big block of concert halls and studios, windowless, but all the more significant for that, might have grown into a great dominating central tower round which, at appropriately lower levels, could have been grouped the office accommodation in proper subsidiary relationship. It would be difficult for an architect to imagine to-day a more thrilling programme than for such a building on such a site. One does not, of course, want to see the parks encroached



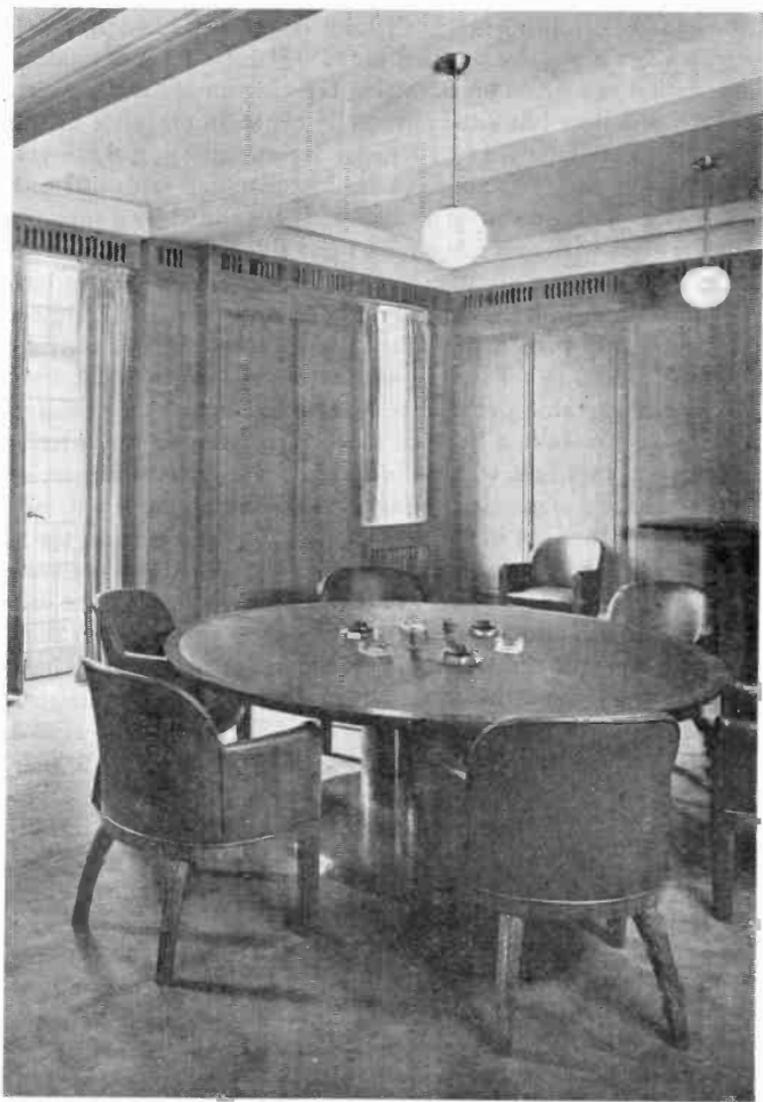
THE ENTRANCE HALL

showing the inscription and Eric Gill's statue of the Sower

upon for any ordinary purpose, but if Hyde Park could admit the Albert Memorial, Regent's Park might well have provided on its edge a worthy position for so striking a form of modern expression as a great broadcasting building for the metropolis.

The architect has naturally made his main entrance at the rounded nose facing down Regent Street. Entering there you are at once in a fine spacious semicircular hall with lifts and doorways opposite you. The semicircle is defined by a range of strong piers with space behind on one side for a counter. This space is where the site with its odd potato-like outline overlaps the semicircle, and shows that in the interior here the architect has very ably turned his difficulties to account. The outside, of course, had to follow the outline of the potato. With land of enormous value per square foot architecture has, as things are to-day, to take a humble place. However, in the interior of this entrance hall, where the architect was able by his device of a semicircle of piers to free himself, the architecture is strong, simple and modern in the sense that it does not rely on traditional motives for its appeal. Immediately behind this entrance hall is the great central core of the building, following the outline of the site and surrounded from top to bottom by a thick wall. This is the central studio block, and once the artists have passed into it from the entrance hall they cross no administrative portion of the building. Their cloak rooms, rest rooms, refreshment rooms and lavatories and, of course, all their studios and concert halls, are within it, artificially lit and ventilated. In persuading the authorities to allow artificially ventilated retiring rooms the architect has, it may be hoped, achieved a very valuable precedent which will in future permit such rooms to be placed in the dark portions of the plan instead of against external walls only, an economy of space and light long since practised in America. When the artists have finished their work they pass out the same way. If, however, instead of going through the central doors for the artists one goes to the right or to the left or takes the corresponding stairs or lifts, one enters, at any floor, the long office corridor which completely encircles the studio block. This corridor serves the layer of offices one room thick which everywhere occupies the external face of the building.

The offices need not detain us. They are straightforward



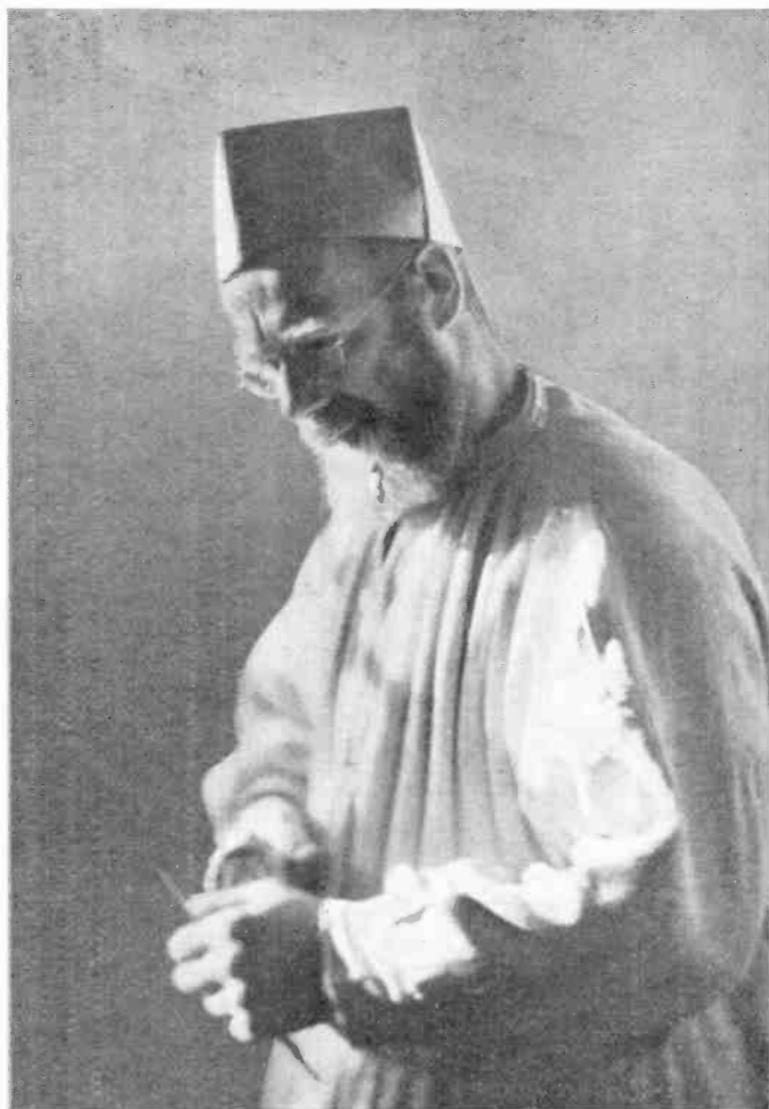
THE BOARD ROOM

well-lit rooms, neither too high nor too low, without ornament but with an air of efficiency which one expects to-day but which was hardly to be found five years ago. Occasionally there is a suite of rooms for a director or sub-director and these have simple panelling. There is a board room treated in the same way, fortunately free from the loops of carved fruit and flowers our bankers still require for complete happiness. Above the entrance hall there is a fine circular conference hall (see p. 110), a little more strongly modelled but still retaining the air of efficiency which is the keynote of the interior.

We now come to the buried studio block in the centre of the structure, the holy of holies, the mysterious heart to which I am sure the architect would have liked to have given fuller expression on the exterior had his site allowed him. The decoration of these studios being the subject of another article, I must only refer to them very briefly. Lowest of all in the second basement, but above the heating and ventilating machinery, is the vaudeville studio, but, nevertheless, with a small gallery for auditors, and with stands for spot-lights, without either of which, even when broadcasting, one may suppose a vaudeville artist would feel abashed and awkward. It seems appropriate that the centre of laughter should be deep in the bowels of the earth. On the next floor up, but still one down from the street, is the big orchestral Concert Hall, the third biggest concert hall, I am told, in London. On the floor and in the gallery 550 of the public will be able to hear the concerts, approaching the hall by stairs and a special entrance, very well managed, from Portland Place. This hall is the finest thing in the building. It is strongly modelled with great bracketed beams to break up the sound. Without reliance on traditional forms it yet has great scale and power. There is indeed something cyclopean about it which provides a suitably serious air, and at once separates it from the ordinary run of frivolous apartments in which English people are, as a rule, compelled to listen to music. Yet with all this it does not lack interest. That is given largely by the lighting, the tapering shape and the heavy crouching balcony. Altogether it is such a hall as Piranesi might have designed had he dreamed of such instead of prisons. The other studios do not come within the scope of this article, but up above them all is the control room which to me, with its switchboards and strange,

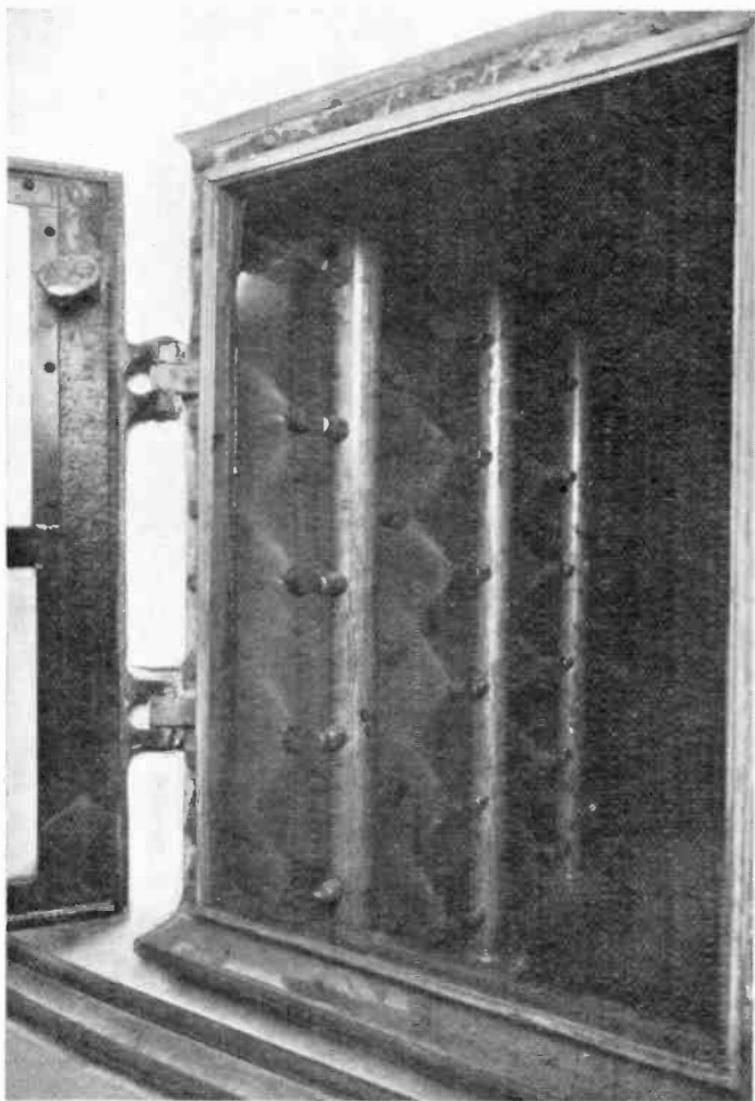
clean, clear-cut instruments under a perspective of sloping beams, is the most decorative of all. The little mixing room at the same level where the sound from all the studios can be mixed together, if not susceptible to much architectural expression, calls up an irresistible desire to return to the mischievous days of one's youth. (See pp. 322 and 325.)

To come at last to the exterior, one sees that the architect has taken the big curved front to Portland Place and modelled it in a series of flat vertical planes rising sheer from the pavement but balanced about a central axis. The windows in their long ranges emphasise admirably the curve of the front. Probably out of sympathy for the surrounding buildings, he has not turned them into long continuous sheets of glass in the logical modern way, but has given each the ordinary vertical shape. He has even filled them with bars, in these days of plate glass, to obtain a contrasting texture with his plain stone surfaces. These great stone cliffs of his, rising as it were one behind the other from a base modulated by a range of larger windows, a band of wave ornament, and a central strongly marked balcony, but with no crowning cornice, give an aspiring look to the building well in keeping with its central function. Such ornament as there is, the decorative coat of arms and the interesting frieze of birds and rays of light on the balcony front, designed by the architect, and the impressive reliefs by Mr. Eric Gill at the base of the two bays flanking the Portland Place front are, like the building itself, restrained and forceful. Mr. Gill is to fill the great niche over the entrance door with a bronze group and it is not fair to judge this front until this is in place. As already pointed out, this front can never be symmetrical owing to the exigencies of the site. Its overloading on one side like a naval aircraft carrier is probably the reason why the building has been likened so often to a ship sailing down Regent Street. If, however, one mentally restores the missing blocks of building one sees at once that this front, if not so placid and dignified as the great curved one, would, nevertheless, come to rest as a stable and solid monument. In an age of transition then, on a difficult and restricted site, and with the most interesting things in his building necessarily hidden, one can congratulate the architect on a very notable achievement. One is a little less certain about congratulating the B.B.C. who set him the problem.



ERIC GILL

Howard Coster



AIR-CONDITIONING PLANT. THE WATER SPRAY FOR WASHING SOOT AND DUST FROM THE AIR DRAWN IN FROM THE STREET

THE VENTILATING PLANT

By CHRISTIAN BARMAN, F.R.I.B.A.

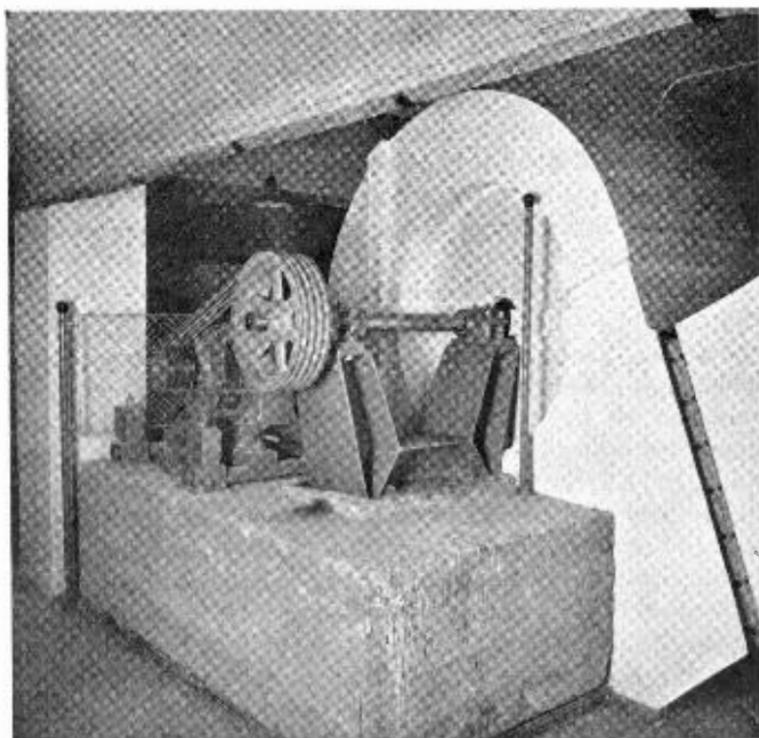
A MODERN CRITIC has said that a house should be a machine to live in, but so long as houses are built with doors and windows like those of our forefathers it will never occur to anyone to connect them with the world of machines. The windowless studio building in the centre of Broadcasting House is, however, every inch a machine. Once you are inside that machine the whole of the natural world disappears and you exist in an environment that is wholly artificial. An ordinary house is content to keep out the rain, but in this studio building you are cut off from all the other elements besides: light and sound, heat and cold, even the outside air, are here completely shut out. Sounds will get into a camera and changes of temperature are soon felt in the interior of a submarine, but if a bomb were to drop on the Langham Hotel the performers in the B.B.C. studios would never know, and a heat-wave might continue for twelve months or more without anyone feeling the warmer by even one degree. The reason for this very thorough insulation is a simple one: in a city like London it is impossible to admit fresh air and daylight direct into a room without also admitting noise. And noise is the one thing that a broadcasting engineer simply will not tolerate. The talks and the music sent out upon the ether must be turned out acoustically pure. That enormous and admirable machine, the studio building, makes it possible to do so without the possibility of error.

There are within the walls of the studio building a great concert hall and twenty-one smaller studios. In all these studios a considerable number of people are constantly at work. These people get no fresh air from windows, no light from windows. All light is artificial: all air is artificially prepared and circulated. Now, the proper ventilation of public places is notoriously a very bad problem for an architect or engineer. For when people come together in a theatre or a meeting-hall, two things at once begin to happen. The people's lungs absorb the oxygen from the air, and replace it with carbon dioxide. At the same time their bodies give off great quantities of heat and moisture. The ill effects of mass-breathing are easily removed by bringing in fresh air. This is fortunate, for people cannot

exist without oxygen, and so the law, which watches carefully over our every step, sees to it that enough oxygen is available to maintain life in a theatre audience so long as the performance lasts. But whereas breathing too much carbon dioxide will kill you in the end, the surplus heat and moisture that accumulate in an ordinary theatre, or in a public meeting-place like the Room at Lloyd's, will merely make you feel horribly uncomfortable. The law in this case is not called upon to interfere, and in most theatres the spectator is allowed to simmer away to his heart's content. This, again, is rather fortunate, since to get rid of this surplus heat and moisture as it rolls up from the human crowd is a much more difficult business than to get rid of dangerous amounts of carbon dioxide. There are, of course, people who have not the slightest objection to being boiled, and there are some who even enjoy the experience. These latter will frequent theatres in the hottest days of summer.

The marvel of the Broadcasting House studios is that if they were filled with people for years on end the air would be of exactly the same quality, temperature, and dryness as at the moment of entering. When it is remembered that the normal crowd for these studios will disseminate in the air a matter of very nearly twenty gallons of water hourly, the difficulty of the business will at once become apparent. To get rid of the heat is very nearly as troublesome. An ordinary theatre will be icy cold on a winter's day, and will require a great deal of heat to make it comfortable; yet by the time the interval comes round the heat given off by the audience will already be greater than most people like. No wonder the Carrier refrigerating machine at Broadcasting House has a cooling capacity sufficient to make 200 tons of ice for every day in the year. But this remarkable machine is not used for direct cooling only. The cooling process is also incidental in the mysterious business of drying the moisture out of the air.

This drying (or "de-humidifying") of the air supply is, indeed, to my mind, the most attractive piece of engineering skill exhibited in this remarkable building. You might perhaps think that to dry the moisture out of the air means to heat it as one heats wet clothing in front of a fire. You could not be more hopelessly wrong. It is only necessary to remember the sensation produced by moisture-saturated air upon the human body



ONE OF THE FANS AND FAN MOTORS OF THE AIR-CONDITIONING EQUIPMENT FOR THE CONCERT HALL

Note the massive vibration-insulating joint

to realise this. No matter what the temperature, on a really close sultry day everybody knows that what is wanted is a good shower of rain to "clear the air." And showers—ice-cold spring showers sent down to order at any season—are what the four air-conditioning plants at Broadcasting House supply in whatever quantity is needed. The showers do not, of course, descend in the studios themselves, but in special chambers, built into the lower basement, where you may watch through a glass window the waves of rain being buffeted about in a miniature gale and swept along as in a hurrying mountain mist. And after the shower there follows another curious operation, which shakes the dewy air precisely as a cook will shake the water out of a

salad. By this time the air is probably a shade too cool and may need warming up a little before it is admitted to the studios. Its freshness and dryness, are, however, clearly evident. It is the sort of air that one associates with clean bracing weather, free from damp, free from coal smoke, and generally on the same level of hygiene as our urban water, our milk, and other necessities consumed on a more manageable scale than air. Of this air the Broadcasting House installation produces several thousand tons each day.

The final stage in this remarkable air supply business is, I think, equally worthy of notice: it is the delivery of the air into the studios. The air, automatically controlled at a temperature which may not err by more than $1\frac{1}{2}$ degrees from the temperature you ask for, travels through a network of ducts to its appointed orifice in a certain studio. It travels through these ducts, and is decanted into the studio, at a speed which is known as precisely as the speed of an Underground escalator or the speed of newsprint racing through a printing machine. As it runs out into the studio, it is unfolded, deflected, and dispersed hither and thither, so that no pools or pockets of stagnant air remain about the room. And at the same time, through other openings, the used-up air is withdrawn at precisely the same speed as that of the entering air, so that eddies and draughts may be equally avoided. Lastly, the entering air has been completely rid of noise. When it is remembered that metal ducts such as those here used would normally act as speaking tubes, and would carry sounds from each one of the twenty-two studios to all parts of the building, the task of insulating the whole system against noise will be seen to have been immensely difficult. Rooms other than studios are ventilated by artificial means, but here it has been thought sufficient to provide what the engineers so fitly call a "good-class commercial silence." For the studios nothing less than a real "super-silence" would do. This "super-silence" is produced by means of specially designed "sound arrestors," in which the sound waves are literally worn down by friction surfaces until nothing audible is left. When all this machinery is thrown into operation, the work of broadcasting may be carried on by the little army of speakers, players, and announcers, with perfect efficiency and in a very enviable state of physical comfort.

SOME STATISTICS

The height of the building above street level is 112 ft. 9 in.

The depth of the building below street level is 34 ft. 3 in.

The weight of the building is 24,000 tons.

The number of bricks used is 2,630,000.

The cubic capacity of the building is 2,260,161 cub. ft.

The number of doors is 800.

The number of panes of glass in the building is 7,500.

The length of corridors is 1 mile.

The weight of earth excavated before building was 43,000 tons.

The average consumption of water per day is approx. 193,000 gallons.

The capacity of the fuel oil storage tanks is 60 tons.

The average oil consumption per day for heating is 2 tons.

The steam-raising capacity of the boilers is 12,000 lbs. per hour.

The number of radiators in the building is 840.

The power-consumption of the air-conditioning and ventilating plant is equal to approx. 450 h.p.

The amount of air handled by the ventilating apparatus per hour is approx. 260 tons.

The number of rooms served by the air-conditioning and ventilating plant is 180.

The moisture given off in twelve hours by people in the tower, when it is fully occupied, would weigh 1 ton.

The number of electric lamps in the building is approx. 6,500.

The number of thermionic valves is approx. 660.

The average filament heating load is 1,700 watts.

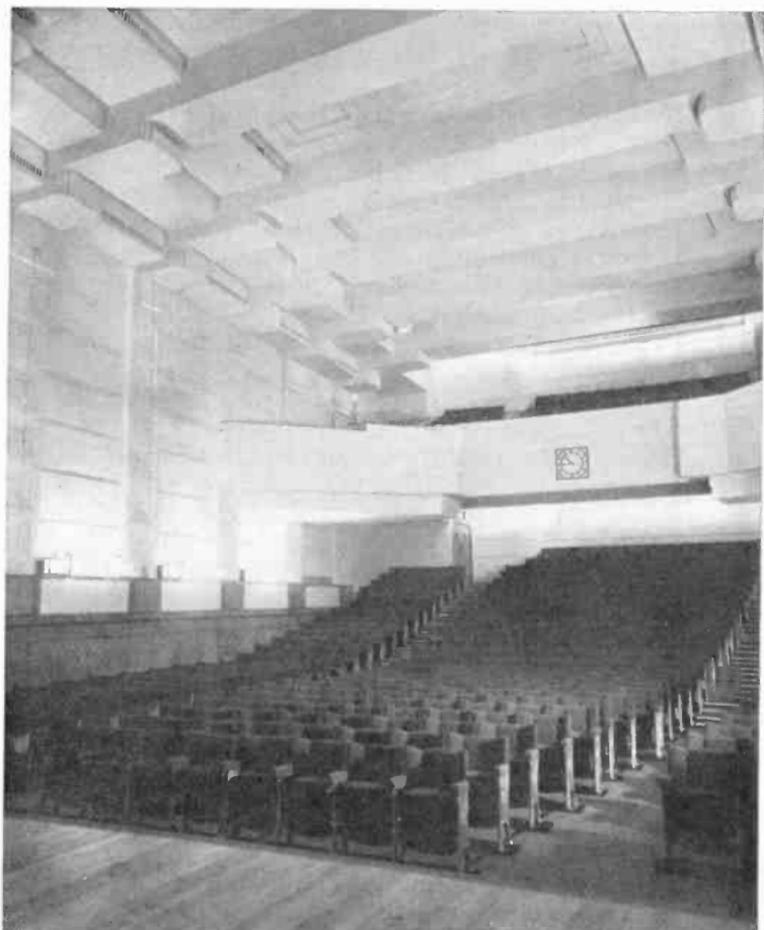
The average H.T. load, including local loudspeaker amplifiers, is 1,300 watts.

The number of permanent staff engaged in the building is approx. 800.

The average total electricity consumption daily is 5,300 units.

The number of clocks in the building is 98.

Total length of wiring in broadcasting circuits is approx. 142 miles.



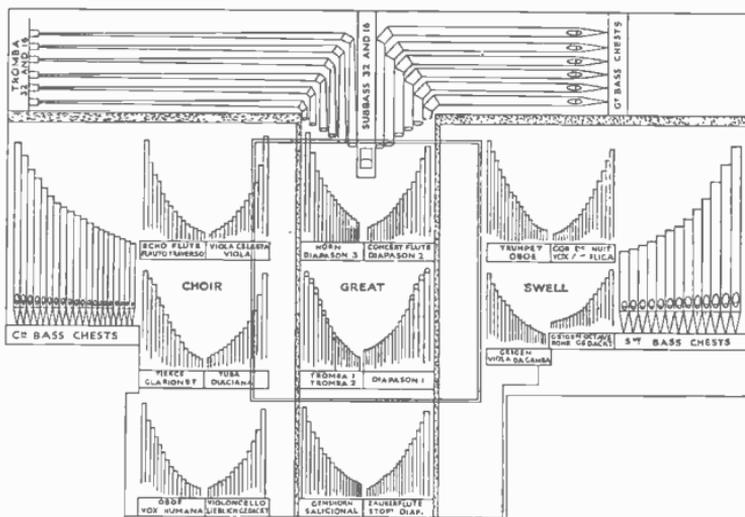
Shaw Wildman

THE CONCERT HALL, LOOKING TOWARDS THE BALCONY

THE ORGAN FOR THE CONCERT HALL

THE GRAND ORGAN now being erected by The John Compton Company Limited in the Concert Hall will be an extremely interesting instrument, and at the time of its completion will represent the last word in modern organ-building on the systems of Extension and Total Enclosure, of which Mr. John Compton has been at once the pioneer and (as is admitted by all who have seen and heard his wonderful organ in Downside Abbey) the master. The principle known as Extension is too technical to be discussed here, but it may briefly be described as the application of economy and efficiency to the mass of mechanical and tonal material of which an organ is composed. It alone makes possible the erection of an organ with the resources of the new B.B.C. instrument in a space so confined as the chamber in the Concert Hall. But the point about Mr. Compton's system is that his organs do not suffer in this confinement; they would not sound any better or even as well if they were erected in a large open hall. For his methods of voicing have been adapted to his methods of tonal distribution; and the principle of total enclosure, to which again his voicing is specially adapted, results in the organ speaking as one controlled unit instead of an assemblage of thousands of individual instruments.

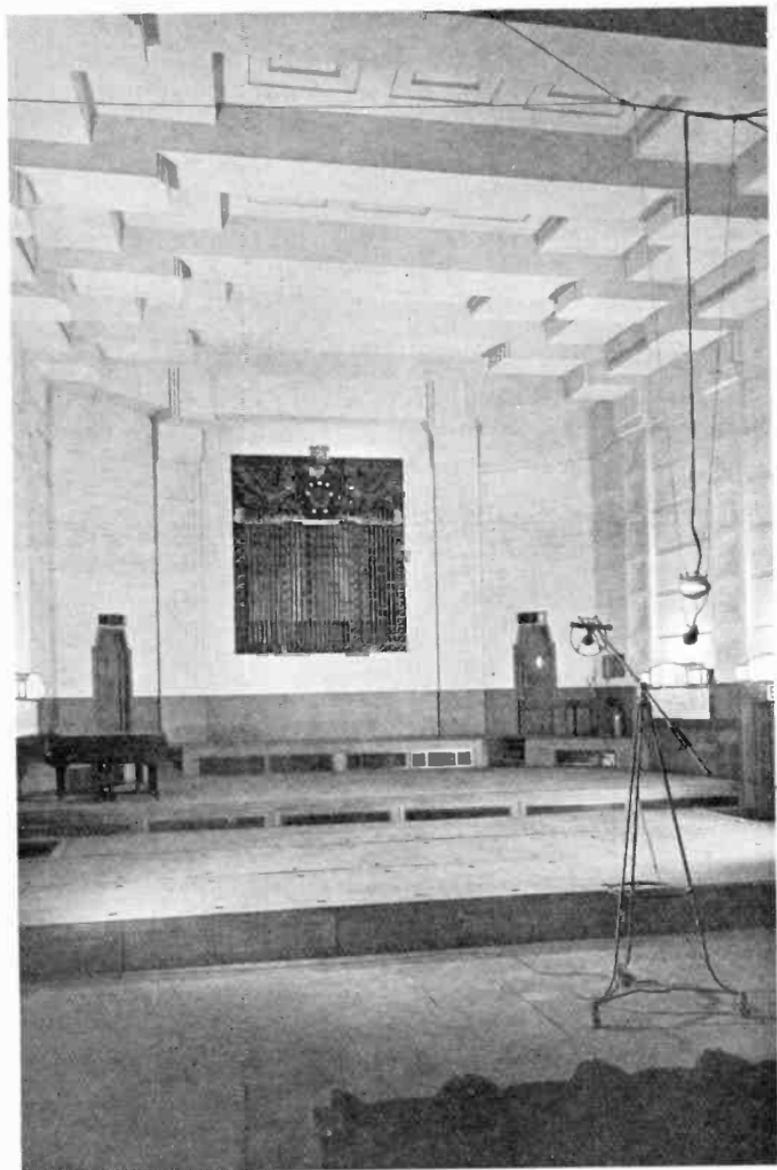
The new organ is an instrument containing 2,362 pipes divided into 31 ranks of characteristic organ tone. Each one of these ranks is a complete organ in itself, sometimes containing as many as 121 pipes and never less than 61. The whole of these pipes are enclosed in three separate chambers, one containing great organ and pedal, another swell and pedal, and the third choir, solo, and pedal. These ranks are again grouped into departments which appear on the stop controls as a pedal organ of 22 stops, a Great of 18, a Swell of 19, a Choir of 29 and a Solo of 17. Instead of ordinary draw-stops, the controls are transparent discs which, on being pressed by the finger, are illuminated and show the stop as drawn; on being touched again the light disappears and the stop is off. Practical experience of the Downside organ has shown that this method of stop control greatly helps the organist in his handling of registers and control of tone colour. The voicing of the organ is being



GENERAL PLAN OF THE ORGAN

specially treated with regard to its tonal relationship to the microphone. The electric action as evolved by Mr. Compton makes the mechanism of the organ a thing of extraordinary simplicity and durability. Glue and leather are practically abolished. There are no bellows; and instead of the hinged pneumatic motor with its perishable leather, requiring expensive renewal at intervals, wind is admitted to the pipes by the positive action of bakelite pistons in which there is practically no wear. The movable console controlling these great forces, with its stop jambs containing 150 stops, is little larger than an ordinary upright piano. It is intended that a duplicate console shall be installed in some studio remote from the actual organ, which will thus be heard by the performer only through the medium of a loud speaker, so that he will be able to hear exactly what his audience is hearing.

Pictures and diagrams of Broadcasting House will also be found outside this section, on the following pages: 63, 80-81, 163, 167, 173-6, 179, 196, 322, 325, 354, 356, 362, 365, 387, 398, 403, and the inside cover papers at the beginning and end of the book.



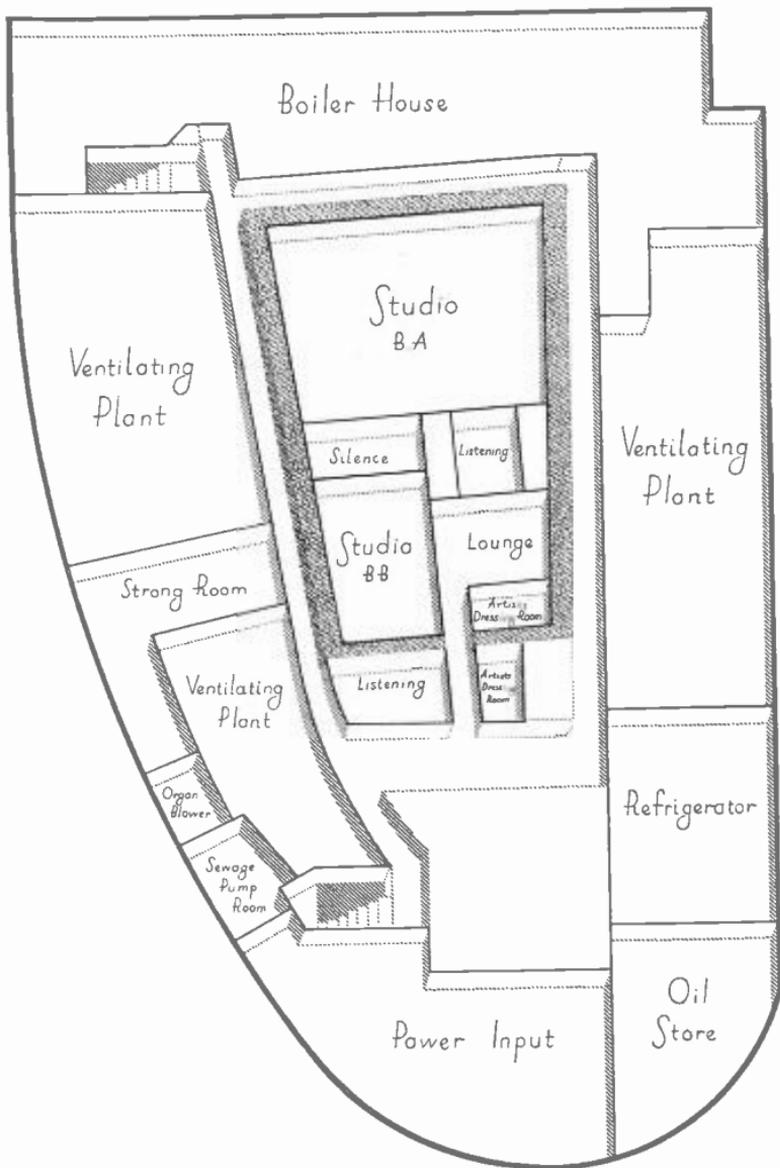
THE CONCERT HALL, SHOWING THE ORGAN GRILL



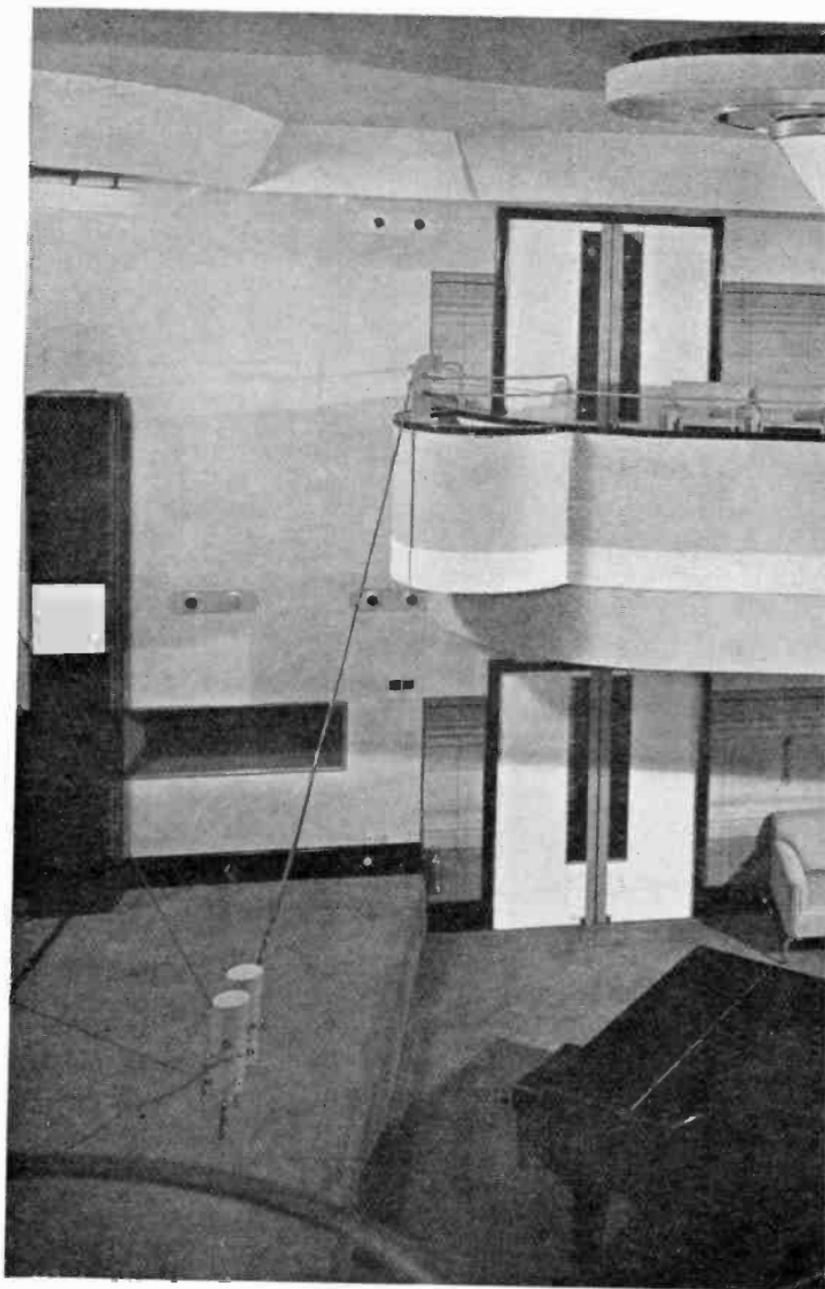
THE GENERAL TYPING OFFICE



THE COUNCIL CHAMBER



PLAN OF THE SUB-BASEMENT FLOOR, SHOWING THE STUDIOS INSIDE THE CENTRAL BRICKED-IN "TOWER"



THE VAUDEVILLE STUDIO (BA) SHOWING SEATING FOR AN AUDIENCE IN "PIT" A
BLACK SCREEN BEING INTENDED FOR USE AS "WINGS." THE POSITIVE
[112]



GALLERY. THE STAGE IS AT THE LEFT OF THE PHOTOGRAPH, THE FOLDING
THE STUDIO IS SHOWN IN THE PLAN ON THE PRECEDING PAGE

[113]

A LIST OF THE STUDIOS

Studio.	Principal Use.	Rever- beration time.	Volume in cubic feet.
BA.	Vaudeville. Light Music.	1·1 secs.	30,000
BB.	Television.	0·85 sec.	10,000
Concert Hall.	Orchestras and Bands.	1·75 secs.	125,000
3A.	Children's Hour and Dance Band.	0·6 sec.	10,000
3B.	Talks.	0·35 sec.	1,500
3C.	Talks.	Dead.	1,500
3D.	Talks.	0·35 sec.	1,500
3E.	Religious Services.	0·8 sec.	7,000
4A and 4B.	News.	Dead.	670
6A.	Large Productions.	0·85 sec.	10,000
6B and 7B.	Speech in Plays and Piano Music.	0·6 sec.	3,200
6C and 7C.	Speech in Plays.	Dead.	3,200
6D.	Effects.	Dead.	8,300
7D.	Effects Research.		1,400
6E and 7E.	Gramophone Effects.	Untreated.	860
7A.	Speech in Plays.	Dead.	1,500
8A.	Orchestras and Bands.	1·1 secs.	27,000
8B.	Discussions.	0·45 sec.	2,100

The numbering of the Studios is according to the floors,
except for the Concert Hall, which occupies three floors in
height.

THE DECORATION OF THE STUDIOS

By LORD GERALD WELLESLEY, F.R.I.B.A.

THE INTERIOR of Broadcasting House is the most important example of untraditional decoration yet completed in this country. The accumulated rubbish or wisdom of the ages has been washed away, and something which is definitely and entirely new has taken its place. Such a phenomenon has never occurred before in the world's history. Taste in building and the trappings of life generally has always been in a state of flux and change, but its evolution has hitherto been gradual, even when enforced by political upheavals. It is therefore natural to wonder why in our time we have not been able to make a complete success of a gradual evolution and adaptation of traditional forms to modern conditions. The Swedes can do it, and to some extent so can the Austrians; but in England such attempts, at any rate in vast town buildings, seem poor anæmic affairs sadly timid compared with honest, stark, functionalism. Nevertheless, though tempered traditionalism may be unexciting, it is in many instances justifiable and can in no circumstances arouse the disgust and ridicule which profuse untraditional and newly-invented ornament causes. How pathetically old-fashioned is the immensely elaborate carved wooden room set up during the first years of the present century in the Musée des Arts Décoratifs in Paris. Will the future ever produce a defender of the luxuriant decorative orgies of that manner which we used to call "the Art Nouveau" and the French "le modern style"? The epoch will, of course, in time find admirers among those who have a great "sense of period." But surely no one will ever want to live in an elaborate "modern" room of the year 1902. The fallacy that you can invent architectural ornament was not dead in the year 1925 when the great Exhibition of Decorative Art was held in Paris. The buildings and rooms bristled with rows of silly flutes and yards of zigzags, which lacked the great traditions of the egg and dart or the Greek fret and were every bit as meaningless. To lay down any law in the realm of æsthetics is difficult, but a strong case can be made out for the proposition that something really new happened in architecture and decoration when it was realised that you cannot invent your own architectural ornament. You

must either use what has come down to you through the ages or else do without.

Now I do not mean by this that no concession to the pleasures of the eye should be made in a modern building. All sorts of things to please the eye can be done without resorting to sinkings and projections. In the first place there is no reason why sculpture should not be used. Let there be no nonsense about the sculpture being part of the construction of the building. It is there purely to adorn it precisely as a room is adorned by a picture or a vase of flowers. When it comes to the inside of a building the possibilities of embellishment possessed by the architect are almost as great as those of an eighteenth-century predecessor. Of course he must not resort to a cornice, or moulded door architraves or skirtings or panelling or a great carved and moulded fireplace forming a climax to a room like the altar to a church. But in revenge he can make all this seem fussy and commonplace in contrast with the clean simplicity of his lines, with the subtle harmonies in colour, which the complete absence of projecting decoration seems to indicate. But above all he can do anything he likes with his lighting. He can toss it from surface to surface, he can throw it up and down. He can diffuse it if he wishes or he can concentrate it to emphasise some feature of his room. It is his slave, as water was the slave of the baroque garden architect. This god-like power to bend light to the will of man, which is the greatest advantage that the designer of to-day has over his predecessors, is peculiarly important at Broadcasting House as, with one exception, the studios, for acoustical reasons, are all embedded in the centre of the building and are never lit by the crude untamable sun.

Another fundamental difference between the room of the past and the truly modern room is the importance which the few decorative objects which are allowed to enter it assume. A Georgian or Victorian room may well contain thirty articles the sole function of which is to adorn. They are, in fact, what old-fashioned housemaids call "ornaments." The modern room contains two or three. One vase filled with flowers, real or artificial, one picture and one statuette on a table—a bare three ornamental objects form quite a liberal allowance for a new room. But then how interesting each becomes. A tall vase with two lilies, placed in a niche and lit from below, is far more



STUDIO 8A FOR ORCHESTRAS AND MILITARY BANDS

arresting than a table covered with fifteen full flower vases which have taken half an hour to arrange. This Japanese economy in objects the sole function of which is to embellish is of the very essence of modernity. The thrill that a vase of flowers or a cactus gives in the setting of a modern room is unexpected and difficult to analyse. It is like a living, articulate, voice in a well of silence. It is the one note which breaks the repose, the one place where rowdy colour flashes and exuberant forms are allowed. Place the same vase on a table in some old-fashioned drawing-room and it would not be noticed. The use of flowers and plants in Broadcasting House is masterly and in many cases forms an essential element in the decorative scheme.

The designers of the studios have in no case had a free hand. They have always had to conform to given proportions of reverberating and non-reverberating substance on their walls. These proportions vary in the different studios. The materials most used are "Donnacona" or "Tentest" wall-boards, made in large sizes and having a rough texture, hard synthetic resin sheets, plywood, and various stuffs. Except the rough wall boards these materials may be of any colour. Although the use of given proportions of these materials as wall coverings meant a strict limitation to the designer's fancy, the mere fact that so much was decided for him was probably a help. A severer limitation was the ban on all foreign imports. Many of the substances used had therefore to be made in England for the first time. Moreover, there is practically no room in Broadcasting House which is a plain rectangle; but this would have been a severer handicap to designers on traditional lines, as would also the rows of small upright apertures demanded by the very efficient ventilating system.

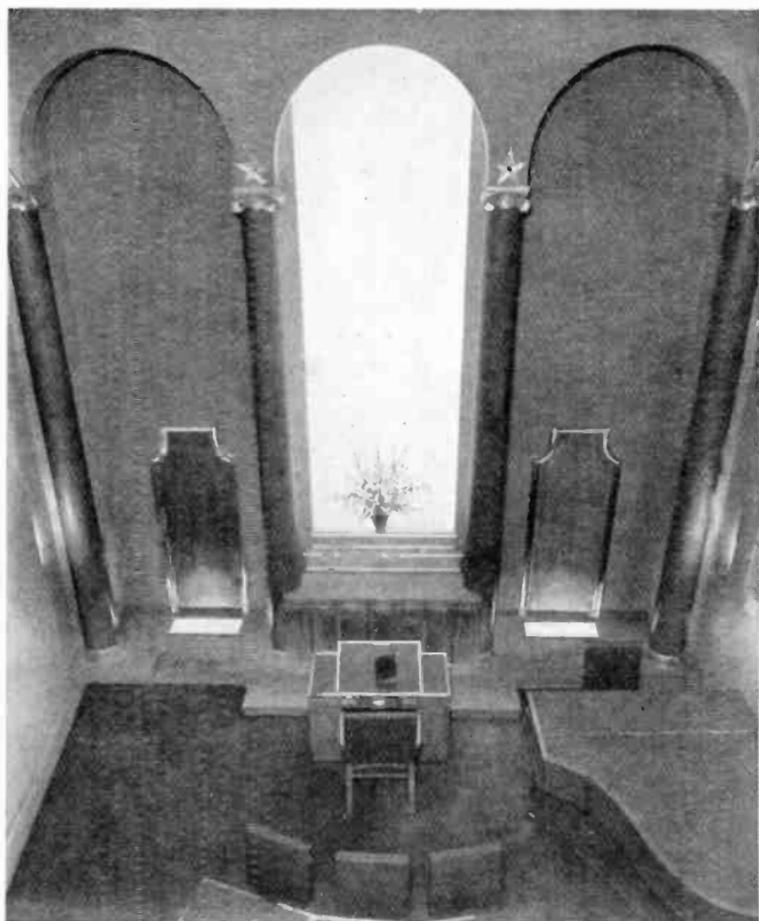
It may be asked why so much care should be lavished on the finish of the studios which are only seen by the broadcasters. Why is more required than, for instance, the standard of finish to be found behind the scenes in a theatre? To such utilitarian questions the reply is that the atmosphere of a broadcaster's surroundings affects his performance. Bright bands demand bright rooms: talkers want intimate little studios: religious performances must take place in a temple-like structure elaborately unsectarian, and plays and sketches must be staged in something resembling a theatre.



ONE OF THE LISTENING ROOMS



THE ARTISTS' LOUNGE ON THE SIXTH FLOOR



Shaw Wildman

THE RELIGIOUS SERVICES STUDIO, 3E

*Photographed from the gallery so as to show the whole of the "Altar" wall
(see also p. 196)*

The resolution of these difficult and delicate problems was entrusted to different designers whose work we will now examine in detail. Lieut.-Colonel G. Val Myer, the architect of the whole building, retained the large Concert Hall in his hands. Most of the other studios were designed by Mr. Raymond McGrath, Mr. Serge Chermayeff, or Mr. Wells Coates, whose works and tastes are on similar lines. A small talks studio in a traditional manner was entrusted to Mrs. Dorothy Warren Trotter and the "Temple to an Unknown God" to Mr. Edward Maufe, who has recently won the competition for Guildford Cathedral.

Far the largest of these apartments is the Concert Hall, for it will accommodate a large though not a full-sized orchestra and an audience of 550. Colonel Myer has made great play in this room with changes of plane. Practically the whole of the wall surface is carried out in plaster, and for this reason, no doubt, acoustical considerations imposed what seems, by comparison with the other interiors, a great elaboration of detail. Sinkings and projections, coffers and corbels, produce strong contrasts of light and shade and give variety and incident to the hall. No attempt is made here to diffuse light. The aim has been to make certain planes stand out in blinding whiteness against the pools of shadow. The general effect will be felt by some people to be exciting, by others restless. No doubt when filled with orchestra and audience the "busy-ness" of the plaster-work will count for much less than it does when the room is empty.

Mr. Maufe had a difficult task set him when he was told to create a temple where Catholic and Calvinist, Jew and Moslem, should feel equally at home. At the "East" end of the "chapel" are three arches of equal height. The two side ones frame two small doors, while the central space is filled with a brilliantly lit back-cloth of palest blue, above a substitute altar. The colour is very happy. The green columns stand out against the pinks of the wall and floor. The ceiling is blue spangled with gold. The four capitals have an Ionic flavour.

As a concession to the conservatism and weakness of human nature, it was decided by the authorities that one of the talks studios should be definitely traditional in flavour. It was feared that elderly dons and clergymen, so far from being stimulated and put at their best by the naked simplicity of functionalism

and metal furniture, would be definitely frightened of it. So a little library with every sham which could be crowded into so small a space was devised for their comfort. The pretty little room, designed by Mrs. Dorothy Warren Trotter, receives light from a large artificial window draped with curtains festooned in the true Regency style. The chief decoration of the walls is provided by book-cases filled with the loveliest book-backs gummed on to the plaster. There is a mantelpiece marbled to look like *verde antico*, but no fire can burn in it as it is not provided with a chimney. Over the mantelpiece a portrait of George Washington, the man who never told a lie, surveys the room with dignified hauteur. It would be absurdly puritanical to quarrel with these innocent deceptions. The room fulfils the conditions imposed on the designer. It is "cosy," an epithet which could not possibly be applied to the other studios. Figuratively speaking a perfume of *pot pourri* and old leather bindings hangs about it. Figuratively, I say, for were it possible to discharge such an emanation into the room, the magnificent ventilating plant would make short work of it. The furniture is good, solid and English. In fact there is nothing to offend the senses of the most cloistered recluse that ever came out of a country deanery, and that is an achievement of which Mrs. Trotter has every right to be proud.

And now we come to the really exciting rooms in Broadcasting House, rooms in which what matters is not the avoiding of giving offence, but the more active and noble effort to design something which is supremely fitted to its purpose, which stimulates the user, something alive, brave, and new. The work of the three remaining designers, Mr. Raymond McGrath, Mr. Wells Coates and Mr. Serge Chermayeff is similar in aim. It is, to use a modern *cliché*, functional. I have never seen a definition of functionalism, but it may be said that its aim is supreme fitness for purpose and the elimination of all material which can be dispensed with. It may be contended that this is not a definition of out-and-out functionalism which is simply the degree of decoration of a factory, but it will do for the B.B.C. studios. It will be noticed that the definition says nothing about superfluous labour. To make my meaning clear let us take a rug, which is a necessity in a talks studio. The rug is made partly of dark brown wool and partly of buff wool. As

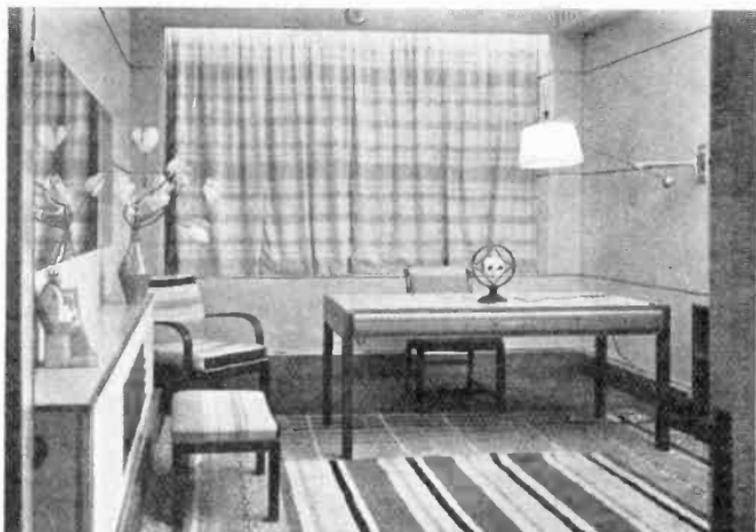


THE "LIBRARY" TALKS STUDIO, 3D

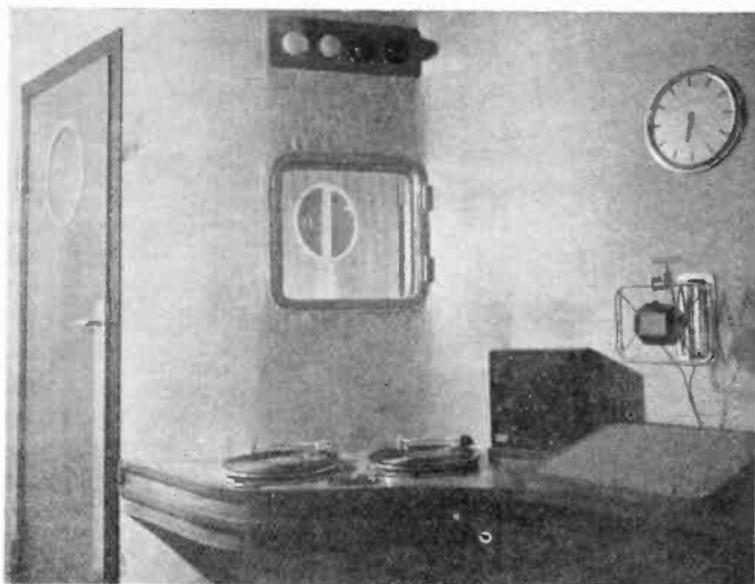
presumably wools of either colour are identical except in tint you add no superfluity to the rug by putting a variegated pattern on it. This makes it more pleasing and interesting to look at. The extra labour is thereby compensated. This principle applies equally to paint on walls and the various stuffs required. On the other hand, applied carving or mouldings are excluded because they involve useless material. I admit that in order to include the systems of lighting adopted in the studios within this definition of functionalism it must be granted that indirect lighting is a necessity in order to avoid eye-strain, for it is not otherwise defensible. In one tiny lobby there are six concealed electric lamps throwing their light on to a ceiling. One exposed lamp would do the same work. It is not easy to find excuses for such extravagance, but it is very pleasant.

The transition from this digression on functionalism to the work of Mr. Wells Coates is an easy one, for he has designed the most entirely functional of the studios, those used for the reading of news and the dramatic effects studio. The news studios and the lobby attached are diminutive rooms containing little more than a curved table running parallel to the wall and a swivel chair. The dramatic effects studio (see pp. 173-176) is as exciting as a magician's cave, and indeed would be taken for such by a savage. For one machine makes thunder; another howls like a February gale. Two neat boxes produce electrical noises; a tank, the prattle of a stream or the roar of a waterfall. A rotating table in the middle has a surface divided into six compartments made of different substances for various percussion effects. The floor has a concrete area and a wooden area for different footsteps. One corner is dedicated to railway noises. All this apparatus is housed and disposed with extreme neatness and compactness. Two microphones suspended from the ceiling and operated by two long jointed arms can be placed beside any "effect" while it is in operation. Even a layman can enjoy all the ingenuity and efficiency of these contraptions, but it probably requires a specialist to appreciate to the full the apparently effortless success of Mr. Wells Coates's achievement.

Of the remaining studios which must be mentioned, three are the work of Mr. Serge Chermayeff and two large ones in the basement of Mr. R. McGrath. Mr. Chermayeff's largest studio is used for bands and orchestral concerts. It is the only studio in



ANOTHER OF THE TALKS STUDIOS, 3B



ONE OF THE TWO NEWS STUDIOS, 4B

(See also page 179)

the B.B.C. building which is lit by daylight, and it is interesting to see how well it passes a test to which the others are not subject. The room is quite shapeless and six large circular "ventilating pans" placed in haphazard positions on the ceiling would have defeated any hope of success except in a "functional" treatment. As it is these blemishes of planning hardly seem to matter at all. Long strip lights are placed across the disks in the ceiling, which is painted with an apparently haphazard pattern. This is echoed in the cork matting on the floor. In neither case is the pattern at all obvious. Probably most people are unconscious of it, but it is just these touches which make the large empty rooms look so different from the gymnasium at a private school. The walls are drab wall-board with narrow white metal joints. The only notes of colour are bright green doors and striped coral pink settees. Mr. Chermayeff's two talks studios (see p. 125 and opposite) are extraordinarily interesting examples of functionalism applied to intimate uses. The colours are all low in tone and harmonise. The lights are shaded, the furniture is comfortable with a comfort which one feels is produced by a profound study of anatomy. The rooms seem to induce bodily well-being and mental alertness. Here one feels is a setting in which lean-faced scientists can discuss relativity, or the more intellectual members of the Communist party an ideal distribution of wealth. One cannot, however, imagine oneself making love in them or playing with one's children in them or even littering them with books and magazines. But for the rather impersonal uses to which these rooms are put they seem perfectly adapted. Even the most unselfconscious cannot entirely relax when chatting to several million people.

Mr. McGrath's two studios are for vaudeville productions and for dance bands respectively. The Vaudeville Studio (see pp. 112-3) is a small theatre which will accommodate a limited audience. The general scale of colour is quite appropriately much gayer than in the talks studios. In fact Mr. McGrath is a real magician with colours. I was trying to find names for some of the colours in the Vaudeville Studio and decided that one part of the wall might be called "mushroom" pink. On examining it closely I found out that it was, in fact, simply drab wall-board, but the surrounding tints and the lighting mysteriously trans-



THE STUDIO FOR DISCUSSIONS, 8B

Shaw Wildman

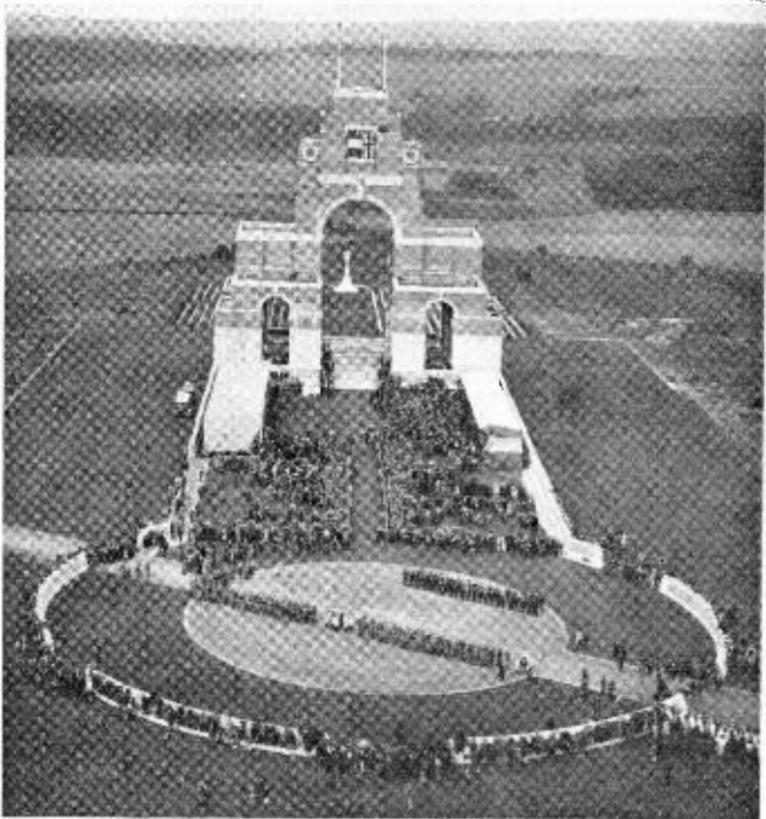


THE ARTISTS' LOUNGE ON THE THIRD FLOOR

coloured it. There is nothing which could even remotely be called ornament in the room, yet bands of lead-colour, primrose-yellow, pinks of different shades, and greys, combine to make up a room which seems palpably and exactly adapted to its purpose. And the best of it is that in a few years if the room becomes shabby or hackneyed it can be repainted in different colours and become quite unrecognisable. The jazz band studio* (No. BB) is even simpler in form than the theatre, for such incidents as a stage and its "wings" are missing, but its colours are particularly amusing. The walls are covered with drab wall-board with bright blue joints about one inch wide. There is a high lavender dado on which are mottled-red and black stripes. Nearly all these colours coincide with changes of material due to the given proportions of reverberating and non-reverberating surfaces. A clock with a copper face and a black-and-white floor complete a room which seems the appropriate cave of harmony for the droning saxophone. And so we must leave Mr. McGrath and his colleagues suiting design to purpose to the last.

* Now used for television.

PROGRAMME
SECTION



Central Press

THE UNVEILING OF THE SOMME MEMORIAL AT THIEPVAL BY
H.R.H. THE PRINCE OF WALES
(1 August 1932)

NOTES OF THE YEAR

POSSIBLY one of the most popular innovations of the year was the extension of the hours of broadcasting on Sundays which took place on June 5th. Previously the Sunday programmes had started at 3 p.m. with a broadcast of one of the Bach Cantatas, which were being performed regularly on a principle similar to that of the Foundations of Music. The new transmission hours were from 12.30 to the close of the programme at 10.40 p.m. with the usual break between 6.30 and 8 p.m. To compensate for the expense of adding 2½ hours to the transmission it was found necessary to suspend the regular performance of the Bach Cantatas.

* * *

A feature of the past year has been the increased attention paid to broadcasting by the Press. Most papers have devoted more space to programme news and comments, and it is now a matter of course for every newspaper to have a regular wireless critic. The B.B.C.'s attitude towards Press criticism is entirely friendly provided that it is unbiassed; informed, that is to say, expert in the subject criticised; constructive; and responsible, in the sense of preserving balance and perspective by looking at the immediate problem in the light of its wider implications. It is pleasant to be able to record the opinion that the standard of responsible criticism in the Press has risen during the year.

* * *

But there still occasionally occurs the unnecessarily extreme and hopelessly contradictory criticism which is of so little help to the B.B.C. Dozens of examples could be given in every branch of broadcasting. For instance, "The Testament of François Villon" provoked from *The Sunday Referee*, "Of all the clotted nonsense. . . ;" while *The Manchester Guardian*, "One of the best plays the B.B.C. has given us." *The Daily Herald* found horror in the play "The Forsaken City;" *The Manchester Guardian* said, "There was nothing in it that could support the assertion of horror-mongering by the B.B.C." *The News Chronicle* said of "Oxford Blazers" "capital entertainment it was," as against *The Saturday Review*, "The year's worst broadcast up to date."

It is a fair deduction from these examples that : firstly, wireless criticism has not yet generally reached the level of other criticism in the Press ; and that, secondly, there remains some justification for the B.B.C. taking these opinions as cancelling each other, and carrying on with its programmes in the way it believes to be best.

* * *

To the same class of confusion belong the usually ignorant and ill-informed agitations against some forthcoming broadcast, of which there was a crop at the beginning of 1931. In every case the B.B.C., while taking full notice of the protesting opinions, made its decision on what seemed to be the merits of the case. There was Patrick Hamilton's play, "Rope," for instance, which was broadcast, and successfully, in spite of strong protests before the event. Then there was Filson Young's play, "Titanic," the protests about which were remarkable as they referred purely to the subject, the play itself not having been written at the time, and the author having publicly stated that the actual sinking of the ship did not figure in the play. This protest was all the more remarkable in that some of the most successful broadcasts of the past have been plays like "Journey's End" and "Brigade Exchange," which must have aroused many more sorrowful memories than the sinking of the "Titanic." In this case the B.B.C. decided to abandon the projected broadcast, as it felt that the play would not obtain a fair hearing and would be prejudiced by the misrepresentation to which it had been subject.

On the other hand, there have been postponements on the B.B.C.'s own initiative where circumstances beyond its control have made the broadcast of a particular play inopportune or tactless. Two examples may be given: the postponement of Galsworthy's "Escape," the broadcast of which had been arranged for a date which happened to come just after the Dartmoor mutiny. Similarly when a Welsh mine disaster occurred a few days before the date of the broadcast from Cardiff of Richard Hughes's mining play "Danger," the B.B.C. felt it right to cancel the programme.

* * *

A development, which will no doubt in years to come be regarded as a milestone in British broadcasting, was the B.B.C.'s decision to co-operate directly with the Baird Television Com-



E.N.A.

BRUNO WALTER CONDUCTING
(20 April 1932)

pany in experimental transmissions of television. As a result the necessary apparatus was installed in a studio in Broadcasting House, and operated by B.B.C. engineers, and from 22 August 1932 transmitted four times a week a programme prepared by the B.B.C. One of the most interesting of the early programmes was the televised broadcast by Mr. J. A. Mollison on his return to this country after having made the first westward solo flight over the Atlantic.

* * *

In musical matters most of the important events are still prospective at the time of writing. They include a fortnight of Winter Promenade Concerts arranged for the musically dead period of the year in January when both the public and the programmes are feeling a reaction after Christmas. Then the season 1932-3 is to include two important festivals arranged by the B.B.C. Firstly, in December 1932, three consecutive B.B.C. Symphony Concerts at the Queen's Hall are devoted to a festival in celebration of Sir Edward Elgar's seventy-fifth birthday. Secondly, there is to be a London Music Festival in May 1933 at which the famous conductor of the Boston Symphony Orchestra, Serge Koussevitsky, is conducting the last three concerts; the conductor of the first three concerts, which are devoted to Brahms' music in honour of his centenary, being the B.B.C. Music Director, Dr. Adrian Boult. It is pleasant to be able to record the fact that Sir Thomas Beecham returned to the programmes in May 1932 to conduct a studio performance of Delius's "A Village Romeo and Juliet."

* * *

Something of a change has been made in the customary arrangements for talks on music. For the time being the B.B.C. is trying the experiment of dispensing with the regular weekly broadcasts by its music critic, and is substituting, firstly, talks on special subjects, and secondly, a series of introductory talks of fifteen minutes before the beginning of its Symphony Concerts at the Queen's Hall. Some of the studio concerts will also be prefaced by five-minute talks by Dr. Adrian Boult.

* * *

An old friend of listeners, Mr. Vernon Bartlett, has brought himself into closer relation with the B.B.C. by accepting a new sphere of activity as foreign correspondent of the B.B.C. in

Europe. His weekly talks on international politics under the heading of "The Way of the World" have been one of the most popular features of the programmes since they were started in 1928. Mr. Bartlett will now range up and down Europe in search of first-hand news of life and politics. Most of his broadcasts will be relayed to London by land-line from the country from which he is reporting.

* * *

The weekly Sunday evening epilogue has been a feature of the B.B.C. programmes for many years. There have often been suggestions from listeners that each night's programme should end with the broadcast of something of artistic value and of a quiet and soothing nature. Music lovers have suggested piano sonatas or chamber music; others have asked for poetry and readings. On 3 October 1932 occurred the first broadcast of a series of such postscripts to the day's programmes, readings of good prose or poetry lasting five minutes, with an allowance of fifteen minutes on Wednesdays.

* * *

A change was made in the past year in the arrangements for broadcast literary criticism. For many years past Mr. Desmond MacCarthy and Miss Victoria Sackville West had shared the responsibility for dealing with general literature. In the autumn of 1932 they gave place to Mr. G. K. Chesterton and Mr. E. M. Forster; a change intended to establish the principle of a rota of service, by which, in course of time, representatives of different schools of thought would be given the opportunity of interpreting literature to listeners.

* * *

The year was notable for three successful series of talks of general appeal. The series of "Escapes," mentioned in the last Year-Book, found a spiritual successor in the series of "Hazards" in which true stories of dangerous adventure were broadcast by the actual participants. The speakers included Admiral Gordon Campbell, V.C., Major P. C. Wren, Rear-Admiral E. R. G. R. Evans, H. St. John Philby, and others. The "Conversations in the Train" was perhaps the most popular series of debates or discussions hitherto broadcast. To the accompaniment of realistic puffings of an engine, the blowing of whistles, and groanings of brakes, chance occupants of a

railway carriage discussed ordinary live questions of the day. The series was notable as being the first extended experiment with actors taking character parts in debates and broadcasting material written by someone else. Finally, in the summer of 1932 came the talks in "The Rungs of the Ladder" series, in which people of eminence in various arts and professions gave short accounts of their early struggles and some advice as to the lessons to be drawn from them. The speakers included Mr. Bernard Shaw, Sir Eric Geddes, Sir William Robertson, Mr. W. H. Davies, and Mr. J. H. Thomas.

* * *

The question of political broadcasting has always been the subject of controversy, and the B.B.C. has often found itself under converging fire from the various political parties, from the supporters of the party in power who thought that broadcasting should be treated as an adjunct of the Government of the day, and from those who pleaded that in a free country the B.B.C. should be free to act as it thinks best in the interests of its listeners, as long as it kept within the principle of impartiality laid down in its Charter. This last school of thought may be said to have prevailed, in that in September 1932 the B.B.C. was able, with the support of all Parties and of the National Government, to form a small Parliamentary Committee of unofficial members of both Houses for the purpose of giving advice on matters connected with political talks other than those at the time of a General Election. Of perhaps similar social significance was the precedent created by the B.B.C. in broadcasting a talk on the subject of the strike in the cotton industry while it was in full swing. The wider subject of the relation of the Governments of various countries to their broadcasting authorities is discussed in an article on page 313 of this book.



L.N.A.

PRESIDENT HINDENBURG BROADCASTS A NEW YEAR'S MESSAGE
TO GERMANY

(Re-broadcast by the B.B.C., 31 December 1931)

SOME INTERNATIONAL RELAYS

		Relayed from	
1931			
November	7	Lehár Festival Concert	Vienna
	13	Official welcome of Watkins-Courtauld Expedition at Copenhagen	Kalundborg
	21	Yale-Harvard Rugby Football Match	New York
December	31	New Year Speech by President Hindenburg	Berlin
	1932		
January	31	Sermon on Disarmament by the Archbishop of York	Geneva
February	1	Official Opening of Telephone Service from England to South Africa	Cape Town
	2	Presidential Address at the Disarmament Conference	Geneva
	22	Speech by President Hoover at the Bi-centenary of George Washington	Washington
March	10	Oration by M. Tardieu at the Funeral of M. Briand	Paris
May	7	Commentary on the Kentucky Derby	Lexington, U.S.A.
	12	Oration by M. Tardieu at the Funeral of M. Doumer, President of the French Republic	Paris
	27	Charpentier's "La Vie du Poète" from the Théâtre des Champs Élysées	Paris
June	22	Opening of the Anglo-Egyptian Telephone Service	Cairo
		Extract from the Opera, "Samson and Delilah"	Berlin
		Opening Ceremony at the Eucharistic Congress at the Pro-Cathedral	Dublin
July	26	Pontifical High Mass in Phoenix Park	Dublin
	1	Extract from the Opera, "Sicilian Vespers"	Berlin
	8	A studio performance of Weber's opera "Euryanthe"	Berlin
	21	Opening of the Imperial Conference at Ottawa	Canada
August	27	Extract from the Opera, "Don Giovanni"	Munich
	1	Unveiling by H.R.H. the Prince of Wales of the Somme Memorial	Thiepval
	3	Concert of Contemporary French Music	Salzburg
September	12	Extract from the Opera, "Oberon"	Salzburg
	3	British International Trophy Speed-boat Race	Detroit
	6	Folk Music of South Bohemia	Prague
	26	Opening Ceremony of the League of Nations Assembly	Geneva
October	6	Speech by Mr. Eamon de Valera as President of the Council of the League of Nations	Geneva
	6	Talk by Mr. Vernon Bartlett	Geneva

INTERNATIONAL BROADCASTING

THE TERMS "international relay" and "international programme exchange" have been used somewhat indiscriminately to cover a variety of quite different things. Often the B.B.C. is asked, "When is the exchange of programmes with America going to start?" and the only possible reply is "What do you mean by exchange of programmes—relaying of each other's ordinary programmes? special programmes arranged for broadcast in both countries? or an American relay of British programme material not broadcast in Britain, and vice versa?" Sometimes, again, the B.B.C. is supposed to have taken a hand in "relaying" international speeches which were not broadcast anywhere, such as exchanges of greetings between a banquet in New York and a banquet in Berlin. As relaying has now become so frequent, it may be of interest to describe the various forms that international broadcasting has so far assumed.

First of all, the broadcasting proper, the radiation to the public, has to be distinguished from the process of linkage whereby the programme is passed from broadcaster to broadcaster. This may seem very elementary, but it is astonishing how often the difference is forgotten by the public and the Press. When one station "relays" another, the connection between them may be either a line, or a commercial wireless telephone such as a "beam," or again the relaying station may pick up the actual broadcast of the originating station. Frequently two of these methods are in use together, the one serving as a stand-by in case of failure of, or inferior transmission by, the other. In an elaborate international broadcast, some countries may be broadcasting as well as acting as links, while others may be merely transit countries. But the two functions are perfectly distinct.

This point being clear, international broadcasting falls into three well-marked classes:—

(1) A broadcaster reviews the advance schedules of another's ordinary home programmes, selects items of interest, and applies for permission to relay.

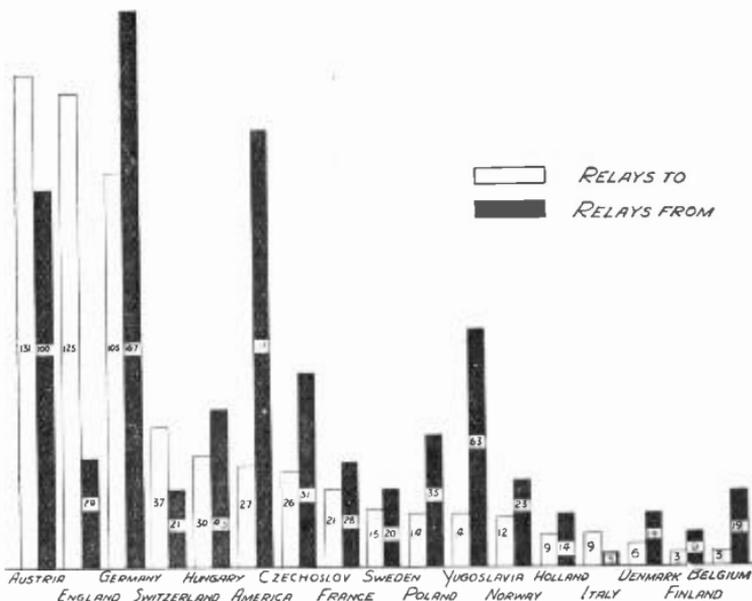
(2) Broadcasters in different countries combine to broadcast simultaneously a programme arranged co-operatively.

(3) A broadcaster draws upon programme material (con-

certs, speakers, sports events, etc.) in another country which is not being broadcast in that country.

All three kinds are now practised on a considerable scale, and the International Union at Geneva has for the last year or more issued a monthly return of relays by its members. That for the month of May, 1932, records one hundred programmes or items as relayed in Europe and America by and to member organisations. In the nine weeks between May 6th and July 9th, 1932, forty relays in one or another of these forms took place between the B.B.C. and the two great American chains.

The first class of relays is the most frequent, the easiest to arrange and, in many respects, the most satisfactory to listeners in the country of relay. For, thanks to the international relations that have grown up in the past four or five years, broadcasters are able to examine the programmes of other countries well in advance (though improvements in this respect are still required) and to choose items that in timing and character fit in with their own programmes. The view held by the B.B.C. and many of their foreign colleagues is that in general there is little to be gained by relaying from a foreign centre programmes that could equally well be mounted at home. What one country wants from another is programme matter typical of the latter's art, life, and outlook. There is (or should be if the "linkage" is adequate) a specific experience in hearing an Italian opera performed in the Scala Theatre at Milan which one does not get in listening to the same opera when performed in London or Berlin. The same applies to Wagner from Bayreuth or Bach Cantatas from the Thomaskirche of Leipzig. And if this is quite often the case with music that for generations has been recognised as international, it is even more so with popular music, such as Hungarian and Tzigane music as heard in Budapest, negro spirituals as heard in the United States, and Lehár as heard in Vienna. Nor, in spite of language difficulties, is such eclectic relaying entirely limited to music. For after all, certain countries do share languages, and, moreover, certain events depend on the occasion and its atmosphere and not on the words said—otherwise why should British stations relay the funeral oration on President Doumer, or German stations the Oxford and Cambridge Boat Race? Certain personalities in the world are so outstanding that the



COMPARISON OF THE NUMBER OF RELAYS TO AND FROM VARIOUS COUNTRIES

public is interested in hearing their voices even if it cannot understand a sentence of what they are saying. Nevertheless, the speech difficulty does and will constitute a limitation upon the full development of this class of relay, for it applies not only to the whole field of talks but to drama, humour, and even, in a measure, to song. At the same time, the practice of arranging for more or less general S.B.'s of the principal musical events of the year (*e.g.* the Bayreuth Festival in 1931) is increasing year by year as telephone line facilities improve.

The second type is that of the "co-operative programmes" planned from the outset for simultaneous broadcasting in several countries. This differs radically from the first in that it is no longer a matter merely of sharing in the wealth of other countries' art, but of building a common programme to express the idea of good-will and comradeship. The first programmes of this class were the "national nights" organised by the Geneva Union, in which each country in turn was, on a given date, honoured by the others' giving programmes typical of its art and life. This form, however, proved disappointing, chiefly

because the duality of motive—the yoking of policy and artistic considerations—hampered programme builders. Other forms have been tried, but real progress in co-operation is now thought to lie in another direction altogether, namely, early consultation between the authorities of different countries as to the contents of their respective programmes, so that if Vienna, for example, plans an outstanding symphony concert for January 4th, 1933, other people can reserve a place for it in their respective normal programmes for that day.

The third type, the broadcasting of matter from abroad that is not radiated in the country of origin, is one which has probably a great future. It has arisen chiefly over transoceanic broadcasting, where time differences operate to make it difficult or impossible for, say, America or Australia to relay the outstanding item of the day's British programme or vice versa. But it is important even within European limits, for it provides a means of overcoming—partially at least—the language difficulty, and is probably the best method of achieving that interpretation of one country to another that was sought for by another route in the "National Nights" programmes. The procedure is this. The British broadcaster, desiring to give his audience a foreign programme of a kind and at a time that suits his own requirements, asks his foreign colleague to make the necessary technical arrangements, and often the programme arrangements as well; at the same time, as in the case of other relays, he orders the line or other point-to-point link.

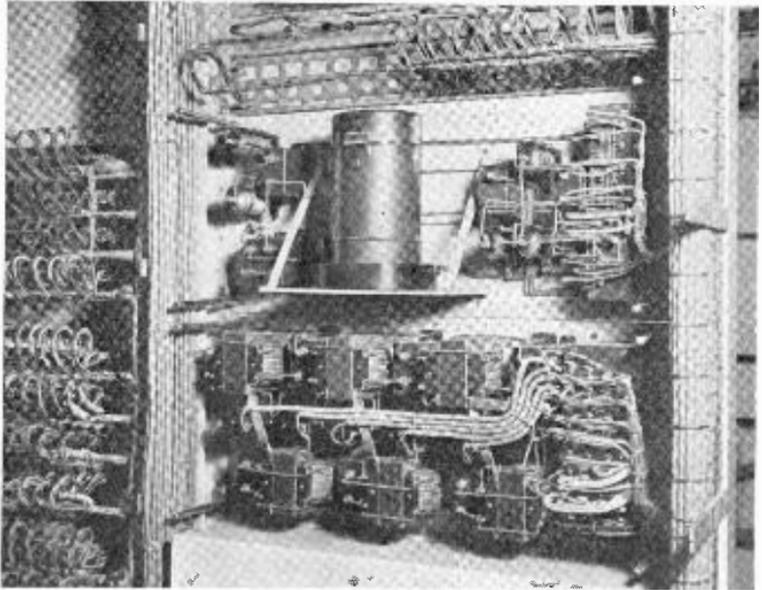
The occasion may be a centenary celebration, a great political occasion, a sports event, a talk on current affairs, a concert of popular music, or a cross-section of ordinary life in the foreign country, such as a visit to a German mining village or an Italian wayside inn. Such programme items, as may be imagined, take a good deal of arranging, and throw an additional strain on the broadcaster in the country of origin, who has his own programmes to carry out. Sometimes the difficulties are insuperable. Nevertheless the goodwill prevailing amongst broadcasters is such that the man on the spot does in fact make every effort to cope with his colleague's request, and if, as is likely, relaying of this type becomes more frequent, broadcasters in general will doubtless progressively adapt their organisation to provide for such calls on it.

T H E T I M E S I G N A L S

L I S T E N E R S, as judged by the letters they write, go one better than Gaul when they discuss the Time Signal service. They divide themselves into three parts. To some, Greenwich merely suggests the source of a peculiarly penetrating sound which the B.B.C. cunningly employs to spoil the end of a symphony or to form an unexpected anti-climax to what had previously been an exciting play. Another group feels that Time Signals alone justify a wireless licence and would like all broadcasting to consist of a procession of "pips" day and night. There is, fortunately, another and much larger section of the public which makes good use of these signals but which keeps them in perspective with all the other programme services.

Time signals go out to the listener from two places, Big Ben in Westminster and the Observatory in Greenwich. With life becoming unpleasantly hurried, few people can now afford to treat their watches leniently and accuracy is increasingly important. Big Ben plays its part by being the most amazing clock of its type in the world. It is not automatically corrected each day as are certain Admiralty clocks, but twice a day it telegraphs its time to Greenwich Observatory, for inspection so to speak, where the Astronomer Royal observes its working. He has just reported on its performance over the past year : what he found may be a surprise to many people. Big Ben only missed the mark by more than a second on nine days, while for more than two hundred it deviated by less than half a second : a great record, but even this is not good enough for astronomers themselves nor for certain scientific workers. For these the margin of error is still too great and they turn to the Greenwich Time Signal. The six "pips" are sent out from the Observatory to the transmitters, and the last "pip," which gives listeners the time, is right to one twentieth of a second. Incidentally, though it is the *last* "pip" which gives the exact time, it is the *first* hour stroke of Big Ben. When Big Ben strikes the quarters, however, it is the first note of the stroke by which one should set one's watch.

So a succession of signals are sent out throughout the day from one or other of these two sources from 10.15 in the morning till midnight. One listener checks the kitchen clock, another



THE TIME SIGNAL APPARATUS IN THE CONTROL ROOM

records the signal on some delicate scientific instrument, while a third, who may be in charge of a Power Station, will check his Master Clock which is sending out time to thousands of owners of A.C. Mains' Clocks.

Some day, perhaps, when human beings make no more mistakes and the unforeseen never occurs, all programmes will end precisely at the appointed time. To-day there is still a factor to be reckoned with called the "human element," as the result of which a programme does occasionally overrun its time and those "pips" admittedly do not improve its finale. Of course, when it is known in advance that some important programme will certainly run beyond the time when the Greenwich signal is given, it is suppressed on all stations except Daventry 5XX. This transmitter is the B.B.C.'s official distributor of Time Signals, and it is to it that the scientific recorder listens. Thus the listener who feels murderous at hearing those "pips" at the end of his symphony concert may do well to think of the man at sea standing in the Chart Room watching the chronometers and waiting only for the "pips."

V O I C E R E C O R D S

THOSE who do not add electrical engineering to the list of their accomplishments can best picture the Blattnerphone as a sort of gramophone recording instrument, capable of "playing-back" immediately a twenty-minute record and, as immediately, of washing the whole thing out and recording something else on the same tape. To those who are engineers, one can best describe the essence of the machine as being a steel tape magnetised to a constant field strength running at a steady speed between the two heads of an electro-magnet which superimposes audible frequencies upon it.

Whichever way one looks at it, its use in broadcasting is becoming increasingly important.

Of course, the listener only sees one side of its use—the re-broadcasting of a past programme. For example, the Derby has been re-broadcast in the News Bulletins for the last two years, so that those who had no chance of hearing the commentary in the afternoon should not miss the thrill of the race. Reminiscent programmes also are given occasionally into which are built extracts from a number of past broadcasts. Those who heard "The End of Savoy Hill" in May may be interested to know that as many as nineteen different programmes in the course of the evening appeared in "flashes" from the Blattnerphone.

For Empire broadcasting it is still too early to say how far the machine may be used, but it is certainly possible for a complete programme to be recorded in England at a time when parts of the Empire may be asleep and re-broadcast at a time when they are able to listen. Again, some events of great public interest take place at a time of day when nobody could possibly listen. In such cases there would be little difficulty in arranging an outside broadcast, the commentary being recorded and radiated at a reasonable hour for listening.

One case of actual transmission by Blattnerphone is of particular interest. Those who broadcast to schools must necessarily discard the manner of the lecture hall and, in talking to the children, acquire a peculiarly personal technique as though they were actually in the classroom and visible to the children. The advantages of such a technique are obvious, but

it is by no means easy for the lecturer to assure himself that he has succeeded in creating the right atmosphere in the listening schools. Several experiments have been made, therefore, whereby the lecturer has recorded his lesson beforehand and has then gone to a school and been present anonymously in the classroom while the Blattnerphone reel of his talk was being broadcast. The children, having no idea that anything unusual was taking place, have spontaneously given the lecturer all the indications he required to judge where his style was effective and where it failed.

The day-to-day uses of the Blattnerphone are less apparent to the listener, yet they form one of the most important aids to programme presentation which has yet been developed. For instance, the cast of a play can, in the course of a rehearsal, hear their own work played back to them so that the producer can illustrate points he wishes to discuss. The conductor can hear the reading of a musical work which he gave last night. The speaker can actually hear himself giving the talk which he is later to broadcast, and can eliminate mannerisms of which he was previously quite unconscious; for the Blattnerphone is an extraordinarily detached instrument. No one recognises his own voice when first he hears it from the loudspeaker. It is just an impersonal voice, vaguely familiar perhaps, but nothing more. People who have been tactfully told that they have some trick of speech, such as saying "er" at frequent intervals, have rarely been personally aware of this previously, but they are the first to notice it when they listen to their own voices from the loudspeaker. No one can be offended at an illustration of this sort, and one can teach a broadcaster more about his own faults by letting him listen to himself for a quarter of an hour than is possible by direct criticism of any length.

Although the Blattnerphone has been installed for little more than a year, the stored records are already able to give a picture of the great events in recent broadcasting on a fairly broad canvas. It can tell a consecutive story of the financial crisis of 1931; it can recall such sporting events as the "Cup Final," the "Boat Race," and the "Grand National," and, wherever Flight-Lieutenant Boothman may be now, he can still be heard as he flew across the end of Ryde Pier to win the Schneider Trophy finally for Britain.

THE "MICROPHONE VOICE"

EVERY NEW MEDIUM of entertainment collects round itself a jargon of its own, a collection of words and phrases which start by being convenient shorthand expressions and end, only too often, as semi-sacred shibboleths. Broadcasting is no exception to the rule. It has acquired its own vocabulary which puzzles the uninitiated and gives a charming if dangerous air of knowledge to those who use it. Any such vocabulary ought to be subjected from time to time to a critical and even a sceptical examination to bring out into the light of day the ideas which a condensed phrase is intended to convey, and discourage the air of mystery which has grown up round it.

"A microphone voice," for example, is a phrase whose implications cover a great deal which is, or ought to be, implicit in the very idea of broadcasting. As such it is useful, but as a half-understood term of praise or abuse it can be misleading and dangerous.

The foundation stone of broadcasting is that the broadcaster can be heard and not seen. He must rely on his voice alone to convey all that he wishes to convey to his listeners. A good microphone voice is primarily, therefore, one which is easily audible, and one which is sufficiently flexible and expressive to reveal the personality of the speaker or singer. So many people have voices which do the very opposite, voices which conceal and almost deny the amiable qualities of their owners. Others are sufficiently audible to be intelligible when one can see the speaker, but difficult to follow through the medium of a telephone or loudspeaker.

A few lucky mortals possess speaking or singing voices which are beautiful in themselves by reason of their musical quality. Undoubtedly the ideal microphone voice is one which adds beauty of tone to audibility and expressiveness, but such voices are too rare to be made the basis of a working definition. It is usual to demand that a voice should not be positively ugly, but the proportion of sheer tonal beauty felt to be necessary may vary with each broadcaster. If Mr. Jones is a man of strong personality, with something to say which is of a personal nature, beauty of voice may be left to look after itself, provided that he is audible and can convey to listeners the flavour of his person-

ality. An announcer, on the other hand, who appears and reappears throughout programmes, and is often acting largely as an impersonal mouthpiece, would not be allowed to have the vocal peculiarities of, say, an explorer or a sea-captain.

It is sometimes suggested that announcers, or people chosen specially for their voices, should read the manuscripts prepared by others whose voices are odd or unusual. Such a suggestion ignores the overwhelming importance of personality in broadcasting. The great difference between hearing Mr. H. G. Wells broadcast and reading an article written by him lies precisely in the fact that one does actually hear his voice emphasising this point, stressing that one, and slurring over another, and by so doing one gains a much more vivid comprehension of his vital personality, together with a greater certainty that one is gathering exactly what he set out to convey.

When one considers the singing voice the emphasis is shifted to the other side. Beauty of voice is of the utmost importance, though here too the possession of the other qualities of a great singer—vitality, interpretative powers, rhythm—may in certain rare cases outweigh the fact that the voice itself, viewed simply as a musical instrument, is not of the first order.

Perhaps it has emerged sufficiently that a good microphone voice is not one with certain mysterious qualities peculiar to broadcasting and measurable scientifically by the technician. It is undeniable that certain voices contain qualities of resonance which baffle any attempt to translate them from the microphone to the loudspeaker; but in the main the phrase is used to denote the possession by its owner of the power to convey what he wants to convey by the only means which, for the present at all events, broadcasting can offer.

A U D I T I O N S

IN EVERY SPHERE of broadcasting the B.B.C. can use first-class executant artists, but in no sphere can it use more of the competent but uninspired, or of the inspired but incompetent. The factors that govern auditions for music, for radio-plays, for vaudeville and talks and, in a lesser degree, for television, vary in detail, but they are all part of one complex problem with which the B.B.C. is seriously concerned every day of its existence. The problem, briefly, is how to fulfil the manifold requirements of the national and regional programmes for a constant flow of suitable players, singers, actors, comedians and talkers.

Let it be said at once that auditions do not in any sense solve the problem. They play a minute part in the solution of a problem that has always to be solved afresh. They make a heavy drain on the time of programme builders, and do much to increase their cares and little to lighten them. In no section of broadcast activity do auditions produce more than 5 per cent. of usable artists, whose names go down in the files and card-indexes for future reference. But, the B.B.C. cannot afford to close its ears to the incessant stream of applicants.

M U S I C

Musical programmes, compounded of solo, instrumental, or vocal talent, ranged in combinations varying from duo to a full symphony orchestra, occupy the largest percentage of broadcasting time, and therefore use the greatest number of artists. In the early days of broadcasting everyone who applied for an audition received one, from prima donna to novice; in those homeric days 2,000 musicians of every description were religiously heard every year. Now, the quantitative need has declined and the quality test has been heightened considerably. Auditions are granted only to musicians of proved professional status, after submission of full details of training and experience, backed by personal recommendations from persons of standing in the musical world. Every applicant is asked to fill in a form, giving details of his or her teacher, nature of voice or of instrument, length of study, concert experience, competition awards, previous broadcasts, and name and status of sponsors. This is

not mere red tape, but a practice designed, after experience, to save time, trouble, and heart-burning to the applicant, and to assist the broadcasting officials. Artists are heard in the studios normally used for broadcasting, by qualified musicians, and are judged on the results as transmitted to a neighbouring listening-room by a normal loudspeaker, approximating to average good reception in the listener's home. Accompanists are provided, but can be brought if desired; a studio attendant is the only other person present in the studio, to give advice when needed, on such points as volume, and position in relation to the microphone. The average duration of a musical audition is eight to ten minutes. The conditions vary slightly for applicants for places in the B.B.C. orchestras: these artists play anonymously to the judges, and reading at sight is required.

B R O A D C A S T P L A Y S

The expansion of radio drama, both in the actual number of plays produced (sixty is an average annual output) and in its increase of scope, makes broadcasting a valuable supplement to the stage from the actor's point of view. But it would be a mistake for actors to think that there is full-time work in broadcast plays: plays seldom have more than two performances and a fortnight's rehearsal. The Productions Department has built up from experience and auditions a "paper" repertory company of five hundred actors and five hundred actresses, which includes practically every type required by written and unwritten radio plays. Their names are filed together with a complete catalogue of their known powers and potentialities, and producers have an average of five choices for every part which they may wish to cast. Only the most versatile of these actors are likely to receive engagements. For the majority of actors broadcasting can only be a spare-time occupation. The quality looked for most at dramatic auditions is that rare and subtle power to impress personality upon the mind of the unseen listener. The tests usually include a portion of modern dialogue, a Shakespeare speech, dialects, foreign languages, and a short "straight" reading. The requisites are characterisation by the voice alone, full command of it as an instrument of variety, range, and inflection, that can make the spoken word a completely satisfying vehicle of expression, and, most important of



IN THE STUDIO



IN THE LISTENING ROOM, WHERE THE ACTOR IS HEARD BUT NOT SEEN

A DRAMATIC AUDITION IN PROGRESS

all, the ability to suggest power, force, personality, call it what you will, that will force the listener to listen, and create in his mind a complete and consistent picture of the character presented. The producer who takes dramatic auditions adopts the method of summoning up by the evidence of the voice alone, a mental picture of the speaker—for the ordinary listener has no other means of impression. But it is the illusion, not the reality, that counts, and is sought by the producer, in broadcasting. A frequent error in tactics committed by the inexperienced is to mistake vocal power and attack for intensity. The power of the understanding rather than that of the lungs is his true weapon, and the factor that makes acting for the microphone the subtle enjoyable art that it is.

V A U D E V I L L E

The organisers of the vaudeville programmes hear over two thousand artists a year, of whom only one per cent. are accepted for broadcasting. Everyone who has a new act is welcome, for vaudeville is the great popular art that thrives on novelty, and the microphone has made the name of many artists who have had new songs, new patter, new "turns" of every description to offer that had the priceless twist of originality added to personality. But here again dull repetitions of familiar things are not wanted. Broadcasting uses material quickly, and there is little hope for a gag once it has gone "on the air." New comedians are always scarce and always welcome. Auditions show a preponderance of syncopated singers who are too often un-inspired replicas of a successful model. There is always room, too, for "speciality instrumentalists," whistlers, ventriloquists, and artists with other out-of-the-way gifts, for vaudeville programmes must be varied, and a balanced programme, with the present tendency towards shorter turns, needs seldom less than six different artists.

R E A D I N G S

Auditions are held, too, for readers of poetry and prose, and for talkers. The conditions do not vary greatly from other departments of broadcasting. A good voice, an air of spontaneity, variety of inflection, are the qualities demanded: and here again is the old cry for personality.

TELEVISION

Television is the youngest and least tried of the broadcasting arts, and the present tendency in experimental programmes is to look for artists, acts, human and otherwise, that fall outside the scope of the ordinary broadcasting programmes. The limitations of the medium, at present, confine possible material to fairly limited classes. Dancers, acrobats and jugglers have been successfully televised at the time of writing. Animals, too, look like coming into their own: a performing seal recently flip-flopped his way across the entrance hall of Broadcasting House, and successfully projected himself on two wavelengths. Another interesting experiment was a shadow-play with hands, with incidental music and "effects." Three types of television are possible at the moment, using a screen six inches by four: upon this, using a deadwhite background, acts are thrown from a close-up, a semi-extended, and fully extended position. Special make-up—dead-white ground, blue lips and blue-shaded eyes—is necessary to give the black-and-white effect that televises most successfully. For this reason, television auditions take longer than most, seldom occupying less than an hour. When attending a television audition, artists are advised to bring costumes well broken up in black and white, so as to avoid the effect, when televised upon the white screen, of either a mass of black, or large patches of invisibility, where the original costume is white.

HOW TO APPLY

To secure an audition, write to the Director of the programme section in which you are interested, and give as many details as possible. Above all, when actually attending an audition, do not be deterred from giving your normal performance by the unusual surroundings. There is nothing in the conditions to warrant the myth of terror with which some have surrounded auditions. Every performer is governed by matters of temperament, but in the carefully regulated atmosphere, discreet decoration, and simplified equipment, of the modern studios at Broadcasting House, there is no reason why any artist after a slight adjustment to surroundings, should not feel completely at ease.

MUSICIANS OF THE YEAR

CONDUCTORS

Ernest Ansermet	Sir Hamilton Harty	Sir Landon Ronald
John Barbirolli	Robert Heger	Malcolm Sargent
Sir Thomas Beecham	Sir George Henschel	Reginald Stewart
Rutland Boughton	Leslie Heward	Richard Strauss
Adrian Boult	Robert Kajanus	Igor Stravinsky
Frank Bridge	Constant Lambert	Bruno Walter
Avlmer Buesst	Nicolai Malko	Anton Webern
Julian Clifford	Darius Milhaud	Felix Weingartner
Sir Frederick Cowen	Percy Pitt	Hans Weisbach
Julius Harrison	Alfred Reynolds	Sir Henry Wood

SINGERS

Stiles Allen	Keith Falkner	Stuart Robertson
Norman Allin	Gustave Ferrari	Sofi Schönnung
Florence Austral	Odette de Foras	Evelyn Scotney
Isobel Baillie	Nora Grubn	Elsie Suddaby
Muriel Brunskill	Olga Haley	Maggie Teyte
John Coates	Roy Henderson	Anne Thursfield
Joan Coxon	Herbert Heyner	Frank Titterton
Arthur Cranmer	Miriam Licette	Walter Widdop
Peter Dawson	Heddle Nash	Harold Williams
Hubert Eisdell	Dennis Noble	Sophie Wvss
Maria Basilides	Frida Leider	Elisabeth Schumann
Elena Gerhardt	Gota Ljungberg	Conchita Supervia
Rfa Ginster	Maria Olczewska	Richard Tauber
Herbert Janssen	Paul Robeson	Jo Vincent
Lotte Lehmann	Friedrich Schorr	Helena Wildbrunn

INSTRUMENTALISTS

Ethel Bartlett and Rae Robertson	Marjorie Hayward	Gershon Parkington
Arthur Benjamin	Myra Hess	Helen Perkin
Arthur Catterall	Edward Isaacs	Orrea Pernel
Harriet Cohen	Lauri Kennedy	Leff Pouishnoff
Maurice Cole	Eda Kersey	Albert Sammons
Jelly d'Aranyi	Frank Lafitte	Harold Samuel
Fanny Davies	Kathleen Long	Irene Scharrer
Adila Fachiri	Frank Mannheimer	Cedric Sharpe
Katharine Goodson	Isolde Menges	Cyril Smith
Beatrice Harrison	Angus Morrison	Solomon
	Mrs. Norman O'Neill	W. H. Squire
Edward Backhaus	Geza Frid	Antoni Sala
Bela Bartok	Walter Gieseking	Felix Salmond
Harold Bauer	Bronislau Huberman	Artur Schnabel
Adolf Busch	Frank Lamond	Eduard Steuermann
Gaspar Cassado	Juan Manen	Igor Stravinsky
René Chemet	Benno Moisewitsch	Guilhermina Suggia
Alfred Cortot	Elly Ney	Zoltan Szekeley
Ernest von Dohnanyi	Nicolai Orloff	Joseph Szigeti
Ania Dorfmann	Egon Petri	Jacques Thibaud
Edwin Fischer	Serge Prokofiev	Bruno Walter

THE LONDON ORCHESTRAS

IT IS DIFFICULT to get a just estimate of the orchestral position in London at the present without going back nearly to the beginning of the present century. At that time orchestral music was not heard much in London, in fact it would be true to say that there was only one regular orchestra. This, known as the Queen's Hall Orchestra, conducted by Sir (then Mr.) Henry Wood, performed a season of Promenade Concerts, a season of Sunday Concerts, and a season of Symphony Concerts every year. A large number of these players also took their part in the eight weeks' summer season at Covent Garden. In 1904 Sir Henry Wood decided that he could no longer conduct this orchestra unless he had first call on the time of every player for every concert and rehearsal.

It is here necessary to explain what is known as the "deputy system," which had long been in force in London. Most orchestral players had some regular position, usually in a theatre, which they would fill unless some better engagement were offered them. On nights when they were playing elsewhere they would send what is known as a "deputy" player to replace them at their regular work. This system would also hold good at the Promenade Concerts, where players would absent themselves during a four or five day provincial Festival and then return to their places at the Queen's Hall. A more awkward example of this would be in cases where an important symphony concert would have two or three rehearsals, and it would be considered quite in order for a player to send a deputy to one or two of these rehearsals if he wished to attend, say, a gramophone session elsewhere, and come himself for the final rehearsal and the concert.

Sir Henry Wood's decision involved the replacement of a good many of his best players by men who had less experience and perhaps less technical capacity, but would attend every rehearsal and every concert unless illness kept them away; and the enormous advantage of this procedure quickly made itself felt. A number of the players who found themselves unable to sign the new contract came together and formed the London Symphony Orchestra, which was rapidly recognised as including many of the finest players in Europe. The birth of the

London Symphony Orchestra and its excellent series of concerts under Richter and later under men like Nikisch, Steinbach, and Weingartner, synchronised with the rise of interest in conducting, as such, throughout Europe and America, and was followed within a few years by the formation of several other orchestras in London, notably those associated with the names of Sir Landon Ronald and Sir Thomas Beecham, a large portion of whose members all had regular theatre engagements on evenings when there was no symphony concert. This brilliant period of orchestral music in London continued until the start of the War in 1914, after which the Queen's Hall Orchestra bravely continued its concerts, but less well-established series were curtailed and mostly discontinued.

After the War the orchestras re-assembled, but it must be admitted that, with the exception of the Queen's Hall Orchestra, which kept its banner going under Sir Henry Wood's magnificent guidance all through the War, the other orchestras had suffered considerably in prestige and in technical capacity. It has always been agreed that English orchestral players are very fine readers, and that they have a wonderful instinct for seizing a conductor's meaning and interpreting it on their instruments. But this quality may connote a corresponding disability in that players of such brilliance may be unwilling to contribute the necessary hard work and steady concentration which provide the only sound basis for artistic work. The existence of the deputy system in itself presupposes, it must be admitted, a want of conscientiousness, and goes to prove that this view is correct. It is true that fine performances were occasionally given, but very slipshod playing was heard also. Only the Queen's Hall Orchestra kept up a uniformly high standard.

At this juncture the late Lionel Powell, whether actually from a desire to show how much better foreign orchestras could be in matters of ensemble, or whether simply from his insatiable desire to keep up with the times and offer something new and brilliant to his patrons, managed to bring about the visit to London of some of the greatest orchestras in the world. On several occasions the Vienna and Berlin Philharmonic Orchestras came to London and astonished everybody by their perfection of ensemble and of all the qualities that go to make ensemble, and they were followed also by the great Amsterdam



THE LENER QUARTET
(7 February 1932)

Concertgebouw Orchestra, and finally by the New York Philharmonic Symphony Orchestra, which gave four memorable concerts under Toscanini in the summer of 1930.

Parallel with this development the B.B.C. had been gradually extending the field of its activities in orchestral work, and by series of public concerts at the Central Hall, Westminster, at Covent Garden, and at the Albert Hall, had shown that the original Wireless Orchestra could be augmented into a symphonic body of fine achievement. In the year 1927 the Promenade Concerts were taken over by the B.B.C. as they were threatened with discontinuance. From 1914-26, Messrs. Chappell were responsible for their maintenance; the B.B.C. has managed them ever since, but up to and including the 1929 season, Sir Henry Wood's Orchestra still played at the concerts. During the season 1929-30 a remodelled B.B.C. Orchestra gave a series of concerts in the Queen's Hall, but it was not until the season of 1930 that, as finally constituted, the B.B.C. Symphony Orchestra of 114 picked players took over the work of the

Promenades, and also all the work of studio broadcasting for which purpose it is divided into various component orchestras. It is a matter of general agreement that during the two seasons of its work the main orchestra has grown enormously in cohesion and ensemble in the fullest and widest sense of that word.

It is worthy of note that, with very few exceptions, all the 114 players who are now in the B.B.C. Symphony Orchestra were either already in the former Wireless Orchestra or came to it from outside the orchestral world. It is not true to say that the B.B.C. combed the existing orchestras. It combed the country, but existing orchestras have suffered very little from the formation of its orchestra. A further point is that organisation makes it possible to arrange its studio and other activities in such a way that adequate rehearsal for every kind of performance is ensured. The Orchestra is still young, and it is to be hoped that it will build up a tradition which will make it as great as any of those who already hold enviable reputations throughout the world. It has sometimes been suggested that the B.B.C. Symphony Orchestra should confine its activities to the studio and leave the Concert Hall to the other orchestras. Such arguments are being answered every day by those musicians and critics who maintain that even good reproduction by wireless cannot be considered any substitute for hearing an orchestra at first hand without the intervention of the microphone. This view, for instance, was reaffirmed in the criticism in *The Times* of the B.B.C.'s Beethoven Concert conducted by Weingartner in the Queen's Hall on March 16th, 1932—

“These readings of Beethoven are something worth broadcasting to the world; moreover, such a concert as this gives the complete answer to those who say that the B.B.C. should confine itself to studio work, for only in the hall and before the audience there present can such delicate adjustment of musical values be fully realised.”

It is for this reason that the B.B.C. provides an opportunity for its listeners to hear its Symphony Concerts direct if they prefer to do so.

For the same reasons it is desirable that the Orchestra should make appearances in the provinces, particularly in parts of the country where there are no local orchestras of a similar standard,

but owing to the expense and difficulty involved in maintaining the Orchestra's contribution to the B.B.C. programmes while it is on an extended tour, it has not so far undertaken any work outside London except for occasional visits to Oxford and to Canterbury for the Cathedral Festival. There is a possibility of further developments of this kind, but nothing in the nature of a tour is at present contemplated; and it has to be remembered that the Orchestra is fulfilling its principal function as long as its listeners all over the country have regular opportunities of hearing it broadcast.

In the London winter season of 1932-3 it appears that there will be five organisations giving regular series of orchestral concerts, the B.B.C. Symphony Orchestra, the London Symphony Orchestra, the London Philharmonic Orchestra, the Royal Philharmonic Society, and the Courtauld-Sargent concerts; the two last organisations using the London Philharmonic Orchestra for their concerts. It will thus be seen that there are three principal orchestras, the London Symphony Orchestra with traditions dating back to the years before the War, the B.B.C. Symphony Orchestra of only three years' standing in its present form, and the London Philharmonic Orchestra which is making its first appearance in the current season. It seems, therefore, that the larger musical public created by broadcasting will not only have ample opportunities for concert-going, but, as some of the concerts given by the other organisations are to be broadcast, it will be possible for country listeners to share in the activities of what promises to be the most important London season of orchestral music since the War.

FIRST PERFORMANCES OF MUSIC DURING THE YEAR

BARTOK	Suite: The Amazing Mandarin
BAX	Winter Legends
BERG	Three Fragments from Wozzeck
BLISS	Colour Symphony (Revised Version)
BOUGHTON	Celtic Symphony
DELIUS	Caprice and Elegy (first <i>Orchestral</i> Performance)
GERRARD WILLIAMS	Ballet: The Wings of Horus
GRAENEV	Suite: The Flute of Sans Souci
HEWARD	Quodlibet
HINDEMITH	Konzertmusik, for Strings and Brass
HOLST	Hammersmith
IBERT	Cello Concerto Divertissement Suite Symphonique (Donogo)
KREIN	Cello Concerto
KRENEK	Theme and Thirteen Variations Suite: The Triumph of Sensibility
LAFONI	Andalgala
LAMBERT	Pianoforte Concerto
LEIGH	Interlude for Theatre Orchestra
MACONCHY	Suite for Chamber Orchestra Concerto for Pianoforte and Chamber Orchestra
MARTINU	Partita for String Orchestra
MILHAUD	Violin Concerto Three Rag-Caprices Madrigali
MONTEVERDE- MALIPIERO	
MOSSOLOV	Pianoforte Concerto
ROUSSEL	Petite Suite
SCHONBERG	Variations Opus 31
SCHUBERT	Deutsche Tanze (1824) Orch. Anton Webern
SPAIN-DUNK	Stonehenge
WALTON	Belshazzar's Feast (first Performance in London)
WEINBERGER	Suite from Schwanda, the Bagpiper
WEINGARTNER	The Spring

THE MUSIC LIBRARY

IN 1922 the B.B.C. was without a Music Library of its own. All the music then needed had to be supplied or hired from outside sources. In 1932 the B.B.C. Music Library, if not actually the biggest, is almost certainly the most extensive, the most comprehensive, and the most up-to-date, working music library in the world. No pains have been spared to make it so.

In describing its composition, figures alone cannot convey the whole of what constitutes its functioning value, but they can at least give an idea of its extent. There are, for example, 10,500 separate works in the Orchestral Library; and this number, by the way, excludes topical dance music of the kind which goes largely to make up programmes such as those given by Henry Hall and his Band. Dance Music has a library of its own. To an orchestral work belongs anything from ten to eighty or ninety separate pieces of printed music for the players. To this number must be added the score used by the conductor (a second score is also needed for the use of the Control Room, the nature of which will be described later); yet this enormous number of multiple items, which is, of course, growing all the time, is not enough. Thus, it may be that more than one station is, in the same week, performing the same work. The second station (and sometimes a third, and even a fourth) must also have a complete set of orchestral parts. Therefore it has been found necessary to have a duplicate or "B" library containing some 3000 works, and a third, or "C" library containing over 500. In this manner provision is made against every possible contingency.

Next in order comes the Military Band Library. This already includes about 2500 works. Many of these are extremely valuable from the fact that they have been expressly arranged for military band combination and are in manuscript. Much the same conditions apply to this library as to the Orchestral Library. There are other sections of the main library; for example, that connected with operas, oratorios, cantatas, and so forth. Of vocal works there are about 3000; but when one considers that the National Chorus, for example, is 270 strong, it is necessary to hold this number of copies of each of many of the works. In effect there are about 32,000 vocal scores and albums in the Library. Of Chamber Music there are about 600 separate

copies, and this in spite of the fact that chamber music players usually bring, and play from, their own music. Of part-songs there are many tens of thousands of copies ; and of what is known as sheet-music, that is separate piano pieces, songs, organ pieces, instrumental pieces, and so forth, the figure is so large as better to be left to the imagination.

To pass to the Control and Reference Library : every broadcast, as many listeners know, is passed through a music control room which roughly serves the purpose of mixing tone and volume in correct proportions for transmission, acting much as the carburetter does in a petrol engine. Obviously the man controlling must be enabled to follow the music. He is, therefore, provided with a duplicate copy of everything that is being played. It follows that every item in the Library must be represented in a separate section, which, consisting not only of duplicated material, but of valuable single copies, scores, library and reference volumes, is known as the Control and Reference Library. This section is practically an index of the whole.

But even that does not exhaust the main library. There is music for revue and dramatic productions, a certain amount of film music for various odd occasions and music in other smaller, though by no means unimportant, sections.

And yet even with all this vast amount of music from which to devise and make programmes and cater for performances a considerable gap remains. There is a good deal of material, particularly of modern operas, orchestral works and unpublished music of all kinds, both in print and manuscript, which cannot be bought and must of necessity be hired or otherwise obtained for each occasion from the owners of the copyright. Traffic in material hired or supplied from outside, therefore, is a department in itself. Finally, there is the music artists themselves bring, and with this to complete the repertory, the custodians of the Library will stoutly deny their inability, if called upon, to produce for performance the material of any musical work ever known to have been composed.

The manifold operations in the Library are in the control of the Chief Librarian and his staff, which at present numbers fourteen. This staff is fully and ceaselessly employed, for, though tried and ingenious machinery makes for smooth working, it must be clear to those who study the programme pages of *The*



THE MUSIC LIBRARY AT BROADCASTING HOUSE

Radio Times with insight that, in a sense, the whole system of the broadcasting of music revolves upon the Music Library. To consider one function alone, a catalogue has to be compiled in such a manner as to preserve a complete life-history of every work in the Library, the time it takes to perform, the details of orchestration, the number of players required, the dates of performances and other items. Music has to be shelved, it has to be bound and repaired, it has to be packed and transported. And day after day it has to be assembled for different programmes, in different studios, indeed in different stations; it has then to be distributed, later collected and re-assembled when the programmes are ended. That this in-and-out movement is no slight operation would be apparent to anybody who had an opportunity to see the work necessary to run, say, even a week of Promenade Concerts at Queen's Hall.

The Promenade season may in fact be considered a miniature of the whole, although, actually, the music used at these concerts comes mainly from Sir Henry Wood's own library, one of the finest private libraries in Europe. Here programmes naturally are known some long time ahead; even studio programmes are known and prepared sometimes as much as a month ahead, but far more often it is less. A month, however, is none too long a time to make the elaborate preparations necessary not only for the Promenades but even for the most seemingly unimportant half hour in any programme on any day of the week. And nobody knows better than the Music Library staff that no half-hour in any of the seven long days a week of broadcasting is unimportant.

Naturally the Library is rounded off with a very complete Reference Library of dictionaries, lexicons, and works of a like nature (one of the many uses of which is to enable the staff to answer the countless questions that are asked by listeners); together with every known publisher's catalogue collected from all over the world.

A final word may speak for the efficiency of those operations, which concern, naturally, not only the staff of the B.B.C. but the co-operating orchestras, artists, and music houses. The annual deterioration through loss in the Library, which can scarcely contain less than half a million separate pieces of music, is so slight as to be literally negligible.

THE NEW B.B.C. DANCE ORCHESTRA

FROM TIME TO TIME listeners ask why the B.B.C. engages a dance band of its own when there are many first-class bands broadcasting regularly from outside. Admittedly it would be difficult to find a higher standard of playing than that achieved by those bands which have by broadcasting turned a national reputation into a European one. That they should have been able to do so is perhaps a tribute to the development of outside broadcast technique, as well as to the bands themselves, in view of the great difficulty of reconciling the technique demanded by the microphone with the élan required in playing to a room full of dancers. The presentation of tunes not necessarily in strict dance time, concert arrangements, and special comedy and other orchestrations, in other words light entertainment not confined to pure dance music, must necessarily be restricted to studio performances, which are generally required at times when it is impossible to engage the best outside bands. Further, in ball-rooms with poor acoustics, frequently packed with people (which in itself must affect the playing), the quality of the broadcast cannot be expected to compare favourably with that of a studio transmission. The subtleties of orchestration may be missed and the actual execution be liable to suffer; both matters of importance to listeners with growing critical appreciation of detail. There are in addition "strategic" considerations. For example, the B.B.C. Dance Orchestra must be beyond suspicion in its programme policy, and as independent in its relations with music publishers as the Corporation itself. It must endeavour to lead rather than to follow; to set a fashion rather than to perpetuate a tradition. Given the right personality in its director, and the necessary talent and pliability in its individual musicians, it can and should do so.

The announcement in January 1932 of the impending departure of Jack Payne's B.B.C. Dance Orchestra started a flow of innuendo and gossip and was inevitably featured as a "Sensation" on some newspaper placards. Actually the facts are extremely simple. Mr. Payne had an opportunity of improving his financial position by a prompt decision one way or the other. The B.B.C. did not wish to stand in his way if satisfactory arrangements could be made for a successor. This proved

possible, and Mr. Payne decided in favour of going, and left with the good wishes of the B.B.C.

The B.B.C. was then faced with the problem of finding a new director, and, through him, of building up a dance orchestra of the first rank, well rehearsed and with a large repertoire, to be ready to broadcast within about six weeks. In the three or four years in which dance music had been broadcast from Gleneagles and the Midland Hotels at Manchester and Liverpool the B.B.C. had been favourably impressed with the work of Mr. Henry Hall, musical director to the L.M.S. Hotels, and one of Sir Arthur Towle's trusted lieutenants. The transfer was soon settled, and although Mr. Hall spent the following weeks anxiously catching milk trains between London and Manchester, auditions and rehearsals proceeded apace.

Musicianly quality was of course vital to the new orchestra, but the style to be aimed at had to be considered. Was it preferable to have a normally constituted dance band with a full brass section, the stage type of band, or one in which softer playing should be a feature with perhaps special instrumental characteristics? On the whole the B.B.C. thought it desirable to work towards the latter objective, although it was not intended to exclude the playing of "hot" orchestrations. The B.B.C. felt that with a well-trained and youthful personnel, backed by experienced key men, and led by a director of Mr. Hall's qualifications, the band might safely be left to develop on the best and most progressive lines. To entertain listeners with dance music for an hour and a half on end demands, among other things, plenty of variety, and therefore, as far as is known for the first time, an oboe was included in a dance orchestra, and one or two other distinguishing features.

The orchestra now playing is not identical with that originally selected, which broadcast for the first time on March 15th, 1932. It consisted of fourteen members, directed of course by Mr. Hall, and was made up as follows:—trumpet, trombone; 1st, 2nd, 3rd, and tenor saxophones (all doubling clarinets, with the 2nd saxophone also doubling trumpet), 1st violin, 2nd violin, oboe, guitar, bass, piano, drums and effects, and vocalist. The brass section has since been completed by the addition of a second trumpet, and the oboe has been dispensed with.

It will be seen that special orchestrations were necessary for



THE B.B.C. DANCE ORCHESTRA
(Directed by Henry Hall)

such a combination, and that most of the tunes broadcast had, in fact, to be specially arranged, which is an expensive matter. The absence of a full brass section may have caused the broadcasts to sound perhaps a little unsatisfying, but it was believed that eventually this style would have been preferred; but it appears that this was a mistake.

As a psychological as well as practical experiment, a uniform jacket was designed for the orchestra, and is already familiar to visitors at studio vaudeville performances. The visual effect is pleasant, and the resultant comfort, compared with the discomfort of ordinary evening dress, should result in increased efficiency towards the end of a long session.

It may be added that the opening broadcast took place in not very favourable circumstances. It was from the then unused studio 8A, the first to be completed at Broadcasting House, and which had been designed, and is now used, for quite different musical combinations. The impending transfer from Savoy Hill to Broadcasting House complicated matters in other ways, making rehearsals and auditions difficult to arrange under the best conditions. It is pleasant to reflect that many listeners chose to be encouraging to this new enterprise. The first broadcast brought in something under a thousand letters, and though many contained suggestions and criticisms of detail, the majority were definitely appreciative?

What of the future of the orchestra? All that can now be said is that finality has not been reached. Efforts will be made to keep the programmes original, to give equal chances to all publishers of suitable music, and to encourage British composers. It is hoped to maintain an individual style, but to avoid its becoming stereotyped; to play old favourites, comedy, and "hot" numbers without overdoing them.

RESTAURANT AND CINEMA MUSIC

London

Dorchester Hotel
Grosvenor House
Piccadilly Hotel

Commodore Theatre,
Hammersmith
Regal Cinema, Marble
Arch
Regal Cinema, King-
ston-on-Thames
Shepherd's Bush Pavil-
ion Cinema
Trocadero Cinema, Ele-
phant & Castle
Tussaud's Cinema,
Marylebone

Birmingham

Beaufort Cinema
Lozell's Picture House
The Palace, Erdington

Blackpool

Imperial Hydro Hotel
The Tower Ball-Room

Bradford

New Victoria Cinema

Bridlington

Prince's Parade

Corstorphine

Astoria Cinema

Handsworth

Regal Cinema

Hanley

Regent Cinema

Manchester

Paramount Theatre

St. Anne's-on-Sea

Hotel Majestic

Whitby

The Spa

Dance Music

Bertini's Band from the Empress Ballroom, Blackpool.
Jock McDermott and his Band and Billy Merrin and the
Commanders, from the Royal Opera House Dances,
Covent Garden.

Ambrose's Blue Lyres from the Dorchester Hotel.

Jack Harris's Band from Grosvenor House.

Henry Hall's Gleneagles Hotel Dance Band from the
Adelphi Hotel, Liverpool.

Ambrose and his Orchestra from the May Fair Hotel.

Roy Fox and his Band from the Monseigneur.

Sydney Kyte and his Band from the Piccadilly Hotel.

The Savoy Hotel Orpheans, Al Collins and his Orchestra,

Joe Kaye and his Orchestra, and Geraldo's Gaucho
Tango Orchestra, from the Savoy Hotel.

BROADCAST PLAYS

The following were the most important plays broadcast during the past year:—

Microphone Plays

- "Love One Another," "Nor'west," and "Bread" (Peach)
- "Goodnight, Vienna!" (Holt Marvell & George Posford)
- "Friday Morning" (Val Gielgud)
- "Ann and Harold" (Louis Goodrich)
- "Oranges and Lemons" (Philip Wade)
- "Flags on the Matterhorn" (Gasbarra and Pfeil)
- "Midsummer Eve" (John Drinkwater)
- "The Sea in a Shell" (Lance Sieveking)
- "Christopher Wren" (Whitaker Wilson)
- "The Little Ass" and "All Souls' Eve" (Bernard Walke)

Adapted Stage Plays

- "Julius Cæsar," "The Taming of the Shrew," "Othello,"
"Henry the Fifth" and "Hamlet" (Shakespeare)
- "There are Crimes and Crimes" (Strindberg)
- "B. J. One" (S. King Hall)
- "Rope" (Patrick Hamilton)
- "A Hundred Years Old" (Quintero)
- "Dr. Faustus" (Marlowe)
- "The Round Table" and "The White Blackbird" (Lennox
Robinson)
- "An Ideal Husband" (Oscar Wilde)

Adapted Novels

- "Jane Eyre" (Charlotte Brontë)
- "Eric, or Little by Little" (Dean Farrar)
- "To Any Husband" (A. E. Coppard)
- "The Turn of the Screw" (Henry James)
- "Markheim" (R. L. Stevenson)
- "The Triumph of Youth" (Jacob Wassermann)

DEVELOPMENT IN DRAMA

WANTED—a wireless comedy! In this imperative need stands drama where it stood. Tragedies, melodramas, fantasies, and more rarely satires, continue to pour into the B.B.C. at the rate of over two thousand a year, but wireless comedy has not yet arrived. This is all the more surprising and disappointing because broadcasting is felt to be an ideal medium for comedy. The listener at his loudspeaker is readier for persuasion to laughter than to tears; not the infectious laughter of a theatre where people gather together to be amused, but the intimate laughter of the listener by his fireside, into whose ear the author speaks. And yet “Dr. Abernethy,” written two, and “Matinée,” two and a half years ago, remain the best and latest comedies. “Arrest in Africa” set out to fill the gap, but unfortunately lost its way in the equatorial jungle. This is not to say that listeners have not been invited to smile. Miss Delafield’s “To See Ourselves,” Strindberg’s “There are Crimes and Crimes,” Oscar Wilde’s “An Ideal Husband” made excellent broadcast material, but they needed considerable modification to make them so, and, having been written for the visual medium, they could not exploit all the possibilities of the microphone. They moved within the limits of translations.

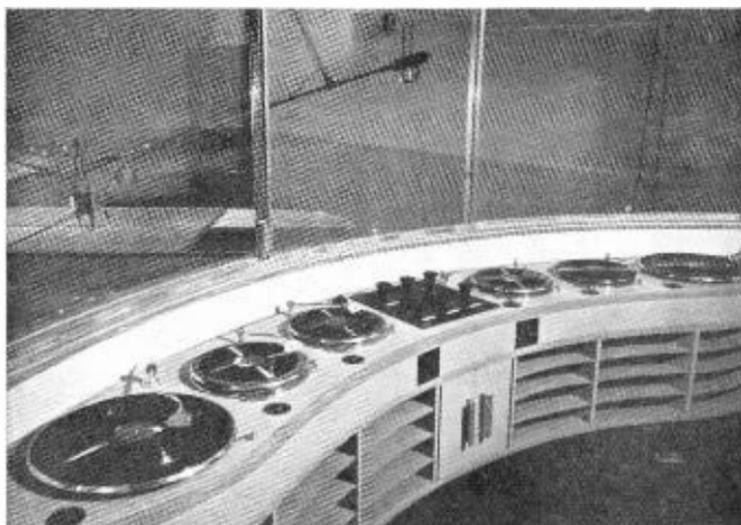
In some respects, however, broadcast drama may be said to have reason to hold its head just a little higher. The number of newspapers which regularly publish notices of wireless plays has increased, and some who possibly began to listen with other intentions have stayed to bless. *The Times* found space for a full-length review of “Othello.” Three volumes of plays which have been specially written for the microphone by, respectively, Mr. Tyrone Guthrie, Mr. L. du Garde Peach, and Mr. Val Gielgud, and subsequently broadcast, have been published.

Of stage plays adapted for the microphone, none can be so sure of a welcome as Shakespeare’s, and the two-hour Sunday afternoon performances seem, as far as it is possible to read the mysterious thoughts of wireless listeners, to have received the sanction of lovers of Shakespeare. There have been requests from many different quarters that these should become a regular feature in the Sunday programmes. One argument in their favour is that distinguished actors, who would not be

available for broadcasting at other times in the week, can be heard in famous parts. Mr. Henry Ainley played "Othello" in March, and Mr. John Gielgud "Hamlet" in June.

The dramatisation of novels tends to become yearly less frequent, the only full-length broadcast during 1932 being "The Triumph of Youth" by the German author, Jacob Wassermann. The form of the novel lacks the fluidity which properly belongs to something which has been conceived from the beginning in terms of the microphone, and, like the stage play, cannot easily acquire it, while, at the same time, it tends to lose its original animation. An exception to this was the adaptation of Henry James's story, "The Turn of the Screw," which succeeded in conveying the atmosphere of inexplicable horror originally created by the author.

Since Mr. Tyrone Guthrie's brilliant combination of dialogue and expressionistic effects in "Squirrel's Cage," which was written in 1929, has been repeated several times since, and always received with enthusiasm by listeners, no other author has developed his conception of rhythmic design with any success, but one or two other plays broadcast during 1932 have indicated other possibilities of the microphone. "Friday Morning," broadcast in February, aimed at recording the simultaneous mental reactions of a dozen ordinary people to a crisis which was not in any way unique, and it subordinated the interest of character and theme to the method of presentation. This play was a finger-post pointing the way along the route of a new mode, and, incidentally, also of new pitfalls besetting the playwright who is rather more intent upon technique than in psychology and story. It applied to a fictitious situation an idea suggested by the "Crisis in Spain" programme, broadcast a year ago, which presented actuality in dramatic form. The same idea was used again in "Waterloo," which was an excellent, colourful, piece of reporting. It might have been the Battle of Waterloo reproduced on the news reel. It is as far from the tear-compelling "Carnival," which had its vogue in 1928, as the news reel is from, say, "Warning Shadows." Its only human, and, from the dramatic point of view, most interesting scene, is the one which occurs at the end by way of epilogue, and records the conversations of the exiled emperor on St. Helena.



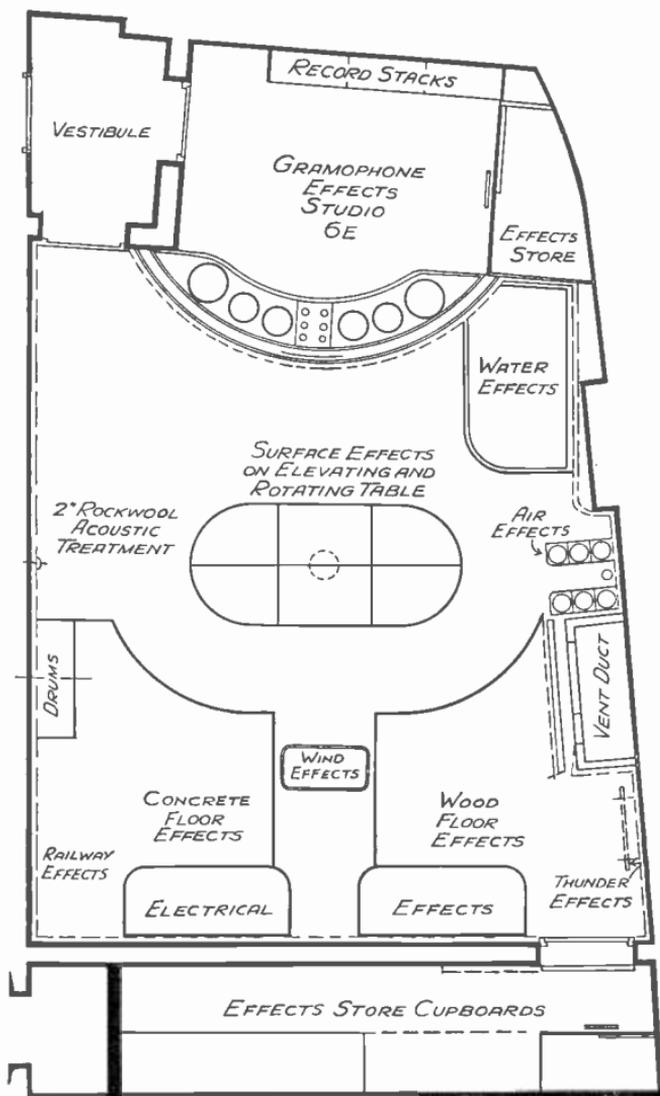
Shaw Wildman

THE GRAMOPHONE EFFECTS STUDIO 6E

(See the plan on the next page)

It is too early yet to describe any development in drama which may follow the move from Savoy Hill to Broadcasting House. The acoustic differences between the old and new studios are about one hundred per cent., and their potentialities are not likely to be fully explored for some time to come. There is no doubt that the knowledge of the perspective of sound in the production of plays has by no means reached its limits.

And in the meanwhile television hovers on the threshold, threatening to destroy the delicate values of sound upon which radio play authors and producers build, and the supersensitive hearing which listeners to radio plays have acquired ; and until the next step forward is taken, and television enters as an actual factor in dramatic production, it is impossible to forecast the future of broadcast drama except in terms of the wildest speculation.

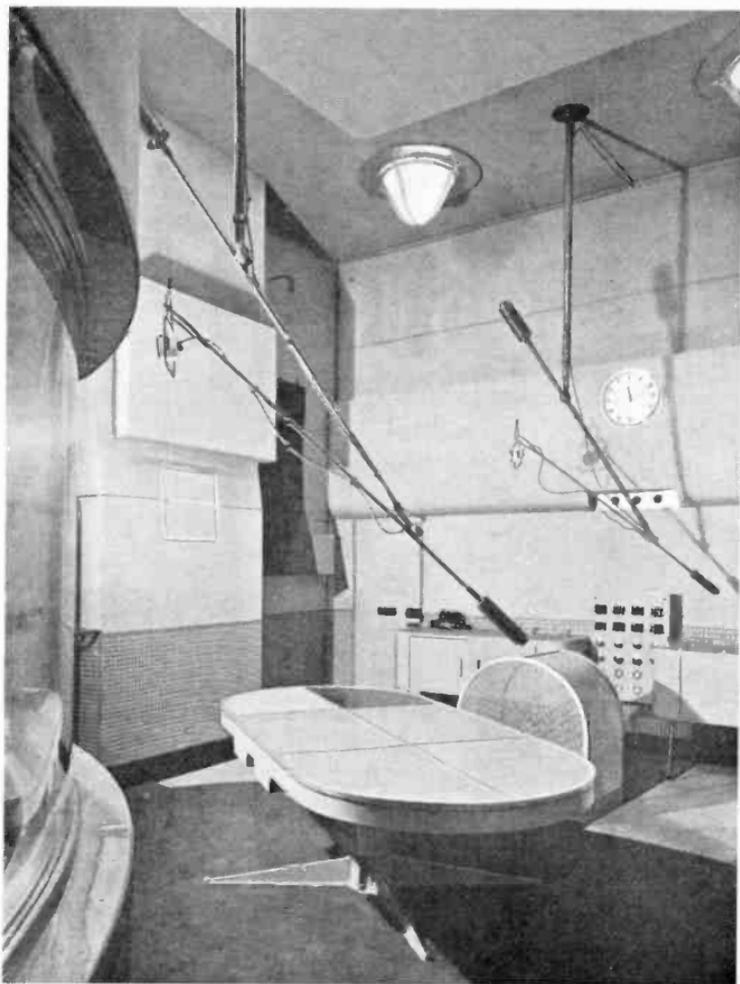


FLOOR PLAN OF STUDIOS 6D AND 6E

As illustrated on the previous and the two following pages



STUDIO 6D, THE MAIN EFFECTS STUDIO, LOOKING TOWARDS THE DOOR AND
THE GRAMOPHONE EFFECTS STUDIO 6E BEHIND THE BOW WINDOW



ANOTHER VIEW OF 6D LOOKING FROM THE DOOR BY THE WINDOW
OF 6E TOWARDS THE BACK WALL

*The hanging rods are self-balancing adjustable microphone holders. Most of the
other objects can be identified by reference to the plan on page 174*

HOW THE NEWS IS CHOSEN

IN BERLIN a "Government spokesman" is explaining the Cabinet's policy to a group of attentive listeners. In Mexico City a harassed young man is seeking reliable information about the damage caused by the latest earthquake. In Manchester half-a-dozen men are patiently watching a closed door, behind which the cotton operatives are meeting the employers. In Leeds or Birmingham a languid voice is asking the fire brigade if there is "anything doing." In a thousand different places a thousand different men are doing their best to collect the news of the day.

Many of the reporters and special correspondents who are concerned with this endless task are directly employed by newspapers, but others are servants of the four news agencies—Reuter's, Press Association, Exchange Telegraph, and Central News—whose names are familiar to newspaper readers and to listeners to the broadcast news bulletins. The men who work for the agencies are the original sources of the evening bulletins, but a great many stages have to be gone through before the announcer reads the news to the listening public; and it may be interesting to give a rough outline of the various processes involved.

The first steps are taken by the reporters and correspondents, who collect their information about interesting and important occurrences, and send it, usually by 'phone but sometimes by wire, to the London office of the agency they happen to serve. When the message has been received, it is handed to the sub-editorial staff, who carefully check it and put it into the most suitable form for transmission to the Press. When the sub-editors have dealt with it, the message is sent out in the agency's tape machine service, and is thus received by all the newspapers who use the agency's material, and by the B.B.C.

In the news room of the B.B.C., then, the tape-machines of the four news agencies are busy by day and by night, receiving the news which has been gleaned from all over the world. Of course there is far too much of it, for if all the messages sent by the agencies were read before the microphone there would probably be no time for any other programme at all. The need for further editing and sub-editing is quite obvious.

One of the most valuable assistants in this task of preparing the bulletins is an extremely large waste-paper basket, which was specially made for the news room when the B.B.C. took over the preparation of its own bulletins. Into this basket go all the agency messages that are clearly unsuitable for broadcasting—the long reports of murder trials, the accidents which have no outstanding significance, the speeches which do not advance any new or important view-point, the messages which are concerned with speculation rather than fact, the hundred and one items which can find a place in the columns of a newspaper but must, from considerations of time and policy, be omitted from a broadcast news bulletin.

The sifting of the news is the groundwork of preparing the bulletin, and it leads up to the task of scrutinising what is left and deciding which of the items should be treated at length and which should be given more summary treatment. In making this decision the chief points for consideration are the general importance and interest of the various items, for the object of the bulletins is to give a sane and balanced account of the chief events of the day, and only to give prominence to those news items which deserve it. Occasionally it may seem to the listener that too much discrimination is used in the selection of news, and that items which the public would like to hear have been deliberately omitted; but it must be remembered that the B.B.C. news bulletins reach a bigger section of the population than is reached by any one newspaper, and the maintenance of a high standard in the selection of news is of the greatest importance. Followers of certain games and sports may occasionally think that they are unfairly treated, and that too much prominence is given to cricket, football and racing; but the policy in broadcasting sporting results is to be as fair as possible all round, and to give the most time to those sports which have the largest number of followers.

When the problems of selection, length and treatment are solved, the news is rewritten in a suitable form for broadcasting *i.e.* it is shortened and simplified, so as to make it easy to grasp when heard from loudspeaker or microphone. Parliamentary and sporting news, which are specially supplied by Reuter's, are then added, and the final duty is to arrange the bulletin in its appropriate order. As a rule the general news comes first,



“ HERE IS THE SECOND GENERAL NEWS BULLETIN ”

and the sporting items later, though a particularly important sporting event may be reported earlier in the bulletin. In the case of general news, interest and importance are the guiding factors in arranging the order, though some kind of coherence is also aimed at. It would annoy the listener if the principal items went from England to Japan, then back to England and off to Germany or Iceland, and to England again by way of Canada or Australia; so far as the news allows there is some endeavour to group the items in a suitable order.

This task is simple enough in the case of the first news bulletin, but it is more complicated in the preparation of the second and the last news bulletins. In these bulletins the chief items which are given in the first news bulletin are treated again, usually with the addition of fresh material which has since been received; and as some of the listeners have already heard the first it is essential that the second and last bulletin should not appear to be a mere repetition of the first. There are rare days on which this is almost inevitable, but usually the interval between the first and second bulletins enables a good deal of fresh material to be added. Any important news received in the short gap between the second bulletin in the National programme and the last in the Regional programmes is of course incorporated.

When all these things are done, the news bulletin is ready for broadcasting. And while the announcer is reading one bulletin, the Government spokesman in Berlin is making another statement of policy, the harassed young man in Mexico city has at last got the real "low-down" on the earthquake, the cotton conference is reaching a friendly conclusion, and a big fire has actually broken out in Leeds or Birmingham. So there will be plenty of fresh news for the next bulletin.

S.O.S. RESULTS JULY 1ST, 1931, TO JUNE 30TH, 1932

	<i>Successful.</i>	<i>Unsuccessful.</i>	<i>Not known.</i>	<i>Total.</i>
Illness	245	222	27	494
Missing	73	248	—	321
Witnesses of Accidents, etc.	54	63	—	117
Total	372	533	27	932

G R O U P L I S T E N I N G

THE Central Council for Broadcast Adult Education has now completed the fourth year of its Five Year Plan of work and there has been further steady development. It should be noted that the B.B.C. has asked the Central Council to remain in being until the summer of 1934, thus virtually adding another year to its life.

There has been progress in various directions during the year, although no new step directly aimed at extending the scope of the work has been made. One of the most important features of the year's work was the programme known as *The Changing World*, which marked an advance in two ways. Firstly, talks on some aspect of the same subject were given on the same night of the week over a period of six months and all the series were linked up to a central leading idea, namely that of change during the last thirty years in politics, religion, science, economics, and literature. Thus listeners, whether as individuals or groups, were offered opportunities for continuous attention to a particular subject over a period of six months. Secondly, the talks lasted for half an hour, yet another innovation made in direct response to the wishes of listeners as expressed at the first national conference of student listeners held in January 1931.

The number of groups has continued to increase. In 1931 the increase was nearly 100%; for 1932 it is estimated at 50%. There has also been a development in the duration of the groups, many of them having listened to series of twelve talks and some of them to twenty-four.

Co-operation between listeners, broadcasters, and staff, has been maintained. Before the autumn programme began, some of the Area Councils organised local conferences of group leaders, at which were present one or more of the speakers who were to broadcast; while in other areas somewhat similar conferences were held later on in the session in order to review the programme as a whole, to hear criticisms and comments, and to receive suggestions for the future. The Second National Conference was held in January 1932 in London and the B.B.C. was again indebted to the Governors of the London School of Economics for allowing the use of their building for this purpose. Much valuable information was gained from all these

meetings, and it was learned that, while the unity and coherence of the Changing World programme was appreciated, a less closely knit programme would meet the needs of many listeners who find it difficult to follow as many as twenty-four consecutive talks. In the new programme for 1932-3 allied subjects will be dealt with on the same night of the week throughout the autumn and spring, but courses will be divided into self-contained series usually of six talks.

In December 1931 a meeting of some 500 people was held in York, with the object of reviewing the progress of adult education by wireless since the last conference on this subject was held there in 1929, and of extending the knowledge of the work of the Yorkshire and North Western Area Councils. The principal speaker was the Archbishop of York, Chairman of the Central Council. Speaking of adult education in general, the Archbishop said that the pioneering spirit and the temper of adventurers and missionaries were needed, and he believed that in the listening groups there was the nucleus of a band of such people. Referring to those who listened as individuals, he said that we had in them what might become a people's university on an immensely extended scale, but it was vital that these people should not only be supplied with what they wanted, but that they should exercise their minds upon it. The welfare of the nation depended upon the rapid increase in the number of those who were ready to think for themselves and ready to exercise individual judgment. It was inevitable that pressure of all kinds should be brought to bear upon the B.B.C. to prevent the broadcasting of disturbing ideas. But for the B.B.C. to keep silence was not to observe neutrality. Such a silence must inevitably be interpreted as a stand in favour of the status quo. It was possible to preserve a true impartiality by securing a free discussion of important issues from all sides. No seriously held opinion should be barred, but the treatment of such subjects should always be sincere and balanced.

The Yorkshire Area Council has made an entirely new experiment in connection with listening groups of unemployed. On certain mornings of the week during the spring of 1932 talks suitable for discussion were given and some thirty groups were formed. The experiment was successful enough to justify the Central Council in recommending other Area Councils to pro-

mote group listening by the unemployed to certain morning talks. Obviously all morning talks are not suitable, and failure may follow if a careless choice is made by the organisers.

The Central Council, in view of the success of the first National Summer School held in 1931, decided on another such school, and the Council has again to thank the Warden and Fellows of New College, Oxford, for putting the college at its disposal for this purpose. The school lasted for a fortnight instead of a single week, with a new contingent of students in the second week. Most of the students came from districts where there are Area Councils, but there were people from other parts of the country, among them ten who had secured free places by winning prizes in a competition promoted by *The Listener*.

This was not the only school for group leaders. At Bangor in August 1931, there was a course for training in leadership at the Summer School of the Workers Educational Association. The students at this course were drawn from Lancashire, Cheshire, and Westmorland, all the arrangements for the course having been made by the North-Western Area Council in conjunction with the W.E.A. A week-end school was also organised by the Yorkshire Area Council in May 1932, an interesting revival of a form of training experimentally tried in 1929.

Some interesting developments have taken place in regard to educational publications. The Changing World programme made desirable a new form of Talks Pamphlet longer than the earlier ones. Each of these new pamphlets (with one exception) covered the whole series of twenty-four talks to which it related. They were not, however, in any sense enlarged syllabuses, but were independent essays introductory to the subject of the talks. Thus one was called "Science," another "Modern Literature," and so on. The exception was the pamphlet on art, which only covered the series of six talks by Mr. J. E. Barton.

Another pamphlet worth mentioning is that on "Discussion Groups; what they are and how to run them,"* which was published in response to requests for practical information on the subject. It has also been published in Braille by the National Institute for the Blind in London and the National Library for the Blind in Manchester, in addition to two of the talks pamphlets. It is to be hoped that these Braille editions of talks

* Obtainable free (by post *1d.*) on application to any B.B.C. Station.

pamphlets will be continued and extended, as apart from their value to individual blind listeners they are of great use to the twelve listening groups of blind people which have met during the past year.

Much else might be said of the ramifications of the work of the Central Council. It would be interesting, for example, to discuss its effect upon individual listeners, a side of its work which must never be forgotten. The proposed survey of these listeners, described in the last Year-Book, has been postponed to some future date, and for the moment definite information is lacking. Still from time to time there are indications of their activities, as when an increased supply of pamphlets is asked for by an organisation in a village, where there have never been groups, on the ground that the number of people having wireless sets has recently doubled. Again the letters which speakers receive often show that quiet constructive educational work is being done.

Another interesting topic is the relation between broadcasting and reading. That there is a relation between the two, librarians and booksellers, who continue to co-operate generously in the Council's work, testify ; but exactly how far it extends no one can say at present.

Adult education by wireless is progressing, as the increase of groups shows, and there is cause for optimism as to its future, but this does not mean that any engaged in the work, whether members of the Council, group leaders, or B.B.C. staff, are unaware of its difficulties. All adult educational work of whatever kind is of a missionary nature. It is mostly uphill work, and there are times when the results on paper seem small and disappointing. But any who doubt its real value should visit some of the groups and they will soon alter their opinion.

The above account of the year's work of the Central Council may not sound exciting, but educational work can never be spectacular if it is really educational. The fact is, of course, that the work of the Central Council, like all true educational work, is not an end but a means, and to believe in its importance is to some extent an act of faith. Fortunately there are some who are ready to act in this faith and to believe that a valuable work of enlightenment is being done, which in due course will profoundly affect the whole community.

SCHOOL BROADCASTS

THE CENTRAL COUNCIL FOR SCHOOL BROADCASTING, having completed its experimental period of office, has been reconstituted on a more permanent basis under the Chairmanship of Lord Eustace Percy.

The retiring members of the Council have summarised their experience of the problems of School Broadcasting in a report* which has attracted wide attention both in this country and abroad. This report comes at an appropriate moment, for a very definite change has been noticeable lately in the attitude of teachers and educational administrators towards the so-called mechanical aids to education. In speeches, in articles, and even in official reports, the need for adapting our educational methods to the conditions of modern life is constantly being urged, and broadcasting, with the film and the gramophone, finds honourable mention. But the teacher who accepts the idea of broadcasting as a new instrument for education in a changing world will want to know, before he embarks on any experiment in its use, how broadcast lessons are to help him in the teaching of his subject, and on what lines his colleagues are already using the broadcast lessons in their schools.

In its report the Council discusses with a commendable detachment, the three questions which have confronted it in its work, (i) what shall be broadcast to schools, (ii) who is to broadcast, and (iii) how is the broadcast lesson to be used.

The report concludes "The evidence before the Council warrants the assumption that, if Local Authorities would help in the solution of the financial and administrative problems which at present hinder development, there would be a very rapid growth in the number of listening schools. This is desirable since an extended use of School Broadcasting will inevitably bring about a more serious study of the possibilities of the broadcast lesson and a better understanding of its place in the curriculum of the school.

"The Council maintains, however, that no attempt should be made to force the pace of development; a gradual growth of School Broadcasting, resting on the reasoned choice of the individual teacher, is in the best tradition of English education."

* "Some Problems of School Broadcasting," price 3*d.*

RELIGIOUS ACTIVITIES

PREACHERS

Archbishop of Canterbury	Archbishop of York
Archbishop of St. Andrew's	Bishop of Croydon
Bishop of Carlisle	Bishop of London
Bishop of Chelmsford	Bishop of Peterborough
Bishop of Chichester	Archdeacon of Plymouth
Very Rev. Sir G. Adam Smith	Canon Sopwith
Canon Anthony Deane	Canon Woodward
Canon Gibson	Prebendary Meyrick
Rev. Basil Bouchier	Mr. Hugh Redwon
Dr. J. C. Carlile	Rev. James Reid
Father M. C. d'Arcy	Rev. H. R. L. Sheppard
Rev. W. H. Elliott	Gipsy Smith
Rev. Ira Goldhawk	Rev. Eric Southam
Rev. T. Major Scott	Rev. F. C. Spurr
Father C. C. Martindale	Rev. Leslie Weatherhead

CATHEDRALS

Armagh	Dublin	St. David's
Birmingham	Dunblane	St. Paul's
Canterbury	Gloucester	Sherborne Abbey
Carlisle	Liverpool	Westminster Abbey
Coventry	Peterborough	York Minster

CHURCHES

Arundel, St. Philip Neri	London:
Birmingham, St. Martin's	All Souls, Langham
Cransley Church	Place
Edinburgh, St. Cuthbert's	Brondesbury Park Con-
Folkestone Baptist Church	gregational
Govan Parish Church	Friends' Meeting
Halifax Parish Church	House, Euston Road
Isle of Man, St. George's,	Highbury Quadrant
Douglas	Putney Presbyterian
Maidstone, All Saints	St. Anne's, Soho
Manchester, St. Patrick's	St. Columba's, Pont
Rye Parish Church	Street
Southbourne All Saints	St. Mark's, North Aud-
Southend, Crowstone Con-	ley Street
gregational	St. Martin's - in - the -
St. Helens Roman Catholic	Fields
Church	St. Michael's, Chester
Windsor, St. George's	Square
Chapel	St. Saviour's, Lewisham
Woodside Parish Church	St. Sepulchre's, Holborn
Yeovil Parish Church	Whitefield's Tabernacle

THE BROADCAST PULPIT

THE OLD SERMON-TASTERS of Thrums and Drumtochty—and there are others described by Dean Ramsay and Crockett—were a distinctive species of the North, mercilessly acute; it was not easy to throw dust in their eyes. The finest eloquence could not carry off a thin sermon. They demanded their pound of flesh in the shape of good solid theology. They demanded also a sturdy framework of a skeleton; they liked to check off firstly, secondly, thirdly, even down to “finally, my brethren.” Elspeth Macfadyen made her fame by repeating the seventy heads of John Peddie’s discourse. They demanded that a sermon should have been prepared in the light of the midnight oil, and then polished with the file. But their opportunities of comparison were few. Their chief delight, one gathers, was to compare the nervous young minister of to-day with the old hero of a thousand sermons on whom they had been brought up; generally very much to the disadvantage of the former.

One wonders how these stalwarts of old time would have enjoyed the opportunities afforded by broadcasting for comparing and contrasting pulpit styles. No doubt everything nowadays would have seemed to them rushed and incomplete. The average broadcast sermon, lasting only fifteen or at the most twenty minutes, would have struck them as a short story compared with a full-length novel, and naturally the brevity of the broadcast sermon has had its effect upon the style. The pulpit of the wireless seldom or never goes beyond “thirdly,” and its “finally, my brethren” would strike those ancients as coming just when they were beginning to get settled down into a good discourse. Nevertheless, when they had adjusted themselves to the rush and hurry of modern times, they must, one would think, have enjoyed the copious opportunity of comparison. Sunday after Sunday, not to mention Thursdays, the wireless would bring to their homes an almost infinite variety of preachers of various denominations and all shades of religious complexion. When they had got used to the change, they would listen, no doubt with added interest, to discourses which they could never have heard in their place of origin. There is no need to-day for a Naaman to bow down in the House of Rimmon, since the House of Rimmon itself comes to his own

hearthside. To-day Drumtochty can hear without prejudice what the heretics have to say for themselves. They can even hear a Jesuit sermon without becoming personally entangled with Babylon. How strange all this is, and how upsetting to those who have no sure anchors! Were it not for the fact that practically all those who preach for broadcasting recognise the limitations of their medium, and do not transgress its unwritten laws by taking sectarian advantage of the occasion, the regular Sunday listener would surely be tossed about by every wind of doctrine, left, it may be, in a state of hopeless confusion or uncertainty threatening the very foundations of right and wrong.

But happily the preachers in the wireless pulpit, who are selected with very great care and generally on trustworthy recommendations, prefer to speak in unison on the essential themes of religion. Some critics complain that for this very reason their doctrine is watered down, their preaching anæmic and their exhortations confined almost to the generalisation: "Be good and you will be happy." It cannot be denied that there are complaints of the lack of quality and force in many of the religious addresses now broadcast in this country, and it can hardly be denied that such complaints have a measure of justification. This may be due in part to the medium itself; how much more pointed would any clergyman's advice be if it were addressed to a single individual! It necessarily loses that quality of point, vigour, and strength, when it has to be broadened out to meet the spiritual needs of unknown millions. The preacher in church very often knows that certain virtues are lacking, or certain vices prevalent, among his congregation of the day, and sometimes, though not as often as might be, the sermon is addressed to encouraging the virtues and rebuking the vices. But when a preacher knows that behind and beyond the visible thousand there is this great host of unseen millions, he may well feel it an impertinence even to attempt to visualise their characteristics, and hence he may be driven to take refuge in platitude. Still, it must be remembered that a great number of the sermons broadcast come from churches where the preacher is thinking first of the visible congregation to which he is accustomed. It is a moot point whether this is the right procedure or the wrong; whether the broadcast listener should be hearing or overhearing. The same dilemma confronts the



Marsh

THE EASTER-DAY SERVICE IN LIVERPOOL CATHEDRAL
(27 March 1932)

actor and the comedian. The ever-vexed question of the audience in the studio raises the same problem; but all producers of vaudeville seem to be agreed that there is a gain in vivacity when the responsive smile is visible. That famous evangelist, Gipsy Smith, was invited first to deliver an address from the studio, with none but a small choir behind him. He came to Broadcasting House and saw the studio, and his heart failed him. He could not feel happy without his crowded church and a congregation before him visibly moved by eloquence. But several preachers find what they want in the quiet reticence of the studio, so that they can concentrate all their attention on the unseen audience. For there are a few rare individuals who have such a gift of imagination that they can do better without the visible stimulus. Some preachers do that; the Reverend W. H. Elliott, for example, has the power of projecting himself into the home and as it were taking husband and wife or son and daughter as they sit by the fire-side and speaking into their ears and into their very hearts.

That is the characteristic contribution which wireless makes to preaching technique. It was not, of course, unknown to the preachers of old, as a permissible or even desirable device, to address their remarks to one particular delinquent in the back pews of the church, and trust that if they persuaded him to amend, their homilies would be acceptable to the rest of the congregation. But the wireless sermon from a studio positively demands the exercise of the imagination. The power of this quality of self-projection across the unseen may be profitably studied in the published returns of the Week's Good Cause. The man or woman who can succeed in traversing space and projecting his or her personality into the home will find a rich return in terms of pounds, shillings and pence. Personality as expressed through the medium of the voice is everything in broadcasting. Above all, the quality most needed is that of audible sincerity. We will assume that all religious broadcasters are sincere; indeed we can hardly doubt that all appealers for charity have a profound belief in the value of the cause they are pleading; and yet for many or most of our speakers there comes up between them and their audience that chilly cloud of reticence or self-restraint, or whatever it is to be called, that prevents them from letting their sincerity into their voices

through the veil of words. They have an excessive fear of "gush." "I did not like to let myself go," they say. Naturally the listener has his part to play in this. If he adopts an obstinate attitude of cynical or critical hostility it may take a thunderbolt before he can be moved. One must admit that thunderbolts are rare from the broadcast pulpit. That is perhaps why so many people appreciated the recent address by Gipsy Smith. He was certainly able to project his smouldering fires across the ether, especially to those thousands who knew his voice and appearance of old. In others who could be named there is an incisive quality of restrained eloquence, and in others a note of sympathy or tenderness which wins men's hearts far and wide. Yet others again, who have won a pulpit reputation by literary skill in the use of epigram, for example, have found the microphone a pitiless revealer of any hollowness that lies behind their tinsel.

The Listener has given to its readers three opportunities of studying this very interesting art of broadcasting sermons in three supplements published respectively on 30th December, 1931, March 23rd, 1932 and August 31st, 1932. These supplements from the broadcast pulpit contain half of the year's sermons, that is, a selected 26—selected, one presumes, on grounds of merit, though other considerations may occasionally intervene, such as the availability of a non-copyright MS. Possibly the 26 specimens may be sufficient for us to get some sort of notion concerning the nature and characteristics of modern sermons.

To begin with, while most of these extracts have been severely cut down, the first thing one notices is the brevity and compression of the original. The old type of sermon which took up the first half-hour with what was called exegesis, that is, the development and exhaustive explanation of the text and its context, has almost disappeared and the modern broadcast address confines itself to the latter part of the full-length sermon, namely, the homiletic. Broadcast sermons, with the solitary exception of two out of these 26, devote themselves exclusively to giving good advice. The good advice is not, as has been alleged, a repetition of the theme, "Be good and you will be happy"; but the one note of God's love towards man, and man's need for love, recurs again and again.

Readers may be interested to read a very brief note on each of the twenty-six :

- (1) Need of a closer contact with God and more righteousness in human relations.
- (2) Opportunities and duties of Christians in the face of Indian Christianity.
- (3) Value and need of friendship as an expression of the love of God, following an exegetical comment on David's Elogy.
- (4) Plea for inward quietness necessary to win the Kingdom of Heaven.
- (5) Advice to trust in the Lord and cast care aside.
- (6) A plea for the sanctification of the will: an address mainly ethical.
- (7) A plea to follow Christ's road.
- (8) Exegetic: development of the teaching of Psalm XXIII.
- (9) A plea for Christmas joy.
- (10) The Church of Christ as the first great International.
- (11) A plea for mercy towards children.
- (12) The importance of Bible study and of honest work.
- (13) A plea for peace and disarmament.
- (14) New avenues of the spirit: for example, broadcasting and the Press.
- (15) A sermon against worry and anxiety.
- (16) On faith and life.
- (17) Man is yet unfinished: God will finish His Kingdom.
- (18) The need for discipline and sacrifice.
- (19) Hear the Word of God, and keep it.
- (20) The pilgrimage of prayer.
- (21) God as our Friend.
- (22) The joy of being in harmony with Christ.
- (23) Sermon for Whit Sunday: The Fruits of the Spirit.
- (24) The light within: cultivate conscience and prayer.
- (25) "The Love that will not let us go" revealed in the life of Christ.
- (26) What delays the kingdom of Christ in its coming? Human selfishness, international, social and industrial.

From this very brief summary the reader will be able to discern a certain trend in the broadcast sermons of the present

day, a trend which is equally observable in the church itself. Preachers either offer their own solutions—religious solutions, of course—of the grave problems and distresses which afflict our generation, or else they reject political conclusions and take refuge in the mystic way. But in both cases the overwhelming presence of the hard facts of modern life leave their scars upon the minds of the preachers. Secondly, very few of the broadcast preachers are able to get altogether free of the besetting problems which modern science has raised in the modern world. Their answers are manifold. Thirdly, they feel almost unanimously that the solution of most of the world's problems lies in unselfishness, that is to say, in the full trial of the golden rule of Christianity. But the voices with which they speak are as various as the speakers.

There is little that can be said about the pulpit art of to-day. For the most part it avoids rhetoric and relies on short words in short sentences to which repetition, or the figure of speech called *anaphora*, lends force from time to time. But some of the best preachers avoid even that device, and aim at an austere severity without any ornament whatever.

The B.B.C. itself, believing that there may be something in the charge of vagueness which is sometimes brought against its pulpit, is going to try a great experiment in 1933. With the cordial assent of its Central Religious Advisory Committee, it has accepted a scheme for a series of 24 lectures arranged in four groups of six each. The general title of the series is "God and the World through Christian Eyes." The first group bears the title of "God," and will be led by the two Archbishops on January 1st and January 15th. These will take the place of the usual religious services on the National wavelength. Thus once a fortnight the Sunday night's religious broadcasting will begin with an address by some distinguished theologian, philosopher, or scientist, which will last perhaps for twenty-five minutes and be followed by a short devotional service. This is an attempt to build up a connected picture of the meaning and aims of Christianity and to prevent the repetition of mild platitudes.

A VESPER HYMN FOR BROADCASTING

WORDS BY PAUL ASKEW

MUSIC BY CYRIL C. DALMAINE

Dedicated to the Wireless Chorus

Adagio
pp *mf* *p*

pp *mf* *p*

mf *f* *ff* *p*

p *ff*

mp *p*

p *espress e legato* *pp*

First system of musical notation. Treble clef: *mf*, *mf*, *p*. Bass clef: *mf*, *mf*, *p*.

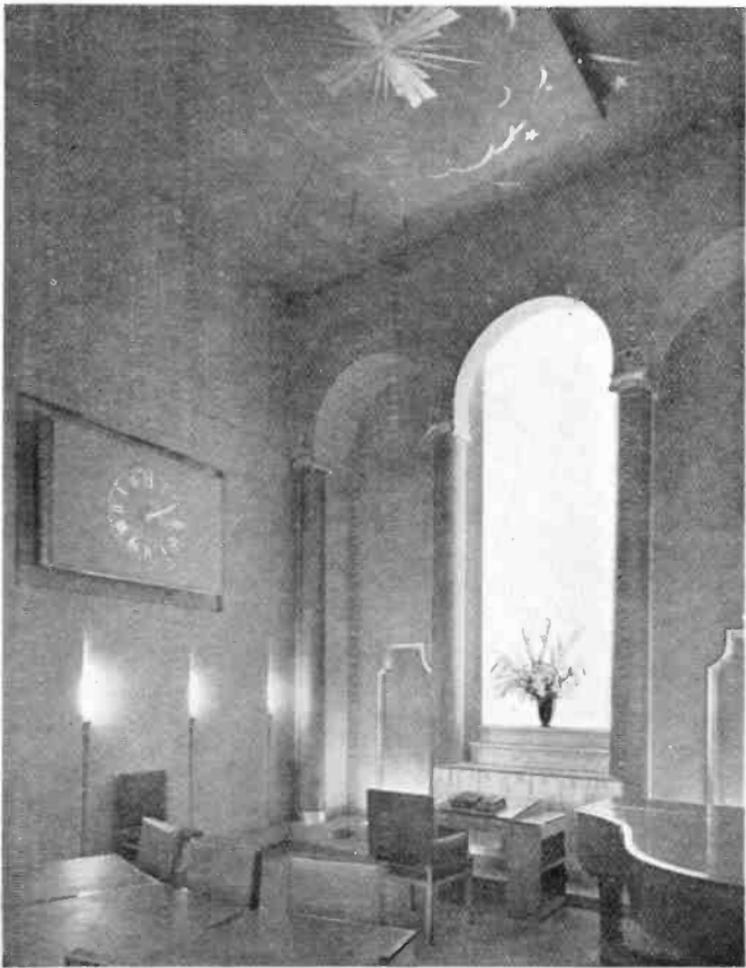
Second system of musical notation. Treble clef: *pp*, *mf*. Bass clef: *pp*, *mf*.

Third system of musical notation. Treble clef: *p*, *mf*, *f*. Bass clef: *p*, *mf*, *f*.

Fourth system of musical notation. Treble clef: *p*, *f*, *p*, *pp*. Bass clef: *p*, *f*, *p*, *pp*.

HEAR now, O Lord, in Heaven above the vesper hymn we raise;
 To Thee be all the glory given and to Thy Name be praise.
 Accept our earnest suppliant prayer before Thy Throne of Grace,
 That all may hear Thy living word and bow before Thy face.

O Heavenly Father in the Height with Thy Almighty power
 Pour down Thy blessing on the earth, this solemn evening hour.
 In concord may all people live, be Thou their strength alway;
 Grant that the nations shall speak peace to nations, Lord, we pray.



THE RELIGIOUS STUDIO IN WHICH THE MORNING SERVICE IS HELD

THE FIRST MORNING SERVICE FROM BROADCASTING HOUSE

OUR service this morning is being taken from the new Broadcasting House and I am sure you would like to join with me in asking God to bless this place and this room from which future services will be taken.

Here is a quiet room,
Pause for a little space
And without faithless gloom
With joy upon thy face
Pray for God's grace.

Let no unholy thought
Enter thy musing mind;
Things that the world hath wrought:
Unclean—untrue—unkind—
Leave these behind.

Pray for the strength of God,
Strength to obey His plan,
Rise from your knees less clod
Than when your prayer began,
More of a man.

Collect for the Twelfth Sunday after Trinity

Almighty and everlasting God, who art always more ready to hear than we to pray, and art wont to give more than either we desire or deserve: Pour down upon us the abundance of Thy mercy; forgiving us those things whereof our conscience is afraid, and giving us those good things which we are not worthy to ask, but through the merits and mediation of Jesus Christ, Thy Son, our Lord. Amen.

The Lord's Prayer

Psalm 122 :

"I was glad when they said unto me: We will go into the house of the Lord . . ."

Now let me read you Jacob's dream, by which he found God's presence near and named the place Bethel, the House of God.—
GENESIS xxviii. 10-19.

We will sing Wesley's Hymn which illustrates this passage and in which we pray we may find God revealed as Love:

Hymn :

Come, O thou Traveller unknown,
Whom still I hold, but cannot see;
My company before is gone,
And I am left alone with thee;
With thee all night I mean to stay
And wrestle till the break of day.
Yield to me now, for I am weak,
But confident in self-despair;
Speak to my heart, in blessings speak,
Be conquered by my instant prayer.
Speak, or thou never hence shalt move,
And tell me if thy name is Love.

'Tis Love! 'tis Love! Thou died'st for me!
I hear thy whisper in my heart!
The morning breaks, the shadows flee;
Pure universal love thou art;
To me, to all, thy mercies move;
Thy nature and thy name is Love.

Songs of Praise 223 (New Edition, No. 476).

The Room

Holy Father who dwellest not in Temples made with hands and yet dost deign to use the work of men's hands for Thy glory and to dwell in the hearts of men thro' Thy Spirit, bless we beseech Thee this room for the welfare of Thy children who will listen; help us to know Thee near as Friend, Encourager and Guide; take our lips and speak thro' them and our voices that they may make melody in the lives of those who hear; and so knit us into Thy fellowship of service that we may all rejoice together in the strength of Thy salvation, and get the power we need each day to meet the storms and stress of life, through Jesus Christ our Lord.

The House

O God whose never-failing providence ordereth all things in heaven and earth, bless we beseech Thee all those who have the responsibility of directing the affairs of this Corporation with courage and divine common sense so that listeners may receive real re-creation of mind and spirit; and truth may flourish in our land and go forth unto the ends of the world. Inspire all who will speak, or sing or play, with noble ideals, that they may give of their best whether grave or gay, instructive or humorous, and men may feel it is filling a real purpose in life for the common good. We ask it through Jesus Christ our Lord.

The Listeners

O Thou who art in every place, give to all who listen a real sense of Fellowship with Thee and one another through these services; so that we may know the companionship of prayer, and be taken out of ourselves into the glorious service of helping those for whom we pray. Grant that what we hear may come as a message from Thyself, to those in sick room or house, hospital, church, or inn, so that day by day we can face life the more easily with courage, joy, and peace, and be a blessing to all we meet, through Jesus Christ our Lord.

Hymn:

(A. & M. 239): "Christ is Our Corner-Stone."

O God, help us to seek Thee, and to find Thee, in the common things of our everyday life. Grant that our Work be well done and our duty loyally fulfilled. When we become tired and lose heart, bring us apart into a quiet place, where we can rest a while, and grant us such Communion with Thee and Fellowship one with another as shall send us back with freshness and hope through Jesus Christ our Lord.

O God of hope, fill us, we beseech Thee, with all joy and peace in believing, that we may ever abound in hope by the power of Thy Holy Spirit and show forth our thankfulness to Thee in trustful and courageous lives.

Hymn:

(A. & M. 551): "May the Grace of Christ our Saviour."

“FUTURE DEVELOPMENTS IN THE NORTH”

TO NORTHERN LISTENERS the B.B.C.'s scheme of alternative programmes has become a familiar institution. For nearly eighteen months they have been able to receive the National and North Regional programmes from Moorside Edge. And they have been able to assess the advantages of a system which offers them, during several hours in the day-time and throughout the evening, the opportunity of turning from one set of programmes to another. During this period the foundations of Regional broadcasting in the North have been consolidated, and, in fact, the structure has been completed.

One of the salient features of broadcasting in the North has been the attempt to mirror in as comprehensive a way as possible the vast variety of interests and activities that spring from an area whose population numbers approximately fourteen millions—a population far greater than that of any of the British Dominions. This being so, it is inevitable that many of the programmes on the North Regional wavelength have been, and will continue to be, in the nature of outside broadcasts, a type of broadcasting which places listeners in continuous contact with realities. A somewhat similar aim will continue to inspire the studio production of material for the Regional programmes, such as, for instance, talks and debates on problems and matters of interest in Northern life, the employment of concert parties which can offer listeners something of a local as well as a seasonal flavour in their entertainment, plays written around events of historical or up-to-date interest in the North, dialect drama, and concerts of music by Northern composers. The Northern farmer, the Northern gardener, and the Northern business man will also continue to be catered for in the various bulletins and talks specially arranged to cover the interests of such sections of a community where climatic, and to some extent economic, conditions are different from those of the South.

The concentration of studio activities in Lancashire at Broadcasting House, Manchester, has hitherto worked satisfactorily, but the B.B.C. has realised for some time past that, in order to enable Yorkshire to make its full contribution to the studio-produced Regional programmes, extensions of studio accom-

modation in Yorkshire would be necessary. Although the old local transmitter at Sheffield has been dismantled, along with all the other local stations in the North of England, the transmitter premises have been retained, and have been recently converted into an up-to-date modern studio, suitable for talks and appeals by prominent persons residing in the Sheffield area. The main concentration of studio activities in Yorkshire is being made at Leeds, owing to the fact that this is the most convenient geographical centre for the majority of talkers, artists, and large bands and choral combinations. By the time that this book is published, a move will have been made from the B.B.C.'s old premises in Basinghall Street in Leeds, to a large new building which was originally the Friends' Meeting House in Cookridge Street. In order to install the latest type of studios, control-rooms, and waiting-rooms, the premises have been completely gutted and rebuilt internally. The large Concert Hall studio is fitted with a gallery, and is approximately fifty feet long, thirty-eight feet wide, and twenty-seven feet high. The Talks Studio is, of course, a much smaller affair, and is designed specifically for talks and studio discussions. In addition to these two studios, there is a large control-room, a listening-room and a dramatic control panel, waiting-rooms for bands and artists, and a suite of offices. With the establishment of these premises, in the planning of which Mr. John Procter, the Leeds architect, has been employed as the artistic expert, the B.B.C.'s studio facilities in the North have now reached completion.

Another development of very considerable future importance has been the alteration of Newcastle's wavelength. Up to June 1932, Newcastle had been transmitting on the common wavelength, with the result that it was exceedingly difficult to offer Newcastle listeners anything other than the National programme. Under the new scheme, whereby Newcastle operates on a wavelength of 211.3 metres, an arrangement has been reached by which Newcastle listeners are offered a combination of the London and the North Regional programme services, including Newcastle's distinctive local contributions to these services. Listeners may, therefore, see some revival of Tyneside broadcasting which, through the North Regional wavelength, will add its quota to the wealth of Northern broadcasting as a whole.

NORTH REGIONAL EVENTS

- 1931
- November 12 Sheffield Musical Union's Choral Concert, conducted by Sir Henry Coward.
- 28 First performance by "The Yorkshire Mummers."
- December 14 "The Messiah" by Leeds Philharmonic Chorus, conducted by Dr. E. C. Bairstow.
- 21 Eye-Witness Account of Boxing Match between Johnny King (Manchester) and Dick Corbett (London).
- 22 Discussion on "Northern and Southern Manners" between Mr. L. Du Garde Peach and Mr. Gerald Barry.
- 24 Carols sung by the Choir of St. Asaph Cathedral.
- 1932
- January 12 Liverpool Philharmonic Society's Concert, conducted by Robert Heger.
- 14 Excerpt from pantomime, "Goody Two-Shoes," from Prince's Theatre, Manchester.
- 16 "At the Circus," from Belle Vue, Manchester.
- 21 Extract from pantomime, "Dick Whittington," from Theatre Royal, Leeds.
- 27 A Lewis Carroll Centenary Programme.
- 29 Extract from pantomime, "Cinderella," from the Empire Theatre, Newcastle.
- February 1 Harold Brighouse's play, "Hobson's Choice."
- 18 The Hallé Concert—Delius' "A Mass of Life"—conducted by Sir Hamilton Harty.
- 23 Speech by the Rt. Hon. Walter Runciman, M.P., President of the Board of Trade, at a Banquet of the International Cotton Committee in London.
- 26 Huddersfield Choral Society's Concert, conducted by Sir Henry Coward.
- March 2 Leeds Choral Union in Bizet's "Carmen," conducted by Norman Strafford.
- 17 Hallé Pension Fund Concert. First broadcast by Schnabel.
- 20 Bach's "St. Matthew Passion," in York Minister, conducted by Dr. E. C. Bairstow.
- April 4 First broadcast from the Hippodrome, Manchester.
- 9 Commentary by Mr. John Graham on the Rugby League Final, Swinton *v.* Leeds.
- 27 Speech by H.R.H. the Prince of Wales at a Meeting in Newcastle-on-Tyne organised by the Tyneside Council of Social Service.
- June 6 Speeches by Earl Grey of Howick, Viscount Grey of Fallodon, Viscount Halifax, Sir Charles Trevelyan, and Professor G. M. Trevelyan, at Newcastle-on-Tyne in celebration of the Centenary of the Passing of the Reform Bill.
- 10 Commentary on the Senior International Autocycle T.T. Race from the Isle of Man.
- 22 Commentary by Mr. R. C. Lyle on the Northumberland Plate from Gosforth Park, Newcastle.
- 25 Commentary on the departure of the motor vessel "Georgic" from Liverpool on her maiden voyage.

- | | | |
|-----------|--|--|
| July | 1 | Symphony Concert from Llandudno conducted by George Cathie. |
| | 5 | Julian Wylie's Revue "Hot Pot" from the Coliseum, Douglas, I.O.M.
Commentary by Mr. R. S. Williams on the Tynwald Ceremony from The Tynwald Hill, I.O.M. |
| | 14
26 | Excerpts from the Military Tattoo at Knavesmire, York.
Presentation of the Freedom of Grimsby to Dame Madge Kendal. |
| August | 1 | Eye Witness Account by Mr. A. E. Lawton of the Cricket Match, Lancashire v. Yorkshire, from the Old Trafford Ground. |
| | 25 | Commentary by Mr. George Aitcheson on the Sheep-Dog Trials in the Vale of Rydal, Westmorland. |
| | 26 | "Rambling," a Discussion, on walking alone or in crowds, between Mr. L. Du Garde Peach and Mr. Edgar Kustgarten. |
| September | 7 | "Shepherd's Purse," a Programme of Music by the Northern Studio Orchestra and Dorothy Donaldson, and readings by Mr. Wyndham Goodden. |
| | 13 | Commentary by Mr. R. C. Lyle on the St. Leger Stakes from the Town Moor Racecourse. |
| | 14 | Mr. Leslie Runciman on "New Problems in Northern Industry and Trade—New Ships for Old." |
| October | 14 | "A Blackpool Night's Entertainment," including Reginald Dixon at the Organ of the Tower Ballroom; a relay from the Palace Theatre of Varieties; Larry Brennan and his Dance Band from the Empress Ballroom; and an Excerpt from "The Arcadian Follies" on the Victoria Pier. |
| | 18 | Service for Cyclists and Wayfarers in Ripon Cathedral.
"The Countryside," a Programme by the Northern Studio Orchestra and Fred Sutcliffe. |
| | 22 | Programme by the Brighthouse and Rastrick Prize Band, the Winning Band in the Championship Brass Band Contest at Belle Vue. |
| October | 28 | Speeches by Mr. J. H. Whitley, Chairman of the B.B.C., and Mr. Leslie McMichael, Chairman of the Radio Manufacturers' Association at the Inaugural Luncheon of the Ninth Northern National Radio Exhibition, at the Midland Hotel, Manchester.
Eye-Witness Account by Mr. R. S. Williams of the Opening Day of the Exhibition at the City Hall, Manchester. |
| | 29 | Musical Excerpts from the Programme of the Belle Vue Tattoo, Manchester, organised in conjunction with the Manchester and Salford Branches of the British Legion. |
| | 30 | "Robinson Crusoe"—his life and curious adventures reviewed in eight scenes on the tercentenary of his birth, September 30th, 1632, by Mr. Wyndham Goodden, after the story by Daniel Defoe. |
| October | 8 | Liverpool Promenade Concert from the Philharmonic Hall, Liverpool. |
| | 18 | The first Concert of the Liverpool Philharmonic Society's Season, conducted by Sir Thomas Beechan. |
| | 20 | The first Hallé Concert of the Season, conducted by Sir Hamilton Harty. |
| | 27 | The North Staffordshire District Choral Society's performance of "King Olaf," conducted by the composer, Sir Edward Elgar, from the Victoria Hall, Hanley. |
| 29 | Concert by the Leeds Symphony Orchestra, conducted by Julius Harrison. | |

SOME MIDLAND OUTSIDE BROADCASTS

DURING the last year or two outside broadcasts have become an important feature of the Midland Regional programmes. Since 1930 they have increased by about 100 per cent. and the figures are still rising. A sudden jump in their number occurred about two years ago when the Midland Regional Orchestra was disbanded and the station officials were looking about for some means by which the individual character of the Midlands could be expressed in the broadcast programmes. For the Midlands has its own personality—despite the fact that its nearness to London has tended to merge it into that of the South. But there is still in the Midlands something which can be found nowhere else; something which should appeal especially to the Midland listener because it belongs to him more than to any other.

There was a good deal of feeling in the Midlands that programmes should be arranged which would to some extent reflect the life of the central counties. Accordingly, early in 1931, an effort was made to link some of the Midland theatre productions with the Birmingham Station. Already sections of the Covent Garden Company's Operas had been relayed from the Prince of Wales Theatre, but nothing in the way of a formal production had yet been heard. In January, Lehar's musical play "Frederica," with Lea Seidl in the name part, was billed for its first production before going to London. It seemed a splendid chance, and the theatre authorities gladly fell in with the scheme: so that on the 12th of the month, the second act of "Frederica" was broadcast. A good deal hung on that performance. It was a test whether or not musical plays of that kind are suitable for the microphone and it gave the engineers a very difficult problem. The "Prince" is one of the most difficult of all Midland theatres from which to do a relay. There is no room near the stage for the control panel, and the engineers, along with their apparatus, must be packed away right under the stage where none of the happenings behind the footlights can be seen.

In order to make the broadcasts possible, hours of work with a score are put in at rehearsals. The exact second of every

single movement, and the kind of control required at that moment, is carefully written into the score—until it looks like a complicated Chinese puzzle. Guided by that, the engineers must work away down in their cellar without a glimpse of the performance in their charge.

On one occasion, during an opera broadcast from this theatre, the lights failed suddenly. In the middle of a love scene, the theatre was plunged in darkness. Singers and orchestra came to a stop. The Midland Regional Director hurriedly left his box, slipped across to the B.B.C. Studios, which are but a stone's throw from the theatre, and rounded up a pianist to fill in the interval. It was twenty minutes before the play could be resumed.

Wet weather put a damper on several outside broadcasts which were to have taken place in the open air. A commentary on a massed pageant in which all the nations of the Empire were to be represented, was to have been given from Wolverhampton on July 14th. When the day came, no pageant could take place; rain fell in sheets and the grounds were completely under water!

But the Tewkesbury pageanters, trained by the famous Gwen Lally, were luckier the next day, and when the commentator entered his "hut" to describe the event, a watery sun was lighting up the brilliant scene beside the Abbey. There, in the very meadows where the pilgrims arrived for the consecration of their new church and where Queen Margaret's followers fled before the soldiers of Edward IV, were enacted scenes depicting the history of Tewkesbury from earliest times. Perhaps, as they followed the commentator's description, many listeners realised for the first time how rich in romance and history are the Midland counties.

During the rest of the year, activities were extended even further. A broadcast in August from the Boy Scouts' Camp at Yorkwood Park aroused a good deal of interest among the young people in their teens—an age for which so little wireless entertainment is directly provided.

The relay from the Three Choirs Festival at Gloucester was a broadcast particularly characteristic of the music of the Midlands, for, as is usual at these events, music by local composers had an important place in the programme.

MIDLAND REGIONAL EVENTS

1931

- November 12 Concert by the Birmingham Festival Choral Society.
 21 Wagner Concert by the City of Birmingham Orchestra.
- December 2 Ross-on-Wye Orpheus Society's Concert.
 4 A. A. Milne's play, "Mr. Pim Passes By."
 7 Strauss' "Rosenkavalier," Act I, from the Prince of
 Wales Theatre, Birmingham.
 14 Cheltenham Orchestral Society's Concert.
 23 Gloucester Cathedral Choristers' Concert.
 31 "Mother Goose" from the Theatre Royal, Birmingham.

1932

- January 10 Cedric Hardwicke in the Trial Scene from "The Merchant
 of Venice."
 12 Extracts from "The Barretts of Wimpole Street."
 16 Coleridge-Taylor's "Hiawatha."
 19 Tchekov's play, "The Artist."
 Recital of Music by Josef Holbrooke.
 25 The Gloucester Orpheus Society's Concert.
- February 4 Leicester Symphony Orchestra's Concert.
 23 "The Bear"—a comedy by Tchekov.
- March 6 Henry Ainley in scenes from "Hamlet."
 25 Masefield's "Good Friday" from the Birmingham Repertory
 Theatre.
- April 7 Jack Buchanan in Act II of "Stand up and Sing."
 19 Coleridge-Taylor's "A Tale of Old Japan" by the Here-
 ford Choral Society.
 23 Opening of the New Shakespeare Memorial Theatre at
 Stratford-on-Avon by H.R.H. the Prince of Wales.
- May 18 "Sad About Europe" from Birmingham Repertory
 Theatre.
 22 Alex Cohen Quartet in Wolf's "Quartet in D Minor."
- June 15 The Pageant of Leicester.
 29 Inaugural Festival Service of the "Friends of Pershore
 Abbey."
- August 19 Recital of songs by Michael Head by Muriel Sotham.
 26 "Shame the Devil" from the Birmingham Repertory
 Theatre.
- September 7 Relay of Concert from the Three Choirs Festival.
 14 "The Big Show" from the Coventry Hippodrome.
 22 Speech by Councillor Diana Ogilvy (Mayor of Worcester)
 at the Worcester General Infirmary Gala Week.
- October 6 First Symphony Concert of the Season by the City of
 Birmingham Orchestra, conducted by Leslie Heward.
 7 Mozart's "Don Giovanni," Act III, by the Carl Rosa
 Opera Company at the Theatre Royal, Nottingham.
 10 Coleridge Taylor's "Hiawatha" by the Leicester Choral
 and Dramatic Society.
 17 Worcester County Week. Pageant of Worcester.
 24 Concert from Dean Close School, Cheltenham.
 28 "Legionnaire" from the Birmingham Repertory Theatre.
 31 Derbyshire County Week. Derbyshire Pageant by L. du
 Garde Peach.

By the end of the year, the attempt to link Birmingham theatres with the Station had borne good fruit. The Birmingham Repertory Theatre had not only entered whole-heartedly into the scheme, but had actually built a small studio in the theatre and placed it, and the company, at the disposal of the B.B.C. for the broadcasting of short plays. Broadcasts from the "Rep" are now a regular feature of the programmes.

When the pantomime season began, lines were put into the Theatre Royal and the first part of "Mother Goose," the pantomime in which Cora Goffin and George Lacy played so successfully, was broadcast. Listeners so much appreciated the fun of the thing that the second half was broadcast a few weeks later.

Gradually lines were put into nearly all the leading theatres in the city, and now excerpts from musical shows or single "turns" from vaudeville programmes are broadcast regularly in the Midland Regional programme.

In the spring of 1932, on Shakespeare's birthday, the new Stratford Memorial Theatre was opened. The Midland Regional Station, in whose area the theatre is built, took charge of the event. The opening ceremony was broadcast to the British Empire and to America. From an engineering point of view the broadcast had certain difficulties. Microphones had to be fixed in the luncheon tent where many prominent English people and ambassadors from seventy countries were assembled. The after-lunch speeches were broadcast from one until two o'clock. Then listeners were "taken over" to the river bank, where the commentator from his "hut" described the scene before him—the new theatre, its sunlit gardens crowded with spectators, the river gay with little craft, the arrival of the Prince of Wales in his monoplane to open the theatre, and finally, the thrilling sight when the Prince unfurled the Royal Flag and a few seconds later, the flags of seventy nations shot out, making a blaze of colour round the stately building. Afterwards, the first part of "Henry IV" was broadcast from the stage.

In addition to these outstanding events, an average of between seventy and eighty outside broadcasts a month are given in the Midland Regional area. These include symphony concerts, choral music, organ recitals, light music, and periods of dance music.

THE WELSH PROGRAMMES

IN looking down a list of Welsh programmes broadcast by the West Regional Station, it is easy to see that the events fall into very definite groups illustrative of life and thought in the Principality. Foremost must come the Welsh services which have been broadcast monthly from Daventry since January 1929. These services are welcomed by Welshmen of all denominations all over the country. Congregational singing has always been an important consideration in arranging these services, and in many homes the family joins in the singing as soon as it is heard on the loudspeaker.

The first meeting of the new Welsh Religious Advisory Council was held at Shrewsbury on Tuesday, March 8th, at 2.30 p.m. Mr. Lloyd George travelled down specially to be present and he was unanimously elected Chairman of the Council. It was decided to form an Executive Committee. The members of the Council are as follows:—

The Bishop of Llandaff,
The Bishop of St. David's,
The Rev. Canon B. Davies,
The Rev. Dr. H. M. Hughes,
The Rev. D. Tecwyn Evans,
The Rev. John Roberts,
The Rev. Thomas Naylor,
The Rev. J. Penry Thomas,
The Rev. R. S. Rogers,
The Rev. W. J. Nicholson,

The Rev. H. Elvet Lewis,
The Rev. John Jenkins.

Laymen

The Rt. Hon. David Lloyd George,
The Rt. Hon. Sir J. Eldon Bankes,
Alderman Sir William Jenkins,
Mr. A. G. Howell,
Major W. P. Wheldon.

A sub-committee of laymen was appointed by the Council to advise on the selection of places of worship and preachers for the monthly Welsh services. The names of the members are:—

Mr. Evan J. Jones, Cardiff,
Mr. R. Richards, Llangynog,
Dr. J. Lloyd Williams,
"Y Cerddor," Bangor,
Alderman Sir William Jenkins,
M.P., J.P., Cymmer,

Mr. J. T. Jones, "Y Ford Gron,"
Wrexham,
Major W. P. Wheldon, Bangor,
Alderman John Lewis, J.P.,
Swansea,
Mr. John Beynon, Cardiff.

Applications from many Welsh churches and chapels were considered and a rota of services was prepared for the next twelve months, having due regard for denominational balance and representation of all parts of the Principality.

WEST REGIONAL EVENTS

- 1931
- November 1 Brahms' "Requiem" performed by the Cardiff Musical Society and the Western Studio Orchestra in the Park Hall, Cardiff.
- 7 Concert by the Bristol Choral Society from the Colston Hall, Bristol.
- December 5 Commentary by Captain H. T. B. Wakelam on the Rugby International Football Match, Wales v. South Africa, from St. Helen's Ground, Swansea.
- 24 Malcolm Keen in the name part of "Scrooge," an adaptation of Charles Dickens' "A Christmas Carol."
- 1932
- February 2 "George Crabbe," a Centenary programme based on his life and his poetry, by Ifan Kyrle-Fletcher and Cyril Wood.
- 8 Speeches at the Annual Dinner of the Bristol Branch of the Society of Somerset Folk.
- March 1 Speeches by Sir E. Vincent Evans, the Rt. Hon. Walter Elliott, and Mr. Ben Davies at the London Welsh Celebration Banquet on St. David's Day.
- 17 Gounod's "Mors et Vita" performed by the Newport Choral Society at the Central Hall, Newport.
- 25 Mendelssohn's "Elijah" by the Cardiff Musical Society.
- April 12 Concert of Music by Vaughan Williams performed by the Swansea Orpheus Choral and Orchestral Society from the Central Hall.
- 14 All-Welsh Concert by the Caernarvon Choral Society from the Pavilion, Caernarvon.
- 19 Concert by Winners at the Welsh University Annual Inter-Collegiate Eisteddfod, Cardiff, 1932.
- 26 "Bird in Hand," a play by John Drinkwater.
- May 28 Speeches by the Rt. Hon. David Lloyd George and Miss Megan Lloyd George at the Welsh League of Youth Eisteddfod, Machynlleth.
- Handel's "Israel in Egypt" performed at the Third Concert of the Three Valleys Festival at Mountain Ash.
- June 1 Speech by Sir Edward Hilton Young, Minister of Health, at the Inaugural Dinner of Cardiff Civic Week.
- July 16 Commentary on the International Water Polo Match, Scotland v. Wales, at Cardiff.
- 21 Programme by Winners of the Lloyd George Banner at the Urd Eisteddfod, Machynlleth.
- August 4 The Ceremony of Chairing the Bard and the Presidential Address by the Rt. Hon. David Lloyd George at the Royal National Eisteddfod of Wales, Port Talbot.
- 5 The Presentation of the Freedom of the Borough of Port Talbot, Aberafan, to the Rt. Hon. David Lloyd George.
- 10 Opening Ceremony of the Hospital Carnival and a Vaudeville Concert in aid of the Queen Alexandra Memorial Hospital from Grove Park, Weston-super-Mare.
- September 9 Concert by Band of H.M. Welsh Guards relayed from Bristol's Annual Exhibition, Colston Hall, Bristol.
- 11 Concerts by Victors of the 1932 National Eisteddfod of Wales, Port Talbot, 1932.
- 23 Vaudeville relayed from the Bristol Radio Exhibition, Colston Hall.
- October 6 Newport Civic Week. Speech by the Rt. Hon. J. H. Thomas, Secretary of State for the Dominions.
- 25 Opening of the New Wing of the National Museum of Wales by H.R.H. Prince George.

Next to the power of the pulpit in Wales comes the Eisteddfod, and some events from the Royal National are broadcast annually, especially such ceremonies—thrilling to Welshmen—as the Chairing of the Bard. The excitement which such a broadcast evokes is only comparable to Derby Day or the Boat Race. Unfortunately the competitive nature of many of the events makes the broadcasting of them a difficult matter, but the difficulty is always solved by offering engagements to the winners in the studio programmes and, as they usually broadcast their test pieces, listeners who were unable to be present at the Eisteddfod are able to hear the best of the performers under the easiest of conditions.

The Eisteddfod of the Youth of Wales—Urdd Gobaith Cymru—is rapidly becoming as important an annual event as the Royal National. In 1932 ten thousand representatives under eighteen years of age and from all parts of Wales took part in a grand March Past while Mr. David Lloyd George, the guest of the Eisteddfod, took the salute. Speeches by Miss Megan Lloyd George, M.P., the President, and Mr. Lloyd George were broadcast, as well as parts of the Penillion Singing Competition and the Folk Song Competition. Some of the winners also took part in programmes broadcast from the studios at a later date.

Starting on October 30th, 1931, a new feature was introduced—the fortnightly Welsh Interlude in the Daventry programme. Songs, Stories, Reminiscences, Penillion Singing, and Harp-playing, have been given in this extremely popular broadcast. It would be invidious to mention names, but it can safely be asserted that the best available artists and speakers were chosen and that North Wales contributed its share to the programmes.

The interlude was made weekly in the autumn of 1932 and changed from Tuesday to Wednesday evening and it has been found that the new day suits listeners better. The Welsh broadcast in the Children's Hour every Friday is an old established favourite and many listeners who are beginning to study Welsh join the children in listening to the simple stories.

NORTHERN IRELAND EVENTS

- | | |
|-----------|--|
| 1931 | |
| November | 21 Concert by the Belfast Wireless Symphony Orchestra, conducted by Sir Henry Wood. |
| December | 18 "The Messiah" (Part I) by the Belfast Philharmonic Society, from the Ulster Hall. |
| | 19 Commentary by Mr. W. P. Collopy on the International Rugby Match, Ireland v. South Africa from Lansdowne Road, Dublin. |
| | 21 Bach's Christmas Oratorio. |
| 1932 | |
| January | 2 Gounod's "Faust." |
| | 30 Mr. H. L. McCready (Chairman of the Linen Industry Research Association), on "The Manufacture of Linen." |
| February | 5 Concert by the Belfast Wireless Symphony Orchestra, conducted by Arthur Bliss, including his "Lie Strewn the White Flocks." |
| | 19 Berlioz's "Faust" by the Belfast Philharmonic Society. |
| March | 12 The Rt. Hon. J. Milne Barbour (Minister of Commerce), on "The Ulster Yet To Be." |
| | 17 Celebration of Pontifical High Mass by His Eminence Cardinal MacRory, D.D., Archbishop of Armagh, from St. Patrick's Roman Catholic Cathedral, Armagh. |
| | 23 "A Rift in the Lute," a County Antrim Comedy by J. H. McIlveen. |
| | 26 Mendelssohn's "Elijah" from the Ulster Hall. |
| April | 2 A Concert of Selected Prizewinners from the Feis of St. Colmcille, Londonderry. |
| | 16 Padraic Gregory on "Our Old Popular Ballads." |
| | 26 Scenes from Shakespeare's "A Midsummer Night's Dream." |
| May | 13 "Bcd o' Roses," a Comedy by Henry W. McMullan. |
| | 17 Opening of the Grand Stand at Balmoral Show Ground, by the Prime Minister, Viscount Craigavon. |
| June | 4 Talk by Sir Robert Mayer on "Youth Hostels in Ireland." |
| | 9 Church of Ireland National Commemoration Service in Honour of the 150th Anniversary of the Landing of Saint Patrick in Ireland, from St. Patrick's Protestant Cathedral, Armagh. |
| July | 2 "Crabbed Youth and Age," a play by Lennox Robinson. |
| August | 8 The Abbey Players in J. M. Synge's "The Playboy of the Western World." |
| | 20 Commentary on the R.A.C. International Tourist Trophy Motor Race over the Ards Circuit, near Belfast. |
| September | 3 Commentary on the International Ulster Grand Prix Motor-Cycle Race. |
| | 5 The Abbey Players in a prose version of Sophocles' "Oedipus Rex" by W. B. Yeats. |
| | 14 Opening Ceremony of the Belfast Wireless Exhibition in the Ulster Hall. |
| October | 15 Orchestral Concert in co-operation with the Belfast City Y.M.C.A. from Wellington Hall. |
| | 21 Concert by the Belfast Philharmonic Society, conducted by Sir Edward Elgar. |

BROADCASTING IN NORTHERN IRELAND

SIXPENCE—and two and a half hours' entertainment by a symphony orchestra and famous soloists. The two seem, at first glance, irreconcilable; but co-operation between the B.B.C. in Northern Ireland and a number of public bodies made the relation between them, in 1932, very popular. For sixpence the Ulster concert-goer found entertainment almost every Saturday evening in the winter and spring, and the success of the concert series which were given in Belfast was quickly established. In all twenty-four public broadcast concerts were given in the city, fourteen in co-operation with the Belfast Corporation in the Ulster Hall, and ten in co-operation with the City Y.M.C.A. in the Wellington Hall. Sir Henry Wood, Dr. Adrian Boult, Colonel Fritz Brase, Charles J. Brennan (the Belfast City and Cathedral Organist), Percy Pitt, and E. Godfrey Brown, conducted the Belfast Wireless Symphony Orchestra at the different concerts, and a number of important works were performed. Among these perhaps the most interesting were John Ireland's new Pianoforte Concerto, and "Morning Heroes," Arthur Bliss' Choral Symphony of War, which was performed in the spring with the composer himself conducting. This work had had its first London performance under the conductorship of Dr. Adrian Boult, in a B.B.C. Symphony Concert at the Queen's Hall in the previous year.

The interest which was evoked by the inauguration of this scheme in 1931 led to a new experiment in the 1932 season which may pave the way to further development. For the first time a series of public concerts was given outside Belfast, in Bangor, County Down, where the Bangor Borough Council did everything possible to ensure the success of the venture. The population of Bangor, of course, is much smaller than that of Belfast, and in consequence comparison between the two series is difficult. On the whole the Bangor concerts may be said to have justified themselves, and the town has the satisfaction of having given a lead in musical appreciation to other parts of the Province. The weekly free concert at the Belfast Museum and Art Gallery was continued and some interesting performances were relayed by the B.B.C. from outside sources, including five

concerts given by the very much alive Belfast Philharmonic Society, which is now in its fifty-eighth year. The microphone also travelled to Lisburn and to Londonderry and elsewhere for broadcast of local musical events.

St. Patrick's Day (March 17th) was made notable by a broadcast of great importance to Northern listeners, the first relay ever permitted in Northern Ireland by the Roman Catholic Church. The occasion was the Celebration of Pontifical High Mass at St. Patrick's Roman Catholic Cathedral, Armagh, by His Eminence Cardinal MacRory in honour of the 1,500th anniversary of the Saint's arrival in the country, and the service was transmitted to America, via Dublin. The lifting of the ban on broadcasting in Northern Ireland on this occasion gave widespread satisfaction. In June the Church of Ireland marked the anniversary with a commemoration service at St. Patrick's Protestant Cathedral in Armagh. The Archbishop of Canterbury preached the sermon, and Church dignitaries from all over the British Isles took part. This service was also broadcast.

The year, as far as the dramatic side of the Belfast Station's work was concerned, produced some competent dialect plays written for the microphone; but apparently the Ulster author has yet to be found who is completely master of the medium, and most of the plays submitted have needed adaptation. Northern Ireland has a distinct drama form of its own which is still in the process of evolution, but up to now it has suffered, as far as broadcasting is concerned, from lack of action and from slow development requiring visual impressions to sustain interest. Out of the long list of purely Ulster plays presented the most notable were "Rolling the Planet," "Insurance Money," and "Tully's Experts" by the Ulster playwright, George Shiels, "The House in the Quiet Glen" by J. W. Coulter, "Apollo in Mourne" by Richard Rowley, and two works by J. H. McIlveen, "Neighbours' Childer" and "The Wheat and the Chaff." The Belfast Station is particularly fortunate in being able to present plays by the Abbey Theatre Company, which visited the studio on various occasions to perform some of the plays with which the theatre has won fame all over the world. In 1931 the Company broadcast "Autumn Fire" by T. C. Murray, and "Oedipus Rex," in a translation by W. B. Yeats, who made his first microphone appearance at Belfast some time before its presentation, and



THE EUCHARISTIC CONGRESS IN DUBLIN
THE CELEBRATION OF PONTIFICAL HIGH MASS BY THE PAPAL LEGATE,
CARDINAL LAURI, IN PHENIX PARK, BROADCAST ON 26 JUNE 1932

gave a reading of some of his poems. During the latter part of 1932, when the Abbey Company returned from its American tour, the Belfast Station broke new ground by arranging a broadcast "season," two plays being given each month. The particular event of this series was a performance of Synge's comedy "The Playboy of the Western World." There is a big audience for Shakespeare in Northern Ireland, and three complete plays were given during the year, "A Midsummer Night's Dream," "As You Like It," and "The Merchant of Venice." Excerpts from other plays included "Hamlet," "Twelfth Night," "Henry VIII," "The Merry Wives of Windsor," and "Richard II." The Belfast Station presents, on an average, seventy plays each year.

The "Outside Broadcast" department, as usual, has had a busy year. Running Commentaries were broadcast on the Ulster Tourist Trophy Motor Car Race and on the Ulster Grand Prix, one of the most important motor cycling events in the British Isles. In both cases two commentators were employed, one being at the Grand Stand and the other at a selected point on the course. A commentary on the Rugby Match between Ulster and South Africa was also broadcast. The microphone was frequently to be seen in Portrush during the season, relaying dance music and concert party performances, and church relays from various towns in the Province were also undertaken.

Apart from programmes, the chief event of the year was the opening of a new studio, to relieve the congestion in the two already existing. Each musical programme presented occupies at least twice as much time in rehearsal as it does at the actual broadcast, and dramatic rehearsals take ten times as long as the performance. In consequence, studios for rehearsal work are in constant demand. The new studio is used principally for plays and small orchestras, and its existence has made the problem of allocation much more simple. During the year also a dramatic control panel has been installed at the Belfast Station, with the result that more elaborate production of plays has been made possible.

EVENTS OF THE YEAR

1931.

- Nov. 7 Lehar Festival Concert from Vienna.
 9 Speech by the Prime Minister at the Lord Mayor's Banquet at the Guildhall.
 11 Armistice Day Service from the Cenotaph, Whitehall.
 13 Official welcome of the Watkins-Courtauld Expedition at Copenhagen.
 16 The Prince of Wales inaugurates the Buy British Campaign.
 21 Yale-Harvard Rugby Football Match from America.
 23 First performance in London of William Walton's "Belshazzar's Feast."
 26 Speech by the Prime Minister at a Dinner in honour of his birthday.
 The Archbishop of Liverpool, Dr. Downey, on "What I would do with the World."
 Dec. 8 Commentary by Captain H. T. B. Wakelam on the Oxford v. Cambridge Rugger Match at Twickenham.
 7 Speech by Lord Reading at the Jewish Agency Dinner.
 9 Delius's "Song of the High Hills" conducted by Sir Henry Wood.
 15 National Service of Prayer for World Disarmament at St. Paul's Cathedral.
 18 National Lecture: Sir William Rothenstein on "Whither Painting?"
 24 Christmas Carols from King's College, Cambridge.
 Jessie Matthews and Sonnie Hale in numbers from "Hold My Hand."
 25 Christmas Day Service from York Minster.
 31 "Account Rendered," a special New Year's Eve Programme.
 New Year Message to German listeners by President Hindenburg.

1932.

- Jan. 2 Commentary by Captain H. T. B. Wakelam on the Rugger Match, England v. South Africa, at Twickenham.
 3 Bantock's "Song of Songs" by the B.B.C. Orchestra and the Wireless Chorus, conducted by Stanford Robinson.
 9 Alfred Piccaver from the London Palladium.
 10 Romantic operetta, "Good-night Vienna," by George Posford and Holt Marvell.
 11 Stars of American Radio from New York.
 14 The Ceremony of the Keys from the Tower of London.
 18 Wagner Concert by the B.B.C. Symphony Orchestra and Helen Wildbrunn.
 Commentary on the Ice Hockey Match, England v. Canada, at Grosvenor House.
 22 Concert of Busoni's Music.
 National Lecture: Sir Frederick G. Hopkins on "Vitamins as Necessities for Life."
 25 Burns Anniversary Programme from Edinburgh.

- Jan. 27 Stravinsky playing his own Capriccio for piano and orchestra in a B.B.C. Symphony Concert conducted by Ernest Ansermet.
Address to the Youth of Great Britain by the Prince of Wales at the Royal Albert Hall.
- 31 Sermon by the Archbishop of York from Geneva Cathedral.
- Feb. 1 Opening of the England-South Africa Telephone Service by a conversation between Mr. Ramsay MacDonald and General Hertzog.
- 2 Speech by Mr. Arthur Henderson at the Opening of the Disarmament Conference at Geneva.
- 3 B.B.C. Symphony Concert conducted by Nikolai Malko.
- 7 Chamber Music by the Lener Quartet.
- 10 First performance of Bax's "Winter Legends."
- 15 Programme of Negro Spirituals from New York.
- 18 Hallé concert: Delius' "Mass of Life."
- 21 Programme of British Music by the B.B.C. Orchestra conducted by Adrian Boult, relayed to the Continent.
- 22 Address by President Hoover before the Joint Session of Congress, celebrating the Bi-Centenary of George Washington.
Speeches by the Duke of York and Mr. Walter Runciman at the British Industries Fair.
- 24 Cortot playing the Emperor Concerto in a B.B.C. Symphony Concert.
- 27 Commentary on the Rugged Match, Scotland *v.* Ireland, at Murrayfield.
- 28 Service from Carlisle Cathedral and an Address by the Bishop.
- Mar. 1 Dance Music by Jack Hylton and his Band.
- 3 Handel's "Israel in Egypt" by the National Chorus, conducted by Stanford Robinson.
- 4 Concert of Bela Bartok's Music conducted by Sir Henry Wood.
- 5 Extract from the musical play "White Horse Inn" at the London Coliseum.
- 11 Talk by Sir Malcolm Campbell on his Speed Records. Violet Loraine, Lady Tree, and Claude Hulbert in a play "His Majesty Proclaims."
- 12 Oration by M. Tardieu at the Funeral of M. Aristide Briand, relayed from Paris.
- 13 Shakespeare's "Othello," with Henry Ainley, Peggy Ashcroft, and John Gielgud.
- 15 First broadcast by the new B.B.C. Dance Orchestra directed by Henry Hall.
- 16 Huberman in a B.B.C. Symphony Concert conducted by Weingartner.
- 17 Hallé Pensions Fund Concert: soloist, Artur Schnabel.
- 18 National Lecture: Professor George Gordon on "The Art and Ethics of Modern Biography."
Commentary by Mr. R. C. Lyle on the Grand National Steeplechase at Aintree.



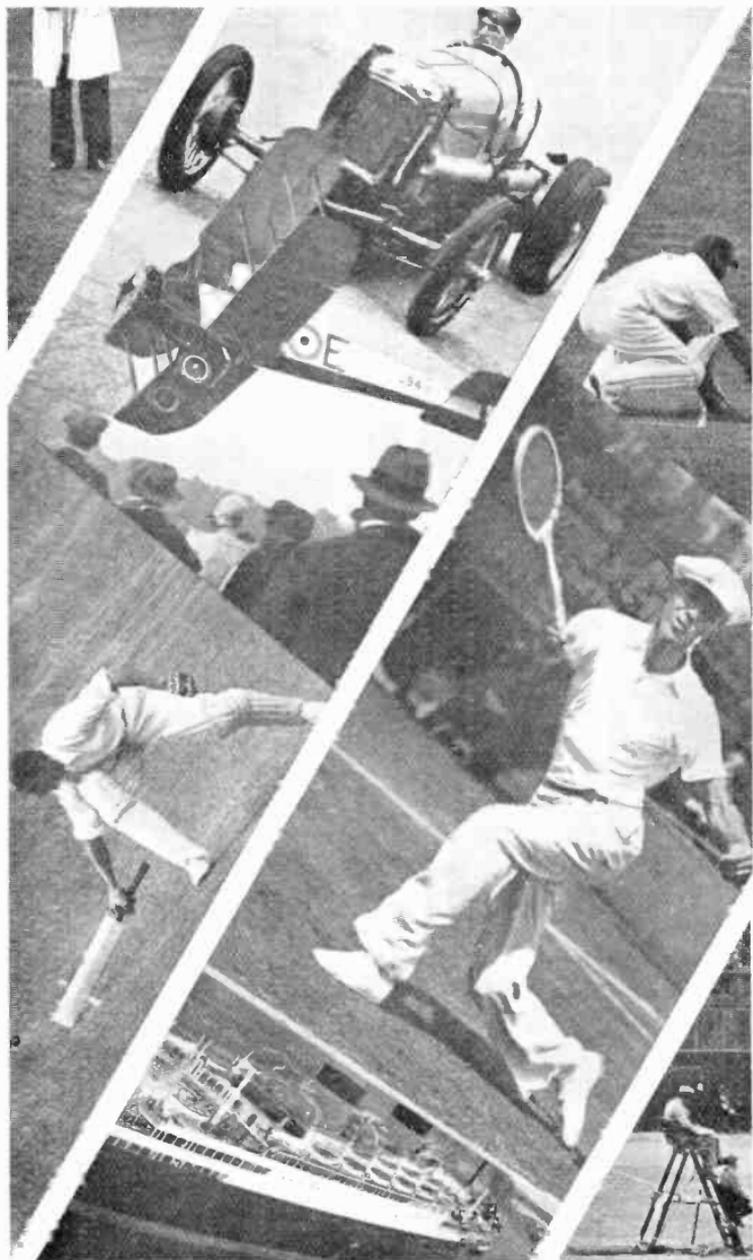
ARTUR SCHNABEL
(17 March 1932)



THE OPENING OF THE SHAKESPEARE MEMORIAL THEATRE AT
STRATFORD-ON-AVON
(23 April 1932)

- Mar. 19 Commentary by Mr. J. D. M. Snagge on the Oxford *v.* Cambridge Boat Race.
- 25 Good Friday "Parsifal" Concert from the Queen's Hall. Service from St. George's Chapel, Windsor.
- 27 Easter Day Service from Liverpool Cathedral.
- 31 Johann Strauss's "The Gipsy Baron."
- Apr. 3 Service from Sherborne Abbey.
- 6 Bach's Mass in B Minor by the B.B.C. Symphony Orchestra and the National Chorus, conducted by Adrian Boult.
- 9 Commentary on the Soccer Match, England *v.* Scotland, at Wembley.
- 11 Serge Prokofiev playing one of his own Piano Concertos in a B.B.C. Symphony Concert at the Queen's Hall.
- 14 First of a series of talks interchanged between the B.B.C. and the Columbia Broadcasting System in America.
- 20 Bruno Walter playing the solo part as well as conducting the B.B.C. Symphony Orchestra in a Mozart Piano Concerto. The Chancellor of the Exchequer, Mr. Neville Chamberlain, explains the Budget.
- 23 Opening by the Prince of Wales of the new Shakespeare Memorial Theatre at Stratford-on-Avon.
- Commentary by Mr. G. F. Allison on the F.A. Cup Final, Arsenal *v.* Newcastle United, at Wembley.
- 25 Strindberg's play, "There are Crimes and Crimes."
- 27 B.B.C. Symphony Concert including Bliss's "Colour Symphony," and Suggia in the Haydn Cello Concerto.
- 30 Speeches by Prince George, Sir W. Llewellyn, and others from the Royal Academy Dinner at Burlington House.
- May 4 Last B.B.C. Symphony Concert of the season at the Queen's Hall. The National Chorus in Beethoven's Choral Symphony conducted by Adrian Boult.
- 7 Cicely Courtneidge from the London Palladium. Commentary on the Kentucky Derby relayed from America.
- 9 The third Act of "The Mastersingers" from the opening performance of the Covent Garden International season.
- 10 Professor Gilbert Murray at the Annual Meeting of the Women's Institutes at the Albert Hall.
- 12 Oration by M. Tardieu at the Funeral of M. Doumer, President of the French Republic.
- 14 "The End of Savoy Hill," a farewell programme devised by Lance Sieveking.
- 20 Sir Thomas Beecham conducting the B.B.C. Orchestra and Wireless Chorus in a performance of Delius's opera "A Village Romeo and Juliet."
- 21 Admiral E. R. G. R. Evans gives the first talk in a series entitled "Hazard."
- 23 The Song of the Nightingale from the Berkshire Woods.
- 24 Empire Day Programme, including a Message by the Prime Minister.
- 26 Celebrity Concert in aid of the Musicians' Benevolent Fund relayed from the Albert Hall, including Florence Austral, Elena Gerhardt, Friedrich Schorr, Backhaus, and Suggia.

- May 27 Charpentier's "La Vie du Poete" from the Théâtre des Champs Élysées, Paris.
Frederic d'Erlanger's Requiem by the B.B.C. Orchestra and National Chorus conducted by Adrian Boult.
- 28 Speech by Mr. David Lloyd George at the National Eisteddfod of the Welsh League of Youth at Machynlleth.
- 30 Royal Command Variety Performance from the London Palladium.
- 31 Extract from "Derby Day," a comic opera by A. P. Herbert and Alfred Reynolds.
Dramatic version of Henry James's story, "The Turn of the Screw."
- June 1 Commentary by Mr. R. C. Lyle on the Derby.
- 3 Third Act of Wagner's "Götterdämmerung," from final performance of the Covent Garden International Season.
- 4 Ceremony of the Trooping of the Colour from the Horse Guards Parade.
- 5 John Gielgud in Shakespeare's "Hamlet."
First day of the extended hours of Sunday broadcasting: from 12.30 p.m. onwards.
- 6 Reginald Stewart conducting the B.B.C. Orchestra.
- 10 Commentary on the Tourist Trophy Races in the Isle of Man.
- 11 Broadcast of the Aldershot Tattoo.
- 12 The new Scottish Regional Transmitter at Westerglen, Falkirk, takes over the Scottish programmes.
- 15 Concert by the B.B.C. Orchestra at the Canterbury Music Festival.
- 18 "Waterloo," a historical play by Val Gielgud and Norman Edwards.
Speech by Jean Borotra at the dinner of the International Lawn Tennis Club.
- 19 First broadcast Service from All Souls' Church, Langham Place, London.
- 22 Opening of the Anglo-Egyptian Telephone Service.
Part of Saint-Saens' opera, "Samson and Delilah," relayed from Berlin.
- 23 "Midsummer Eve," a play written for broadcasting by John Drinkwater.
- 25 A record afternoon of sport, including commentaries on the Midland Automobile Club's Hill Climbing Test at Shelsley Walsh; the All-England Lawn Tennis Championships at Wimbledon; the departure of the "Georgic" on her maiden voyage from Liverpool to New York; the Royal Air Force Display at Hendon.
- 26 Pontifical High Mass celebrated by Cardinal Lauri, the Papal Legate to the Eucharistic Congress in Dublin, relayed from Phoenix Park.
Service from Peterborough Cathedral.
- 30 Speech by the Prince of Wales at the annual Canadian Dominion Day Dinner.
- July 1 Act I of Verdi's "Sicilian Vespers" from Berlin.



A RECORD AFTERNOON'S BROADCASTS OF SPORT

(2. June 1933)

[221]



DR. SCOTT LIDGETT SIGNING THE DEED OF REUNION AT THE
UNITING CONFERENCE OF THE METHODIST CHURCHES

(20 September 1932)

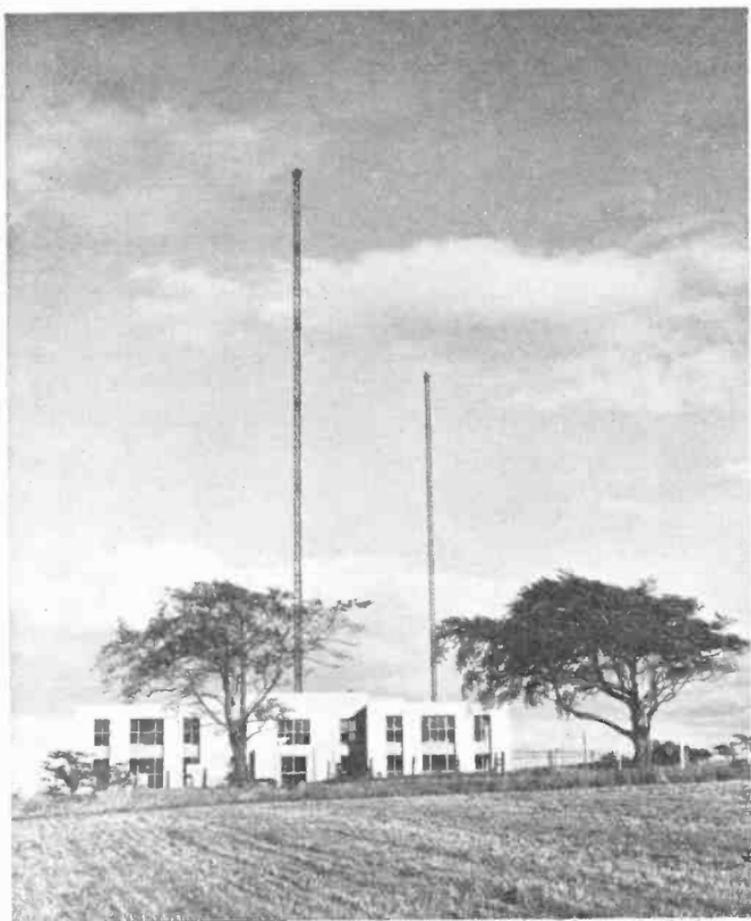
- July 2 Commentary by Colonel R. H. Brand and Captain H. T. B. Wakelam on the Finals of the All England Lawn Tennis Club Championships at Wimbledon.
- 4 A concert of Sebelius' music played by the London Symphony Orchestra, conducted by Robert Kajanus, in the Queen's Hall.
- 5 "Flags on the Matterhorn," from the German broadcast play by Christian Pfeil and Gasbarra.
- 7 Lord Hailsham on the War Loan Conversion Scheme.
- 8 Weber's "Euryanthe" from the Berlin Studio.
- 12 Speeches by Mr. Winston Churchill and Dr. Nicholas Murray Butler at the Washington Bicentenary Commemoration Dinner in London.
- 17 Concert from the Kursaal, Ostend.
- 21 Speeches at the Opening of the Imperial Economic Conference at Ottawa.
- 27 Part of Mozart's "Don Giovanni" relayed from Munich.
- 30 Broadcast of the Tidworth Tattoo.
- Aug. 1 Unveiling by the Prince of Wales of the Somme Memorial at Thiepval.
- Proceedings at the Trial for the Award of the Dunmow Flitch.
- 3 Concert of contemporary French Music from Salzburg.
- 6 First concert of the Promenade Season at the Queen's Hall by the B.B.C. Symphony Orchestra conducted by Sir Henry Wood.
- 12 Extract from Weber's opera "Oberon" relayed from Salzburg.
- 15 Gwen Ffrangcon-Davies in Shakespeare's "As You Like It."
- 17 Mozart's "Cosi Fan Tutte" from Munich.
- 20 Commentary on the Ulster T.T. Races from the Ards Circuit, Belfast.
- 22 First of a new series of experimental transmissions of Television.
- 27 Mr. Stanley Baldwin explains the Ottawa Conference Agreements on the return of the British Delegation to England.
- Sept. 4 The Archbishop of Armagh gives the first talk in a new series entitled "Christ in the Changing World."
- 7 Commentary on the St. Leger Stakes at Doncaster.
- 15 "An Ideal Husband," a play by Oscar Wilde.
- Commentary by Mr. H. W. Rawnsley-Gurd on the Final Speedway Test Match, England v. Australia, at Wembley.
- 16 Handel's "Water Music," played complete by the B.B.C. Orchestra.
- 18 Archbishop Goodier in the series of talks on "Christ in the Changing World."
- Sonatas by Brahms and Beethoven played by Adolf Busch and Rudolf Serkin.
- 19 Lady Gregory's "The Workhouse Ward" played by the Abbey Players.
- 20 Speech by the Duke of York at the Uniting Conference of the Methodist Churches at the Royal Albert Hall.

- Sept. 26 Sir Walter Scott Centenary programme arranged by Christine Orr.
Ernest Milton in "Precession," a Caricature by E. J. King-Bull.
Speech by Mr. Eamon de Valera as President of the Council of the League of Nations, from Geneva.
- 28 First talk, by Lord Macmillan, of a series entitled "The Law of the Land."
- 29 First of a series of talks by Mr. Desmond MacCarthy on "The Art of Reading."
- 29 Arthur Miller's "The Gypsy Princess" adapted for broadcasting by Gordon McConnel.
Act II of Bizet's "Carmen" by the Carl Rosa Opera Company.
- Oct. 1 Final Night of the Promenade Concert Season at the Queen's Hall, by the B.B.C. Symphony Orchestra conducted by Sir Henry Wood.
- 3 Mr. E. M. Forster on current literature.
Bach's "Art of Fugue" played by the London Symphony Orchestra, conducted by Hans Weisbach, at the Queen's Hall.
- 4 Sir Thomas Horder gives the first of a series of talks on Health.
- 5 "The White Blackbird," a play by Lennox Robinson.
- 6 Mr. Vernon Bartlett gives the first of his new series of talks from the Continent.
- 9 Miss Phyllis Neilson Terry in "Impressions of *Twelfth Night*."
- 10 Vaudeville including Jeanne de Casalis and Ethel Levy.
- 13 Recital by Evelyn Scotney and Frank Mannheimer.
- 15 First Public Concert in Broadcasting House: Chamber Music by the Catterall Quartet and John Coates.
First "Mock Trial" in the "Consider your Verdict" series.
- 17 Harry Tate in a Vaudeville programme.
- 19 First B.B.C. Symphony Concert of the season conducted by Adrian Boult in the Queen's Hall.
- 20 Service in Commemoration of the Tercentenary of Sir Christopher Wren from St. Paul's Cathedral.
"Sir Christopher Wren," a play by Wren's biographer, C. Whitaker Wilson.
Royal Philharmonic Society's Concert conducted by Sir Thomas Beecham.
- Oct. 23 First Sunday Orchestral Concert of the Winter Season conducted by Adrian Boult.
- 24 "Nor' West," a play by L. du Garde Peach.
Chamber Music by the International String Quartet.
- 26 B.B.C. Symphony Concert in the Queen's Hall conducted by Adrian Boult. Soloist: Mischa Elman.
- 27 Jack Hulbert and his "Follies."
- 28 First of the Political Debates: "Disarmament."
- 29 Public Chamber Music Concert in Broadcasting House Concert Hall. Lionel Tertis and Solomon playing sonatas of Bax and Brahms.

SCOTLAND

H

[225]



THE SCOTTISH REGIONAL STATION AT WESTERGLLEN

NOTES OF THE YEAR

BY A HAPPY CHANCE the opening of the new Scottish Regional Station at Westerglen near Falkirk has occurred in the same year as the centenary of Scotland's most famous man of letters, Sir Walter Scott. In fact, the putting of the new Regional Station into full operation has almost coincided with the centenary celebrations described on page 247. The station has been built on the same technical lines as the previous Regional Stations at Brookmans Park and Moorside Edge, but with certain improvements in detail. Visitors to Westerglen seem to be impressed by the imposing isolation of the site, the building standing on a hill above Falkirk, with views across the valley of the Forth to the east, towards Glasgow to the west, and across the Carse of Stirling to the north.

* * *

The new station, like its predecessors, has two transmitters working on approximately equal power. The site, chosen after exhaustive field tests, enables them to cover 80 per cent. of the population of Scotland. The article on page 231 describes in detail the problems of distribution and how they are being met by the B.B.C. There has been some public misunderstanding of the facts of the case and of the difficulty of providing a direct service to remote parts of the Highlands when the shortage of wavelengths available under international agreements makes it very difficult to serve a mountainous country with an extremely scattered population. The B.B.C. is hopeful, however, of finding a solution of the problem. With the opening of the new High-Power Station, Aberdeen has become a relay station with a changed wavelength, and the Dundee, Edinburgh, and Glasgow transmitters have been closed.

* * *

The closing of the transmitters does not mean the abandonment of the studios attached to them, or the reduction of the amount of local material contributed to the Scottish programmes. In Glasgow, on the contrary, the B.B.C. has modernised its equipment, and the studios in Blythswood Square will continue to contribute their share of the Scottish programme, a share which in the last year has amounted to about 50 per cent., excluding routine broadcasts like the news, agricultural

bulletins, etc., which, naturally, are delivered from the B.B.C.'s headquarters in Edinburgh. In the matter of orchestral and choral music, as a reference to page 248 will show, Glasgow has contributed considerably more than half.

* * *

Aberdeen has also maintained its long-established personality in the Scottish programmes. On the one hand it has contributed light entertainments by, for instance, Harry Gordon, the most characteristic of Aberdeen comedians, and "The Silver Citizens," a party of Aberdeen variety artists. On the other, there are the chaumer and the bothy concerts, which could come from nowhere else than the north-east corner of Scotland. Aberdeen is also well situated for undertaking many of the Highland broadcasts, from running commentaries on outside events like Highland games to Gaelic songs and *ceilidhs*.

* * *

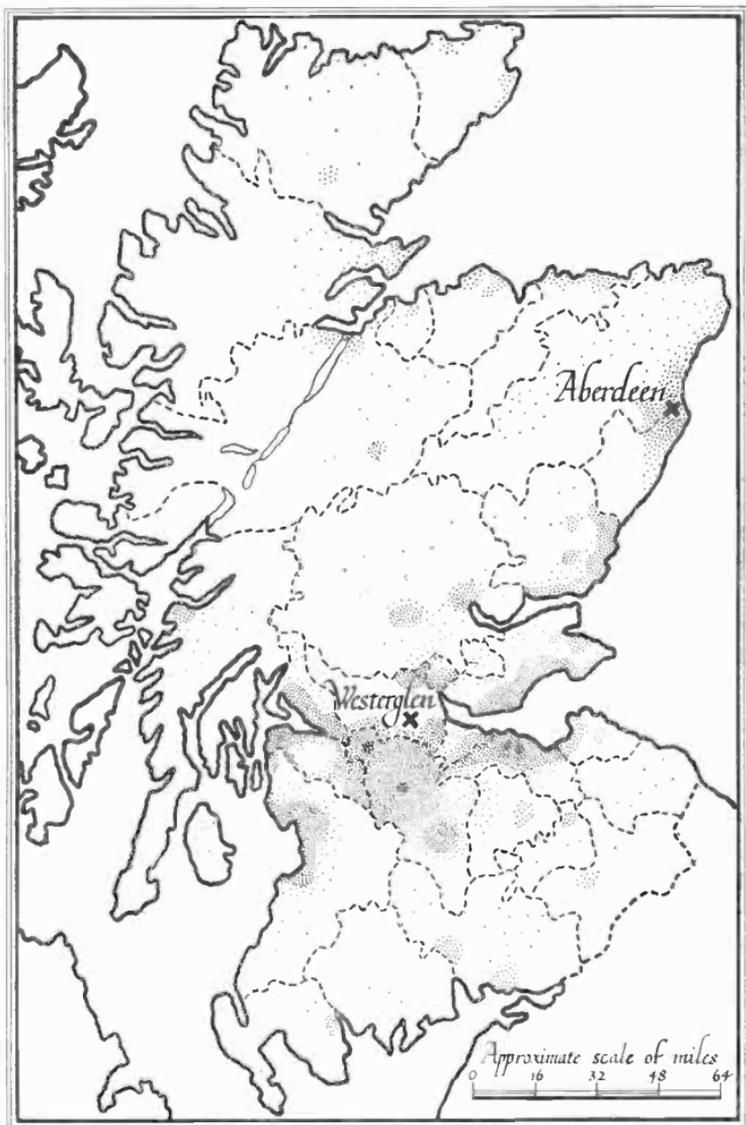
Thus authentic Scots traditional music is finding its place more and more frequently in the Scottish programmes as the B.B.C. develops its policy of exploring and encouraging local talent, particularly in the remoter parts of the country where the old traditions still linger. Encouragement, however, is not solely directed towards these survivals, but, hand in hand with the fostering of historical and folk traditions, regular opportunities are provided for the broadcasting of music by modern Scots composers and for the reading of contemporary poetry.

* * *

An event that promises to be of first importance is the B.B.C.'s attempt to persuade various existing orchestral societies of high standing to combine together to form, in co-operation with the B.B.C., a single united Scottish orchestra organised on a national basis. The scheme has met with a certain amount of opposition, but the B.B.C. and many eminent musical authorities are convinced that development on the lines of unification is inevitable and will prove to be in the best interest of Scottish music.



THE TRANSMITTER HALL



MAP OF SCOTLAND SHOWING DENSITY OF POPULATION IN RELATION TO THE HIGH-POWER STATION AT WESTERGLLEN AND THE ABERDEEN RELAY STATION

THE PROBLEM OF DISTRIBUTION

BROADCASTING is a national service, and in planning a system of distribution it is necessary to consider how the service can most easily be made available to as many potential listeners as possible. The problem of satisfactory national distribution is a very difficult one, not only on account of purely technical difficulties but because of variations in the density of population, and for geographical, geological, and other reasons.

Thus a system of distribution which may meet the needs of one part of the country may be less adequate for another. Since technical requirements require a co-ordinated solution and at the same time imply severe restrictions as to the methods of attack, it follows that the ideal solution of any problem of distribution is almost inevitably impracticable for one reason or another.

In planning the system of broadcasting stations for Great Britain, the B.B.C. has been faced with the difficulties of an irregular coast-line, great variations in the density of population, mountainous country, and the different needs to be catered for in the selection of programme material. Scotland has presented these obstacles very prominently. The country is fairly flat in the south, but mountainous in the north, and wireless waves weaken rapidly in travelling over hilly country. Eighty per cent. of the population is concentrated within seventy miles of Glasgow and Edinburgh and there are large tracts of thinly populated country to the north.

Why, the non-technical reader may ask, does this create a problem of distribution? Why cannot a number of stations be dotted about the country so that everyone is within easy reach of at least one of them? There are several reasons why this is not possible.

A broadcasting station requires a wavelength on which to work. Now the number of available wavelengths or "ether channels" is strictly limited by international agreement. Great Britain has ten such wavelengths at its disposal for broadcasting purposes, and the question therefore resolves itself into making the best use of these wavelengths having regard to the claims and, to some extent conflicting, interests, of all parts of the country.

To use these wavelengths to the best advantage, the B.B.C. is building a number of high-power transmitting stations capable of serving large areas. Obviously the stations must be placed in or near the centres of population so that the maximum number of listeners may be given a good service.

Another technical limitation arises here. A broadcasting station using one of the "medium" wavelengths available for broadcasting (between 200 and 545 metres) cannot in any circumstances give a reliable service beyond a range of 60-80 miles, whatever the power of the transmitter may be. Beyond this range there are likely to be severe variations in the strength of the received signal and distortion of its quality. A transmitter using the one "long" wave available to Great Britain can, however, give a good service up to 200-300 miles. There is no possibility of further long waves becoming available.

The B.B.C. has, therefore, proceeded on the lines of placing its medium-wave stations near the populated areas, leaving the long-wave station centrally-placed to fill in the gaps and provide a service in the outlying districts.

Apart from the purely service angle, the economic side must not be forgotten. The B.B.C. exists on the licence money collected from listeners. It would obviously be wrong to build and run expensive transmitting plant merely to serve a sparsely-populated area, bearing in mind that the number of wavelength channels is so definitely restricted. Such a course would mean that a more heavily populated area would have to suffer.

How, then, can Scotland be best served having regard to the facilities at the B.B.C.'s disposal and the competing claims of other parts of the country? The first step is to cater for the eighty per cent. of the population in the south. The B.B.C. has built a twin-wave high-power transmitting station at Wester-glen near Falkirk, almost mid-way between Glasgow and Edinburgh. This is capable of giving a good service over a range of about seventy miles.

Thus a large section of the population is given the choice of alternative programmes on simple apparatus. The new Station has replaced the low-power transmitters which were situated in Glasgow, Edinburgh, and Dundee, and gave only a local service ; and the high-power transmitters have greatly increased the area over which good reception is possible.

There still remains the problem of serving the sparsely populated Highlands. Aberdeen and an area about 10 miles round it is served by the low-power transmitter which has been in operation since 1923. In order to allow this transmitter to give the programme most suited to the needs of Aberdeen, it now employs an exclusive wavelength, borrowed from Poland, instead of the national common wavelength of 288.5 metres which was used until recently.

Various suggestions have been made for improving the service in the Highlands, but, for reasons which it is not possible to go into fully in a short article, none of them are practicable.* Suffice it to say, however, that the solution does not lie in terms of moving the Daventry long-wave station to a point further north or increasing the power of the Aberdeen and Scottish Regional transmitters. Even if a wavelength were available, a transmitting station placed near, say, Inverness, would serve only a very small part of the Highlands because of the physical conformation of the country.

It is hoped that this article has succeeded in explaining some of the difficulties of improving the service to Scotland in the face of the international limitation of wavelengths. Future developments in the system of distribution depend to a large extent on the results of international agreements. It is impossible, therefore, to forecast in what direction they will lie. It is unnecessary to add that the B.B.C. considers the interests of Scotland as much as any other part of the United Kingdom, and that the need for an improved service to the Highlands is fully realised. No effort will be spared to provide this when technical developments and the requirements of the country as a whole permit.

* A pamphlet on the subject, "The Broadcasting Service to the North of Scotland," may be obtained free from the B.B.C.



A CONTROL DESK

THE SCOTTISH REGIONAL STATION

THE Scottish Regional Station is the third twin-wave transmitting station to be built by the B.B.C., its predecessors being the London Regional Station at Brookmans Park and the North Regional Station at Moorside Edge, near Huddersfield.

The Brookmans Park Station was designed to serve the London district, and Moorside Edge to cover the industrial North from Liverpool in the west to Hull in the east. The Scottish Station primarily had to provide a good service in the two main centres of population, Glasgow and Edinburgh, and at the same time to reach north to Dundee and south over the populated Lowlands. Thus it was necessary to find a site approximately midway between Glasgow and Edinburgh. After many tests with a portable (lorry) transmitter and field strength measuring apparatus, a site was chosen at Westerglen, three miles south-west of Falkirk on the Falkirk-Slammanan Road. The site is 500 feet above sea-level.

The design of the station closely follows that adopted for the earlier stations. Some improvements which have come to light from experience in operating the other stations have, of course, been incorporated; but in equipment, as well as in design, all three stations are very alike.

The arrangement of the aerial system is, however, quite different. At Brookmans Park, the B.B.C. was limited by Government regulations to a mast height of 200 feet, and two masts supported each of the two aerials. At Moorside Edge no restrictions were imposed and three masts each 500 feet high and built in triangular formation support the two aerials.

In view of the shorter wavelengths to be employed at the Scottish Station and the desirability of adopting the cheapest mast arrangement consistent with efficient working conditions, a series of experiments were carried out to determine the suitability of a type of "umbrella" aerial which requires only one mast to support it. These experiments were successful and this type of aerial was accordingly adopted for the Scottish Station.

Two stayed lattice steel masts each 500 feet high support two "umbrella" aerials each consisting of three radiating conductors hung from the top at equal distances round the mast and held at the bottom by anchorages approximately 150 feet from

the base. The three wires are brought together in an aerial-transformer house at the foot of the mast. This building contains the high-frequency circuits necessary to transfer the energy from the incoming high-frequency feeder lines to the aerial.

The masts are insulated, being supported at the base by seven sets of porcelain cheese-type insulators which rest on a concrete foundation. The three sets of stays per mast are also broken by insulators. Owing to the height of the masts, red lights are fixed at the top to give warning after dark to aircraft. As the masts are insulated, these lights have to be fed through a high-frequency filter circuit to prevent the flow of high-frequency current in the lamp leads.

The earth system consists of a number of bare copper wires, No. 16 S.W.G., laid radially 5 degrees apart and buried about a foot beneath the surface. The wires extend 235 feet from the base of each mast.

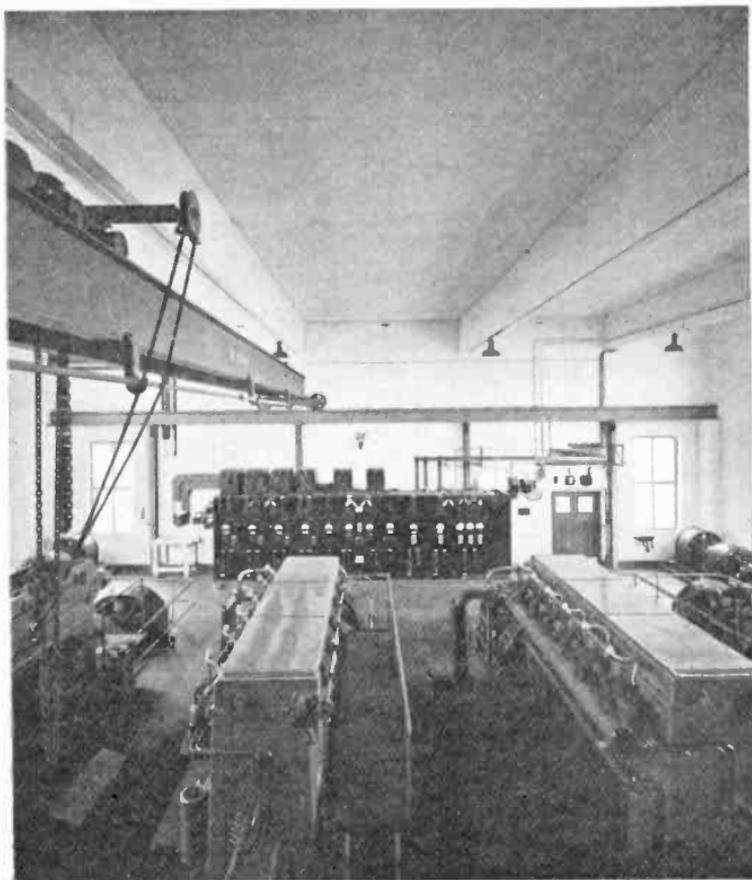
A local stone has been used for the outside of the building, and the natural-grey colour gives an appearance in keeping with most of the large buildings in that part of the country. Except in the office block to the front, the building has one storey only, and the considerable length made it necessary to choose its position with care, to show the building to the best advantage.

The power for the station is generated by four Diesel engines direct coupled to direct-current generators. Three months' supply of fuel oil is stored in two tanks, each of 75 tons capacity, at the rear of the building. The generating sets are mounted on a concrete raft weighing 600 tons, which effectively prevents any vibration being transmitted to other parts of the building. Each engine develops 365 B.H.P. at 350 R.P.M.

The whole building is heated by waste heat extracted from the exhaust gases of the Diesel engines, but an auxiliary oil-fired boiler is used when the Diesels are not running.

Direct-current generation at 230 volts has been adopted in order that an accumulator battery may be used to take care of off-load periods and to provide an emergency source of supply in the event of engine failure. The battery consists of 115 cells of 2,000 ampere-hours capacity and is able in emergency to take the load of one generating set for one hour. It is housed in a large top-lighted room near the power-house.

The power is conveyed by overhead busbars from the power-



THE POWER-HOUSE

house to the machine-room, in which are housed all the various motor-generator sets required to convert the main power supply to power at the different pressures required for the various inputs to the transmitters.

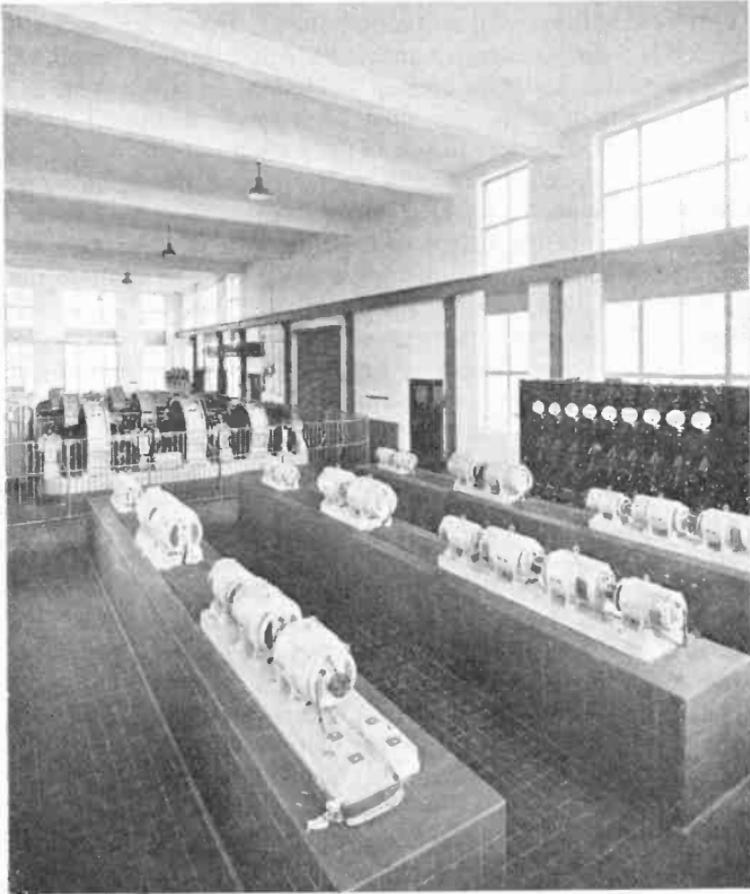
The principle of having three of each type of motor-generator set has been adopted. One is normally in use for each transmitter and one is spare. The sets supplying high tension at 12,000 volts to the anodes of the power valves are rated at 230 kW. Each set consists of one driving motor and two generators on the same shaft, each generator having two commutators. Thus there are four commutators in series, the voltage across each being 3,000 volts. The baseplate of the set is not insulated, the main insulation being provided on the shaft. Low-tension generators supply filament current for the power valves at 20 volts, the maximum current being 1,300 amperes for each transmitter. Three sets of three motor generators supply grid bias voltages for the various stages of the transmitter and high-tension power for the earlier stages.

The cables carrying the power supplies from the machine-room are run through ducts into a crypt which is formed round three sides of the transmitter hall. From the main switchboard, the wiring is led round each side of the crypt above which stand the transmitter units.

The transmitter hall is a lofty room lighted by means of a dome in the roof. There are no side windows, since it has been found that side lighting is inclined to cause dazzle on glass-fronted meters, making them difficult to read. The two transmitters are arranged down the sides of the hall, and each has a control desk placed in front of the tuning unit containing the high-frequency output circuits.

The two transmitters are similar, except, of course, that they are adjusted to different wavelengths. Each transmitter consists of five separate units built up on an aluminium framework with glass fronts and metal-panelled doors at the sides and back. These doors are interlocked so that if one is opened then all power supplies are immediately interrupted, and cannot be re-applied until the door is shut and latched.

The first unit contains the drive, separator, sub-modulator, modulator, and modulated amplifier circuits and valves. It is, in fact, a complete low-power transmitter and could be used as



THE MOTOR GENERATOR ROOM

such if properly connected to an aerial. The output of this unit is led to the second unit containing the first power amplifier, which is a medium-power push-pull high-frequency amplifier. The modulated high-frequency oscillations from this stage are further amplified in the final high-power push-pull high-frequency amplifier, each side of the push-pull being contained in a separate unit. The fifth unit contains the tuning and coupling circuits for the final power stage.

The transmitting valves used in the two power stages are water-cooled, coils of rubber pipe being used to insulate the water circulation system from the high-tension voltage at the anodes. In each stage it is possible to switch in a spare valve without breaking the power supply. Thus programme interruption is avoided in the event of a valve failing.

The front block of the building contains two control rooms, listening room, test room, studio, administrative offices and staff mess room. The studio is used for emergency and testing only. The control rooms contain low-frequency amplifiers, switching, measuring and testing equipment for dealing with the programmes received by land line from the Regional control room in Edinburgh. There are also wireless receivers for checking the quality of the transmissions. Accumulator batteries providing power for the control rooms are situated on the first floor.

The Regional transmitter is operating on 376.4 metres and the National transmitter on 288.5 metres. As in the case of the North Regional station, the B.B.C. has published two booklets to help listeners who find difficulty in receiving the new Station. The first is entitled "Receiving the Scottish Regional Station," and the second "Selectivity and the Scottish Regional Station."

Public reception tests of the Regional transmitter began on 2 May, 1932, the whole service being taken over on 12 June from the low-power transmitters at Glasgow, Edinburgh, and Dundee, which closed down on that date. The National transmitter began its tests on 22 August, and the full dual programme service came into operation on 25 September, 1932.

The new Station will serve approximately 80% of the population of Scotland, and with the expansion and modernising of studio facilities and equipment at Edinburgh and Glasgow, there is no doubt that Scottish programmes will reflect these improvements to the benefit of Scottish listeners.

THE EARLY DAYS IN SCOTLAND

WHEN Glasgow, the first of the Scottish Stations, was opened in the spring of 1923, it was made welcome in a way which smoothed over a good many initial difficulties. In directions where other B.B.C. Stations had met with opposition, or at best neutrality, Glasgow was lucky from the outset in finding older institutions ready to co-operate with the new service. The University and the Education Authority were quick to see its possibilities, and, under the ægis of a strong Committee on which both were represented, broadcasting to schools was in full swing there before any other B.B.C. Station was ready to embark on it. In a part of the world where education was until recently, if it is not still, years in advance of its nearest neighbour, that was but right and proper. The University took a keen interest too, from the outset, in the possibility of reaching the big audience which broadcasting offered, and many of the professors gave series of talks. It was by the help of the University, too, that Glasgow was the first Station to broadcast a whole Greek play, Sophocles' *Antigone*, in Professor Harrower's translation with incidental music and choric odes specially composed by Percy Gordon, a distinguished Glasgow musician. The company was trained, and the play produced, by the University's lecturer in elocution, Parry Gunn.

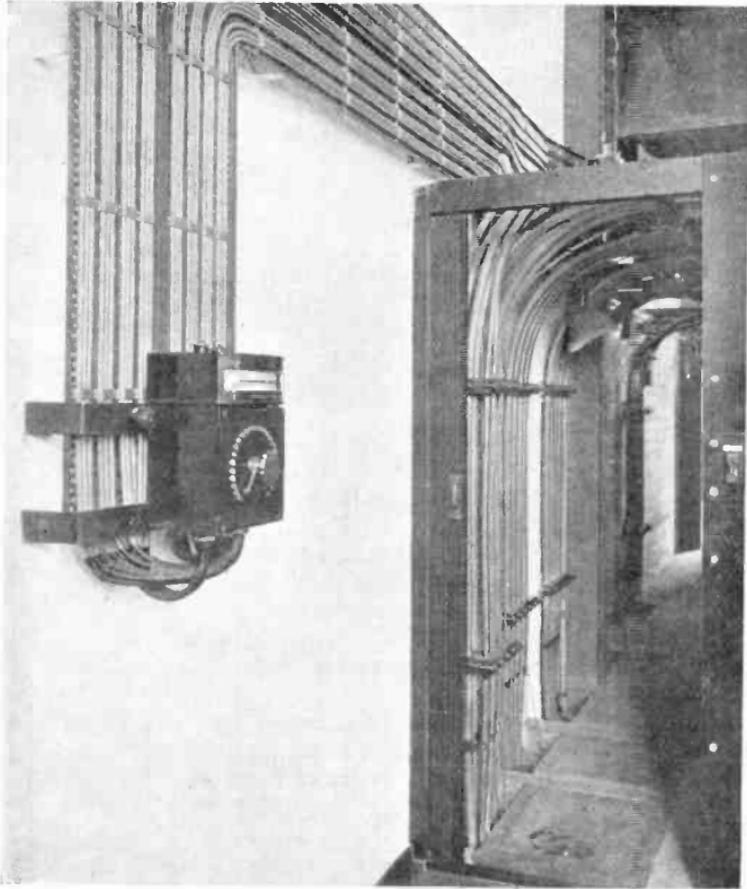
That was only one of many directions in which Glasgow made B.B.C. history. The first broadcast play, *Rob Roy*, was given there in August 1923; it was repeated shortly afterwards as the first Simultaneous Broadcast to the British Isles from a provincial Station. Opera from a provincial theatre was first broadcast from Glasgow Station, during a visit of the British National Opera Company to the Glasgow Coliseum Theatre in 1923. It was there, too, that a complete act of an opera was first broadcast from the studio—Act I of *Die Walküre* being given with a trio of principals from the B.N.O.C. Glasgow was first in the field, too, with the story recitals which were afterwards popular elsewhere. In Glasgow also were invented the programmes in which drama and music were woven together to present historical episodes or great careers. It was the first B.B.C. Station, too, to broadcast children's plays with children taking part, and the first to give a children's pantomime from

the studio, in which young members of the Radio Circle formed the cast and chorus.

Aberdeen Station, opened later in the same year, was the first to make a feature of broadcast Community Singing. Familiar though that has since become, it was as thrilling as it was novel, one Sunday afternoon in 1923, to hear some two thousand children singing together with all the strength of their lungs. Grown-ups were not long in following so fine an example. Aberdeen must have been the first B.B.C. Station, too, to have staunch adherents overseas. Well heard in Norway, Sweden and Denmark, it had regular correspondents all over Scandinavia.

Edinburgh, within three weeks of its opening in the following May, brought off one of the most striking of the "first broadcasts" which it was everybody's chief desire to achieve in those early days—the opening Ceremonial of the General Assembly of the Church. That same desire to be first in one direction or another was responsible for the talk with which Father Ronald Knox all unwittingly scared half England out of its wits. At that date no Roman Catholic Service had been broadcast, and Edinburgh had seized the chance of Father Knox's presence in Scotland to arrange for him to conduct one. At the last moment, his Church raised objections and the service had to be cancelled: in its stead, he agreed to give a talk on the previous evening—Saturday—and delivered the bogus news bulletin which Scotland thought so rich a jest, but which was not quite understood across the border.

But if difficulties from without were fewer than in less progressive parts of the world, there were troubles enough and to spare of the B.B.C.'s own. One of the worst arose from the establishment of the first Station at Glasgow instead of in the ancient capital of the Kingdom. A whole series of minor trials arose, too, from the inadequate premises in which Glasgow was first housed; to recall them now, with present-day facilities in mind, is to wonder that broadcasting there was even possible. But it was all tackled with such splendid zest then, as a great adventure rather than a job of work, that nothing was too difficult. The listener enjoys an incomparably better service now, but the provision of it has lost that first sense of being a tremendous opportunity, a grave responsibility which was at the same time the most joyous fun that ever happened.



CABLES IN ONE OF THE CORRIDORS

W. Ralston

SOME SCOTTISH TALKS OF THE YEAR

- 1931
- November 7 Mr. Campbell Bilney on the Soccer Match, Scotland *v.* England.
 14 "Present Discontents in Scotland," a series of anonymous discussions.
- 1932
- March 9 Mr. Pat Castle on "Early Angling Waters."
 16 The Earl of Elgin on "Scottish National Shopping Week."
- April 2 Mr. Peter McLeod on the Scottish Shinty Cup Final.
 6 Mr. Eric Linklater on "Recent Scots Literature."
 16 Mr. Campbell Bilney describes the Scottish Cup Final, Rangers *v.* Kilmarnock.
 20 Mr. C. J. Mackay Cunningham on "Unknown Gaelic Songs" with examples sung by James Macphee.
- May 4 Sir Iain Colquhoun, Bart., of Luss, on "Preserving Rural Scotland. Some Difficulties."
- June 1 The Duke of Montrose on "The Trade Mission to Canada."
 8 First of a Series of Talks on "Scotland Out of Doors."
 12 An interview with Mr. F. B. Czarnomski on "Scotland and Poland."
- July 12 Running Commentary by Mr. G. F. Allison on Kaye Don's attempt on the water speed record on Loch Lomond.
- September 20 The Abbé Dimnet on Sir Walter Scott.
 27 Dr. Otto Schlapp on "Scott, Goethe, and Germany."
- October 13 Mr. Compton Mackenzie and Mr. J. F. Duncan debating "To wear or not to wear the kilt."

A POLICY OF CENTRALISATION

IN SEPTEMBER 1932, the Scottish Broadcasting organisation completed the final stage of its development, from the original four comparatively short-range stations, to a completely organised and co-ordinated programme service covering the majority of the population of Scotland. The first stage in this gradual change began after Belfast ceased to be a part of the B.B.C.'s Scottish Area and became an independent unit. A system of co-ordination was instituted; the several stations ceased to broadcast talks, concerts, and services independently to the same extent, and were concentrated on the task of specialising in their individual and characteristic contributions to an all-Scotland programme pool, special attention being paid to the search for local folk talent and tradition. Shortly afterwards, the process of specialisation was applied to programmes other than music. Religious services, charitable appeals, and the special bulletins, became the special care of one official; another was appointed to handle press relations and advance publicity for programmes; experts in school broadcasting and adult education joined the staff; and contracts for microphone work were negotiated with play producers outside the office. Scotland was the first of the broadcasting regions to be so organised, and the third to receive a high power transmitter to radiate the resulting programmes.

As soon as the process of staff specialisation and concentration on a central point was complete, the headquarters were transferred from Glasgow to Edinburgh—where they are now situated in Scottish Broadcasting House, close to the headquarters of the Education Department, the Department of Agriculture, the Church of Scotland, and St. Andrew Square, the business centre of the Capital. Then followed a short transition period of testing and preparation, while the Westerglen Transmitter was being built and the new machinery installed in the Control Rooms in Edinburgh. The new transmitter was officially opened on May 20th, and from June until September the number of Scots programmes radiated from Westerglen steadily increased in ratio to the progress of the testing of the new transmitters as reflected in the reports sent in from all parts of the country.

Meanwhile in preparation for the considerable increase of programmes originating in Scotland, a musical director was appointed for the first time since the disbanding of the Scottish Wireless Orchestra in 1928, the Studio Orchestra was enlarged, and a group of singers known as the Scottish Wireless Singers engaged. The Concert Hall in Scottish Broadcasting House was thrown open to the public during the transition period, for a series of charity performances, for several vaudeville and variety shows, and for two series of summer symphony concerts—one of them a Promenade series. This had the effect of arousing a noticeable increase of interest on the part of Edinburgh licence-holders in the building of the Scottish programmes. At the same time in the rural districts—more especially those hitherto out of reach of broadcasting and inadequately combed for their characteristic talent—a search had been conducted during the months before the opening of Westerglen. This “regional survey” resulted in the series of “Frae a’ the Airs” programmes discussed in the article on p. 255.

All these factors have, it is hoped, combined to whet the appetite of the Scots listening public, both urban and rural, for the programmes now being prepared for them and to be broadcast over a far wider area in Scotland than ever before. The improved conditions of reception have borne fruit also, as was only to be expected, in popularising both school broadcasts—now listened to in a steadily increasing number of rural schools—and listening groups. The Report of the Carnegie Trust experiment, just issued, bears witness to the steady advance of this type of serious listening in a country justly renowned for never neglecting to turn its educational opportunities to good account.

The B.B.C. has never contemplated making available a 100 per cent. all-Scots programme on one of the alternative wavelengths directly both the Westerglen transmitters are in operation. For some time the ‘Regional’ wavelength will carry a composite programme, made up from sources in England, Ireland, and Wales, as well as Scotland, as an alternative to the regular “National” programme. The importance of the Scottish contribution will steadily increase as the expanding opportunities for proving new talent enhance, as they inevitably will, the quality and quantity of the entertainment material available.

THE SCOTT CENTENARY

IT WAS A FORTUNATE COINCIDENCE that the opening of the Scottish Regional transmitter for full Regional programmes should coincide with the week of celebrations in connection with the Centenary of Sir Walter Scott. The B.B.C. in Scotland had therefore full opportunity of doing justice to this great event and of giving to Scots listeners not only broadcasts from the studio in memory of Scotland's greatest novelist and romanticist, but also outside broadcasts of the celebrations organised in various parts of the country. On the eve of the day of the Centenary, Tuesday, 20 September, a chronicle play by Miss Christine Orr dealing with the life of Walter Scott was broadcast. On the day itself, the microphone was taken to the Centenary Lunch at Edinburgh, for speeches by H.R.H. Prince George and the Lord Provost of Edinburgh, Sir Thomas Whitson, and to Galashiels for a concert by the Scottish Philharmonic Orchestra and the Galashiels Choral Society which included Hamish MacCunn's "Lay of the Last Minstrel" and W. B. Moonie's "Allanadale" and "Pibroch o' Donuil Dhu."

An outstanding feature of the Centenary were the broadcasts for children. There were dramatic versions of the songs and stories connected with the childhood of Sir Walter, extracts from "The Tales of a Grandfather," and a "feature" programme entitled "The Scott Clan and the Scottish Balladry" by Helen Drever. For this three choral and orchestral arrangements were commissioned.—"The Dowie Dens o' Yarrow" by David Stephen, "March, March, Etrick and Teviotdale" by Ian Whyte, and "Happy the Love that meets Return" by Dr. W. G. Whittaker. The other broadcasts for children included a performance by the company of the Edinburgh Children's Theatre of extracts from "Rob Roy," "Harry Gow," "The Talisman," and "Katharine Barlass," and two ballets produced by Marjory Middleton and Rhona Johnstone.

Finally, the international influence of Scott was not forgotten and there were two spoken tributes (apart from a general one by Mr. John Buchan). These were—"Walter Scott from the French Point of View," a Centenary Oration by M. L'Abbé Ernest Dimnet, and "Scott and Goethe" by Dr. Otto Schlapp of Edinburgh University.

SOME SCOTTISH
ORCHESTRAL CONCERTS

*The Scottish Orchestra at the Concerts of the Choral
and Orchestral Union of Glasgow*

	1931	Conductor
10 & 19	November	Basil Cameron
1 & 5	December	Robert Heger
12	December	Warwick Braithwaite
29	December	Nicolai Malko
	1932	
5	January	Constant Lambert
12	January	Albert Van Raalte
26	January	Issai Dobrowen
6	February	Issai Dobrowen

The Reid Orchestral Concerts in Edinburgh

26	November, 1931	Professor Donald Tovey
31	January, 1932	Henry Havergal
25	February	Adrian Boult

*The Scottish Philharmonic Orchestra in the
Studio at Edinburgh*

	1932	
5	April	David Stephen
19	April	Guy Warrack
3	May	Ian Whyte
17	May	Stewart Deas
31	May	Kemlo Stephen
14	June	Henry Havergal

SCOTTISH ORCHESTRAL MUSIC

SINCE the Glasgow Station Orchestra was disbanded on the inauguration of the Regional programme policy a few years ago, most of the orchestral music for Scots listeners has been provided by a small instrumental combination at Scottish Broadcasting House—the Scottish Studio Orchestra, consisting of three violins, viola, 'cello, double bass, flute, clarinet, and piano, and directed by Guy Daines. This Studio Orchestra provides morning, lunch time, and afternoon concerts, and accompaniments, interludes, and incidental music, in the evening programmes. During the early summer months, these players were augmented in numbers on six occasions for a series of Scottish Philharmonic Symphony Concerts given in the Concert Studio at 5, Queen Street, under the conductorship of Stewart Deas, Kemlo Stephen, Guy Warrack, Henry Havergal and Ian Whyte. Several miniature orchestras have broadcast from time to time in addition to the studio players—for instance, that directed by Mr. Cahill in Aberdeen, the Heather Sextet directed by Lena Blackman, and John Macarthur's orchestra from Glasgow.

Early in the year, all the bodies concerned for the future of orchestral music in Scotland were represented at a series of discussions, presided over by (among others) Sir Daniel Stevenson, Lord Glentanar, and Mr. John Pearson of the Caird Trust, Dundee. The need for some form of Scottish National Orchestra was apparent to all present, but there arose various points of difference regarding the position of the various constituent bodies in the event of a merger. The chief concert-giving organisations represented were the Glasgow Choral and Orchestral Union, the Edinburgh Concert Society, the Reid Symphony Orchestra, and the B.B.C. There were only two main points of disagreement; firstly, the question of the demand for orchestral concerts in the provinces and the feasibility of providing them (which it was contended must be one of the major concerns of any National orchestra committee); and secondly, the technical problems of orchestral auditions and the engagement of one conductor for the whole season. Difficulty in finding unanimity on these points led, in the first place, to the foundation of a new orchestral organisation—the Scottish Phil-

harmonic Orchestral Society Ltd., established to handle (until the advent of the National Orchestra) the problem of the provincial demand, under a pledge not to compete with the Scottish Orchestra; and, secondly, to the decision of the B.B.C. to take the majority of its orchestral concert relays this season from the Reid Orchestra. This orchestra and the Philharmonic Orchestra both agreed to the principle of professional auditioning, and all their players have since been tested by Dr. Adrian Boult, the Music Director of the B.B.C. The Philharmonic has already negotiated a series of visits to Galashiels, Ayr, Inverness, Perth, Kirkcaldy, and Kilmarnock, many of which will be broadcast. Scots listeners will also hear the greater number of the Reid Concerts on Thursdays and Sundays under the conductorship of Professor Tovey.

Two of the concerts which are being organised by the Glasgow Choral and Orchestral Union this winter in Glasgow, will be broadcast. In addition, the B.B.C. has been able to co-operate in the scheme whereby this old-established orchestra will visit Dundee, Aberdeen, and Greenock.

In all contracts for orchestral broadcasts in Scotland, the B.B.C. has continued to stipulate for the inclusion of opportunities for young Scots composers and conductors, and this stipulation will be adhered to in the coming winter. It is gratifying to note that agreement has now been reached regarding the principle of audition for the National Orchestra and that arrangements are well in hand for the establishment of the project in 1933. The activities of the Scottish Philharmonic Orchestra since April have also given opportunities of extended symphonic employment and experience to a large number of Scottish instrumentalists, and have opened up a new vista of hope for many places in provincial Scotland, where at present fine choral organisations exist.

THE SCOTS VERNACULAR

IN HIS CONTRIBUTION to the first "Statistical Account of Scotland," published towards the end of the eighteenth century, the parish minister of Mauchline stated: "In this parish the Scots dialect is the language spoken, but is gradually improving." The word "improving" clearly indicates his attitude towards the vernacular. It gave him pleasure to note that some of his parishioners were gradually discarding their mother tongue for "Southern English."

He was probably ignorant of the fact that the Ayrshire dialect is a variant of Northern English, itself an older and purer form of English than that which became the King's English. The process of "improvement" had been going on since James VI went to London. People who had hopes of preferment at court or of commercial advantages as a result of the Union of the Crowns began to learn and to speak English. For a number of reasons, many of them thoroughly enlightened, the process of approximation to Standard English has been going on since then. English is the vehicle of instruction in Scottish Schools and Universities, the medium of traffic, spoken and written, in the worlds of literature, science, theology, and commerce.

Those who deplore the disintegration of Standard Scots (as used at the Scottish court before 1603) into dialects, and something worse, should remember that Scots failed to rise to the opportunities which were presented to it equally with English. The Reformers did not give the people a Scots translation of the Bible. More or less successful attempts have been made since to make good this failure, but the average Scotsman to-day probably considers it more respectful to worship God in English than in Scots. Again, great writers like Dunbar, Henryson, Lyndsay and Douglas had no immediate successors, and this at a time when the Elizabethans, stirred to the depths of their being by discovery and splendid achievement, were forming a corpus of literature the like of which had never been seen before in any country. The development of Scots was arrested. It was to blossom again with a rare beauty in the hands of Ramsay, Fergusson, Burns and others, but the greatest of these, namely Burns, was to have no equal or even successor. Incidentally, it is worth noting that an analysis of Burns' language

indicates a startling dilution of the vernacular. "A Man's a Man for a' that," "Duncan Gray," "Auld Lang Syne," and "The Death of Poor Mailie" contain 873 words, only 152 of which are Scots. That is, in four poems, in which it will be agreed that Burns is really "Scots," the percentage of English words is 82·12.

The fate of the Scottish vernacular would appear to be sealed. Does it matter? Does anyone care except the sentimentalists? The answer to the first question may be made in four parts:—

1. The childhood of a people can receive its proper nurture and sense of race only through its historic language.
2. The simple joys and sorrows of life cannot find their best expression in an alien tongue.
3. The character of a people, particularly its diversities, is embedded in one language, and a substitute cannot serve, because that substitute is the product of another people, different in character and genius.
4. Language is not only the symbol but the container of nationalism. As for caring, a number of influential bodies are at work both in Scotland and England, in the preservation and rehabilitation of the Scottish vernacular. If the four points enumerated above contain any merit it is useless to bring forward the charge of sentimentalism.

If the character of a people lives in and is perpetuated by its speech it is obviously desirable to preserve the Scots vernacular. But Scots is incapable of expressing the complete thought of modern civilisation. One way of escape from the dilemma seems to be through the development of bilingualism. Scottish schools, however, are not disposed to add an extra subject to the already crowded curriculum. The authorities seem to prefer that Scottish children should be learned in Chaucer rather than in Dunbar or Henryson. The child not unreasonably believes that there is inherent vulgarity in the vernacular. But were the idea of bilingualism agreed it would still have to be decided which of the existing dialects should be adopted as the national speech. The battle would be waged fiercely; the last part of the country to give in would be probably the North-East.

It has become a habit to blame wireless for accelerating some of the many changes which are taking place in the national life. From what has been said it will be obvious that no such charge can be brought against it with regard to the Scots vernacular. On the contrary, the argument may now be developed that

SCOTS PLAYS AND MUSIC

- 1931
- November 7 A Chaumer Concert from Aberdeen.
 14 "The Duries of Durrissdeer," adapted from "The Master of Ballantrae."
 30 Frae a' the Airts: a programme for St. Andrew's Night.
- December 31 A Hogmanay Smoking Concert from F. and F.'s, Edinburgh.
- 1932
- January 13 Unknown Gaelic Songs, sung by James Macphee.
 25 Burn's Night programme from Poosie Nansis's Hostelry, Mauchline.
- February 13 "In the Highlands, In the Country Places," Scenes from life and character in rural Scotland to-day.
 14 Songs of the Hebrides by Patuffa Kennedy-Fraser and Margaret Kennedy.
- March 29 "Glints at Glesca," scenes of Glasgow life.
- June 2 A Tannahill Anniversary Concert.
- July 2 A Bothy Concert from Aberdeen.
 14 "The Auld Alliance," a broadcast play of France and Scotland by Moray McLaren.
 29 Recital of modern Scots Songs by Gerald Martin, and a reading of contemporary Scots verse.
- September 7 George Blake's "Clyde Built" performed by the Scottish National Players at the Aberdeen Exhibition.
 12 Scottish sing-song, celebrating the cutting of the "clyack sheaf," from Aberdeen Exhibition.
 20-24 Scott Centenary Celebrations (see p. 247).
- October 4 Gaelic Song-gathering from the Highland Hotel, Fort William.
 8 "Tweed," a song and story programme by George Burnett and David Stephen.

broadcasting is the only really powerful integrating factor at work. Until its appearance the average Scotsman had few opportunities of realising how closely the vernacular spoken in other parts of the country resembled his own. Because he had few opportunities to compare, the differences were more obvious to him than the similarities. Is it not possible that this realisation will develop, say between Buchan and the Borders, a closer sympathy, and encourage a scrutiny into usages which have been freely accepted like the airs of heaven? The "Frae a' the Airs," and Bothy programmes, which are a feature in Scottish broadcasting, are invaluable in this connection. What does Mr. Dufton Scott think of Mr. Walter Barrie's speech? And what does Mr. Barrie think of the speech of Mr. McCrindle? Does Morningside rush to switch off its sets when a "Doon the Watter" programme comes along? Is Kelvinside aghast at a relay from Portobello? Differences may shock at first, but if there is to be any rehabilitation of the Scottish vernacular, many adjustments will have to be made, and a sympathetic criticism exercised.

The work of Sir Walter Scott has necessarily been much drawn upon in this centenary year, but the public might be made more familiar with the writings of Galt, quite as masterly, from a dialect point of view, as those of Scott. Dramatisation and adaptation of and readings from good literature, relays of concerts, festivals, and round-the-fire "cracks," find increasing space in the Scottish programmes.

But equally important are talks which remind listeners of Scottish customs; attention to characteristic festivals like Hallowe'en, Meal and Ale, Kirn, Auld Yule, Candlemas, Easter, and March Ridings; the glories of past history arranged in a pageant of sound; and the methodical presentation of the best Scottish music. Naturally Scots vernacular is the speech used in connection with a number of these broadcasts, since it is important that custom and speech should not be divorced.

There is good reason to believe, therefore, that wireless, instead of dealing a death-blow at the Scots vernacular, will give it a new lease of life. Whether any particular dialect will attain a national status, or a synthetic language arise, will be decided by the good sense of the Scottish people.

F R A E A ' T H E A I R T S

IN SCOTLAND there are three distinct languages spoken—Gaelic, Broad Scots, and English. The Gaelic is spoken in the Western Highlands and Islands and in large tracts of the far north; Broad Scots is the tongue of the East Coast and of the Lowlands; English is spoken almost at its best by the Highlander when he is not conversing in Gaelic, his native tongue: one language that the Highlander finds it impossible to talk is Broad Scots. Between the Gaelic and Broad Scots there are countless divisions and dialects, each belonging to some particular part of Scotland.

Thus in Scotland local characteristics of all kinds have a strong barrier of language to preserve them, and even in a country sorely distressed by emigration and the evils of over-industrialisation, there remains a truly remarkable conservatism amongst the country people, a conservatism which has guarded the native arts of song and story-telling, verse and music, in a manner which England has long lost.

It was one of the earliest difficulties of broadcasting in Scotland to draw upon the rich material preserved in the remoter parts of the country. The Scottish genius, it cannot be too often repeated, is domestic; the Scot is at his best by his own fireside or in some familiar and jealously guarded spot where he may tell his stories, recite his verses, or sing his songs, in a company with which he feels at ease and against a background with which he is familiar. This atmosphere cannot, unfortunately, be produced in a broadcasting studio. The Scottish peasant, if he is brought up from the country and placed in a broadcasting studio, is apt to lose his nerve and say little, or else become forced in his humour and narrative, losing the very quality which the broadcast strove to capture.

If those Scots folk could not be brought to the microphone, the microphone could at least go to them, and so in the past two years the B.B.C. has adopted a scheme of exploring the lesser known parts of rural Scotland, with a view to discovering fresh microphone material, and producing it for broadcasting in a manner which would not destroy its value. Officials of the B.B.C. have been travelling down in the Borders, on the East and West Coasts, and in the Highlands, meeting

local characters and singers and all others who could tend to make broadcasting from the country a success. As a result of these voyages of exploration, the microphone has been taken down on various occasions to remote parts of the country, to some local inn or well-known spot with which the characters are familiar, and there broadcasts have been arranged, under the general heading of "Frae a' the Airts."

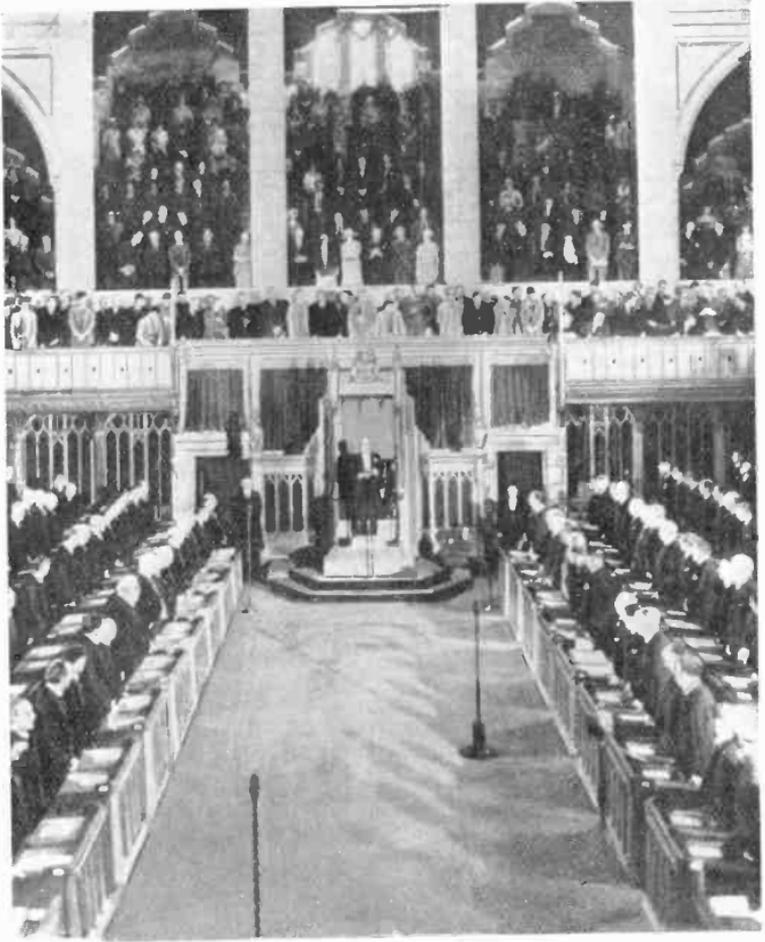
The way this has been done is to approach some well-known local authority—the minister, the priest, or the laird—and to get him to preside at the broadcast gathering. He knows usually just who are the people who have the real local flavour in story-telling or song. He knows with whom they will work and of whom they are shy. He knows just which man is garrulous and apt to talk too long, and which man needs coaxing out. With the broadcasting official in charge of this particular district, he will gather together some half-dozen or so local characters in, possibly, the village inn, and with a background of their friends to encourage them, they will gather round the microphone, sing their songs, tell their stories, and generally have an evening party of their own familiar kind.

Though this experiment in local programmes is as yet in its infancy (for there are countless other regions in Scotland waiting to be explored), it has been in most cases very successful. Sometimes a crofter, a fisherman, or a farmer, has been microphone-shy; sometimes a little too confident; but on the whole the microphone has not failed to catch the essential flavour and quality of these local gatherings.

Apart from providing good broadcasts and encouraging local interest in the wireless, these "Frae a' the Airts" programmes have been undoubtedly successful in discovering talent which can afterwards be produced in the studio. The Gaelic singer and the local fiddler are people who only too often remain unheard by the public, and despite their unique musical qualities are known only to a few in their districts. These broadcasts have helped to bring out such talent, and in the future, when the programmes have been extended into the Western Highlands, the far north, and, it is hoped, into the Hebrides, the B.B.C. confidently expects to discover many valuable new contributors to its programmes.

EMPIRE
SECTION

[257]



THE OPENING OF THE IMPERIAL ECONOMIC CONFERENCE AT OTTAWA
(Broadcast 21 July 1932)

NOTES OF THE YEAR

THE last "Year-Book" went to press with a note on Empire Broadcasting which ended with the words "matters therefore seem at a standstill." A few weeks later, in November 1931, the B.B.C. made the announcement of its intention of developing Empire broadcasting on its own initiative. In doing so the B.B.C. pointed out that difficulties of financing the service had up till then delayed the establishment of Empire broadcasting on permanent lines. In fact, the difficulties had not, and still have not, been overcome, but are being ignored by the B.B.C., or at any rate shelved for the time being, in recognition of a widespread demand, particularly from individual listeners all over the Empire and broadcasting organisations in the Crown colonies. This decision, which met with immediate general approval, was the result of the B.B.C. realising that there was no immediate prospect of concluding the negotiations with the Dominions and Colonies and the Treasury on the subject of the cost of an Empire service, and that for many reasons action had become urgently necessary.

* * *

It was appropriate that the new permanent Empire Broadcasting Service should have started to function in the year of the Ottawa Conference, the opening ceremony of which was one of the most important events in the B.B.C. programmes. Broadcasting was not directly represented at the Conference, but Sir Stephen Tallents, the Secretary of the Empire Marketing Board, was charged with a watching brief on behalf of the B.B.C. The Conference passed a strong resolution in favour of the greatest possible co-operation between broadcasting authorities throughout the Empire.

* * *

Perhaps the most interesting feature of recent developments in broadcasting among the countries of the Empire has been the definite tendency towards following the B.B.C.'s public service organisation as a model; Canada, Australia, and New Zealand have all adopted it, and there are rumours of changes in South Africa. Even in the United States the companies responsible for the great rival system of commercial broadcasting are reported to be finding it desirable to enforce a degree of anonym-

ity on their announcers, a step which implies a certain departure from the principle of unrestricted exploitation. Australia may even be said to have gone beyond the B.B.C. model by establishing C class stations for the exclusive purpose of broadcasting programmes of high intellectual and artistic merit. This is a possibility that has entered into B.B.C. deliberations from time to time in past years (there being a Continental example in the German Deutscher Welle programmes of entirely educational material), but preference had always been given to the principle of broadcasting a completely balanced mixed programme, as providing a greater inducement to listeners to hear types of programmes which they would habitually ignore on the basis of an exclusive programme.

* * *

A by-product of the adoption of the B.B.C. system overseas has been an intermittent demand for the services and expert advice of members of the B.B.C. staff. The borrowing process dates back to 1924, when one of the first London Station announcers went to South Africa. Since then B.B.C. officials have gone all over the world to advise, and often to learn.

* * *

The first step in the development of the new policy has been of course, the building of the permanent Empire short-wave Station at Daventry. This Station is described in a later article and no more need be said here than that the fact that short-wave broadcasting relies on the indirect ray, together with the necessity for using directional aerials, enables the Station to reach the Empire with a comparatively small expenditure of power. Actually the saving resulting from the use of directional aerials is such that the transmitter is able to work on a sixteenth of the power which would be required for omni-directional broadcasting. Although five directional zones are necessary, differences of time between the various countries will, it is hoped, make it possible for them to be served, without clashing, by only two transmitters.

* * *

A corollary of the new Empire policy is the encouragement of short-wave reception throughout the Empire, the service being primarily directed towards the great number of individual

listeners who are not attached to any local overseas station. Those interested in this side of broadcasting will find a list of short-wave stations in the Appendix. It should be pointed out that the Empire Station will not normally be receivable in the British Isles even within the beam areas. The relative weakness of the direct ray and the skipping effect of the indirect ray should usually make direct reception impossible.

* * *

Another corollary of the new policy was the B.B.C.'s decision to make its foreign and technical journal, *World-Radio*, the official organ of Empire Broadcasting. This implied the development of a weekly Empire Supplement dealing with the technical problems of short-wave reception, as well as programme and administrative matters. The first of these supplements appeared on Trafalgar Day, October 21st, 1932. The B.B.C. hopes to develop *World-Radio* in step with the Empire Broadcasting Service without sacrificing any of its existing functions as a journal of world broadcasting devoted to the programme and technical interests of readers in this country and Europe.

* * *

Big Ben has long been a romantic and symbolic figure to listeners all over the world. Fresh and increasing signs of his popularity are constantly reaching the B.B.C. To listeners in the Empire the strokes of Big Ben carry a breath of London and home and are waited for with a kind of nostalgia. To listeners in America his chimes seem to confirm an imaginary picture of all that is typically English. The two principal American companies frequently relay this item from British programmes, and although the novelty must have worn off long ago, it is seldom that this particular international broadcast does not bring some letters of appreciation. After the introduction of the Empire news bulletins into G5SW's daily transmissions at the beginning of this year, letters were received from all parts of the Empire, but 90 per cent. of these accompanied their thanks for the news with a request for more Big Ben.



THE UNFINISHED EXTERIOR OF THE EMPIRE STATION AT DAVENTRY

EMPIRE BROADCASTING

THIS year, after three years of planning and discussions, Empire broadcasting is at last taking concrete shape. It was in the summer of 1929, informally, and in the autumn of the same year, formally, that the B.B.C. laid its proposals before the Government. Then, in 1930, the scheme was discussed at the Colonial Conference and the Imperial Conference; it was welcomed and substantially supported by the former, but received what was hardly more than a platonic approval from the latter. In the spring of 1931 the detailed scheme was circulated to the broadcasters of the Dominions and through the Colonial Office to the governments of the Colonies and Dependencies. The replies received did not effectively advance matters much, though Australia and New Zealand suggested a parallel line of development (of which more anon) which has been incorporated in the B.B.C.'s present scheme. Next came the financial crisis, and with it an end of the expectation that Imperial funds would be available to support the service. The Corporation had thereupon to take stock of the situation. The alternatives were, to abandon the project entirely, to allow certain outside schemes for commercial broadcasting to develop, or itself to assume the burden for the time being. The British listener's direct interest in the project is, of course, *nil*. But the question of national interests had to be looked at more broadly. Everywhere short-wave stations were springing up, which put the view-points of their respective countries before short-wave listeners and relaying broadcasters all over the world, and it seemed contrary to the interests of the listener, as a citizen, that Britain alone should be without a world-wide voice, seeing that it is both the focal point of a world-wide Empire and dependent upon world-wide exports and capital investments. There was another consideration affecting him as listener. If interesting programme matter is to come to him from the Empire, the United States, or South America, it may only be possible by courtesy of the short-wave services in those countries, for which a like output from Britain seems the *quid pro quo*.

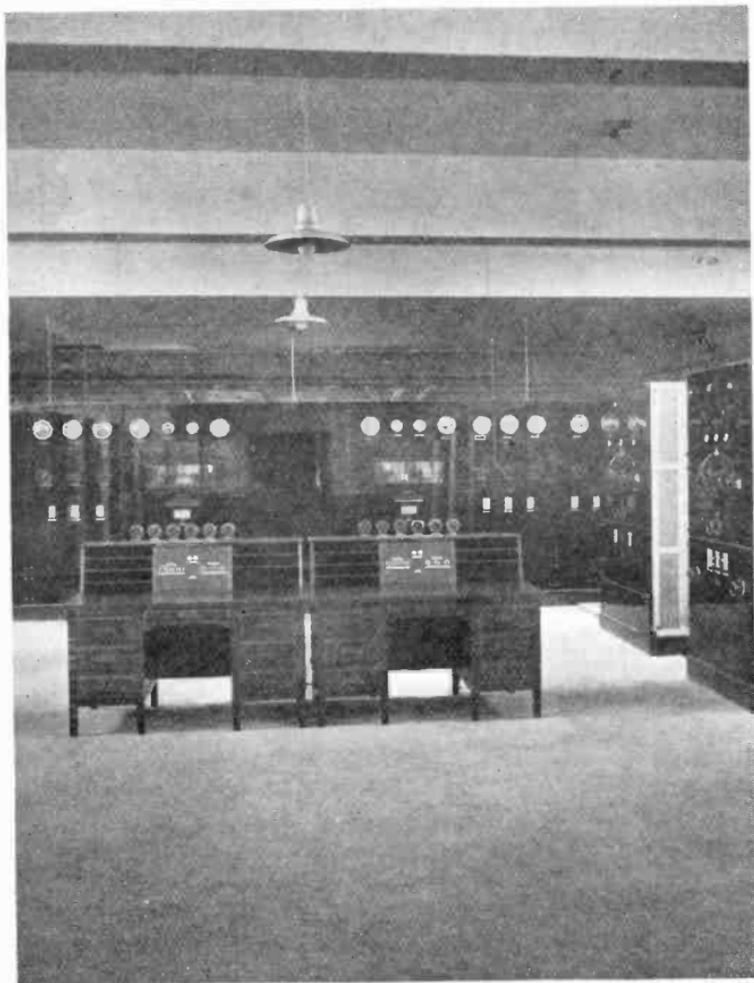
All things considered, therefore, it was decided to adopt the third course, and to replace the old experimental G5SW (which has been rented from Marconi's Wireless Telegraph Company

for some years) by a modern station with two transmitters, eight waves, and numerous aerials—directional and all-round. A technical account of the station is given in the article on p. 275. Here the concern is with the purposes of the station and the policy which it is intended to pursue with it.

Firstly, the main appeal will be to the “direct” listener equipped with a short-wave receiving set. Experience has modified the views which were expressed four years ago in the 1929 Hand Book (p. 35), and, while neither of the two functions—broadcasting direct to the overseas listener and providing a link for the delivery of relayable matter to overseas broadcasters—heavily predominates in importance over the other, the day-to-day service will have primary regard for the needs of the former, while wireless relaying (both inward and outward) will, on the whole, tend to be restricted to peak items as and when these happen to occur. Such at any rate is the present view. Whether still further experience will place the “linking” function first and the direct “broadcasting” function second remains to be seen. This question, which is only one of many, will serve to give an idea both of the complexity of the Empire broadcasting problem and of the necessity of approaching it with an open mind and a readiness to experiment.

Then there is the question of special programmes. The British Empire stretches effectively through three hundred odd degrees of longitude, involving twenty hours of time-differences from Greenwich, and an early step, therefore, was to work out an estimate of the distribution of potential listeners. From this it appeared that the overwhelming majority of whites in the Colonies, South Africa, and India, could (apart from news) be served by matter taken from the British home programmes, but that programmes for Canada and Australasia would need to be specially mounted about 3 a.m. and about 10 a.m. respectively.

Further, the quality and regularity of short-wave reception is not at all comparable with that of local-station reception, and a good gramophone will—so far as can be seen at present—always give more satisfactory results than direct reception, or even than the secondary reception of a local broadcaster’s pick-up; for, however well equipped the latter’s receiving station may be, it cannot improve what it receives. This, combined with the longitude difficulty, led the Corporation to adopt the sug-



THE TRANSMITTER HALL IN COURSE OF CONSTRUCTION

gestion of Australia and New Zealand (reinforced as this was from other quarters) and begin recording certain programmes for export. A start was made with this in August 1932. Here, too, are problems—problems of relations with gramophone companies, artists, and composers, of costs and markets and so on. For instance, how is one to treat topical events, the very items which, next to news, possess the greatest interest to the overseas listener? Time differences and atmospheric conditions often put direct reception of a broadcast out of the question, while the physical export of discs is made impracticable by the weeks that must elapse in transit. The expedient that has been adopted is to make, at the originating or the receiving end, an electrical record for broadcasting at the first suitable moment after the event; but this, however arranged, involves a trans-oceanic wireless link, and thus does not amount to reproduction at the original quality level.

These three problems—of relay and direct listener, of home and special programmes, of transmission and record—will serve as typical of many others that have already arisen or will arise in the near future. They are almost without exception difficult, and for one at least, the attainment of “local” standards of quality at the receiving end, the solution seems indefinitely distant. But one never knows. Already it is possible to ensure a service, even if not a first-quality service, to the Empire and to the overseas world at large, by putting technique, good-will, and money into it. Difficulties other than physical will be outflanked or surmounted in one way or another. The effort, having been decided upon, will be made without hesitation.

PROGRAMMES FOR THE EMPIRE

AT THE PRESENT JUNCTURE an article on the subject of Empire programmes cannot, for obvious reasons, be related to concrete achievement, nor, for that matter, to any definite schemes or programme plans. It is only possible to discuss and investigate the problems that confront the B.B.C. when considering the provision of a regular Empire programme service and to endeavour in a speculative manner to be constructive.

Nevertheless, three quite definite statements may be made, viz.: (i) from the outset those concerned with the work have no preconceived ideas or prejudices; (ii) the complexity of the general problem is not under-estimated; (iii) the "home" standards governing quality and tone of material will be scrupulously adhered to.

The conditions imposed by the shape of the Earth on its inhabitants provide the first major problem of Empire broadcasting, a problem that would only cease to exist if the globe were simultaneously and throughout the day subjected to a sun shining with the same intensity and from the same position. This unfortunately not being the case, the question presents itself: how is the Empire to be provided with a service of broadcast programmes which can be heard equally conveniently by the settler in Australia, the Canadian farmer, and the dweller in South Africa—to take only three, but three very distinctive, examples?

Obviously the situation can only be met by *directing* programmes to portions of the Empire lying within the bounds of certain longitudes, such programmes emanating from the Empire transmitters at Daventry at times of the day which are equivalent to satisfactory listening times within those longitudinally bounded portions of the Empire to which the programme is being directed. Thus it is that for purposes of Empire broadcasting the world has been provisionally divided into five zones, the division, to meet technical as well as programme requirements, being based on the following three factors:

- (a) Time of transmission;
- (b) direction of transmission;
- (c) distance from this country.

The zones may be defined approximately as follows :

1. Australia, New Zealand, and Borneo ;
2. India, Burma, Federated Malay States, and Straits Settlements ;
3. South Africa, East Africa, Sudan, and Somaliland ;
4. West Africa, including Nigeria and the Gold Coast, Ascension Island, St. Helena, and Tristan da Cunha ;
5. Canada, West Indies, Trinidad, British Guiana, and the Pacific Islands.

A scheme having been devised on the above lines, the next consideration is to ascertain what is the most convenient listening time for the inhabitants of the various zones. In broad terms, it may be assumed that this falls somewhere between the hours of 6 p.m. and midnight, local time, since there must inevitably be variations of time within a zone itself. At this point, however, attention must be paid to the important fact that the habits and conditions of life of Empire listeners vary not only in accordance with their daily occupations, but also in relation to the climatic conditions of their respective countries, which alone are sufficiently different to necessitate particular modes of life and arrangements for the waking day. In any event, it is quite certain that the habits of the listener in the British Isles can be no criterion. On this special point the B.B.C. can for the time being do no more than experiment, but the endeavour in the early stages will be to provide a programme of one to two hours in duration every day of the week, Sundays included, aimed at reaching listeners in all zones between 6 p.m. and 12 midnight local time with the hours 8 p.m. to 10 p.m. as a focus.

With regard to the content of the programmes, this must in the beginning—that is to say for the first few months of the Empire Station's active existence—be of secondary consideration. The first and most important objective will be to ascertain how the station is received. During this stage the co-operation of the Empire listener will be of the utmost importance, and the B.B.C. must to a very large extent rely on correspondence giving information with regard to the many points on which guidance is needed, and which can only be obtained through reports coming from abroad. It is hoped that information will be received in a steady and increasing measure, dealing with such

PRELIMINARY LIST OF RECORDED PROGRAMMES

THE following are provisional details of the first set of B.B.C. programmes to be recorded for circulation overseas (see p. 289).

1. "*Ellan Vannin through the Ages.*"
A Manx National Programme, with music based on traditional airs.
2. "*Cakes and Ale.*"
Old English songs and choruses.
3. *A. J. Alan*—"My Adventure at Chislehurst."
4. *News Reel.*
Selection of items of topical interest, linked by music.
5. *Vaudeville Programme.*
Lily Morris, Bransby Williams, Charles Coborn, etc., with Henry Hall conducting the B.B.C. Dance Orchestra.
6. *Scottish National Programme.*
Traditional music, pipes, etc.
7. *A Pageant of English Life, 1812-1933.*
Industrial conditions, the Diamond Jubilee, the Great War, etc., by the Wireless Military Band and B.B.C. Orchestra.
8. "*Songs from the Shows.*"
British Musical Comedy successes, old and new, by the Wireless Chorus and B.B.C. Orchestra.
9. "*Postman's Knock.*"
British musical comedy specially written for broadcasting by Claude Hulbert.
10. "*Christopher Wren.*"
Biographical play by Whitaker Wilson, with Organ music from St. Stephen's Church, Walbrook.
11. *Children's Hour Programme.*
"Robin Hood and the Sorrowful Knight." Traditional songs and choruses, written round the Robin Hood legend.

matters as the type of programme that is best heard, the time which is most suitable or most satisfactory for reception, the types of voices that carry well and the types that do not, whether musical transmissions are satisfactorily received, what types of music and what musical combinations come over most clearly. These are only a few of the many points on which information will be sought, but they should serve as a guide.

Certain experience has, of course, already been gained by means of the programmes which have been broadcast through the short-wave transmitter G5SW at Chelmsford. These transmissions have been, however, for the most part, experimental, and the service has admittedly been no more than a makeshift—with the exception, naturally, of the three daily (Sundays excepted) news bulletins, which have been sent out at 12.30 p.m. (12.45 p.m. on Saturdays), 6.15 p.m. and 12 midnight, and which have been regarded from the point of view of the Empire listener as the “Eastern,” “Middle,” and “Western” bulletins respectively. Beyond the fact that between the hours of 12.30 p.m. and 1.30 p.m., and 6.15 p.m. and midnight (12.45 p.m. and 2 p.m. and 6.15 p.m. and midnight on Saturdays and no transmissions on Sundays), when G5SW is transmitting, a selection has been made from the two main B.B.C. programmes, the National and the London Regional (the choice being based on a study of what is thought to be (a) most suitable for short-wave transmission, and (b) most generally acceptable to Empire listeners), no endeavour has been made to construct a programme (or programmes) which has regard to the wishes of those to whom it is directed. The ultimate objective of the B.B.C. is to build up slowly and steadily a service of programmes which might conceivably, given that reception conditions warrant it and economic circumstances permit, be entirely independent of the regular B.B.C. programmes which are constructed for the home listener. While such a scheme is not outside the bounds of possibility, it does not seem likely nor necessarily desirable that a considerable proportion of the home programmes should cease to form part of the Empire service, as so much that is broadcast here is not only of general appeal, but inevitably of acute interest to the overseas listener. On the other hand, there is a great deal that will be of particular interest to the Empire or to parts of the Empire, and which will be of less

general appeal here. To start with, therefore, it would seem advisable to plan a service based on existing material but containing a proportion that is exclusive to the Empire—special news bulletins very naturally being an important feature of the latter.

Here again those concerned with the Empire work will rely in very large measure on the criticisms and suggestions received from correspondents overseas, and also on information gleaned from visitors to this country, who it is hoped will not neglect the opportunity while in England of letting the B.B.C. have the benefit of their observations. The expression "Empire listener" has been used on more than one occasion in this article. The term is a convenient one, but to avoid its being misleading the fact should not be overlooked that the Empire programmes will in a number of cases be available to those many British inhabitants of countries outside the Empire in many of which there are numerous isolated dwellers as well as small colonies. To these it is hoped that the new transmitters will be a source of satisfaction, since the primary object of the service is directed to those, the short-wave listeners, who are unable to take advantage of the facilities provided by the existing Dominion and Colonial broadcasting organisations. It must be remembered, however, that in the zone division referred to above the main concern has been to provide the inhabitants of the Dominions and Colonies with a service. While, therefore, many British residents in foreign countries will inevitably benefit, it has not been possible to make the service all-embracing.

To sum up, while there is justification for optimism as to the ultimate popularity and effectiveness of the Empire broadcasting service, the work of the immediate future will be one of pioneering. Difficulties and disappointments of one kind or another will necessarily occur, and the overseas public—particularly in those countries already possessing a good local service—will be ready to criticise both the programmes and the technique of transmission. With patience and co-operation all round, however, there is every reason to anticipate that satisfactory results will be achieved.



MAP OF THE WORLD SHOWING THE
 Statistics of Population, Distance, Time



COUNTRIES OF THE BRITISH EMPIRE.
 Factors, etc. are given on the next page.

EMPIRE SERVICE STATISTICS BY ZONES

	Population (approx.).	White popula- tion (approx.).	Area to nearest 1,000 sq. miles.	Dist- ance to nearest 1,000 miles.	Time factor.
ZONE 1					
Australia incl. Tas- mania	6,489,000	6,379,000	2,975	11	+ 8 to + 10
New Zealand	1,574,000	1,444,000	105	12	+ 11½
Hongkong	840,000	20,000*	0.4	10	+ 8
British North Borneo	270,000	500	31	9	+ 8
New Guinea and Papua	679,000	4,000	160	13	+ 10
Sarawak	600,000	200	50	9	+ 7½
Pacific Islands, incl. Fiji	472,000	7,500	20	11-12	+ 10 to + 12
ZONE 2					
India incl. Burma	353,000,000	126,000*	1,805	5	+ 5½
Ceylon	5,312,000	9,000	25	6	+ 5½
Malaya	4,381,000	18,000	51	9	+ 7
ZONE 3					
Palestine	816,000		9	2	+ 2
Sudan	5,600,000	3,000	1,008	4	+ 2
Somaliland	344,700	100	68	4	+ 3
Aden (incl. also in India)	50,800	500	0.1	4	+ 3
Uganda	3,514,000	2,000	94	6	+ 2½
Kenya	3,025,000	17,000	225	4	+ 3
Tanganyika	4,852,000	7,000	374	6	+ 3
Nyasaland	1,396,000	2,000	38	3	+ 2½
Rhodesia, N. and S.	2,454,000	64,000	437	5	+ 2
Basutoland, Swaziland, and Bechuanaland	765,800	6,000	294	5	+ 2
South and S.W. Africa	7,156,000	1,851,000	784	6	+ 2
Seychelles	27,600	1,000	0.15	6	+ 4
Mauritius	393,000	102,000	0.7	8	+ 4
ZONE 4					
Malta	242,000	20,000	0.12	2	+ 1
Gambia	210,000	350	4	3	- 1
Sierra Leone	1,541,000	1,200	31	3	- 1
Gold Coast and Togo- land	2,845,000	3,000	92	4	0
Nigeria and Cameroons	19,409,000	6,000	373	3	+ 1
St. Helena and Ascen- sion Islands	4,000		0.1	4	0
Tristan da Cunha	127	127	0.02	3	- 1
Falkland Is. and S. Georgia	3,500	3,500	6	8	- 4
ZONE 5					
Canada	8,788,000	8,500,000	3,510	3	- 5 to - 8
Newfoundland and Labrador	275,900	275,900	163	3	- 3½
Bermudas	31,000	6,000	0.02	3	- 4
British West Indies	1,892,200	15,000†	12	4	- 4 to - 5
British Honduras	51,500	10,000	8	6	- 6
British Guiana	312,000	8,000	89	4	- 4

* Excluding Army and Navy.

† Jamaica only, others not known.

THE EMPIRE STATION AT DAVENTRY

WHILE it is the purpose of this article to describe the plant which is now being installed at the Empire Broadcasting Station, it is not possible to explain the most outstanding feature of the equipment, *i.e.* the aerial system, without examining briefly some of the problems of supplying a broadcasting service to the Empire. The vast distances between individual Dominions and Colonies and the differences in longitude introduce two factors. Firstly, differences in longitude make it essential to arrange transmissions to different countries at times which are convenient to listeners in these countries. It is evident, therefore, that to provide a satisfactory service for a few hours a day to all parts of the Empire it will be necessary to transmit at times outside the normal programme hours in this country.

The second problem is that of the choice of wavelengths which will give a satisfactory service to the various countries to which it is desired to transmit. It is now generally known that wavelengths, particularly in the band between 10 and 50 metres, are capable of giving satisfactory communication over great distances, but these waves show certain peculiarities of behaviour which make it essential to choose a wavelength which is suitable for use over the particular route at the time during which it is desired to transmit.

It is probably unnecessary to explain that short waves do not follow the curvature of the earth but are reflected by an ionised layer of the atmosphere, the angle of reflection, and, therefore, the point at which they again strike the earth, being governed, among other factors, by the length of the wave and whether the whole route is in daylight, darkness, or an intermediate condition. For this reason any one wavelength will not give a satisfactory service to all parts of the Empire. Further, it would sometimes be necessary to change wavelengths at certain seasons, even if only a single part of the Empire had to be served.

After careful consideration of the problems involved it was decided to divide the Empire into five zones, each zone being provided with a directional aerial system. Some of these aerials will be capable of transmitting on as many as three different

wavelengths, which would be chosen to meet conditions obtaining at any time in that particular zone. Owing to the fact that it is necessary to cover countries of large area, such as Canada and Australia, the normal type of directional aerial used for point to point communication for commercial service would not be satisfactory and, for this reason, the aerial systems have been designed to produce a fairly broad beam.

The aerial system which has been constructed at Daventry consists of five distinct aerial arrays, each of which is oriented to serve a particular zone. The countries which they will serve are given in more detail on p. 274, but zone names and the approximate wavelengths on which they will be served are as follows:

ZONE 1. AUSTRALIA.

Aerial Array to transmit on wavelength of 25.6 metres. The radiator and reflector units of this array are reversible and arranged so that the beam can be directed to follow the Great Circle in either direction.

ZONE 2. INDIA.

Aerial Array to transmit on wavelengths of 17 metres, 25 metres, 32 metres.

ZONE 3. SOUTH AFRICA.

Aerial Array to transmit on wavelengths of 14 metres and 32 metres.

ZONE 4. WEST AFRICA.

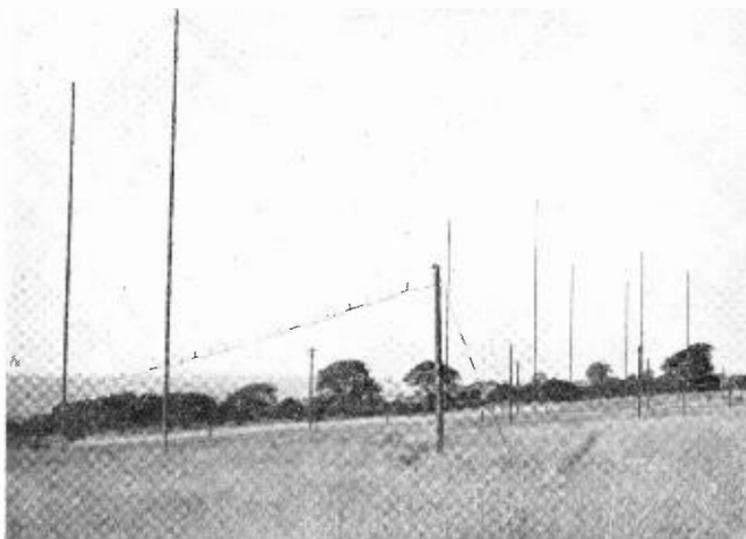
Aerial Array to transmit on wavelengths of 32 metres and 48 metres.

ZONE 5. CANADA.

Aerial Array to transmit on wavelengths of 19 metres, 32 metres, 48 metres.

In connection with the above table it should be noted that although only the larger countries are mentioned, the majority of the smaller colonies are included in one or another of the zones. The wavelengths given are not necessarily those which will eventually be used, but have merely been quoted to demonstrate the principle of the scheme.

In addition to the directional aerial arrays, six omni-



THE CANADIAN ZONE AERIAL ARRAY

directional aerials have been provided. These will be used for transmitting any special programmes which it may be desired to receive at any hour in any part of the world.

Each directional aerial array consists of a radiating curtain of vertical elements behind which is placed a reflecting curtain of similar elements, each element consisting of a length of copper wire equal in length to $\cdot 4\text{--}\cdot 5$ of the wavelength to be transmitted. The number of elements in each curtain varies with the width of beam to be transmitted, but a typical example is Zone 5, where four vertical elements, each 12·8 metres long, are suspended at equal distances on a triatic slung between two 80 ft. stayed steel masts. Behind these at a distance of $\frac{1}{4}$ wavelength are placed four reflecting elements suspended in a similar manner between two masts. Each radiating element is fed at its centre by a two-wire feeder tapped across a coil in series with the element. These feeders are brought to an impedance matching transformer to which are connected the feeder lines which run to the transmitters.

The six omni-directional aerials are similar in construction

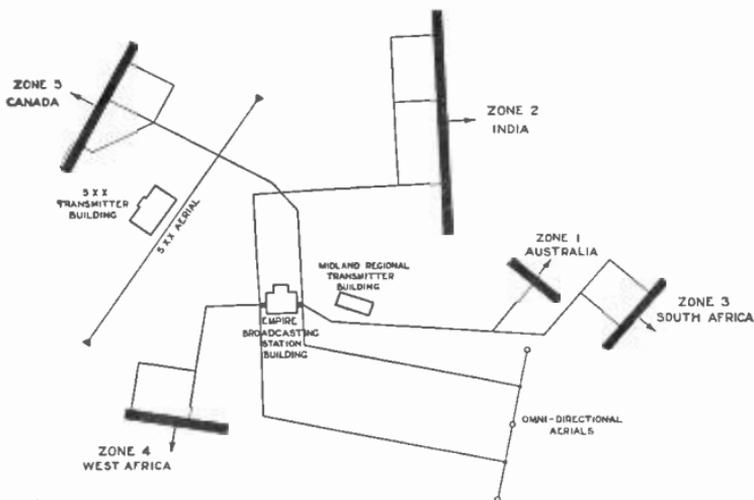


DIAGRAM OF THE LAY-OUT OF THE EMPIRE STATION

to the directional aerials, except that only one radiator element without a reflector is used.

The position of the aerial arrays and the buildings of 5XX, the Midland Regional and the Empire Stations are shown above. The aerial arrays and the transmitters were designed and constructed by Messrs. Standard Telephones and Cables, Ltd.

The building which houses the two Empire Broadcasting Transmitters can be described as consisting of three distinct portions: a central block which contains the Transmitter Hall, Control Rooms and Offices, and two wings, in the first of which are situated the motor generators, switchgear and sub-station equipment, and in the second the valve water-cooling plant, boiler-room and stores, etc.

The lay-out of the Transmitter Hall is similar to that adopted in the Regional Stations of the B.B.C., the units of the transmitters being ranged along opposite walls of the Hall, with the transmitter switchboard at one end and the Control Table occupying the centre of the space between the transmitters. The components of each transmitter, with the exception of those of the master oscillator, are contained in four cubicles, the main framework of which is constructed of duralumin L-

sectioned members, closed by doors or removable panels at the sides and rear.

The fronts of the cubicles are covered by polished black slate panels, and to avoid dielectric loss in the slate, due to strong electric fields from the components of the transmitter, these panels are screened at the back by sheets of duralumin. The necessary meters and adjusting handles are mounted on the front of the slate panels.

All doors giving access to the cubicles are mechanically and electrically interlocked in such a manner that it is impossible to open any of them without automatically switching off all dangerous voltages. The circuits of the master oscillator are situated on a rack separate from the transmitter cubicles.

To obtain the constancy of frequency necessary for a service of this kind, a master oscillator, controlled by a quartz crystal, is used to produce the carrier wave. The frequency at which a quartz crystal oscillates is governed by its physical dimensions: in the case of a disc-shaped crystal, the thinner the disc the higher is the frequency at which the crystal oscillates. It happens that a crystal, ground to produce the frequency of the carrier wave, would be too thin to be robust, and to overcome the difficulty the crystals for the Empire transmitters are ground to generate a frequency equal to $\frac{1}{3}$ of the frequency of the carrier wave. This frequency is increased to that of the carrier by frequency-multiplying circuits described later.

Since the frequency produced by a crystal is governed by its physical dimensions, it is essential to avoid expansions or contractions due to changes in temperature, and for this reason each crystal is housed in an asbestos-insulated box, the interior of which is kept at a steady temperature by means of an electric heater, which is controlled by a thermostat; by this means the temperature inside the crystal box is kept constant within a fraction of a degree.

The master oscillator of each transmitter is provided with a crystal for each wavelength at which the transmitter will be required to work. These crystals are mounted in their boxes next to their associated circuits; switches are provided so that any crystal can be connected to the transmitter by a simple operation.

The power output from the master oscillator is extremely low

and it is necessary, therefore, to amplify this before coupling to the first harmonic generator: a 50-watt valve connected to a balanced circuit is used for this purpose. This circuit, in addition to amplifying the weak oscillations from the master oscillator, also acts as a separator or buffer circuit between the master oscillator and the other circuits in the transmitter. This arrangement ensures that the impedance of the circuit into which the master oscillator works is kept constant, which tends to prevent a change in frequency due to "feed back" when the later stages are being adjusted or when the transmitter is modulated.

It should be mentioned, in passing, that the frequency doubler circuits which follow the separator stage themselves act as buffer circuits between the master oscillator and the higher-powered circuits in the later stages of the transmitter.

The separator stage drives the first frequency doubling stage, which consists of two 50-watt valves connected to a doubling circuit. This in turn drives a second doubling stage which consists of two 50-watt valves, coupled to appropriate circuits. This is followed by the third doubling circuit. The frequency of the master oscillator, having been multiplied by eight by the three doubling stages, is now at the frequency required for the carrier wave.

The output of the last doubler is applied to the grids of the modulated amplifiers which are connected in push-pull. This circuit is modulated by two 250-watt valves, also connected in push-pull, the modulators and oscillators being coupled by a transformer of special design. The speech frequency currents from the line are amplified by a two-valve amplifier before being applied to the grids of the two main modulators.

All the above circuits, with the exception of the crystal oscillator, are contained in the first apparatus cubicle of the transmitter.

The second cubicle contains the circuits of the intermediate H.F. amplifier, which consists of two 2 kW water-cooled valves connected by a push-pull circuit. The intermediate amplifier in its turn drives the first power amplifier, which consists of two 10 kW water-cooled valves, also connected in push-pull.

The final cubicle of the transmitter contains the circuits of the final amplifier, which consists of four 15 kW valves con-

nected in push-pull, the output circuits of which are coupled to the aerial feeder. The circuits of the last three "stages," *i.e.* the intermediate amplifier, first power amplifier and main power amplifier, are of the balanced bridge type, which is now almost standard in high-power transmitters. Needless to say the circuits are more complicated in detail than those used in transmitters working on relatively long wavelengths, because special precautions have to be taken to stabilise the circuits and to lay out the components in such a manner that spurious inductances and capacities are either made use of or eliminated entirely. The necessity for avoiding stray capacities and inductances and for keeping the circuits quite symmetrical precludes the possibility of using spare valves *in situ*, as in the B.B.C.'s Regional transmitters.

The outgoing feeders from the transmitters are connected to the aerial array changing panels which are mounted above each transmitter. These are a form of selector switch of special design, by means of which a transmitter can be switched to any of the feeders connected to the aerial arrays which have been described.

The high-tension D.C. power supply for the first power amplifier and main power amplifier is derived from a six-phase rectifier having a D.C. output of 10,000 volts 6 amperes. The rectifier valves, which are of the water-cooled, thermionic type, are placed behind the transmitter hall switchboard, together with their associated inter-phase reactors, transformers, and induction regulators, which last are used to control the output voltage of the rectifiers and are operated by motors controlled by push buttons. A separate rectifier is provided for each transmitter equipment.

All other power supplies for the transmitters are provided by motor generators which are housed in the motor generator room. There are twelve of these machines, which are divided into three groups, two of the three groups being used at any one time to supply the respective transmitters to which they are switched, while the third group of machines acts as standby plant. Each group contains four machines:

The first is used to supply the grid bias voltage for all valves in the transmitter and provides power for operating certain interlock relays associated with the transmitters.

The second consists of two generators coupled to one motor, the first generator having two windings and two commutators on one armature, the windings having outputs of 1000 volts 2 amps. and 1500 volts $\frac{1}{2}$ amp. respectively. This machine supplies the anode voltages to the circuits of the modulator-oscillator unit. The second generator of this combination supplies the filament current for the valves in this unit and has an output of 18 volts 80 amps.

The third set consists also of two generators, driven by one motor, the first generator having an output of 5000 volts 1.5 amps., which supplies the anode H.T. to the intermediate amplifier; while the second generator supplies the filament current for this unit, the output of which is 18 volts 80 amps.

The fourth set is used to supply the filament-heating current of the main power amplifiers, which consume 400 amps. at 26 volts.

The outputs of these generators are taken to a cubicle type switchboard, also situated in the motor generator room, on which are mounted selector switches, by means of which the output of any one of the three sets of motor generators can be connected to either transmitter.

All the generators described are driven by squirrel-cage type, three-phase, induction motors, which derive their supply from the station mains at 415 volts, 50 cycles, three-phase. The stations on the Daventry site are fed by an 11,000-volt, 50-cycle, three-phase power line, and a cable from this line runs into the sub-station which is situated within the motor generator room of the Empire Station. Here the 11,000-volt supply is coupled to the station mains by a 300-K.V.A. transformer. Since the circuits of transmitters of the type used in this station are fairly sensitive to change of voltage, an automatic induction regulator has been installed to compensate for the variation in voltage of the supply mains. Station lighting and power for the master oscillator and other auxiliary services are supplied from a 15-K.V.A. single-phase transformer which steps the pressure down to 220 volts A.C. This load is also fed through an induction regulator.

The water used to conduct the heat from the anodes of the water-cooled valves is re-cooled by air-blast type coolers, which consist of large radiators on one side of which are mounted fans driven by three-phase induction motors.

The water from the valve jackets flows through these radiators and is then lifted by electrically driven centrifugal pumps to a tank situated in the roof, from where it flows again to the valve water-jackets.

To prevent the deposit of scale on the anodes of the valves, which would occur if water from the local supply were used, the valve cooling system is filled with distilled water. An electrically heated distilling plant is provided to make up any loss due to evaporation in the main system.

The Control Rooms are situated in the front of the central block of the building. One of these contains the necessary equipment for terminating the land lines, together with the amplifiers required to raise the incoming programme to a level suitable for application to the input of the two-valve amplifier in the modulator-oscillator unit in the transmitters.

The second Control Room is equipped with a desk containing a control potentiometer and is used only for controlling the input level to the second transmitter, all switching operations being carried out in the first Control Room, which contains the line-terminating and speech-amplifying equipment for both transmitters.

The amplifiers and controls in the first Control Room are mounted on panels supported on steel racks, which are approximately 6 ft. high. An operator's shelf, which extends the whole width of the equipment, is fixed on the front of these racks at ordinary table height.

There is a separate amplifier equipment for each transmitter, with a third which acts as a spare. The circuits are arranged in such a manner that either of the three equipments can be switched to either transmitter. Similar switching arrangements are provided on the seven incoming lines.

The power supply for the anodes of the valves in the amplifiers is obtained from a rectifier employing two hot-cathode mercury-arc rectifying valves which feed the various amplifiers through filter circuits. The filament heating current for the same amplifiers is supplied by a metal rectifier which also feeds through suitable filter circuits. A Barreter lamp is used in series with each filament circuit to compensate for the regulation characteristics of the metal rectifiers.

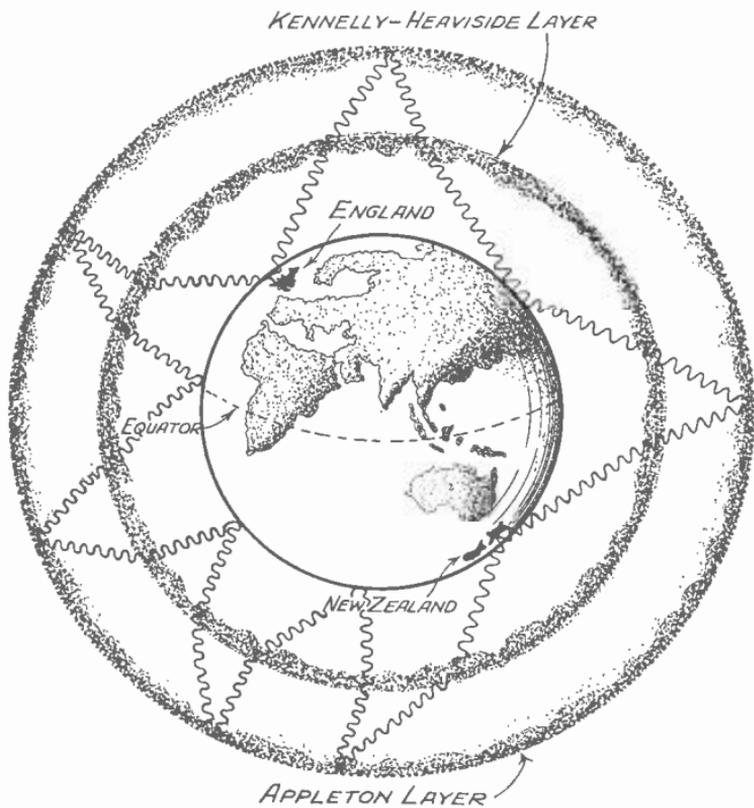


DIAGRAM OF THE PROBABLE METHOD OF SHORT-WAVE PROPAGATION,
 BY THE INDIRECT RAY, BETWEEN ENGLAND AND NEW ZEALAND

RECEIVING THE EMPIRE STATION

THE transmissions from the Empire Station at Daventry described in the previous article may be received in two ways. Firstly, they may be picked up directly by the listener equipped with a short-wave receiver, and secondly they may be received at a central receiving station established for the purpose by a Dominion or Colonial broadcaster and thence relayed for public reception over the normal medium-wave broadcast transmitter or transmitters. It will be obvious that the former course is the only possible one in the Colonies where no central broadcasting organisation exists, but it may also be used in those parts of the Dominions unserved by local broadcasting stations. Before going into any details regarding the two methods of reception and their respective advantages, it is first necessary to consider briefly how transmissions on short waves are propagated over the earth.

A wireless transmitting aerial such as is used at a broadcasting station sends out waves not only parallel to the earth's surface (*i.e.* horizontally), but also at an angle to its surface. In normal broadcast reception well inside the service area of a station it is the former radiation which is utilised and which gives constant unfading reception. As the distance from the transmitter is increased this direct ray becomes rapidly weaker from losses during its passage over the earth's surface. Thus the direct ray may have a range of quite a short distance—say only 20 to 30 miles or so. The other waves which have been radiated at an angle to the horizontal are not similarly attenuated, however, and they reach the upper atmosphere, where they are then reflected down to the earth again. The reflection takes place in layers of ionised atmosphere, one, the Kennelly-Heaviside layer, at about 60 miles above the earth, the other, the Appleton layer, at about 130 miles above the earth. The former is responsible for reflection of the long waves, while the latter reflects the short waves. It will be seen that the short waves have to pass through the Kennelly-Heaviside layer before they reach the Appleton layer, and in fact they are attenuated in their passage. The attenuation in the one layer and the reflection or refraction in the other layer do not remain constant from minute to minute, while the conditions of ionisa-

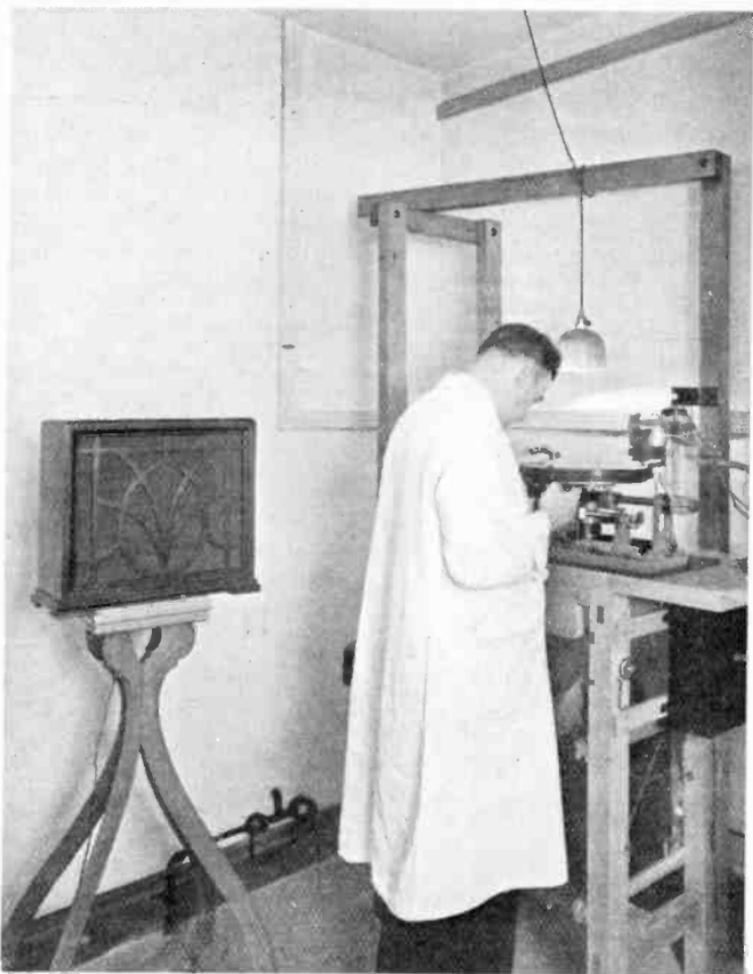
tion of the two layers change considerably with day and night and with changing seasons. It has already been stated that the direct ray, or ray travelling over the earth's surface, is rapidly attenuated for short waves and it therefore follows that reception of a short-wave station at great distances is entirely by means of the indirect ray, or ray reflected from the Appleton layer. Just as it is by virtue of this reflecting process that short-wave communication is possible, so it is by virtue of the variable conditions encountered in the reflection that short-wave communication may be unreliable—or at least variable. It will also now be apparent why the Empire Station will use several wavelengths in order to reach the different parts of the Empire—the transmission path sometimes being in complete daylight, sometimes in complete darkness and sometimes partially in darkness.

In the practice of short-wave communication there still remains an element of chance, however, even though, from considerable accumulated practical experience, the most suitable wavelength has been chosen having regard to the length of the path, the conditions of daylight or darkness, the season, etc. Practical experience, however, shows further that something can be done at the receiving end to minimise variations in the received signal caused by variations in the ionised layers. These variations of signal strength, known as fading, may be of two kinds—one a slow variation and the other a fast variation, the latter sometimes superimposed on the former. In addition, the carrier wave and the sidebands may be unequally reflected, giving rise to bad quality of reception. This is known as selective or differential fading. This last cannot be corrected at the receiving end, but the first and second can to some extent be compensated for by the provision of some form of automatic gain control. The principle of the various forms of this device is generally to arrange that an increase in strength of the carrier wave above a certain value causes a decrease in the amplification or gain in the receiver and vice versa. The speed at which this compensation takes place must be limited, so that it is slow in comparison with the time taken by one cycle of the lowest modulation frequency it is desired to reproduce, and it therefore follows that there is a limit to the speed of high-speed fading which can be dealt with.

A second method by which fading can be minimised at the receiver is by the use of "spaced" or "diversity" aerials. It was observed some years ago that if two receivers, separated by a relatively short distance, were used to receive the same distant short-wave transmitter, the time at which fading occurred at the two receivers was not the same. The conclusion was reached that if the outputs of the two receivers were combined a levelling-up process would result. Practical tests carried out in this country by the B.B.C. and Marconi's Wireless Telegraph Company and in America by the N.B.C. and the Radio Corporation of America confirmed that this method could be used with advantage in certain conditions.

In addition to these two methods of minimising the effect of fading, it has also been found that the use of directional receiving aerials is often advantageous in reducing the noise level on a short-wave channel. The aerial system of a comprehensive short-wave receiver may therefore become quite complicated and take up considerable space in comparison with the very simple single wire aerial which is generally used for broadcast reception and which will still suffice for the reception of short waves by the listener who has his own short-wave receiver and listens direct to the distant short-wave transmitters.

It will be obvious that the apparatus necessary for improving reception conditions in these ways is relatively complicated and costly, and it follows that it cannot be used by the individual listener in the remote parts of the Empire who needs a cheap and simple receiver. A central broadcasting authority, however, would be able to install and operate such apparatus with advantage for relaying the Empire programmes over the local broadcasting network. The advantage to be gained might well be worth while where the technical quality of reproduction of these programmes would inevitably be judged on the basis of the local transmissions. The lonely listener, or the listener who has no local service, will, however, be prepared to accept something which, although less good from the technical point of view, may well be sufficiently good to enable him to enjoy a large part of the programme without difficulty and without great expense.



INSPECTING THE FIRST RECORD OF A B.B.C. PROGRAMME ("ELLAN VANNIN," SEE P. 269) A FEW MOMENTS AFTER IT HAD BEEN MADE

RECORDED PROGRAMMES FOR THE EMPIRE

THE EMPIRE TRANSMITTERS were built primarily to supply a British programme service to listeners overseas equipped with their own short-wave receivers. Listeners thus equipped are numerous in the Colonies; but in the Dominions, where local broadcasting stations are in operation, are in the minority.

The relaying of the Empire station by overseas transmitters cannot for various reasons be assumed to be possible as a regular practice and therefore the recording of programmes on gramophone discs becomes an important subsidiary method of programme circulation. Direct relays, however, will usually be employed for programmes of a topical nature or of immediate Imperial importance.

It will be seen that by the distribution of programmes in the form of gramophone records, the following advantages result:—

1. Good reproduction can be obtained by local listeners.
2. Programmes are available for broadcasting at whatever time of the day they may be required by overseas stations, and may be repeated.
3. Land-line expenses are avoided, since each of several stations can be supplied with a set of records.
4. British programmes are heard not only by listeners equipped with short-wave apparatus, but by those with standard receivers tuned to their local station.

It must be remembered that a great proportion of the world's foremost artists, musicians, and entertainers live in Europe and the U.S.A., so that the compilation of broadcast programmes by Dominion and Colonial stations often presents considerable difficulty. In all cases, however, programmes distributed by this method will be of a kind which for one reason or another cannot be produced locally, either by reason of lack of artistic resources, of talent, of production facilities, or of the necessary revenue. No programmes will be included which would be likely to increase unemployment among artists and musicians in the Empire; and, for this reason, no ordinary performances of "straight" music by bands or orchestras will

be recorded. It is not intended that these programmes should ever be made available to the public for gramophones.

American programmes are already circulated by this method, which is termed "electrical transcription." They have, for some time past, been broadcast at intervals by Dominion and Colonial stations.

The majority of the programmes will be produced in the London studios of the B.B.C. at Broadcasting House; but a few may be made in the new studios of the Gramophone Company and Electric and Musical Industries Limited, at Abbey Road, London. Two permanent telephone lines link the Control Room at Broadcasting House with the necessary recording apparatus: one being utilised for control purposes, and the other to carry the speech and music currents.

The actual processing of the records is almost identical with that used in the manufacture of commercial records, except that, in this case, a method is employed which allows them to play for a period of six minutes.

So far as production is concerned, it is necessary to split each programme into units of six minutes each before the actual recording takes place. When the records are played in sequence, however, the listener is unable to detect any break.

Outside broadcasts can also be handled by this arrangement. All land-line connections are centralised at Broadcasting House, and it is, therefore, possible to relay a programme to Abbey Road for recording purposes from any part of the United Kingdom. Special line-correcting gear has been installed at Abbey Road by the B.B.C. engineers, so that the recording apparatus registers the same standard of quality of reproduction as that sent out from Broadcasting House.

At a later date, it is hoped to come to a reciprocal arrangement by means of which programmes produced in one Dominion may be recorded locally, and afterwards broadcast at home by the B.B.C., and by other Dominion and Colonial transmitters.

BROADCASTING IN THE EMPIRE

CANADA

(83 stations; 598,934 licences; licence fee 2 dollars.)

THIS HAS BEEN an eventful year for broadcasting in Canada. In the spring a Parliamentary Committee was appointed to consider the whole situation with particular reference to the recommendations for a system of national control made by the Royal (Aird) Commission which reported on the subject in 1929. The Committee heard the evidence of competent and representative witnesses, including that of Major Gladstone Murray, who, at the Committee's invitation, was nominated by the B.B.C.; and as the immediate result of their deliberations a Broadcasting Bill was drawn up and passed through the Canadian House of Commons in May. The object of the Bill is to provide for the establishment of a Commission with the necessary powers to carry on the business of broadcasting in Canada in addition to regulating and controlling broadcasting by other agencies. The Commission, which will consist of three members appointed by the Governor-in-Council, is to be established as an independent corporation with full control of the national programmes. Provision is also made for the appointment of nine assistant commissioners, one for each province, who will be immediately concerned with the control of local programmes.

This Bill, which in general principle brings Canadian broadcasting on to British lines, still leaves it to follow American procedure in one important respect: advertising, although limited to 5 per cent. of any single programme, is not prohibited. The decision to continue a certain amount of advertising was reached in view of Canada's proximity to the United States and the consequent disadvantage to Canadian industries if advertising from her own stations were stopped altogether.

The recommendations of the Committee include an ambitious scheme for the building of a national system throughout the Dominion, requiring the erection of five new 50 kW stations, one each in British Columbia, Manitoba, Ontario, Quebec and the Maritime Provinces. Many other new stations, supplemented by the adaptation of existing ones, are proposed. It at once became obvious that even a modified version of these

proposals could not be achieved without the co-operation of the United States. This co-operation, however, was at once forthcoming, and under the new agreement Canada will have the use of nine clear channels without limitation as to power, as against five under the old agreement, and twenty-seven shared channels as against the present twelve.

A U S T R A L I A

(56 stations ; 369,396 licensed listeners, licence fee 24s.)

This year Australian broadcasting has entered upon the third period of its history. The first period began early in 1924 when the Postmaster-General issued a transmitting licence to Messrs. Farmer and Company for the erection of station 2FC in New South Wales. By November 1925, six "A" class stations had been established and 13 "B" class. The division into A and B, which still exists in a modified form, meant that, although all stations were privately owned, a certain number known as "A" class received from the Postmaster-General a percentage of the licence money collected from owners of receiving sets ; "B" class stations depended for their revenue on broadcast advertising. The second period began in 1929, when the Government bought up the "A" class stations and formed them into the Australian Broadcasting Company. Technical control was retained by the Government, but the service of providing programmes was let out to a group of theatrical interests on a three-year contract. With the expiry of this contract in June last, a new Broadcasting Bill came into force for the establishment of a Commission to control the "A" class stations and to run them as a national service. The Commission, which consists of five members appointed by the Government, is, like the Canadian Commission, constituted as an independent body responsible to the Government only for the efficient carrying out of its duties. The Australian Broadcasting Bill introduces a system of control which, like the new Canadian System, is built largely on B.B.C. lines, although naturally it is adapted to the very different problems with which it has to deal. Advertising from the national stations is definitely prohibited by the new Bill, but the broadcasting of sponsored matter under certain rather vague conditions is allowed. The future of the "B" class stations has not, at the moment of going to press, been settled.



“My Commission has deep regard for the principles which influence and guide the conduct of the affairs of your Corporation, and pledges itself to serve with similar intent and to be guided by similar ideals.”

MR. C. LLOYD JONES, CHAIRMAN OF THE NEW AUSTRALIAN BROADCASTING COMMISSION, EXCHANGING GREETINGS WITH MR. J. H. WHITLEY, THE CHAIRMAN OF THE B.B.C., BY THE LONG-DISTANCE TELEPHONE, ON 12 JULY 1932

NEW ZEALAND

(About 36 stations; 72,977 licensed listeners; licence fee 35s.)

As in the case of Australia, 1932 marks for New Zealand the beginning of a new epoch in broadcasting. She anticipated the larger Dominion by about six months in passing a Bill for the Constitution of a Board to control broadcasting on B.B.C. lines. The situation before this year had developed in very much the same way as in Australia; that is to say, out of a number of privately-owned stations operating under licence from the Postmaster-General, four only, under the management of a single concern known as the New Zealand Radio Broadcasting Company, were recognised as supplying what approximated to a national service and as such received a considerable percentage of the licence money collected from listeners; the remainder of the stations, some thirty odd, were known as "B" class and were unsubsidised.

The New Zealand Radio Broadcasting Company's licence expired in December last, and the new Board took control on January 1st. The Board consists of three members only, but the Act which legislated for its formation provided also for an Advisory Council of eight whose business it is to advise the Board in respect of its functions. This Advisory Council has been formed to ensure that the point of view of listeners in all parts of New Zealand shall be fairly represented; the members, who are elected for the period of one year only, are well-known public men, five from the North Island and three from the South.

The problem of the "B" class station is an even more urgent one in New Zealand than it is in Australia, principally because the question of coverage, from which it is, of course, inseparable, is more acute; and in recognition of this the new Board, in addition to administering the "A" stations, has been made responsible for the formulation of a policy for control of the "B" stations.

SOUTH AFRICA

(5 stations; 3 principal and 2 relay; 39,610 licence-holders; licence fee fixed by ratio, maximum 35s.)

Compared to the other Dominions, 1932 has been an uneventful year for South Africa so far as broadcasting is concerned. Her

stations remain under the control of the African Broadcasting Company, which was formed in 1927 by African Theatres Limited. There have, however, been signs of unrest and it is rumoured that the possibility of a new system of control may be considered. The Postmaster-General's department in granting a licence to the African Broadcasting Company did so on a five years' contract, which expires this year, and although the contract is renewable for a further period, the Government reserves the right to take over the licence on an agreed basis at any time during the second period. The most significant development during the year was the constitution of a Broadcasting Advisory Committee to investigate matters in connection with broadcasting in the Union, and to formulate recommendations to the Postmaster-General. The committee has been appointed for a period of five years.

NEWFOUNDLAND

There is very little information available about broadcasting in Newfoundland. She does not as yet possess any organised service, although as far back as 1929 the Government appointed a Commission to report upon the practicability of operating a powerful station. There is a small 500-watt station, 8WMC, built and operated by the local church at St. John's.

INDIA

(2 stations; licence-holders 10,000; licence fee 10 rupees.)

The history of Indian broadcasting so far has been a mere struggle for existence. The difficulties are immense, the problems unique; and it seems as though only by unique solutions and methods hitherto untried will they be solved. The main efforts until now have been directed (as in most countries) towards the establishment of a centralised national service with stations at Calcutta and Bombay. These stations, after many vicissitudes, were finally taken over by the Government in April 1930, as the organs of the Indian State Broadcasting Service. In spite, however, of the introduction of sponsored programmes, the Government, like the various companies which had gone before, found that broadcasting in India under existing circumstances could only be run at considerable financial loss, and at the end of 1931 it looked as though they would close

down altogether. Nor does the decision to carry on, reached early this year as a result of various proposals put forward by trade deputations and others, mean more than that the Indian State Broadcasting Service is making one more effort to become self-supporting.

Interesting and ultimately more hopeful are certain schemes which have recently been evolved by private individuals, or groups of individuals, living in different parts of India for broadcasting experiments based on the idea of communal listening. One of the most active originators of this idea is Mr. F. L. Brayne of the Indian Civil Service, who, in collaboration with the Indian Village Welfare Association, has already carried out some interesting experiments with a small transmitter at Lahore. The B.B.C., which has for a long time felt that the future of Indian broadcasting lay with the villages, rather than with the towns, has promised that if reasonably satisfactory conditions can be assured for the development of Mr. Brayne's scheme on a larger scale it will assist by providing a transmitter.

THE COLONIES

Few of the Colonies have as yet started broadcasting on their own, and of those that have there are no recent developments to report. Ceylon, with about 1,250 licensed listeners, continues to give a regular service from the station at Colombo. This station, which was opened for broadcasting in 1925 as an adjunct to the Posts and Telegraphs Department, has built up a programme service which for variety and enterprise compares favourably with the programmes of many Dominion stations. Kenya possesses a short-wave broadcasting station, which since 1930 has been under the control of Imperial and International Communications Limited. Hong-Kong, Singapore, and the Falkland Islands, have small Government transmitting stations and do their best against considerable odds to give a regular local service. The Falkland Islands service is interesting in that reception by subscribers is over wires as in the so-called wireless exchanges that are becoming familiar in Europe. It is understood that a new experimental station has recently been opened at Livingstone, Northern Rhodesia, but further information is not yet available.

INTERNATIONAL SECTION



Carbonato

A TABLET AT THE UNION RADIO STATION AT BARCELONA
Commemorating the fact that it was the first station in Catalonia to proclaim the Republic

NOTES OF THE YEAR

UNION RADIO in Spain, which has co-operated closely with the Republic since the latter was formed, during 1932 rendered to the Government and the people a service which will go down to history. At dawn on the 10th of August the Sanjurjo rising broke out in Seville. Telegraph and telephone communication between Seville and the rest of the country ceased. The Seville transmitter, temporarily in the hands of the insurgents, broadcast to Andalusian listeners the news that the rising had been as successful throughout Spain as it had been in Seville. But Andalusia was soon informed by other broadcasting stations that the situation was well in hand in the capital and that the Cortes Constituyentes (Parliament) had sat in perfect order as usual. The news spread rapidly and took immediate effect on the populace and garrison of Seville; when a later broadcast made known that 30,000 loyal troops were marching on the city, the rising was at an end.

* * *

Everyone interested in what may be called comparative broadcasting knows that Denmark has many more licensees per hundred inhabitants than any other country in the world. This has often been attributed in part to Danish familiarity with telephones. The German broadcasting authorities recently prepared an interesting diagram showing the numerical relation of telephone subscribers to licensed listeners; this shows that in fact Denmark has the highest percentage of the former as well as of the latter (9.6 per cent. telephone subscribers, 13.4 per cent. licensed listeners). But the figures also show that a highly developed telephone service will not alone ensure success for broadcasting, nor a moderately developed one impede it. It is interesting to note that in Italy the broadcasting service, although only 0.9 per cent. of the population is licensed, still beats the telephone service by 0.3 per cent.

* * *

It was some time ago—September 1931, while Dr. Brüning held office as Chancellor—that an emergency decree of the German Government was first made known by broadcast before publication in the official gazette. The procedure excited and astonished the public, but is now the standard practice of the

Government. It was objected at one time that the whole population were not listeners; in reply it was very justly pointed out that incomparably more people listened than read the gazette or any other official publication. The law of 1923 relating to the publication of decrees fortunately admits publication, in certain cases, not only in three official sheets but "by other means," although broadcasting can scarcely at that time have been in the mind of the draughtsmen.

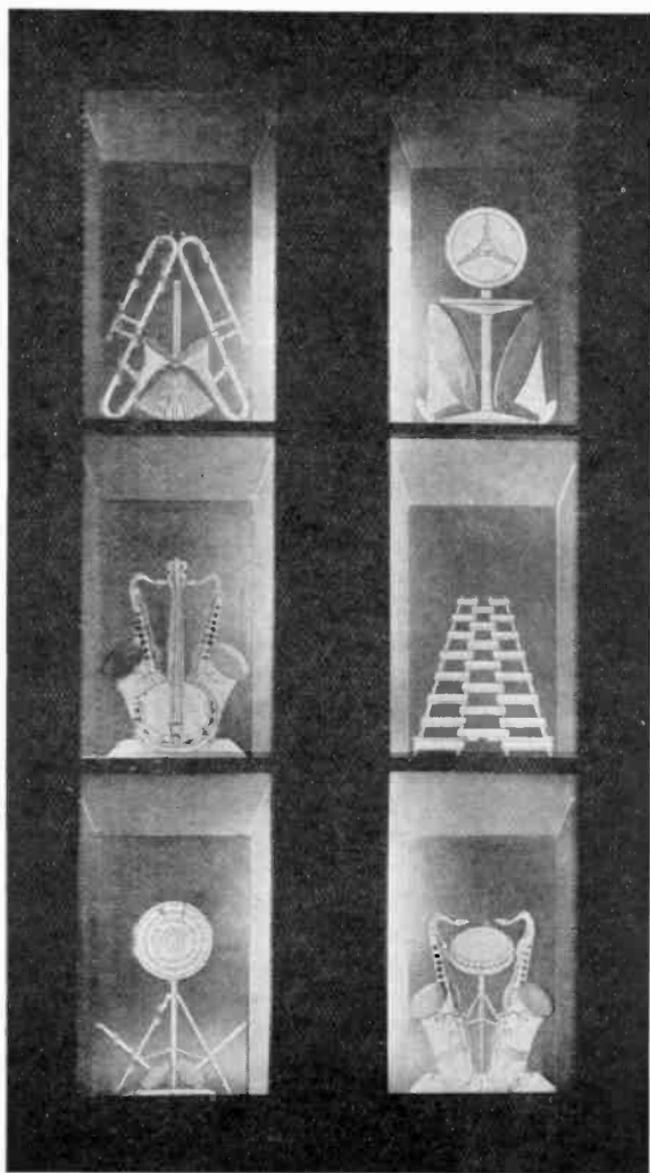
Although an announcer's error in reading would not affect the bindingness of the decree, the Government headed by Herr von Papen required the broadcaster always to record the text and publish the decree by broadcasting the gramophone record.

* * *

The Broadcasting House of Rome was completed about a year ago. It is a dignified building in traditional style, but a surprising one because the exterior in no way suggests that the building serves any special purpose. On going inside one is still more surprised to find that many of the windows one has seen give direct light to the five studios. Obviously, of course, all noise from outside is excluded; and purified air at a constant temperature is supplied. The object of the architect-decorator was elegance, convenience, modernness; and no effort towards a ponderous consistency has been made. The interior reminds us that broadcasting touches every art; and that, new as it is, it is no more able to cut itself off from traditional culture than from contemporary life. These considerations make a frame to enclose the disparate styles illustrated. Some of the detail is delicious and has given Italian artist-craftsmen a notable opportunity to display their technique.

* * *

Firms buying time on foreign stations are dealing in a most unstable article. A station's power and wavelength may be changed any time, not to mention its policy and its estimate of the material value of time; its licence may be withdrawn; its native listeners may revolt; fire and flood and acts of God may intervene between the middleman and his just reward, that depends on so delicate a thing as a transmitting aerial. Governments step in, too. Advertising has been abolished, for instance, in Holland. Italy has very exactly regulated the quality and quantity of sponsored programmes. The Irish Free



A GLASS DOOR IN THE BROADCASTING BUILDING IN ROME

State discourages the foreign manufacturer. Germany allows advertising only in the morning, and publicity without publicity at that. In Poland, on the other hand, the financial straits of the broadcaster are opening promising vistas to the advertiser; and there is a powerful syndicate behind the "national" transmitter in Luxemburg, which has already engaged a trilingual young lady to announce, although failing the publication of—can it be less important?—appointments such as the programme director, it is difficult to guess at what she will announce. Radio-Paris and the Poste Parisienne are the most important of the French stations accepting sponsored programmes, and it is believed that it is the first of these that has found most difficulty in reconciling its listeners to frequent announcements in somebody else's language. It is Radio-Normandie, however, that excels in devotion to the English listener; it now even transmits personal messages for him.

* * *

The National Broadcasting Company of America does not expect to move into its new headquarters in Radio City until the middle of 1933, but some interesting information on the design of the N.B.C. unit in the central tower is already available. It will comprise about 27 studios, of which all but one will be two stories high: the other one will be more than three stories high. An innovation will be an observation room for the public in front of the main control-room, presumably separated from it by a glass wall. The public galleries in several studios will also be separated by glass from the main body of the studio. The American solution of problems of studio decoration, both psychological and technical, is awaited with interest.

* * *

A law passed in England in 1709 remains the basis of American legislation on copyright, and the peculiar provisions of this law have been held responsible for the fact that American law still gives industrial protection priority over protection of intellectual property. Moreover, or perhaps in consequence, in the United States copyright is not established by artistic or intellectual creation (the principle of the Berne Convention), but depends upon the fulfilment of certain formalities (the principle of the Havana Pan-American Convention), including the payment of fees. Legislation recently introduced to enable the

United States to adhere to the Berne Convention did not succeed. But the House Patents and Copyrights Committee has since heard evidence with a view to drafting a bill to bring existing law up to date. Mr. Sirovich, chairman of the committee referred to, himself introduced a bill into Congress, as did also Senator Dill, who is very much interested in broadcasting. Broadcasting is the particular aspect of the situation that has recently engaged most attention. Mr. Louis G. Caldwell presented the view of the National Association of Broadcasters to the Committee; it appeared from his evidence that the most urgent need of broadcasters is to be able to ascertain readily whether each musical item is protected or not. There are a number of musical works which cannot be broadcast without special permission from case to case. The list of such works is, Mr. Caldwell believed, altered five or six times a year, and thus broadcasters are obliged to exercise a constant check, which the smaller stations cannot afford. The evidence is extremely interesting; it refers to points ranging from the liability of a hotel proprietor operating a loudspeaker to the suggestion, apparently seriously entertained in some quarters, that the law should be amended to make an organisation such as the American Society of Composers, Authors, and Publishers illegal.

* * *

The public dispute between the National Association of Broadcasters and the American Society of Composers, Authors, and Publishers, in regard to fees, has happily been settled. The fees are to be considerably higher than hitherto, but, on the other hand, considerably lower than those mentioned at the beginning of the negotiations. The system of assessment, depending as it does largely on the sale of time and the existence of networks and key-stations, does not lend itself to comparison with European procedure.

Indeed, on closer examination, the juridical position itself in the United States is not easily compared with that in Europe. To us one of the most interesting facts of the American struggle is that the broadcasters referred to themselves throughout as "the industry"; and the nomenclature is certainly in this case significant, for they may try to show that inter-state commerce is adversely affected by the claims of the copyright-owners.



HERR GIESECKE, DIRECTOR OF THE REICHS-RUNDFUNK-GESELLSCHAFT
AND VICE-PRESIDENT OF THE INTERNATIONAL UNION

THE YEAR AT GENEVA

DURING THE YEAR under review the Union Internationale de Radiodiffusion has held two principal meetings, in October 1931 at Rome and in June 1932 at Montreux—the familiar “Beau Rivage” at Ouchy-Lausanne having this year been taken up by the Reparations Conference. Vice-Admiral Sir Charles Carpendale and MM. Giesecke and Tabouis were again elected President and Vice-Presidents, and the personnel of the Council and the various Commissions underwent very little change. There was, however, one innovation of importance; apart from the usual delegates, the executive programme directors of various countries assembled for a brief but thoroughly useful exchange of views on programme-building questions.

The main business of preparing proposals for the International Radiotelegraphic Conference at Madrid (which is at work at the time of writing) had already been done in the meetings of 1930-31, and in the technical field attention was chiefly directed to adjusting the European situation, with which the system of the “Plan de Prague” of 1929 was no longer able to cope. The Union had previously asked the Czechoslovakian Government, as being, so to say, the official guardian of the Protocol of Prague, to convoke a European conference of Governments, to be held at Lugano in the autumn of 1931, but a majority was not obtained for this course, and the Union could therefore do no more than effect minor (though important) adjustments. The European governments will, however, hold a meeting, in conjunction with the Union as their expert adviser, as soon as the world conference at Madrid has completed its labours and agreed upon the extent of the broadcasting wavebands. (The Radiotelegraphic Convention, it will be recalled, allocates wavebands for particular services—ships, aircraft, radio beacons, telephony, etc.—irrespective of nationality, and does not in principle concern itself with the assignment of waves to particular countries or stations.)

In fields other than technical, the most effective work of the Union this year has been its participation in certain important inquiries initiated by the League of Nations and the International Labour Office. One of these may be specially mentioned—if only as an example of the fact, that meetings and



B. Fransioli

THE DELEGATES AT THE MONTREUX MEETING IN JUNE 1932

The group includes Vice-Admiral Sir Charles Carpendale, Controller of the B.B.C., the news of whose knighthood was received by telegram from England in the course of the meeting

resolutions do not constitute the whole of the Union's work, and that the activities of the Geneva Office, no less than those of the technical control centre at Brussels, are continuous. This was a large-scale investigation of educational broadcasting, which was carried out jointly by the International Institute of Intellectual Co-operation and the Union Internationale de Radiodiffusion under the directions of the Assembly of the League. Apart from such special tasks, there are numerous routine functions which the Office carries out. A member organisation may be contemplating changes in announcing technique—at once the Office is asked to ascertain from other members the number and hours of duty, etc., of their announcers, the qualifications demanded of them and the salaries paid; frequently, as in the last-named case, the information is only supplied confidentially, and the Secretary-General has to recast the data in such a way as to be useful to all members without violating the confidence of any of them. Again, the Office maintains a regular service of law reports to members: thus if the High Court of some country holds in favour of a tenant's right to an outside aerial, or rules that loudspeaker reproduction

of music to a café crowd involves copyright fees to the composer, such judgments, in full or in abstract, are translated and appear in the Monthly Bulletin. Again, most broadcasters keep up statistics as to their allocation of programme time, but the appropriate Commission of the Union has worked out a common form for such statistics, so as to render them more or less comparable as between one country and another, and the Office collects, digests, and restates the data in a quarterly return. Other such returns deal with international relays, radio-dramas, and music specially written for broadcasting.

In fact, quite apart from the organisation and conduct of meetings, the work of the Office has become so varied that a certain reaction has set in among members. The spirit of economy is abroad—one had almost said, rife—and much of the time of the annual meeting at Montreux was devoted to considering whether to draw rein, and if so how. For, while the spirit of nationalism seems, for the time being, to become more and more active, the facts of international interdependence become more and more patent. The Union has still to work out ways and means of harmonising the two. So far as Europe is concerned, this task has been achieved with a measure of success that, all things considered, is most remarkable. But the next stage, that of bringing about a thoroughly effective liaison between the broadcasters of different continents, has still to be tackled. The rapid development of transoceanic short-wave broadcasting is making the question urgent, and yet it is no easier now than it was five years ago for Australians or Americans or Japanese to attend three or four conferences annually; moreover, the radical difference that exists between the commercial organisation of broadcasting in America and the public-service form that prevails in Europe inevitably leads to differences of outlook even towards common problems. But there is no reason to suppose that such difficulties will not be solved in one way or another; for notwithstanding all such differences of organisation and operative policy, there remains the fact that broadcasting possesses a fundamental and specific unity.



THE OLD PALACE OF THE SENATE, WHERE THE CONFERENCE WAS HELD

THE MADRID CONFERENCE

AS THIS BOOK goes to press there will be in session at Madrid an important international conference. This conference will not deal with reparations or with war debts or with disarmament, for it is the meeting of engineers and officials from all over the world who, in their respective countries, are responsible for the organisation and operation of telecommunication services (telegraphs, telephones, and broadcasting by wire and by wireless). Almost all countries in the world will be represented, usually by members of their governmental Postal and Telegraph Administrations which are responsible for licensing and operating telecommunication services. There are, however, some exceptions in which private enterprise operates these services, notably, for instance, in the United States of America. The official delegations will be accompanied by advisers and representatives of the various commercial wireless, telegraph, and telephone companies, so that there may well be some five or six hundred participants representing over seventy different countries.

The international regulation of telecommunication services is carried out through two Unions—firstly the International Telegraph Union and secondly the International Radiotelegraph Union. In the past these unions have met separately, and agreements achieved at their meetings have been incorporated in separate conventions, the most recent two being the Telegraph Convention of Paris in 1925 and the Radiotelegraph Convention of Washington in 1927. The latter conference expressed a wish “that the contracting governments should examine the possibility of combining the International Radiotelegraph Convention with the International Telegraph Convention and, if they think it desirable, should take the measures necessary to that end.” This possibility has been examined during the past five years and arrangements have been made for the two conferences to meet simultaneously at Madrid with this end in view. At the outset it seems probable that this fusion of the two conventions may be achieved probably under a single “Telecommunications” Convention. Difficulties will arise, however, for certain countries (*e.g.*, the United States of America) are signatories to one Convention and

not to the other, but these difficulties should not prove insoluble.

It follows that the scope of the discussions at Madrid will be very wide, but at first sight it may not be obvious how they affect broadcasting and thus become of interest to readers of this Year-Book. The Convention itself will incorporate quite general agreements (the Washington Convention itself had but twenty-four fairly short articles), but annexed to it will be one or more sets of Regulations which will deal in considerable detail with the prescriptions to be observed in operating the various communication services. Of first importance and interest to the wireless services (including the broadcasting service) will be one of these regulations which deals with the division of wavelengths between these services. In the Washington Convention, Article 5 of the Regulations is the relevant one. It contains eighteen paragraphs, and is headed "Distribution and use of frequencies (wavelengths) and types of emission." It is the amendment of this article, in a sense more favourable to broadcasting, which the International Broadcasting Union (U.I.R.) is seeking, and it is certain that this will form one of the major issues and the most controversial point of the whole Conference.

What are the facts? The first two Radiotelegraph Conventions, those of Berlin in 1906 and of London in 1912, were limited almost entirely to the organisation of maritime wireless services, and did not establish any general distribution of wavelengths. In consequence of the World War and the following period of difficulty, the next International Radiotelegraph Conference did not meet until 1927 at Washington. During this period of fifteen years between conferences, a period which, in the ordinary course of events, is far too long, the more especially between conferences dealing with a science which develops with such astonishing rapidity, many other applications of radio-electricity, in addition to the maritime services, had developed: to name but two—aeronautical services and broadcasting. The administrations of the various individual countries had in the meantime made the necessary arrangements nationally to accommodate these services as they grew up. The Washington Conference, which had to take all these existing arrangements into account and at the same time to

avoid causing too great dislocation, did little more in the matter of wavelength allocation than to sanction, in its main outlines, an already existing situation. It is unfortunate, although inevitable, that this wavelength allocation was not based on a full technical appreciation of all the problems involved, for in 1927 insufficient technical data were available for the work in hand. In the past five years not only has the development of wireless in all its applications been even more rapid than before, but also a large amount of work on the propagation of waves has been carried out, which furnishes a much more definite conception of phenomena previously well known but little understood. If the Madrid Conference could start off anew, and base the allocation of waves to the claimant wireless services in accordance with technical considerations, an allocation table giving satisfaction to all services could almost certainly be achieved. This is obviously not possible, however, and economic and political, as well as technical, considerations must necessarily be taken into account.

The case put forward by the International Broadcasting Union fully recognises this necessity, and its proposals respect the existing situation, especially when the question of safeguarding human life is concerned, even though purely technical considerations would have suggested a different solution.

It may be asked, How is it possible to provide more space for broadcasting in wave bands which are already congested, without seriously prejudicing the other services? The International Broadcasting Union believes that a fuller use and application of modern, and increasing, technical knowledge could do much to relieve the existing congestion of the wave bands.

For instance, the waves with which broadcasting is mostly concerned are those between 2000 and 200 metres. It has been amply demonstrated that over land, and particularly over hilly and mountainous country, the range of a broadcasting station increases very greatly with increase of wavelength, whereas the range of a station working over sea is not increased to anything like the same extent by a similar increase in wavelength, at any rate as far as distances of 200 to 300 miles. This increase of range with increase in wavelength, when transmitting over land, results from two causes; firstly the direct ray suffers considerably less attenuation, and secondly the indirect ray decreases

in intensity with increasing wavelength. The practical result is, therefore, that the range of a broadcasting station for reception in good service, or non-fading, conditions depends on the wavelength in use and cannot be usefully increased simply by increasing the power beyond the optimum figure for the wavelength in use. A second important technical point is that telegraph and telephone services, which use headphone reception, can tolerate a very much greater variation in signal strength due to fading than can a broadcasting service where listening is carried out by loudspeaker, and where absolute continuity of reception is essential for the artistic reproduction of a programme. On the other hand, the direction-finding services, working in conjunction with ships and aircraft, cannot use much shorter waves than at present, for the reason that the stronger indirect ray which, as stated above, is present on these waves and causes fading in broadcast reception, may be responsible for considerable inaccuracies in the observed bearings. Thus inaccurate positions might be given to a ship or aircraft, resulting in danger to life. A process of simple exchange in wavelengths between certain services could do something to ameliorate the situation.

This is not the place to set down and to discuss in detail all the propositions of the various delegations to the Madrid Conference; indeed, it requires a book considerably larger than this to contain them all. This work has already been well done by the Berne Bureau of the International Telegraph Union, in a book of quarto size containing over 600 closely printed pages. It is here desired to indicate the general scope of the Madrid Conference and its particular interest from the broadcasting point of view. In conclusion, it is well to mention that this Conference will not deal with the question of allocation to individual stations of waves in a given band. If the Madrid Convention provides any increase of channels available for broadcasting—and even if it does not—there will almost certainly be a subsequent meeting of the European administrations to reconsider the present detailed allocations of waves to individual European broadcasting stations. This further conference will probably resemble the Conference held at Prague in 1929 which resulted in the Prague wave plan.

THE RELATION OF GOVERNMENTS TO BROADCASTING

DURING the ten years, more or less, in which broadcasting has been in existence, the attitude of governments towards it has varied from time to time, as well as from country to country. It is probably true to say that in the beginning it was not taken very seriously, which is not surprising in view of its novelty and of the fact that, in the early stages, it was closely linked with the amateur movement, and so could be regarded as a scientific hobby. Even the suddenness with which the movement spread all over America in 1921 did not of itself compel governments of the world to look on the newcomer as a social phenomenon of the first importance, for American youth is mechanically and electrically minded, and for a very long time the chief interest of the listener was in the game of "pulling in" numerous distant stations—the more distant the better. In fact, he was not yet a listener, and indeed he preferred to call himself a "fan." In the first stage, therefore, the outlook of a government on broadcasting was determined by its attitude towards communications in general. Thus, in the United States telegraphy and telephony are not public services, but privately owned "utilities," subject indeed to more regulation than drapery shops and candy stores, but still essentially commercial. This being so, the State interfered as little as possible—so little that after some years it was found that the Secretary of Commerce possessed no legal powers under which he could refuse a transmitting licence or even assign a wavelength. At the other extreme were those governments (and they were not a few) which were anxious that their subjects should hear nothing, from within or without, that had not the approval of authority. The views of European governments in general lay between these extremes. The exploitation of electrical communications was regarded as a state privilege, something, therefore, which private persons (whether as transmitters or as receivers) could only carry on under licence or concession, but the main motive of the reservation was not so much censorship as the safeguarding of the principle upon which a great revenue-earning state activity rested, and which protected the assignment of waves to the various important wireless services

already existing. This attitude on the part of governments was as proper as it was natural. Broadcasting had yet to justify itself socially, and the only criticism that fair-minded retrospect can make is that in some cases governments have taken over-long to convince themselves that broadcasting ranks among the most, and not the least, important applications of wireless.

Something more than the mere desire to safeguard prerogatives, however, must have led to the next step, which was to be of such far-reaching importance in the development of European broadcasting, namely the idea of using the licence rule to obtain a revenue upon which a broadcasting service could be securely based. (Old friends of the B.B.C. will recall that an attempt was made as late as 1925 to challenge the legality of this method, and that, to make assurance doubly sure, an Act was passed assimilating the legal position of receiving sets to that of transmitters.) So far as available information goes, the authorship of this masterly idea lies somewhere in the British Post Office, which in the summer of 1922 carried out negotiations with the leading wireless firms for the establishment of the old B.B.C. The example, as all the world knows, was quickly and widely followed, and maintenance by licence revenue is now the rule in four out of every five countries.

This system, however, from its origins and nature, implies some degree of governmental or Parliamentary control, or both, over the broadcasting service (as distinct from the mere permission to operate), and the extent of this control and the manner of its exercise in different countries would provide—and has in fact provided—an interesting subject for constitutional jurists to study. All varieties of form seem to have been tried—a broadcasting branch of the Post Office as in the Irish Free State, a self-contained but responsible public authority as in Great Britain and Denmark (incidentally the two European countries with the highest proportion of listeners to population), government participation in companies of ordinary commercial constitution as in Germany, a public authority supervising a programme concessionaire as in S. Africa and (till recently) in Australia.* But, as in most other matters, the spirit is more than the form, important as the latter is, and the

* France has endeavoured to combine Governmental and free broadcasting in parallel systems.



Wide World

PARTY POLITICS BY WIRELESS IN AMERICA. PRESIDENT HOOVER SPEAKING AFTER ELECTION AS REPUBLICAN CANDIDATE FOR THE PRESIDENCY

progressive advance of governments from their first half-interested toleration of the "fan" to their realisation of the fact that the broadcast listener is the community constitutes the political history of European broadcasting from its beginning to the present day.

For nine people out of ten, in nine contexts out of ten, the word "political" suggests strife, whether strife of parties or of countries, and in the case that concerns us here it suggests propaganda and the admission or otherwise of controversial matter. But "political" is, after all, only the adjective of the noun "policy," even though its common connotation has become so fixed that one is reduced to speaking of "policy considerations" when the wider sense is intended. How, then, do governments in general view the social rôle of broadcasting—from a policy standpoint or a political standpoint? The answer is, usually from both. This is inevitable, since democracy has so thoroughly interlinked government as such with the "government of the day." But the ability normally to distinguish them was the great secret of British Parliamentary Government, and

it was not always detected by Continental imitators when parliamentary institutions became general abroad. And so, because of this age-long tradition, it comes about that in British broadcasting things can happen naturally which in many other countries—though not all—would be forbidden as likely to provoke a revolution or, at the least, an undesired popular outburst. Conversely, things can happen naturally in the broadcasting of a country where other conditions rule that would be inadmissible in the case of the B.B.C. What is decisive is no longer the attitude towards communications but the attitude towards the community, and the peculiarity of broadcasting is that, owing to its universality on the one hand, and the limitation of available channels on the other, it forces those responsible for it, as no other mode of transmitting thought forces them, to make up their minds as to where they stand, as to whether they do or do not identify the managerial with the “political” rôle, as to whether they will or will not curtail liberty of expressing opinion. For whereas measures like the censorship of printed matter or the prohibition of public meetings are negative, the broadcast programme is positive. The range of available programme matter is out of all proportion greater than the possibilities of broadcasting it—hence the act of selection itself involves a much more sweeping act of exclusion. Fundamentally, therefore, control of broadcast transmissions lies, not in the hands of a censor who may forbid this or that proposed broadcast, but in those of the programme-maker, who can administer nectar or medicine or poison where the censor can only wield a bludgeon. And, with the experience of years, certain Continental governments have gradually come to realise this fact.

The recent re-organisation of German broadcasting under the Papen régime is a striking case in point. Governmental control in that country was until a few months ago exercised through nominees on the boards of the various companies and through an organ called the supervising board, which is a statutory part of every limited liability company in Germany. This has been fundamentally changed by transforming the companies, centralising programme control in the hands of a Commissioner appointed by the Ministry of the Interior and making important changes in the higher programme appointments, which are now

to be filled by persons politically acceptable to the government. Belgium has chosen a different system, but one which in its way illustrates the same tendency; there the nominations to the board and to certain executive posts are made by the Government and the Parliamentary parties in conjunction, the politics of the candidate being taken into account. In both cases it is evident that the determining factor has been the general attitude of the governors to the governed. We need not, therefore, go as far as the dictatorships of Italy and Russia to find our examples; nor would these instances prove much, since in each of these countries practically all institutions, social and economic as well as political, have been radically transformed. But the fact that in countries which have parliamentary constitutions and in which society in general runs on the old lines, broadcasting should be singled out for special treatment is most suggestive. Technics compelled the adoption of a standpoint but not necessarily of these standpoints.

Whither, then? In a recent address which attracted considerable notice, the American publicist and broadcaster William Hard propounded the intriguing paradox that the effect of "governmental" broadcasting as practised in Europe is to advance culture but not civics, while American "free" broadcasting is advancing civics but not culture. When allowance is made for the over-sharpness of the generalisation, the proposition as stated would be very difficult to confute. But the facts might equally well be stated in another way, that the freedom of America is failing to rise to a cultural opportunity that the governments of the Old World have been socially-minded enough to seize, and that the higher the cultural level of the governed is the less they are likely to be successfully "doped" by the governors. Still other interpretations could be suggested, but common to all of them is the fact that the standpoint of a government towards broadcasting is fixed by its standpoint towards its people. This is the root of the matter, and the forms of constitution, administration, and finance, important as they are, are derivatives. The question "Whither broadcasting?" therefore can only be answered by posing another question "Whither society?", and it is best, here, to leave it at that.

BROADCASTING IN RUSSIA

LAST YEAR a French review organised an expedition to the U.S.S.R. On their return the members of the expedition were confronted by the editor with a list of items against which they were asked to write "Yes," or "No," that is "I approve," or "I do not approve." Readers may care to play this game mentally with the following items of information about broadcasting in the Union of Socialist Soviet Republics.

The broadcasting hierarchy corresponds in a general way to the political hierarchy, and there is a five-year plan, and a second five-year plan, for broadcasting. The country is divided for broadcasting purposes into districts coinciding with the governmental districts, *i.e.* Central Russia (counting for broadcasting as eleven districts), Ukraine, White Russia, Transcaucasia, Usbekistan, Turkmenistan and Tadschikistan. Each district has its own managing committee and is subdivided into listening-circles (of which there are altogether, it is believed about 4000), each again with its own committee. The managing committee of Moscow has naturally grown to be the most important.

From the nature of broadcasting as radio-electric communication, the People's Commissar for Posts and Telegraphs is the supreme authority; he sent representatives to the International Radiotelegraphic Convention that opened in Madrid in September 1932. The U.S.S.R. is thus not unprepared to collaborate on technical ground with other states, but it is not prepared as yet to collaborate, in broadcasting, on any other ground. It is not a member of the International Broadcasting Union, because members of that Union agree that broadcasters should avoid programmes likely to offend the governments of other countries. The U.S.S.R., as most readers will know, habitually broadcasts Communist propaganda, on a long wavelength, in foreign languages. This is given from the station of the All-Union Central Council of the Trade Unions, in Moscow; the languages include German, French, English, Dutch, Spanish, and the talks are to some extent adapted to the country of intended reception, *e.g.* "A Chapter from the History of the Revolutionary Movement in the U.S.S.R." in Spanish. At the moment of going to press news has been received that

this external policy is to be reversed and that the government will make itself directly responsible for the transmissions of this station; the foreign talks are, it is said, to be discontinued.

Russian broadcasting exists to teach, and not to entertain. It exists to impart information, to exhort, above all to inculcate an ideal, the Communist ideal of the Soviet republics in their particular circumstances of the moment. It is not to be understood that nothing but the spoken word is broadcast—there are excellent orchestras, other musical combinations, and soloists, permanently employed by the broadcaster—but rather that everything broadcast has been submitted to the criterion “Has this a social purpose?” (Mr. Maurice Dobb has said, “To the Marxist art is a social phenomenon.”) Two minor examples: first, Occidental dance-music is barred, as appealing to the lower passions; second, many stations now use as an interval signal a hammer hitting an anvil.

It follows from what has just been said that, in the interests of the state, as many people as possible must be induced to listen regularly and often. Therefore the licence-fee was abolished as from the 1st January, 1930, and in certain towns selected for experiment, particular citizens were summoned to show cause why they were not listeners. It is now reported that a licence-system is to be re-introduced, but, if the report is well-founded, there is little doubt that the fee will be very moderate. No postage is payable on letters to the broadcaster.

One obvious method of enlisting interest is to make the listener give the programme (listeners are divided into three great classes, workers, peasants and youth). For example, a programme broadcast *to* pioneers (boys and girls from eleven to about sixteen years of age) will be given *by* pioneers, with some assistance. The content of the programme will be instruction and exhortation, with all the benefit of inside information on weak spots; the form will be dialogue, almost strophe and anti-strophe, probably with music to illustrate, to increase the tension and work up excitement. In the same way, workers in heavy industry will give a programme for fellow-workers, which may describe new inventions, new progress, or may consist of outspoken, uncensored, criticism of methods and policy in a particular area or factory. It is scarcely necessary to add that this not only interests the listeners for whom it is intended but

leads directly to the removal of the abuses thus relentlessly laid bare. The broadcasting system itself invites criticism and practises self-criticism. After programme hours stations may be heard discussing by wireless what would in any other country be private business, but in Russia becomes, by the means of communication chosen, public business. Why, asks Moscow, for example, of another station, has the quality of your transmission been since the day before yesterday beneath description? Because, comes the answer, we have never got the new valves we indented for, and you promised us, weeks ago.

It is, of course, to be expected that a high degree of technical efficiency throughout the country will not be obtained for some time to come; the reasons for this are sufficiently obvious. But the plans in hand are far-reaching and ambitious. Leaving aside the manufacture of transmitters and receivers and parts, included of course in the five-year plan for broadcasting, they relate on the one hand to a large number of new high-power stations and on the other to the installation of loudspeakers in factories, clubs, streets, schools, railway-stations, and public places of all kinds, particularly in villages. These loudspeakers were to be connected with the studio by landline or cable and only remote villages were to pick-up stations in the more usual way; but this scheme has had to be modified and only villages in the near neighbourhood of studios are at present supplied by line. On the other hand, every village is supplementing its communal loudspeaker by connections to the separate houses on the principle of a wireless exchange. The communal loudspeakers can be used in two ways. In the usual way, to put out a programme performed at a distant place (whether received by line or picked up from the ether); or to make audible a programme given in the building where the loudspeaker is: for example, in the manager's office of a factory, either by the manager on business or by a soloist sent from the broadcasting station; or from a special carriage in a railway-train where gramophone records are run off, or travellers with talent may entertain their companions.

TECHNICAL SECTION



THE CONTROL ROOM AT BROADCASTING HOUSE
(See also the diagram on page 325)

NOTES OF THE YEAR

THE OUTSTANDING ACTIVITY of the B.B.C. during the past year has, of course, been the completion of the building and equipping of Broadcasting House, and no undertaking could have provided more interesting problems. On the civil engineering side there have been the difficulties of sound-proof construction, and sound-proof methods of ventilation, as well as intricate problems in the steel work, sanitation, and the combining of decorative schemes with the somewhat rigid specifications of the acoustic engineers.

* * *

The study of studio acoustics forms an important section of B.B.C. research work, and is particularly interesting, largely because existing data are very vague and far from complete. Then again, there has been the absolute necessity of preventing "electrical interference" between the different sections of the wiring in Broadcasting House; that is to say, the complicated power wiring, signalling and telephone circuits, have had to be arranged in such a way as not to interfere with the equally complicated wiring carrying the actual music and speech intended for radiation by the transmitting stations.

* * *

There is not an exact counterpart anywhere in the world of the central Control Room, which is on the eighth floor of Broadcasting House. This room contains the amplifiers, control apparatus, and switchgear, for handling all studio programmes and rehearsals, and outside broadcasts, whatever may be their destination. Owing to its unique character, the Control Room has been designed in detail by B.B.C. Engineers, working entirely on their own past experience and incorporating in the design everything necessary to meet the somewhat exacting requirements of the programme producers.

* * *

However, Broadcasting House has been by no means the only activity during the past year. Quite apart from the day to day handling of programmes in twelve different programme centres, the maintenance of the transmitting stations, and the arranging of outside broadcasts, there has been constructional work almost all over the country. The new twin-wave Regional Station for

Scotland was opened on the 2nd May, 1932, while work on a similar station for Wales and the West of England was started in January, 1932. Both these stations are on somewhat similar lines to those at Moorside Edge in the North of England, and Brookmans Park near London, but naturally every new station contains improvements and additions.

* * *

During the spring of 1932 a search was begun for a site for the new high-power long-wave station (the new 5XX), which will also incorporate the new medium-wave Midland Regional transmitter. As is usual when searching for sites the lorry transmitter has been erected on every site selected for test, in order that exact measurements may be obtained and the service which the new station may be expected to give forecast.

The B.B.C. always goes through a very elaborate procedure in the choosing of sites ; in fact it is doubtful whether many broadcasting organisations go to quite the same trouble in connection with this particular problem. However, the B.B.C. considers that it is impossible to take too much trouble in making sure that local conditions shall be favourable in every way. There is also the question of economy ; a great deal of money can be saved by finding a suitable piece of land where essential services, such as water and high quality telephone circuits, are available without excessive expenditure.

* * *

This new station will not follow precisely the same lines as the other regional stations, and therefore a great deal more work will be necessary on the design. This is partly due to the fact that the long-wave station, as its name implies, employs a wave much longer than the Regional transmitters, and partly to the fact that the power is much higher.

* * *

There has been still another highly important development during the past year on the transmitting side. This is the building of a station for broadcasting direct to the Dominions and Colonies. Although G5SW has been in operation since November 1927, the B.B.C. has not hitherto possessed a short-wave transmitting station efficiently equipped for transmitting to all parts of the Empire. It is interesting to note that the site of this station will be Daventry, which is already associated with one

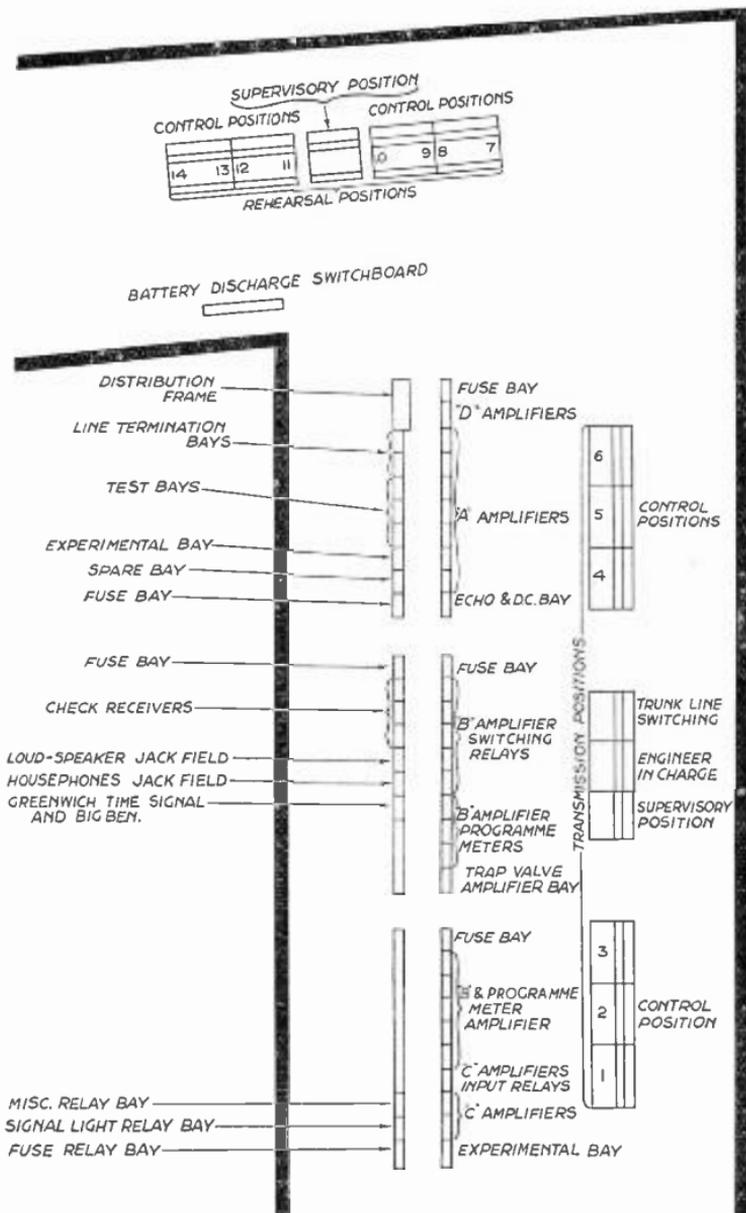


DIAGRAM OF THE CONTROL ROOM SHOWING THE ARRANGEMENT OF THE CONTROL POSITIONS AND THE VARIOUS BAYS

of the most important steps ever taken in broadcasting in this country, namely the building of the long-wave station 5XX, which has been of such great benefit to listeners for the past seven years. Before the year is out it is hoped that the new short-wave station will have been heard at least in most parts of the Empire, but it will not be possible to establish a full schedule of programme transmissions from both transmitters until a long series of tests has been completed to determine the best wavelength for all conditions.

* * *

Efficient transmitting stations, however, are not very much good unless they are supplied with programmes produced in equally efficient studios. London has already been well catered for, and already the work of equipping the provincial centres is well advanced. Edinburgh and Manchester have studios and control room equipment which only differ from London in respect of the actual number of studios, and the fact that existing buildings have been adapted. Glasgow is being similarly equipped, although the studios will be somewhat smaller than at Edinburgh, while the accommodation at Birmingham is being completely remodelled in order to obtain a studio of greater volume and therefore more suitable for large orchestras.

* * *

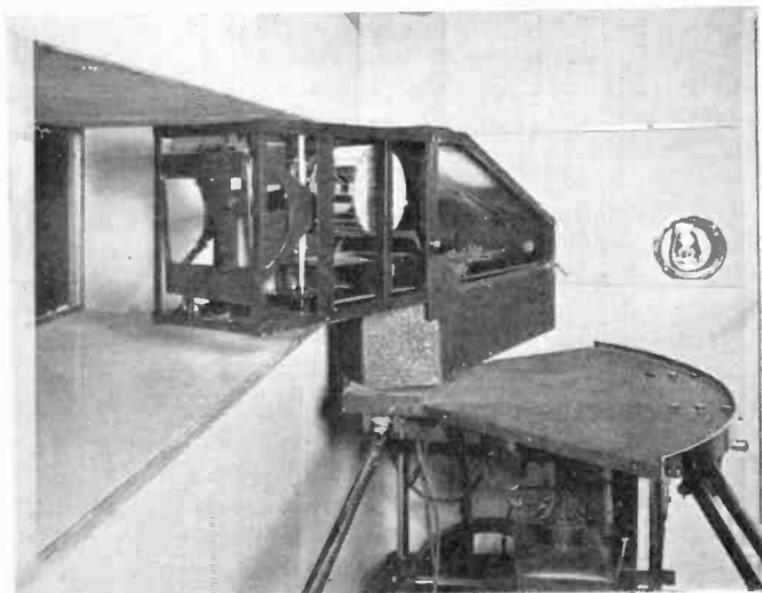
Before long there will be up-to-date studios in Bristol, where there will be a control room which, in addition to the usual apparatus, will contain the "repeater" equipment for the "simultaneous broadcast" lines which will pass through Bristol to Cardiff, the new high-power station at Washford Cross, and Plymouth.

* * *

Apart from the experimental work arising from the various activities mentioned above, the B.B.C. Research Engineers have been doing extensive work with the object of improving the synchronising of stations working on one wavelength, as it may be necessary to make further use of this method of economising wavelengths in the future.

* * *

When the acoustics of studios generally are improved it is necessary to make sure that the microphone is capable of



THE TELEVISION EQUIPMENT AT BROADCASTING HOUSE WITH AND WITHOUT THE COVER REMOVED

[327]

reproducing the improved quality made possible by the design of the studio itself. This has been a research problem during the last year, and at the present moment there are some half dozen different types of microphone under test. Efforts are being made to utilise microphone designs originating in this country, and one successful type of condenser microphone in particular has been developed by an English engineer.

Unfortunately microphones which give the best reproduction are sometimes the least easy to maintain in good condition, but recently a new design has been tested which makes use of the moving coil principle. It seems to give reliability combined with excellent reproduction, but tests are not yet complete.

* * *

There is a department of the B.B.C. which, although technical, is not directly connected with the transmission of programmes. This deals with such questions as the elimination of various types of electrical interference, the investigation of complaints of oscillating receivers, the preparation of pamphlets explaining changes in the service, and the collection of technical data. Activity in connection with interference consists mainly of liaison with the General Post Office, which carries out investigations of interference and oscillation by means of its district staffs all over the country.

The Post Office activity in connection with the "struggle against parasitic interference," as it is always called abroad, is not only confined to the investigation of listeners' complaints. A very considerable amount of research work has already been done by them, one particularly successful instance being the suppression of interference on trolley-buses. The success of such work, depends largely on the friendly attitude of the owners of the offending plant, and in this particular case very little could have been done had the owners not been willing to put the Post Office recommendations into effect. It is a great pity that all organisations whose plant is causing interference to large numbers of listeners do not take similar action.

* * *

There is another technical department of the B.B.C. not directly connected with actual broadcasting, which deals with all matters connected with the permanent trunk cable circuits

which are hired from the G.P.O.—as well as all lines for Outside Broadcasts.

* * *

By the time these notes appear the B.B.C. will be radiating regular transmissions of television. The television has been installed by the Baird Company in one of the studios at Broadcasting House, and is being operated by B.B.C. Engineers. The programmes are also produced by the B.B.C.

* * *

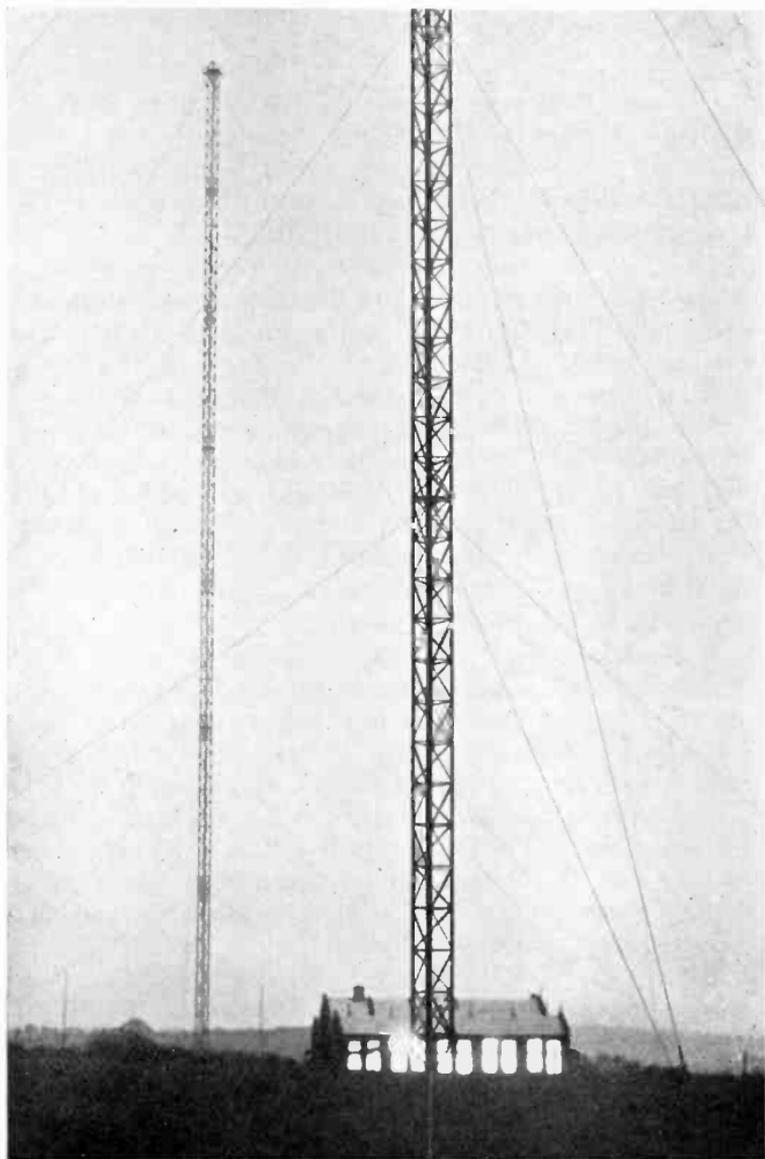
In September 1932 a meeting of the International Telegraph and Radio-Telegraph Conference was held in Madrid. The meeting, which had not concluded at the time of going to press, is of the greatest importance to all users of wireless, and everybody naturally hopes that the conditions which will result from the decisions of the Conference will show an improvement over those existing at present. Although it is difficult to see how the expansion which is taking place in all forms of wireless activity can be fully accommodated, there is still much which could be done to improve existing conditions. The matter is dealt with in the article on page 309.

* * *

On account of the scarcity of wavelengths the B.B.C. is carrying out experiments to find out to what extent "ultra-short" waves could be used for broadcasting. The technique of both transmission and reception of such waves is very different from the accepted practice for the ordinary wavelengths at present used for broadcasting. For this reason it will be some time before such a system could be used for the regular service, even assuming that the results of the experiments are satisfactory, which is of course by no means certain.

* * *

During the period 3rd October, 1931, to 24th September, 1932, the total transmission hours for all Stations was 58,163 hrs. 8 mins. The average percentage breakdown was .023%. These figures show a decrease in programme hours when compared with last year of 9,523 hrs. 39 mins. This is due to the closing of the Northern Relay Stations. The average percentage breakdown for the period October 1st, 1930, to September 26th, 1931, was .03%.



THE OLD DAVENTRY, 5XX

[33°]

T H E N E W D A V E N T R Y

THE PRESENT DAVENTRY STATION, 5XX, was opened for public service in July 1925. It was an immediate success and the use of "long" waves for broadcasting in this country has proved one of the most important steps taken since broadcasting began, so far as the technical service is concerned.

The present long-wave transmitter at Daventry radiates approximately 30 kW of carrier power; in the early days this was looked upon as very high power, and its introduction was viewed with some apprehension by other users of the ether. However, 30 kW is by no means the limit of useful power for a station working on 1554 metres. In the case of medium-wave stations the power is limited from the economic point of view, owing to the fact that however great the power used, fading at night is bound to interfere with reception at ranges much beyond about 80 miles. Therefore, if a satisfactory field strength is established at this distance it is impossible to extend the area of really reliable reception after dark by raising the power still further. In the case of long waves, however, the amount of indirect ray in relation to direct ray is such that the useful range can be extended up to 400 or 500 miles, or even more, so that the economic limit of power in this case is very much higher. Naturally, it requires a higher power to establish a good working field strength at 500 miles, even on long waves, than it does to establish an equal strength at 80 miles on a medium wavelength.

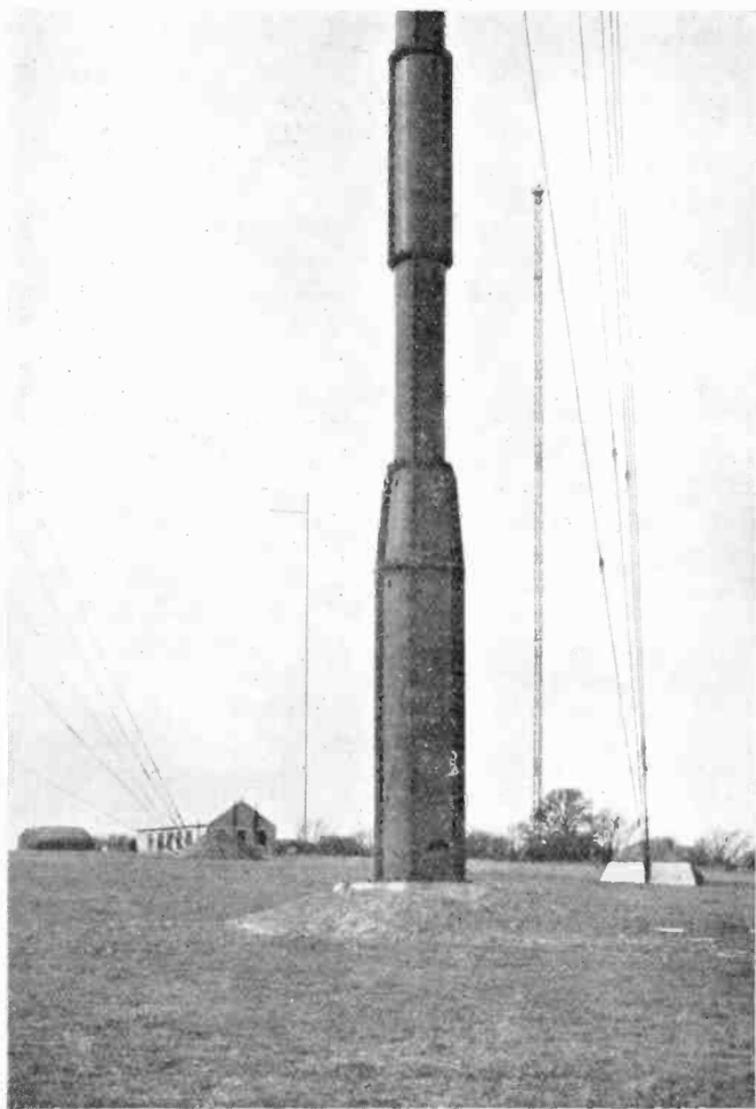
In practice, the limit of power for long waves is more likely to be determined by the claims of the other wireless services which are obliged, by international regulations, to carry out their work on neighbouring wavelengths; this applies particularly to aeronautical services. However, it is clear that to make the best use of the valuable wavelength of 1554 metres, the power should be increased considerably. There is, however, another reason for rebuilding the present 5XX station. The quality of the present station when considered in terms of the relative response to all frequencies in the musical band, is much inferior to that of the Regional Stations at Brookmans Park, Moorside Edge, and Westerglen. This is due not only to the fact that the transmitter was designed in 1924 and naturally has a somewhat inferior performance, but also to the fact that there is always a difficulty in

reproducing the upper frequencies faithfully in relation to the lower frequencies, on account of the use of the longer wave. Incidentally, it may be mentioned that this also applies to receivers. Thus, if one changes over quickly from, say, the London National to the Daventry National transmitter, when the two are doing the same programme, it will be found that the quality from Daventry is lacking in high frequencies and, therefore, sounds "plummy." However, by correct design in the transmitter, and particularly in the aerial circuits, it is possible to avoid this depreciation of the high frequencies. Thus, there are two good reasons for rebuilding the long-wave station:—(1) To increase the power. (2) To bring the quality up to the modern standard.

There is, of course, another station at Daventry, namely, the Midland Regional, which is also somewhat out-of-date. Originally, 5GB, as it is frequently called, was assembled from a miscellaneous collection of components, with the object of carrying out experiments which would determine the best type of transmitter to adopt for the system of regional high-power stations. This important experiment was begun in July 1926, and after the object of the experiments had been achieved, and a design developed along the lines which the test indicated, the experimental transmitter was put into regular service in August 1927 to radiate the Midland Regional programme. It has given very good service and its quality is naturally similar to that given by its descendants, the Regional transmitters. However, its power is only 25 kW instead of 50, and it is not so reliable as the latter because it was originally intended only for experimental purposes, and the design is, therefore, far less comprehensive and robust. For instance, it has no quick means of introducing spare valves into the various stages.

For these reasons, the B.B.C. decided to build an entirely new station containing a high-power long-wave National transmitter, and a Regional transmitter for the Midlands. The station, however, is more than equivalent to a Regional station such as Brookmans Park, because the long-wave station will cover almost the whole of the United Kingdom, instead of merely supplying the National programme to a Region. The second transmitter, however, will be equivalent to an ordinary Regional transmitter.

It has been decided to build the new station on a site some fifteen miles S.W. of Birmingham. This site has many advan-



THE OLD MIDLAND REGIONAL STATION—DAVENTRY, 5GB

tages, partly because it covers certain wavelength eventualities affecting the whole service, and also because, from the Regional point of view, it will give the best possible service to the thickly populated districts of Birmingham, Wolverhampton, etc.

The design of the new Midland Regional transmitter will follow closely that of a standard Regional transmitter, as in this case the problems involved are precisely the same.

Regarding the long-wave station, after considerable negotiation with various Government Departments, it has been possible to obtain permission to raise the power to 100 kW of carrier power, and a change of site has facilitated the obtaining of this permission. The design of the transmitter is at present in hand. It will not follow exactly the lines of the other Regional transmitters because the problems involved are not precisely the same, but the performance and quality of reproduction will be similar. Again, it is anticipated that there will be changes in the power plant and general arrangement of the station, not from dissatisfaction with the performance of the Regional stations, but because later developments make it possible to introduce improvements, particularly in a higher-powered transmitter.

With regard to the masts, it will not be possible, on account of the long wave, to use the single-mast arrangement for each transmitter which was adopted for the Scottish station at Westerglen. For long waves it is necessary to use a high capacity aerial, and it is obviously not possible to erect a vertical aerial approaching half a wavelength without using masts of a height which would be altogether impossible from an economic point of view. Thus, the new long-wave aerial will probably be supported by three, or even four, masts, while one of these masts will support also an aerial for the medium wavelength transmitter.

This station will be the most important in the B.B.C. system, and it is anticipated that it will greatly improve the broadcasting service to a large number of listeners, particularly those living in mountainous districts where the medium wavelengths cannot be received free from fading, also those in coastal districts where there is far less interference on the long waves, and where, in many cases, the medium-wave stations are out of range. It is too early as yet to give a date for the opening of the station, but now that Government permission has been obtained, work on it is progressing as fast as possible.

360 crippled children from all parts of the country are given every chance of becoming physically normal citizens.

50 crippled lads in the College are being trained in mastering a trade which will enable them to earn a living.

This is the National work which is being carried out at Lord Mayor Treloar Cripples Hospital and College. The organisation is dependent on voluntary contributions. No matter if you can afford only a little; remember the widow's mite, and the urgent need of these children.



LORD MAYOR TRELOAR CRIPPLES HOSPITAL AND COLLEGE

ALTON and HAYLING ISLAND

TRUSTEES :

The Rt. Hon. and Rt. Rev. The Lord Bishop of London, D.D., K.C.V.O.

The Rt. Hon. Viscount Burnham, G.C.M.G., C.H.

Miss Florence Treloar.

The Rt. Hon. The Lord Mayor of London.

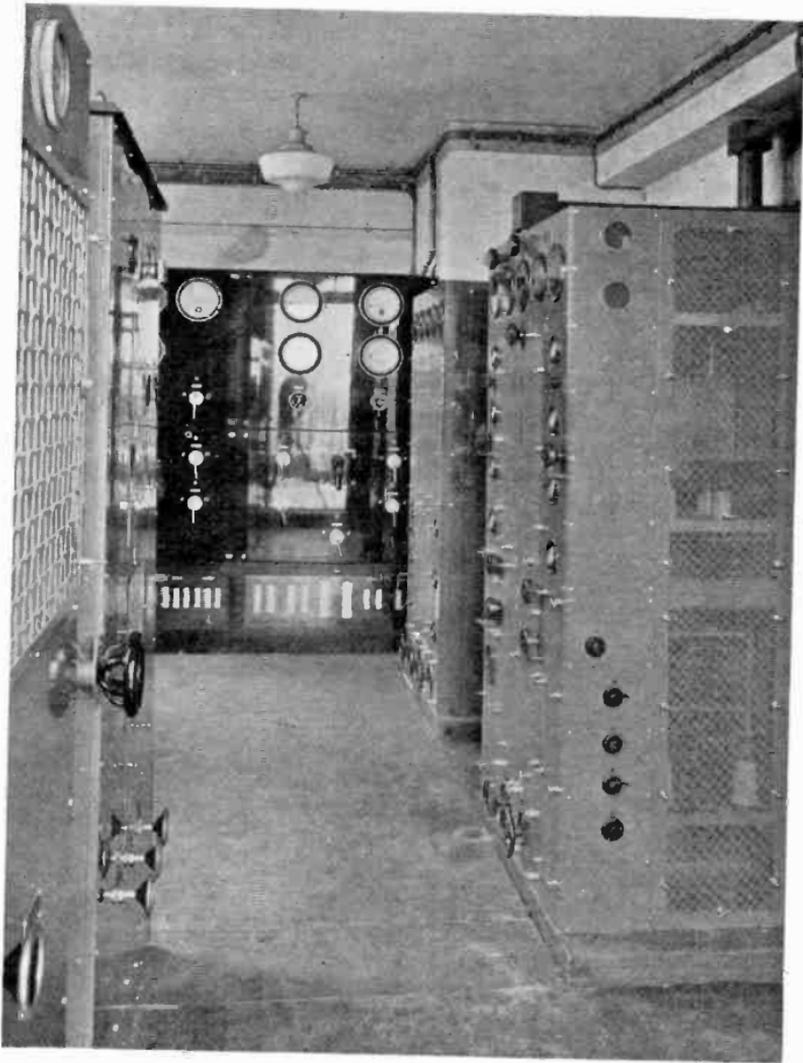
Lt.-Col. Frederick Lawson, D.S.O., M.C.

T. J. Harrowing, Esq., C.C. (*Treasurer*).

Secretary: H. B. Harper, J.P.

Communications to:

The Secretary, 25 ELY PLACE, LONDON, E.C.1.



A GENERAL VIEW OF THE ULTRA-SHORT WAVE TRANSMITTER
IN BROADCASTING HOUSE

ULTRA-SHORT WAVE BROADCASTING

IN previous issues of this book, information has been given about the serious congestion of the broadcast wave-bands due to there being insufficient ether channels to provide accommodation for all the broadcasting stations of Europe. Extensions to the broadcasting service in this and other countries are restricted on account of this difficulty. It is natural therefore that every effort should be made by technicians to discover the usefulness or otherwise for broadcasting purposes of wavelengths which so far are not in common use.

In broadcasting it is necessary to provide a reliable service to as wide an area as possible, while at the same time using an economical amount of power at the transmitting end. For a reliable service the listener must receive the direct or ground ray, and must not have to depend upon the indirect or reflected ray, which is subject to fading and distortion of quality. The range of the direct ray on medium broadcasting wavelengths between 200 and 545 metres is about 50 to 80 miles, whatever the power. Beyond this distance, some fading is bound to occur. On shorter wavelengths the area which can be provided with a direct-ray service is less, but the strength of the indirect ray which can be heard at long distances from the transmitter, after the direct ray has completely died out, may be appreciable. This property of short waves is used for communication over long distances. For example, on 25 metres the direct ray may be inaudible beyond a range of about 20 miles, but it may be possible to receive the indirect ray after reflection from the Kennelly-Heaviside layer when it strikes the earth at a distance of perhaps 5,000 miles from the transmitter. The efficiency of a particular wavelength for long-distance communication depends upon several factors, such as the time of day and the time of year, and in no circumstances is a service of this character entirely free from fading and distortion.

Now a great deal of interference between broadcasting stations working on adjacent wavelength channels, or on the same wavelength, is caused by the indirect ray of a distant station being audible in the direct-ray service area of another.

Progress in the last ten years in wireless communication in general, and broadcasting in particular, has been so rapid that

even the short waves (under 100 metres) are becoming congested. Ten years ago little was known about the performance of waves in this band, but intensive research has resulted in the rapid growth of long-distance communication services using these waves.

As already explained, short waves are of little value for providing a *national* broadcasting service because of the rapid attenuation of the direct ray and the objectionable features of the indirect ray. To meet the need for further expansion, attention is therefore being directed to ultra-short waves under 10 metres. The band of frequencies is an extremely wide one—for example, between 6 and 8.5 metres there are approximately 14,700 kilocycles, a band almost fifteen times as wide as the whole of the existing medium wave broadcasting band of 200 to 545 metres.

If therefore these waves can be used for broadcasting, the problem of congestion will almost cease to exist. Sufficient work has, however, already been done to show quite definitely that ultra-short waves can never replace the medium and long waves already used for broadcasting. The reason for this is that the range of the direct ray is even more limited than that discussed in connection with short waves. However, there are compensating advantages which make the subject worthy of further investigation.

In order to study this subject, the B.B.C., in co-operation with Marconi's Wireless Telegraph Co. Ltd., have installed at Broadcasting House an ultra-short wave transmitter, but before describing this in detail, some further advantages and disadvantages of this band of wavelengths, as far as are at present known, should be mentioned.

From earlier work carried out in America and Germany it is known that for all practical purposes the range is very limited. From what has already been said about short waves it might be thought that any hope of ultra-short waves being usefully employed for broadcasting would be doomed to disappointment. However, this is not so, since certain advantages appear which offset the disability of rapid attenuation of the direct ray.

The results of earlier experiments seem to show that these waves are not reflected at all by the Kennelly-Heaviside layer.

MARCONI LEADS!

The Marconi Company's leadership in every branch of wireless development is again evidenced by the present experiments in ultra-short-wave transmission from Broadcasting House, London.

The transmitter used is of Marconi design and manufacture, and Marconi engineers are collaborating with the B.B.C. in carrying out the first broadcasting tests on wavelengths of this order.

All the B.B.C. high-power Regional transmitters are of Marconi manufacture

**MARCONI'S WIRELESS TELEGRAPH
COMPANY LIMITED**
MARCONI HOUSE STRAND LONDON, W.C.2

*Phone : Temple Bar 4321
Telegram : Expanse, London

After an exhaustive examination and test of the finest work done by a number of the most eminent organ-builders

THE BRITISH BROADCASTING CORPORATION

decided to instal a

COMPTON ORGAN

in the Concert Hall at

BROADCASTING HOUSE, LONDON, W.

THE JOHN COMPTON ORGAN CO. LTD.,
CHASE ROAD, WILLESDEN, N.W.10.

Telephone—Willesden 6666

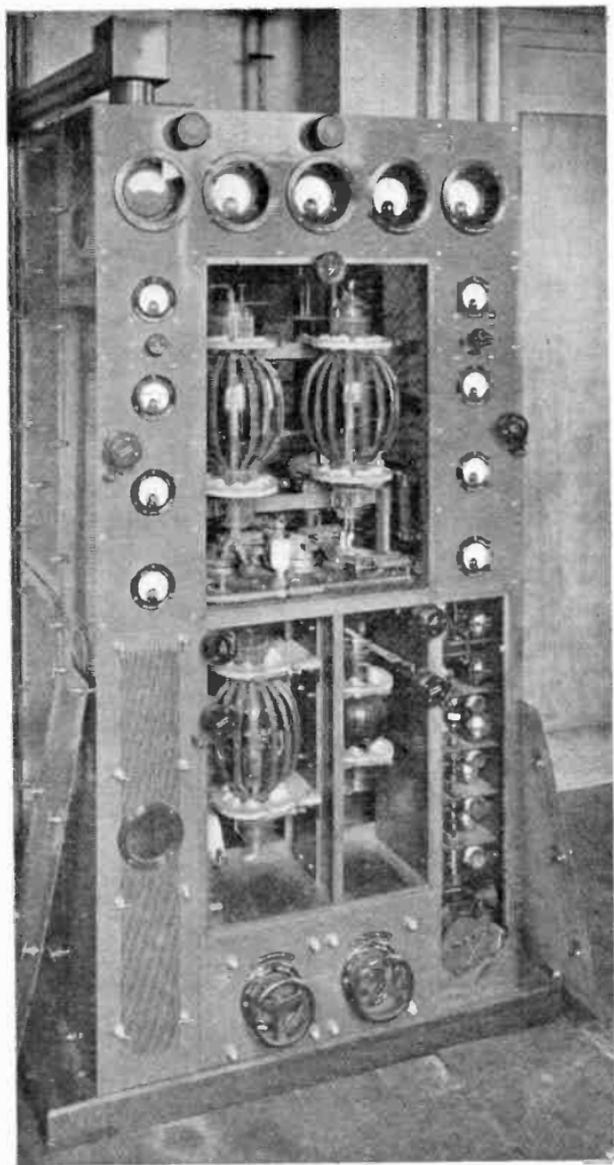
Thus the indirect ray and all the troubles of interference which it brings with it virtually do not exist. It would be possible therefore to have a large number of ultra-short wave transmitters on adjacent wavelengths or even on the same wavelength, each providing a local service up to a range of say five miles in densely populated areas. Further, the scanty evidence so far obtained indicates an almost entire absence of atmospheric disturbances on these waves.

For a reliable service, the strength of the required transmission must be high compared with the strength of the interference from whatever source. Since the latter is apparently low, it follows that a relatively weak signal, as compared with that required on medium waves, will be sufficient for listeners' requirements. However, it is too early to say what order of field strength will be desirable, and consequently it is not known what transmitting power will be necessary to provide a reliable service over a range of say five miles from the transmitter.

To provide a true picture of what may be expected from this new field, a few of the disadvantages which are already known should be mentioned. Needless to say, further experiments may bring to light unexpected difficulties which may destroy what value these waves may have in other directions.

The strictly limited range has already been mentioned. The difficulty of reception must also be considered. Short-wave receivers are not so easy to handle by the non-technical listener as are ordinary broadcast receivers. However, as the need arises so will technical design improve, and it is not unlikely that the most common receiving set for ultra-short waves will consist of an ordinary medium-wave set in which provision has been made for adding a small short-wave unit to convert the set into a super-heterodyne or super-regenerative type of receiver.

It is believed that the ignition systems of motor cars cause considerable interference to receivers tuned to these wavelengths. Whether this can be overcome by a suitable increase in power of the transmitter has yet to be discovered. As no absolute measurements of field strengths on these waves have been made, it is too early to say whether the interference is due to its own high level or to the low level of signal from the transmitter.



THE MASTER OSCILLATOR AND AMPLIFIER UNIT

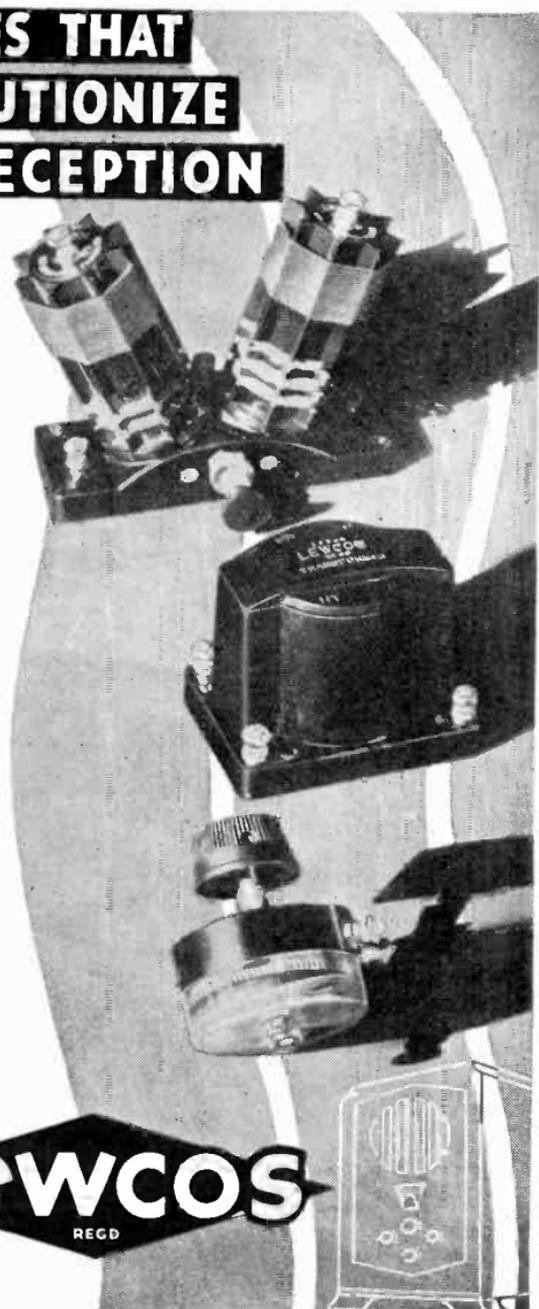
MASTERPIECES THAT REVOLUTIONIZE RECEPTION

Each LEWCOS RADIO COMPONENT

used in the construction of a receiver is a long step nearer to perfect reception and reproduction.

The masterly design and performance of every Lewcos Unit is the result of intensive scientific research, the use of only the finest raw materials and highly skilled workmen.

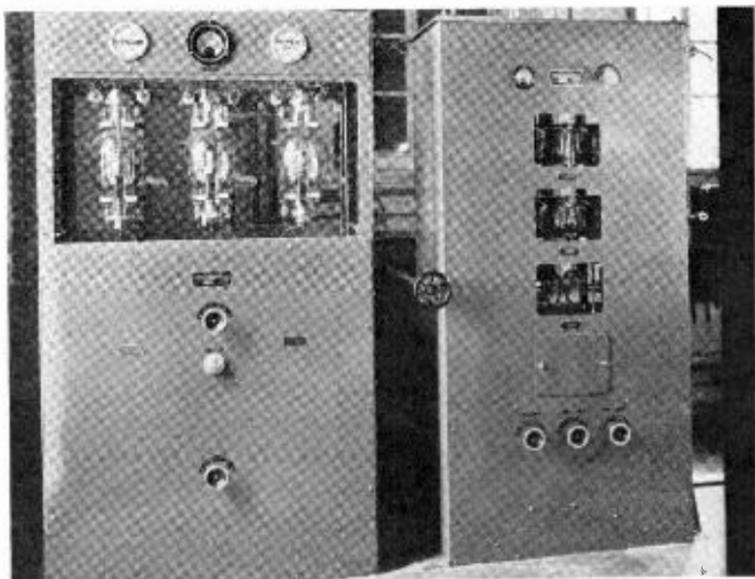
Lewcos components of every type are stocked by all first-class dealers. Descriptive leaflets will be sent on application to Radio Publicity Dept. Y.B



Lewcos
REGD

LEWCOS RADIO PRODUCTS FOR BETTER RECEPTION

THE LONDON ELECTRIC WIRE COMPANY AND SMITHS LIMITED, CHURCH ROAD, LEYTON, LONDON, E.10



THE RECTIFIER UNITS

Another likely trouble is shielding. It may be found that in a city with steel-frame buildings, reception is extremely unreliable. In one street it may be good and in the next no reception may be possible. This may lead to receivers being placed on the roofs of buildings, or, alternatively, the aerial (which, of course, is very short on these waves) may be on the roof and connected by means of a high-frequency transmission line to one or more receivers on the floors below.

A Marconi type SWB₄ transmitter has been installed in a room on the seventh floor of Broadcasting House, and the output is connected by means of a high-frequency feeder line of the concentric tubular type to a coupling box on the roof immediately underneath the aerial. This is supported by means of a triatic slung between two lattice steel masts each 35 feet high, and is of the Franklin type, consisting of two half-wave aerials with a phase-correcting device in the middle.

The transmitter consists of four units, the main rectifier unit, the auxiliary rectifier unit, the modulator unit, and the oscillator

unit. Power is supplied from the mains at 415 volts, 3 phase, 50 cycles. After a voltage step-up by means of a transformer, the supply is rectified in the first unit by three air-cooled valve rectifiers. After smoothing, the D.C. power output is approximately 1,200 milliamps at 4,000 volts.

The second unit contains the auxiliary rectifiers for providing the various D.C. voltages for the earlier stages of the transmitter. A motor-generator set is provided for heating the high-frequency amplifier and modulator valve filaments, but the drive valve is heated by a 6 volt accumulator.

The third unit contains three stages, a sub-sub-modulator, a sub-modulator, and the main modulator comprising four valves in parallel. A high-power choke control system of modulation is employed, and the frequency characteristic of the modulator system is sensibly flat between 30 and 9,500 cycles. Amplitude distortion does not exist up to 80% modulation and is negligible up to 90%.

Finally, there is the fourth unit, which contains nine stages of high frequency. The frequency of the carrier wave is determined by a Franklin master oscillator working on 2,150·54 kilocycles (139·5 metres). This is followed by a five-stage amplifier. The first and third stages triple the frequency by selecting the third harmonic, the second, fourth, and fifth being amplifying stages. The output frequency is therefore nine times the initial frequency, which is thus increased from 2,150·54 kilocycles to 19,354·86 kilocycles (15·5 metres).

The output of this amplifier is applied to the first high-power amplifier. The output of this stage is connected to a doubling stage, which gives the final carrier frequency of 38,709·72 kilocycles (7·75 metres). The last link in the chain is the final high-frequency amplifier consisting of two valves in parallel and modulation takes place at this level.

Of course, these figures apply to one adjustment only. The experimental transmissions have been started on this wavelength, but investigations will be made over a band of about 6 to 8·5 metres. It is quite possible that while a wavelength at one end of the band may give poor results, another a metre away may be very satisfactory.

RADIO *and* RECORDS



"TRUE TO LIFE"

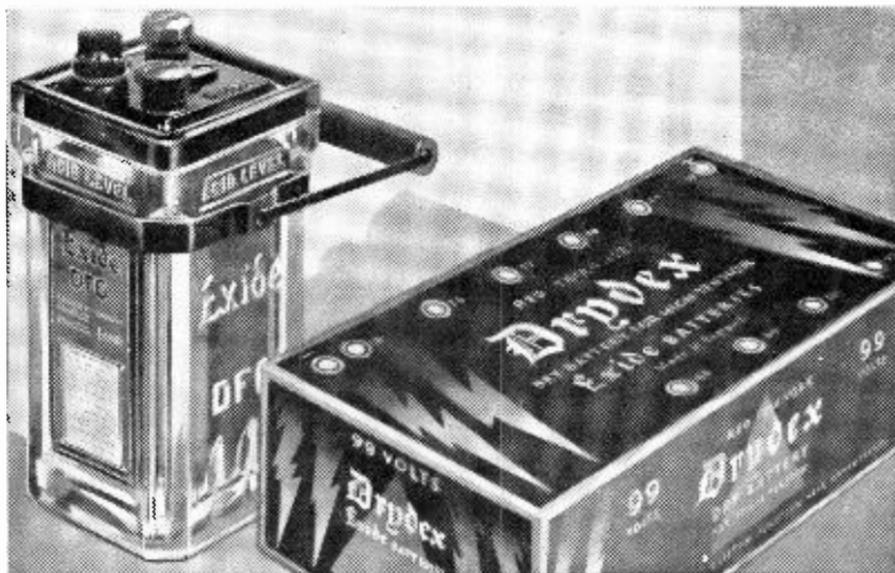
Today the pre-eminence of "His Master's Voice" in radio and radio-gramophones is just as securely established as their supremacy in gramophones during the last twenty-five years. 'True-to-life' is no idle boast where "His Master's Voice" is concerned, for the wonderful purity and clarity of tone with which broadcast programmes and records are reproduced, cannot be summed up more honestly than by these three words.

Beauty of cabinet design, simplicity of control, perfection in tone—these three qualities make every "His Master's Voice" instrument the highest achievement of modern sound reproduction.

Supremacy of artists, brilliance of recording, wealth of repertoire — these three qualities place every "His Master's Voice" record in an unrivalled position.

"His Master's Voice"

The Gramophone Co. Ltd., London, W.1



Exide AND Drydex

BATTERIES FOR WIRELESS

● Exide Batteries for wireless low tension and high tension. Drydex Dry Batteries for wireless high tension and grid bias. Also for torches, cycle lamps and bells.

Obtainable from Exide Service Stations and all reputable dealers

Exide Batteries, Exide Works, Clifton Junction, near Manchester. Branches at London, Manchester, Birmingham, Bristol, Glasgow, Dublin and Belfast P.4

THE POWER RATING OF TRANSMITTERS

AT FIRST SIGHT it might seem that the power rating of a wireless transmitter is not a subject which requires much consideration, or which involves any difficulty in definition. A few years ago, however, it was found that, in practice, considerable discrepancies did exist between the power ratings of similar broadcasting transmitters in different countries and, further, that widely different methods of rating were in use for transmitters in the various wireless services (broadcasting, ships, aircraft, commercial telegraph and commercial telephone stations). It resulted, therefore, that without knowledge of the system of rating employed and the technical details of the transmitter in question, it was quite impossible to know whether the ratings of two given transmitters were comparable or not. How great the discrepancies might be can well be seen from the fact that under the different systems of power rating at one time in force, the London Regional transmitter, for instance, might be rated variously as (a) 300 kilowatts, (b) 150 kilowatts, (c) 50 kilowatts or even (d) 40 kilowatts, to name but four—a maximum discrepancy of some eight to one—according to where the power was measured. These four power rating figures correspond to measurements of (a) the total input power taken by the transmitter from the supply mains, (b) the direct current power supplied at high tension to the anodes of the main output stage, (c) the high-frequency power delivered to the aerial, and (d) the high-frequency power radiated by the aerial. It will be seen, therefore, that the first essential, in order to avoid ambiguity for any one type of service, was an international agreement as to where the measurement should be made. Secondly, to avoid confusion between services, it was desirable that any agreement on the first point should be equally applicable to all.

In 1925 the International Broadcasting Union (U.I.R.), realising the desirability of some agreement on this subject, particularly amongst its own members, decided that (b) should be used for purposes of calculating the part of its members' subscriptions which was based on the power of their stations. It did not necessarily follow, however, that rating (b) was invariably used by all countries in the published figures of their

stations' powers, and it fell to the International Consultative Technical Committee for Radio-electric Services (C.C.I.R.) to consider this matter at its first meeting, which took place at the Hague in 1929. Agreement was reached on a rating based on system (c), *i.e.*, the high-frequency power delivered to the aerial. This measurement was to be made while the transmitter was being modulated to the maximum depth of which it was capable, without distortion exceeding a given (small) amount. This system was equally applicable to all types of transmitter—it being agreed that a telegraph transmitter was modulated to 100 per cent. while the key was depressed for transmitting a dash. The methods by which the measurements could be made were indicated by the committee and a great improvement resulted from the almost universal application of their system, which became known as the Hague Power Rating.

A second meeting of the C.C.I.R. took place at Copenhagen some eighteen months after the Hague Meeting, and in the interim experience had been gained in the practical use of the Hague Rating system. This experience had shown that what, at the Hague, had been hoped would prove a simplification had, in fact, introduced unnecessary complication. Actually the single power rating figure which took account of modulation depth, as well as of carrier wave power, had not proved so simple as had been hoped, and the committee, therefore, recommended a slight change whereby two separate figures would be given, *i.e.*, firstly the power in kilowatts supplied to the aerial in the carrier wave condition and, secondly, a figure for the maximum percentage of modulation of which the transmitter was capable. These figures are now known as the Copenhagen rating, which has been generally adopted. Thus it is now possible to compare the published powers of two stations, with the knowledge that they relate to measurements made under similar conditions. The relation between the two ratings is given by the formula $P_{\text{Hague}} = P_{\text{Copenhagen}} \left(1 + \frac{k^2}{2} \right)$, where k is the percentage of modulation expressed as a fraction. In this way it will be seen that a broadcasting transmitter, which had a Hague rating figure of, say, 66 kilowatts when modulated to 80 per cent., would have a Copenhagen figure of 50 kilowatts and 80 per cent. peak modulation depth.

The Artists of the B.B.C. on **Columbia** RECORDS

The B.B.C. Artists who record for the gramophone exclusively for Columbia Records include these favourites:—

THE B.B.C. DANCE ORCHESTRA
directed by **Henry Hall**

in the latest dance music—new records being issued twice a month.

THE WIRELESS SINGERS
in madrigals and old English songs—gems of vocal music.

THE B.B.C. CHOIR
in familiar hymns, and in choruses from "Messiah," Stainer's "Crucifixion," and "Faust," etc.

THE B.B.C. NATIONAL CHORUS
in choruses from "Elijah," "The Creation," etc. Conducted by Stanford Robinson.

THE B.B.C. WIRELESS MILITARY BAND

Conducted by **B. Walton O'Donnell**
in a score of brilliant records of typical music from their programmes.



on

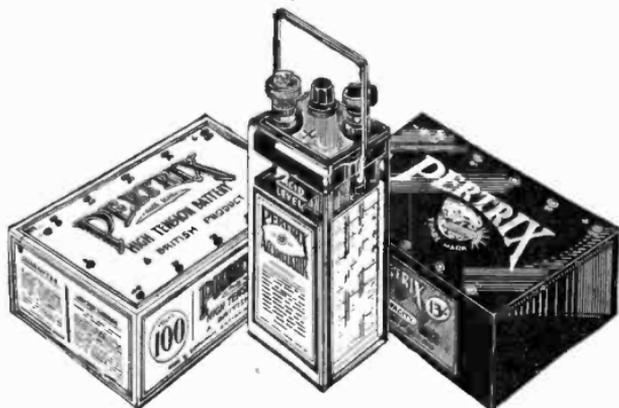
Columbia RADIO and RADIO-GRAMOPHONES

- Lists of Columbia records and instruments sent post free: write COLUMBIA, 98-108, Clerkenwell Rd., London, E.C.1.

A
PERTRIX

**BATTERY FOR EVERY
PURPOSE AND PRICE**

High Tension or Low Tension—inexpensive or Super Capacity Batteries—every need for wireless power can be met from the Pertrix range. The extraordinary long life qualities of Pertrix Batteries are the result of over forty years of battery manufacture. Plug into Pertrix and forget all your battery troubles !



PERTRIX
TRADE MARK
**DRY BATTERIES
& ACCUMULATORS**

H.T. BATTERIES From 5/6 L.T. ACCUMULATORS From 4/6

*Advt. of Britannia Batteries Ltd., 233 Shaftesbury Avenue, London, W.C.2
Telephone : Temple Bar 7971 (5 lines). Works : Redditch (Worcs.)*

There are several methods by which the power rating may be assessed. The power delivered to the aerial is given by the product of the square of the aerial current measured in amperes and the total high-frequency resistance of the aerial in ohms—the measurements being carried out at the same point in the aerial system. If it is inconvenient to make these measurements, then the power delivered to the aerial may be calculated from the measurements of D.C. power delivered at high tension to the anodes of the final high-frequency stage of the transmitter, and a knowledge of the efficiency of transformation of energy in the last stage and any other intermediate circuits, such as high-frequency feeders. This efficiency of transformation of energy from D.C. to radio frequency will depend on the type of modulation in use. As an example it may be of the order of 60 per cent. for a high-power modulation system, such as is in use in Daventry 5XX, while it may be of the order of 30 to 35 per cent. for a low-power modulation system, as is in use at B.B.C. Regional transmitters. It is interesting to note, however, that the total power taken from the mains by each of two transmitters, working one on each system, is approximately the same for the same aerial power in both cases, and what is gained by the greater efficiency in the high-frequency circuits of the high-power modulation system is lost in the extra power which has to be supplied to the modulator valves in this system.

At the beginning of this article, four methods of power rating were mentioned. In conclusion, it is well to state that there are also other methods, and that all of them have some advantage or other in giving certain information about the performance of a transmitter. It will be noted, for instance, that the rating now adopted internationally (the Copenhagen Rating) does not take into account the efficiency of the aerial system in radiating the energy delivered to it and, therefore, that one cannot compute the field strength at a distant receiving point. There are so many other extraneous factors which enter into such a calculation, however, that for practical purposes it has been found best not to take it into account. The Copenhagen Rating, therefore, gives a useful figure for the power of the transmitter, but not complete data about the aerial system and earth conditions of the station at which it is installed.



You can't
go wrong

with
G.E.C. Radio

Sold by all Wireless Dealers



Advt. of The General Electric Co., Ltd., Magnet House, Kingsway, London, W.C.2.

[352]

T H E T U N I N G N O T E

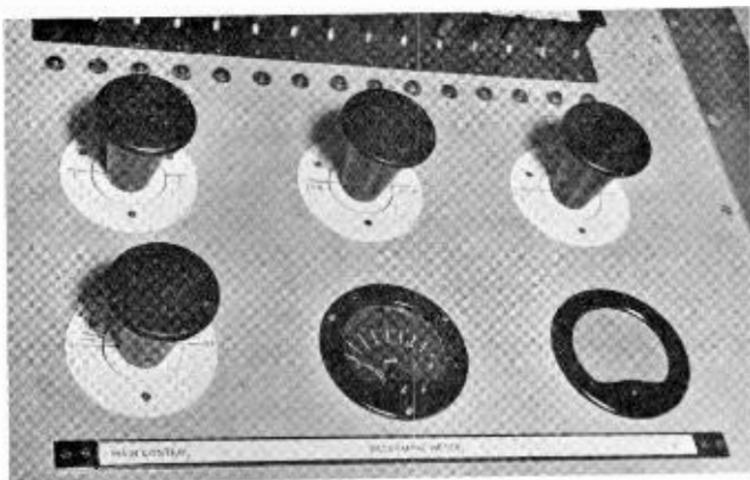
DURING recent months the B.B.C.'s postbag, and letters published in certain technical journals, have indicated that listeners are showing some interest in the objects of the tuning note.

In certain quarters it has been suggested that the present tuning note should be abandoned, and that the B.B.C. should, in its stead, radiate certain frequencies embracing the whole of the audible range of musical notes. In the first place, it should be stated that the B.B.C. does not intend that the tuning note—the whistle which precedes transmissions—should be used by listeners as a means of adjustment of their receivers. Actually the tuning note is for “lining up” the modulation levels at the various transmitters.

In the B.B.C. Year-Book for 1932, an article was published, entitled “Control of the Volume of Transmissions,” describing a device which has become known as “the programme meter.” As stated in this article, the tuning note is used so that the programme meters at the different transmitters will all read the same at any instant in the ensuing transmission. Were this not done, the London National transmitter might be modulated during a S.B. Transmission to a depth of, say, 60 per cent. at an instant when the modulation of the North National transmitter was 45 per cent. and the Scottish National 70 per cent.

During the transmission of the tuning note, modulation levels are adjusted at the transmitters, and therefore it is anything but a satisfactory and constant medium on which to set output volumes from receivers.

It may be noticed that the tuning note is nearly always stopped five minutes before a transmission begins. This is for the following reason: if the tuning note were run on until, say, 30 seconds before the start of the transmission, listeners who switched on their receivers two minutes or so before the time would have to put up with the whistling note for about a minute and a half. As it is unlikely that they would do this, they would probably switch their receivers off, with the consequent possibility of finding that they had missed the beginning of the transmission when they switched on again. The five-minute gap between the end of the tuning note and the



THE CONTROL ROOM IN BROADCASTING HOUSE
DETAILS OF A CONTROL POSITION, SHOWING A
FOUR-CHANNEL FADE UNIT

beginning of the transmission gives listeners the opportunity of switching on their receivers without being subjected to the noise of the tuning note.

Those who are interested in the equipment used for the production of the tuning note may care to know that it is a simple valve oscillator (1000 cycles per second), equipped with 10-watt type valves, and is inserted in the chain of transmission immediately before the B amplifier. In this way the modulation depth is adjusted on the main B amplifier control-potentiometer, and if necessary on the individual inputs to each transmitter-line on the C amplifier potentiometer.

The actual readings on the programme meters at the various transmitters which are about to be linked for an S.B. transmission are then adjusted so that the meters all read the same, the "lining up" being checked if necessary at different modulation levels. Subsequently the transmission can be controlled only at the source of origin, and it will be known that all the transmitters which are taking it are modulated to the same instantaneous modulation depth.

From the above it will be seen that the phrase "tuning note"

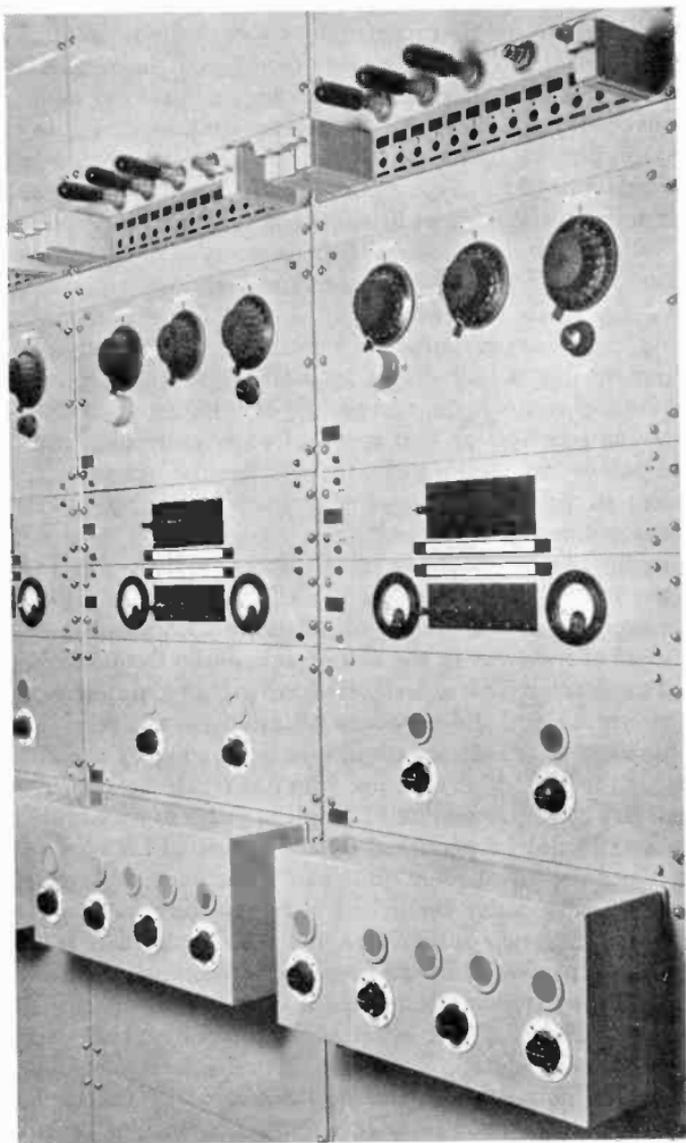
is now a misnomer, as the note is not intended for the tuning of receivers, or for that matter the *tuning* of the transmitters.

The B.B.C. has for some years considered the possibility of radiating standard frequencies in order that listeners might test the over-all response of their receiving equipment. It has been decided, however, that it is best not to radiate receiver test transmissions of this type at present. In the first place, only a very small percentage of listeners are sufficiently interested in the technical performance of their receivers to make use of such transmissions, while manufacturers and serious experimenters can easily devise their own equipment for a test of this nature. Again, frequency-response tests when judged aurally can be extremely misleading unless an immediate and direct comparison can be made on, say, two types of loudspeaker fed from the same receiver, or two types of receiver feeding into one loudspeaker of known frequency-response characteristics. Merely to listen to a range of frequencies on one receiving equipment would be meaningless.

Finally, the necessary crowding together of high-power transmitters in the band of wavelengths allotted to broadcasting has led manufacturers to make considerable compromises in the response of receivers to the ultra-treble audio frequencies. Indeed some receiving-set designers have provided adjustments of selectivity, so that the necessary selectivity of the receiver can be matched to the actual conditions demanded by the district in which it is used. A designer who has taken the only course of cutting the reproduction of "top" in order to avoid interference should not be penalised by the failure of his receiver to reproduce the ultra-treble quite as well as some other receiver working under easier conditions of reception.

For the time being, therefore, the B.B.C. considers it advisable not to radiate standard frequency transmissions; but if in the future the transmission of them would be of benefit to the listening public and the wireless manufacturer, this decision might be reconsidered.

After all, actual music can be listened to by the critically minded in the course of an evening's transmission, and it is more important that a receiver should give a musically accurate reproduction of an orchestra than that its reproduction of certain isolated frequencies should be academically correct!



THE CONTROL ROOM AT BROADCASTING HOUSE
TWO OF THE RECEIVERS USED FOR CHECKING THE QUALITY
OF TRANSMISSIONS

[356]

S H O R T - W A V E R E L A Y S

IT HAS BEEN explained in previous issues of this Year-Book why relays are carried out by use of special telephone lines in preference to the use of a wireless link, when the former course is possible. Briefly, it is because much greater reliability can be achieved. There are many places, however, which cannot be reached by land lines, either because the lines do not exist or because they are unsuitable for the transmission of broadcast programmes. This is not to say, however, that there may not be much interesting programme material available in such places, and it is then that the use of the wireless link becomes justified. In general it may be said that it is only the longer distance relays for which the wireless link is necessary, for the land-line cable network is extending so rapidly that it is possible to get suitable lines over a very large part of Europe. Even more so is this true of North America, where the land-line network extends for 3,000 miles from coast to coast. It follows, therefore, that the wireless link is not generally required for transmission over a few hundred miles, but rather for transmission over some thousands of miles as an intercontinental link. There are, of course, long-distance submarine cables linking up the various continents, but these are only suitable for telegraphy. A new transatlantic cable has been projected, which would be suitable for ordinary commercial telephony, but even it would not be suitable for the transmission of music.

It results, therefore, that long-distance relays are carried out by short waves, as, with one notable exception, this is the only means available. This exception is the long-wave circuit of the General Post Office Anglo-American telephone service. This system is extremely ingenious and works on the single side-band principle, but such links cannot be duplicated to any great extent, firstly owing to congestion in the ether and, secondly, owing to their high initial cost and high operating expenses when compared with short-wave links.

There are two ways in which the B.B.C. carries out relays by short waves. Firstly, short-wave broadcasting stations in various parts of the world can be received at the Corporation's receiving station at Tatsfield in Surrey, the programme being put on to a land line which connects this receiving station with the

Control Room at Broadcasting House, and thence to the desired B.B.C. transmitters. A programme received in this way can, of course, be distributed to other European broadcasting stations by land-line connection if desired. The second method is to make use of the General Post Office Radio-telephone services which are being gradually extended to cover a large part of the world. The first of these services was the Anglo-American, opened in January 1927, followed by the service to certain ships at sea in February 1930, then by the Anglo-Australian service in April 1930, extended to New Zealand in July 1931, the Anglo-South American services to the Argentine, Chile, Uruguay and Brazil in 1930 and 1931, the Anglo-South African Service in February 1932, the Anglo-Egyptian service in June 1932 and most recently by the Anglo-Canadian Service opened on July 11th of this year. Indeed, one of the best short-wave relays which has been accomplished was the recent transmission of the opening of the Imperial Conference at Ottawa, which was carried out over this last service. For relays using these radio-telephone links, connection is made from the Radio Terminal of the London Trunk Exchange to Broadcasting House, the procedure being similar to that adopted in ordinary line relays. If the transmission is outgoing from London, it is radiated from the G.P.O. central transmitting station at Rugby, while if it is incoming it is received by the G.P.O. central receiving station at Baldock. Arrangements can also be made, when necessary, to broadcast both sides of a telephone conversation. Relays of this latter type may be recalled by listeners—e.g., Mr. Harold Nicolson's conversation with a passenger in R.M.S. *Homeric*, Commander Stephen King-Hall's conversation with Captain Latta of the *Empress of Britain*, and the official opening ceremonies of the Australian, South African, and Egyptian radio telephone services.

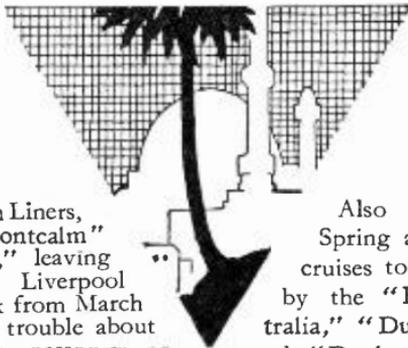
The choice of method to be adopted for a particular relay must necessarily depend on circumstances. In many cases there may be no choice, for either one or the other may not be available. It is only to be expected, however, that where a commercial telephone service exists, it can be relied on to give more consistent reception than a short wave link which the receiver has not the same opportunities of observing because it is not in such continuous use as a commercial service. It is only

CAN PAC CRUISES

TO THE

MEDITERRANEAN

There is no finer or more enjoyable holiday than a Sea Cruise on a famous Canadian Pacific liner. Glorious sunshine, sparkling sea air, fascinating scenery, entertainment all the time—gay life on board—Outdoor Swimming Pool—Deck Sports—Dancing, etc.



Famous 16,400 ton Liners, "Montrose," "Montcalm" and "Montclare," leaving Southampton or Liverpool nearly every week from March to October. No trouble about Customs, luggage, passports or depreciated currency. 13 day Cruises — Minimum Rate : £12.
BOOK EARLY.

Also several attractive Spring and Autumn luxury cruises to the Mediterranean by the "Empress of Australia," "Duchess of Atholl," and "Duchess of Richmond," etc. Minimum Rate: 19 Gns. First Class Only.

ALSO

WORLD CRUISE by "EMPERESS OF BRITAIN"
WEST INDIES CRUISE by "DUCHESS OF RICHMOND"

Write for full information to E. N. Powell, Cruise Dept.,

CANADIAN PACIFIC

World's Greatest Travel System

62-65 CHARING CROSS (TRAFALGAR SQUARE), LONDON, S.W.1,
103 LEADENHALL STREET, LONDON, E.C.3, OR LOCAL AGENTS
EVERYWHERE

**PERFECT
POWER**

MEANS PERFECT

TONE

EVER

READY

BATTERIES

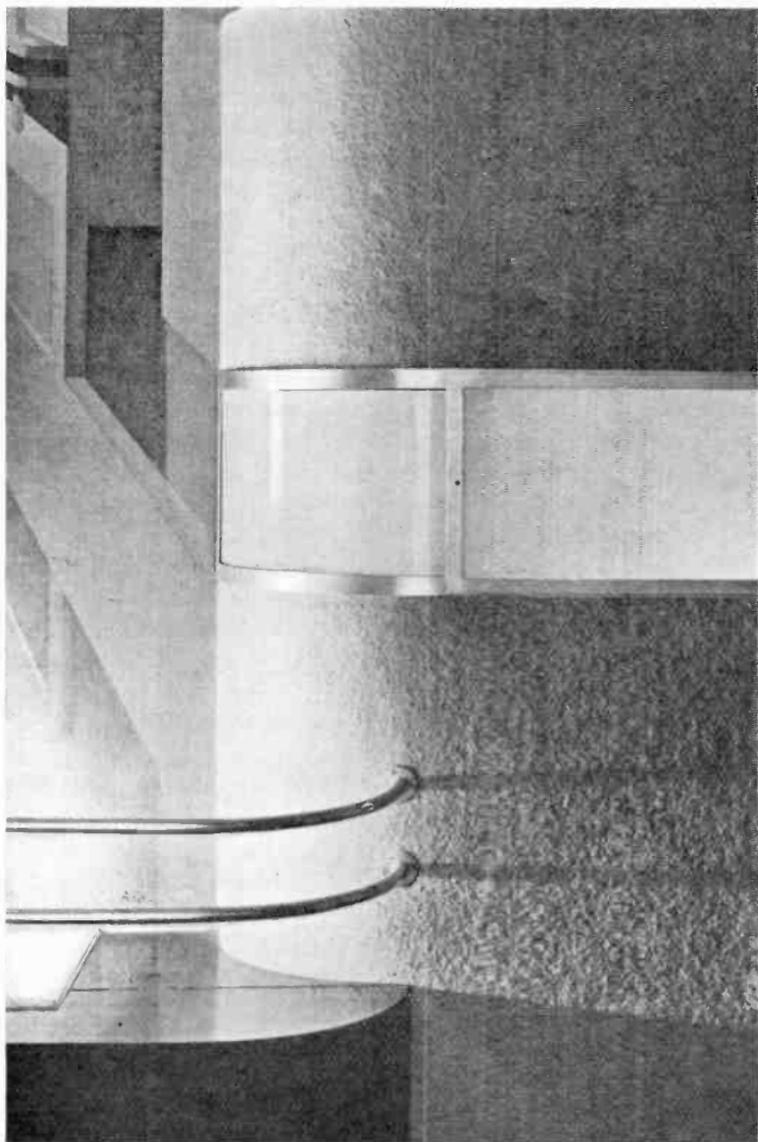
are made to fit and power perfectly every size and make of set.

THE EVER READY CO. (GREAT BRITAIN) LTD.
HERCULES PLACE, HOLLOWAY, LONDON, N.7

[360]

by continuous observation of the conditions, gained from practical experience, that consistent results can be obtained, and it is here that the commercial services have the advantage. There is little doubt that if it became commercially profitable to set up short-wave links designed specifically for the transmission of broadcast programmes, results could be obtained better even than those already achieved over the commercial radio-telephone services, the more especially where music transmission is concerned. Certain relays already carried out between a short-wave transmitter and a receiving station, both specially designed for broadcasting, have provided practical evidence of this, and within the last few months some interesting experiments have been carried out between America and Germany. The Radio Corporation of America and the German Post Office, are using special short-wave broadcasting transmitters and receivers, near New York and Berlin, to relay broadcast programmes between the two countries. It is understood that this service is to be developed on a commercial basis and that just as a call can be booked for a long-distance telephone conversation, so this service can be booked for broadcast relays. If this service proves successful it will, presumably, be extended to cover the relaying of broadcasting programmes between other countries and America.

At the beginning of this article, the question of reliability of the wireless link was mentioned. In conclusion, it must again be emphasised that the wireless link does not generally offer the same reliability as transmission over modern high-quality cable circuits. This is true the more especially in short-wave relays. Short-wave transmission over great distances is only possible by virtue of reflection of the waves in ionised layers of the upper atmosphere, and the conditions of this reflection are governed by factors at present imperfectly understood, but certainly outside human control. All one can do, therefore, is to make use of the already considerable practical experience available and to fulfil the technical conditions indicated by this experience. Changes in the Kennelly-Heaviside and Appleton layers, and the influence of magnetic storms may occasionally and unexpectedly upset any short-wave transmission for the success of which elaborate precautions have been taken.



THE BUILDING BOARD USED FOR ACOUSTIC PURPOSES IN THE STUDIOS
AND LISTENING ROOMS

THE ACOUSTICS OF THE STUDIOS

IN THE LAST YEAR-BOOK an account was given of the general principles on which the acoustical treatment of the studios in Broadcasting House was specified. It was explained that probably the most important properties of a broadcasting studio are its reverberation time and the manner in which the latter depends on pitch or frequency. The reverberation time is the time, expressed in seconds, taken for a fairly loud sound to die away to inaudibility, after the source has ceased to operate. In any given room, the value of the reverberation time depends upon the quantity of sound-absorbing material. In a studio such material may consist of furniture and hangings, carpets, wall treatment specifically introduced to provide sound-absorption, and even the actual personnel present in the studio. The more sound-absorbing material a studio contains the less is its reverberation time, and the latter quantity can be calculated from a knowledge of the materials employed, or measured by various means in the completed studio.

In Broadcasting House, since it was desired to design studios whose reverberation time should not depend very largely on frequency, acoustic materials were used having approximately the same absorptive properties for all important frequencies within the audible range. Of these, ordinary "building board" or "insulation board," cemented to a hard plaster surface beneath, was used for the wall treatment of the majority of studios designed to have a definite reverberation time. A limited amount of "felt and wall-paper" treatment was also employed, whilst for a number of studios, primarily intended for speech in one of its various forms, the treatment consisted in covering the whole of the walls and ceiling with a material known as "mineral wool," with the object of providing the maximum degree of absorption at all frequencies and rendering the studio as free from reverberation as possible.

In the construction of a good studio it is important, in addition to the provision of an adequate amount of sound-absorbing material, that the building construction shall be such that, as far as possible, any resonance in the walls, floor or ceiling shall be avoided. Such resonance usually takes the form of the vibration of the partition concerned as a large semi-flexible dia-

phragm, and in practice can be readily observed as a tendency to "boom" on the part of the structure. One effect of partition resonance is often the apparent prolongation of the reverberation time at or near the natural frequency of vibration of the partition, whilst in bad cases a definite "coloration," by the boom tone, of speech or music performed in the studio can easily be heard. Unfortunately it is very difficult, in modern building construction, to make every part of the structure of a studio absolutely rigid, as required for ideal conditions, and means have to be adopted to render resonance as innocuous as possible.

In Broadcasting House, for example, the ceilings of the studios, as well as of the listening and silence rooms, are of the suspended type, the space between the ceiling and the floor above being occupied largely by ventilating ducts, etc. Experiments undertaken in some of the studios, in the course of the acoustical treatment, showed that a certain amount of vibration of the ceilings was possible, particularly at the lower audible frequencies, resulting in an apparent increase of reverberation time over the range of pitch concerned beyond the limits desirable for good acoustics. The provision of perfectly rigid suspended ceilings was impossible, but it was found that by damping the vibration the effect could be reduced until it was no longer detrimental to the acoustics of the studio. The treatment adopted consisted of cutting a slot about two inches wide round the ceiling at the point of its junction with the walls, and in addition of dividing it into approximately rectangular portions about six or eight feet in size by cutting cross slots in a similar way, the isolated portions of the ceiling being still supported by the hangers connecting them with the floor above. The mechanical damping was then introduced by packing the slots tightly with strips of building board and felt. As the result of this treatment the ceiling resonance was so far reduced as to cause only a comparatively slight increase of reverberation time for the lower frequencies, which is not an unacceptable condition in a broadcasting studio.

In certain of the studios the nature of the substance composing the suspended ceilings was modified so as to reduce the resonance and in these cases also a satisfactory result was obtained.

In the final state of the studios at Broadcasting House the



EEL GRASS FOR SOUND-INSULATION SANDWICHED IN WALLS OF PUMICE
CONCRETE

[365]

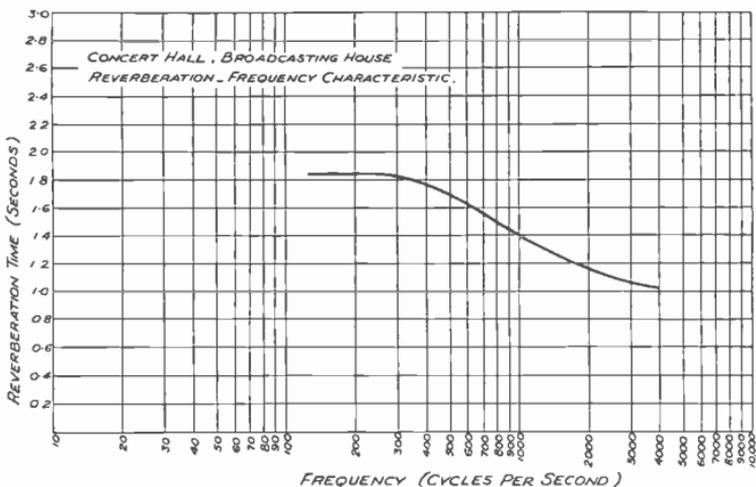


FIGURE I

acoustics have been found to be in accordance with present ideas as to desirable conditions.

Thus studios intended for music possess a reverberation time which decreases somewhat as the frequency increases, but not to a marked degree. The maximum value of the reverberation time in each case depends on the volume of the studio and the purpose for which it is to be used, but is based on the well-known curves due to F. R. Watson, connecting volume in cubic feet with reverberation time, the value being in general slightly reduced in accordance with experience in the requirements of broadcasting. Studios intended primarily for speech as well as those for dramatic effects are, as already indicated, practically without reverberation.

The Concert Hall is unique among the studios in that it has received no specific acoustical treatment, except in connection with certain precautions with regard to the actual structure and in the provision of a suitable type of seating accommodation. In the design of public concert halls a difficulty frequently encountered is the variability of the reverberation time according to the size of the audience, owing to the sound-absorbing properties of the latter. In the hall in Broadcasting House this difficulty has to a very large extent been avoided by providing

heavily upholstered seats for the audience and by carpeting the space occupied by the orchestra. The upholstery and carpets provide sufficient sound absorption in themselves, and conditions are not greatly altered when the upholstered seats are occupied. Figure 1 on the previous page shows the measured reverberation time of the Concert Hall, in the condition in which it is normally used for broadcasting, as a function of frequency. It will be observed that the time decreases somewhat with increasing frequency and that the maximum value, at low frequencies, is 1.84 secs. Such a condition is considered to be very satisfactory for a hall of the volume concerned, which is approximately 125,000 cu. ft.

The question will probably be asked as to what improvement is to be expected in the general effect, compared with that associated with the older studios at Savoy Hill. The answer may be summarised as follows.

- (1) Increased liveliness and brightness of musical transmissions, without the use of artificial reverberation.
- (2) Improved reproduction of the characteristic tone of the various musical instruments.
- (3) Acoustical conditions more suited to the individual requirements of different items, owing to decreased use of the "general purpose studio."
- (4) Better acoustical conditions in the studio from the point of view of the artists themselves.
- (5) For speech, whether in the form of talks, etc., or in dramatic productions, greater naturalness and freedom from the confusing effect of audible studio acoustics.

To sum up, a considerable improvement is expected, and has indeed already been realised, in the general atmosphere associated with the various types of programme, and a better reproduction, through the medium of broadcasting, of the best conditions experienced elsewhere.

B·B·C· EMPIRE

SHORT WAVE



Standard Telephones and Cables Limited, Connaught House, Al

BROADCASTING

STATION



Psych, London, W.C.2. Telephone: Holborn 8765 (24 lines)

[369]



ESTD.
1804



WORLD'S
LARGEST OUTPUT
OF GRAND PIANOS

Uprights from .46 gns.
Grands from 66 gns.

THE ONLY PIANOS
PURCHASED BY
**THE BRITISH
BROADCASTING
CORPORATION**

**CHALLENGE
PIANOS**

Full Particulars from
13 & 14 HANOVER ST., REGENT ST., LONDON, W.1

Phone: MAYFAIR 4218

M I C R O P H O N E S

DURING THE PAST YEAR, and coincident to a very large extent with the move to Broadcasting House, a considerable development has taken place in regard to the microphones employed by the B.B.C. and the technical equipment associated more immediately with them.

Time alone will show to what extent the peculiar merits of different types of microphone are of value in practice, but at the outset at least it is necessary to analyse their theoretical requirements and advantages. The requirements were enumerated in the B.B.C. Year-Book for 1930, where they were grouped under the following headings:

- (1) Good frequency characteristic.
- (2) Linearity of response.
- (3) Freedom from hiss or other background noise.
- (4) Adequate sensitivity.
- (5) Ease of maintenance and reliability of operation.

These characteristics are still considered to define the requirements of a microphone, but are inadequate for a description of its practical performance, since it is now realised that directional effect and its dependence upon frequency have also to be taken into account.

In endeavouring to form a mental picture of the meaning of the various features referred to above, it must be realised that the function of the microphone is to convert the minute fluctuations of air pressure which reach its sensitive surface, and constitute the sound waves, into corresponding electric currents which can be amplified by suitable means and used to modulate, for example, a broadcasting transmitter. It is clear that if faithful reproduction is to be attained, the electric currents must be precisely similar in form to the changes of pressure with which they correspond. Conditions (1) and (2) ensure that such shall indeed be the case. The first means that the response of the microphone must be sensibly the same over the whole of the audible range of frequency or pitch. Failure to fulfil this condition involves unnatural tone or "timbre" in the reproduced sound. The meaning of the second is that the magnitude of the currents produced by the microphone must always be strictly proportional to that of the original sound pressures, otherwise the

type of distortion known as "microphone blasting" occurs, resulting in rough, harsh, reproduction characterised by very disagreeable "combination tones."

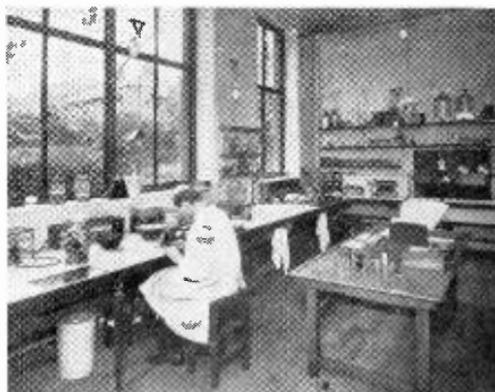
The three remaining conditions are to a large extent self-explanatory. Directional effect will be discussed in dealing with individual microphones.

Until comparatively recently the microphones used almost exclusively by the B.B.C. for a number of years were of the carbon type, and while it has always been realised that with these microphones considerable care was necessary to avoid blasting, owing to their limited linearity, yet it was considered that their frequency characteristic was fairly good. This was indeed the case, by comparison with the microphones which preceded the type under discussion in the early days of broadcasting and the loudspeakers available at that period. A curve published in the Year-Book for 1932, and reproduced again herewith as Fig. 1(a), shows, however, that much is still to be desired from this point of view. The departure from the ideal represented by the curve is easily appreciated by ear when modern receiving equipment and loudspeakers are used, and takes the form of a peculiar nasal quality as applied to speech and a hardness of tone, particularly of strings, as applied to music.

Certain of the more important studios at Savoy Hill were equipped with what may be termed the stretched-diaphragm type of condenser microphone. The great advantage of this type of microphone as compared with the carbon type is its almost complete linearity and consequent freedom from blasting, as well as freedom from ground-noise in the form of hiss, always a difficulty associated with carbon microphones. The reproduction when this microphone is used indicates at once, however, to a critical ear, that the frequency characteristic is not ideal. The frequency response of a microphone of this type is shown in Fig. 1(b), and it will be seen that there is a marked similarity between it and that of the carbon microphone.

In the past both these types of microphone have been used in broadcasting without any attempt having been made to correct the departure from ideal frequency response as shown by the curves of Fig. 1. Recently, however, circuits have been devised and applied to the "A" or microphone amplifiers, whereby the

Please Help



THE CANCER HOSPITAL (Free) is applying itself to the methodical and scientific investigation of the causes of Cancer; and the results of its invaluable research work are placed at the disposal of the medical practitioners of the world.

Whilst carrying on this work of study and research The Cancer Hospital is contributing to the alleviation of suffering. It is well equipped with the most up-to-date appliances. Poor patients are admitted free, and a certain number of beds are provided for advanced cases who are kept comfortable and free from pain.

The Cancer Hospital

(FREE)

(Incorporated under Royal Charter)

FULHAM ROAD, LONDON, S.W.3

FORM OF BEQUEST OF A LEGACY.

"I give and bequeath unto THE CANCER HOSPITAL (FREE), situate in the Fulham Road, London, the sum of (free of Legacy Duty), to be applied towards carrying on the charitable designs of the said Institution."

Bankers: COUTTS & CO., 440 Strand, London Secretary: J. COURTNEY BUCHANAN, C.B.E.

CLIX

Components for Perfect Contact.

Universally standardised by set makers.

Consistently specified in the technical press.

WANDER PLUGS
TERMINALS
VALVEHOLDERS
CONNECTORS
PLUGS & SOCKETS
AND OTHER FITMENTS

LECTRO LINX LTD.

254 VAUXHALL BRIDGE RD., S.W. 1

Do Not Forget the Children They MUST Come First

Please help us to bring Happiness into the lives of 1,100 poor Boys and Girls taken from poverty; some fatherless, some motherless, some total orphans.

The Shaftesbury Homes & "Arethusa" Training Ship

(Founded 1843).

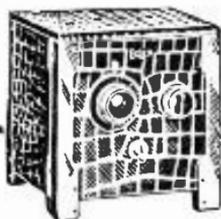
PLEAD MOST EARNESTLY
FOR IMMEDIATE FUNDS.

PLEASE HELP US

The Children Will Thank You.

164, Shaftesbury Avenue, London, W.C. 2

ENJOY ULTRA SHORT WAVE PROGRAMMES ON YOUR OWN SET



**60/-
COMPLETE**

Without alteration to your set you can enjoy 70 additional programmes including America. It makes every set a super-het. Easily connected. Complete 60/- (with valve). All mains model 65/- (without valve). Two valver 85/- (without valves). Write for Booklet P 2.

EALEX SHORT-WAVE CONVERTOR

J. J. EASTICK & SONS,
Ealex House, 118 Bunhill Row, London, E.C.1

Phone: Metropolitan 0314/5/6

RU 128417

"Are you one to wait for one's heaven?"

until the hereafter, or do you believe that heaven can be experienced on earth by those who carry out the "golden rule"?

Happiness is the reward of those who bring happiness to others. Help us to bring gladness into the lives of fatherless girls and boys by saving them from distress and difficulty.

We are caring for 370 children in our School at Maitland Park, London, N.W., and have received over 7,400 during the past 174 years. They are fed, clothed, and trained to be useful, self-reliant citizens.

The present-day difficulties, whilst making it harder to raise funds, are compelling more widows to seek our aid for their children. Send a donation to-day.

ALEXANDRA ORPHANAGE

Treasurer: Lord Marshall.

34/40 Ludgate Hill, London, E.C. 4

THE PROBLEM OF THE ELDER LAD

THE CHURCH LADS' BRIGADE

CARRIES ON THE WORK OF EDUCATION FOR CHURCH AND STATE.

It trains the elder lads between 14 and 21 years of age to become loyal Christian citizens.

Full particulars can be obtained from the Headquarters Staff Chaplain and Secretary,

The Rev. G. M. ARMITAGE, M.A.

GENERAL HEADQUARTERS, ALDWYCH HOUSE, CATHERINE STREET, LONDON, W.C.2

ANY TIME
IS
TEA-TIME
IF IT'S—

*Mazawattee
Tea*

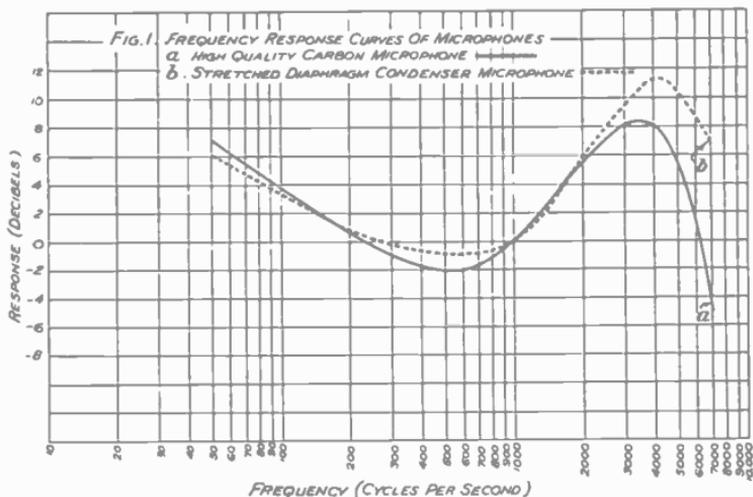


FIGURE 1

response curve of these microphones can be almost exactly equalised. A very considerable improvement in quality has been the result, and consequently Broadcasting House, in common with all Control Rooms where modern gear has been recently installed, is provided with microphone equalising circuits.

At this point it may be well to remind the reader of the principle of operation of the stretched-diaphragm condenser microphone. It consists of a rigid metal back-plate in front of which, at a distance of about one thousandth of an inch, is tightly stretched a very thin metal diaphragm, usually composed of duralumin. The latter is insulated from the back-plate and forms with it an electrical condenser. Variations of air pressure on the diaphragm, due to the incidence of sound waves, cause it to vibrate and so alter the capacity of the condenser as its distance from the back-plate varies. By suitable circuit arrangements these changes of capacity can be made to cause corresponding voltage changes on the grid of an amplifying valve and hence to generate "speech" currents which may be further amplified in the usual way.

We have now to describe an entirely new type of condenser microphone, which, at least so far as broadcasting is concerned,

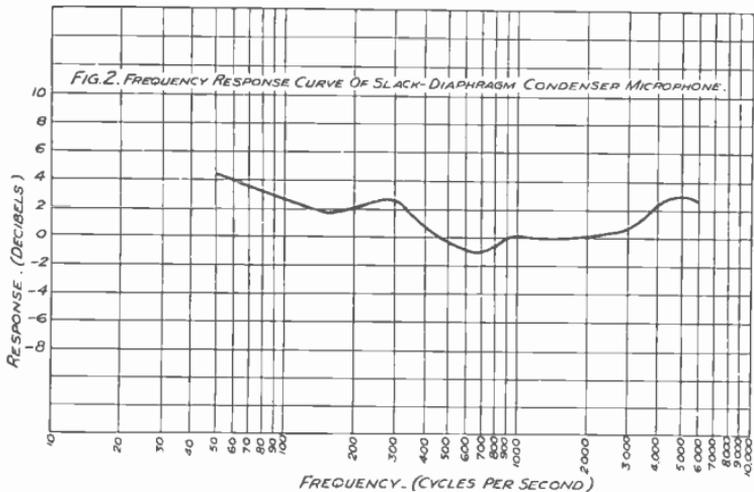


FIGURE 2

has come into use only during the past year. This may be described as the slack-diaphragm type.

In its present form it consists of a central pillar about four inches long and of elliptical section. This has a conducting surface and takes the place of the back-plate of the stretched diaphragm microphone, forming one electrode of the condenser. Over this is a thin film of insulating material and around the whole is wrapped a piece of aluminium foil only about one thousandth of an inch in thickness. The latter is stretched just tightly enough to keep it in place, and is not maintained under tension as in the case of the other type of condenser microphone. The foil forms the second electrode and the connections to a valve are made in precisely the usual way.

The frequency characteristic of a condenser microphone of this type is shown in Fig. 2, the curve shown being the mean of those of a number of individual microphones. It will be seen that it possesses a fundamentally flatter characteristic than the stretched-diaphragm condenser microphone. In the case of the latter microphone the pronounced resonance peak, showing maximum response at about 4000 cycles is really composite, being due partly to the resonance of the tightly

DR. BARNARDO'S HOMES:

NATIONAL INCORPORATED ASSOCIATION

Charter :

" No Destitute Child Ever Refused Admission."

No Voting System.
No red tape.

The need of the child is the only consideration.

On an average 5 children are added to this Family every day, which is the Largest Family in the World.

The children are rescued from unfavourable surroundings, given a new environment, trained and placed out in life as useful and self-supporting citizens.



113,000 children admitted. 16,628 children and young people dealt with last year. 8,200 always being supported. 1,319 are babies and toddlers under 5.

447 are crippled or afflicted.

1,124 are under industrial training.

30,509 have been migrated to the Overseas Dominions.

Will you help Barnardo's in their work for the Nation?

Please send a gift of 2/6 to the Annual Appeal for 400,000 Half-Crowns for the Children's Food.

*^o Cheques and Orders payable "DR. BARNARDO'S HOMES" and crossed, may be sent to DR. BARNARDO'S HOMES, 297 BARNARDO HOUSE, STEPNEY CAUSEWAY, LONDON, E.1

IMPERIAL CANCER RESEARCH FUND

Patron—HIS MOST GRACIOUS MAJESTY THE KING.

President—HIS GRACE THE DUKE OF BEDFORD, K.G.

Chairman of the Executive Committee—SIR HUMPHRY ROLLESTON, Bt., G.C.V.O., K.C.B.

Honorary Treasurer—SIR GEORGE MAKINS, G.C.M.G., C.B.

Director—Dr. J. A. MURRAY, F.R.S.

The Honorary Treasurer desires to thank those who have hitherto supported this Fund by their donations and subscriptions.

The object of the Research is for the good not only of the whole British Empire but of the whole world.

The Imperial Cancer Research Fund is working unceasingly in the cause of suffering humanity. Cancer is now one of the most important causes of death, and the suffering it entails in its protracted course makes the call urgent for improved methods of diagnosis and treatment, and in research work alone lies the one hope of checking its malevolent power. Radium treatment has been proved effective in some incipient cases and in cases near the surface of the body, but cancer when deep-rooted still presents a serious problem.

Donations and Subscriptions may be sent to the Honorary Treasurer, Examination Hall, Queen Square, Bloomsbury, London, W.C.1, or may be paid to the Westminster Bank, Ltd., Marylebone Branch, 1, Stratford Place, London, W.1. A/c Imperial Cancer Research Fund.

FORM OF BEQUEST.

I hereby bequeath the sum of £ to the Treasurer of the Imperial Cancer Research Fund under the direction of the Royal College of Physicians of London and the Royal College of Surgeons of England for the purpose of Scientific Research, and I direct that his receipt shall be a good discharge for such legacy.

Your present piano may be
just a piano—but, used in
part payment towards a
CHAPPELL

it becomes the stepping-
stone to the world's finest
musical instrument

Send for Illustrated Lists
& Simple Plan of Exchange
Upright Models from 60 gns.
Grands from 95 gns.
Convenient Deferred
Terms available



The Chappell Piano Co., Ltd.
50, New Bond Street,
London,
W. 1.

THE MARIE CURIE HOSPITAL

Patron: H.M. THE QUEEN

RADIUM TREATMENT OF CANCER IN WOMEN

Entirely free to necessitous patients. A few Private Rooms

THIS NEW HOSPITAL URGENTLY NEEDS SUBSCRIBERS

Please send donation to the Secretary, 2, Fitzjohns Avenue, N.W.3

IT IS ALL SHADOW
FOR HOMELESS
CHILDREN

YOU
CAN GIVE
THEM
LIGHT &
HAPPINESS

Contributions gratefully received by the Secretary

WAIFS & STRAYS SOCIETY (GIO) KENNINGTON SE11

stretched diaphragm itself, partly to the resonance of the air column formed by the cavity in the face of the microphone and partly to what is known as "obstacle effect." The last effect is due to the fact that sound waves of the higher frequencies, whose wavelengths in air are smaller than the actual physical dimensions of the microphone, are completely reflected by the latter. Their effective pressure on the microphone is therefore doubled by comparison with that of waves of greater length and lower frequency, which in effect slide round the microphone without being reflected therefrom.

The slack-diaphragm microphone in its present form is effectively free from all the effects just mentioned. Even obstacle effect does not take place, since both back and front are sensitive, and what, at high frequencies, is gained by pressure doubling tends to be lost due to lack of response on the part of the back surface. The response of the stretched-diaphragm microphone is mainly dependent on the properties of the diaphragm itself, modified by the details of its mounting. In the slack-diaphragm type the essential properties of the microphone appear to be those of the thin film of air enclosed by the diaphragm, which merely follows the compressions and rarefactions of that film.

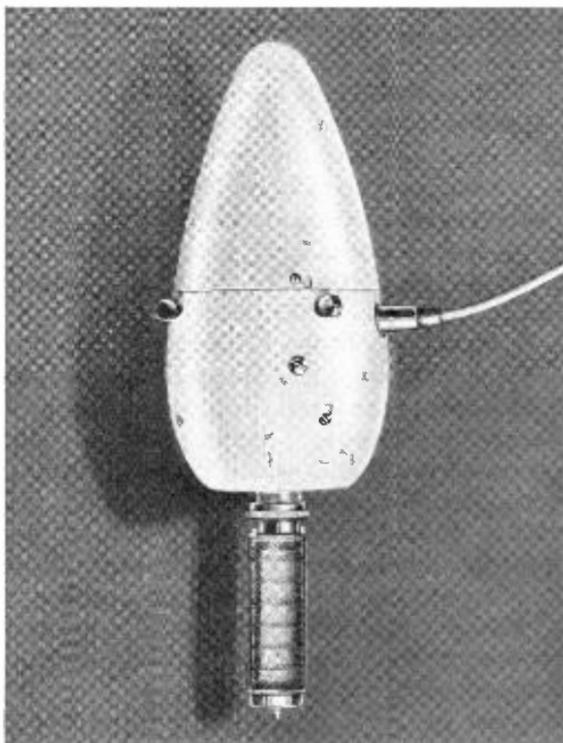
It is to the properties of the air film that the fall in response occurring at middle frequencies appears to be due in the case of the slack-diaphragm condenser microphone. This loss of response tends to cause a slightly "low-toned" quality of reproduction if the microphone is used unequalled. Good results can be obtained in this condition, but improvement can be attained by the use of a suitable equalising circuit, and it is anticipated that such will in due course be used in conjunction with all microphones of this type.

The principal disadvantage of the slack-diaphragm condenser microphone is its lack of sensitivity, compared even with other types of condenser microphone. All such microphones are normally employed mounted as part of a self-contained unit consisting of the microphone itself and a valve amplifier of one or more stages. The B.B.C. actually uses a single stage amplifier with a fairly conventional circuit and embodying an output transformer designed to work into the input of an ordinary "A" amplifier. In the case of a relatively insensitive microphone, such as the slack-diaphragm type, great precautions have to be

taken to ensure that what is usually known as "valve noise" associated with the condenser microphone amplifier shall be minimised, otherwise the relative ground-noise level due to this cause may be at least as high as that of the carbon microphone. As the result of much experiment it has been found that it is necessary to take precautions to exclude even the slightest trace of moisture from the wiring and components of the amplifier by sealing up as much as possible of the latter in paraffin wax, and to take the greatest care in the selection of the type of valve. Certain types of separately heated cathode valves have been found to be the most satisfactory in this respect, but valve noise is still a difficulty owing to the low sensitivity of the microphone, and further investigations are in progress with the object of reducing it.

The accompanying photograph shows the single-stage amplifier which has been developed by the B.B.C. for use with condenser microphones of both the stretched and the slack-diaphragm types. It consists of a cylindrical unit embodying the amplifier proper, mounted in rubber sponge inside a streamlined aluminium housing. The whole assembly is used with its axis horizontal in the case of the former type of microphone and vertical in that of the latter. The cylindrical form was adopted in order to avoid modifying the obstacle effect already described. Any considerable increase in the effective dimensions of a microphone by mounting it in the centre, for example, of one face of a fairly large cubical amplifier results in the extension of the obstacle effect to lower audible frequencies, with undesirable results with respect to the frequency characteristic. The stream-lining does not appear, in itself, to possess any acoustical advantage, but it enables a neat and pleasing unit to be designed, in accordance with acoustical requirements.

It will be seen that the slack-diaphragm condenser microphone possesses one considerable advantage from the point of view of studio technique in certain types of broadcast, in that it is practically non-directional in a plane at right angles to the principal axis of the microphone. In a dramatic production, for example, it is possible for a number of actors to be grouped comfortably round a single microphone, instead of trying all to get into the field of a fairly directional microphone or being obliged to use two or more of such a type.



A SLACK-DIAPHRAGM CONDENSER MICROPHONE AND AMPLIFIER

The non-directional microphone has also been used in the production of Vaudeville performances where the theatrical atmosphere and lay-out of artists and orchestra have been preserved. A single non-directional microphone of the type under discussion has been suspended over the "footlights," or the position usually occupied by such accessories, at a height just above the heads of the performers. In such a position both artists and orchestra are correctly reproduced and suitably balanced, an impossibility with a more directional microphone.

The directional or non-directional properties of a microphone have, however, a more fundamental effect on studio technique and acoustics than those involved in considerations of balance. The importance of obtaining the correct degree of reverbera-

tion associated with a musical performance has been stressed many times during the consideration of matters of acoustics as applied to broadcasting. The reverberation period, described in general terms as the time in seconds taken for a fairly loud sound to die away to inaudibility, is a physical property of a studio and can be measured fairly accurately by suitable means. The effect of reverberation as heard by the listener can, however, be varied at will between certain limits by attention to such details as microphone placing. Such adjustment is necessary if the best effect is always to be obtained without the complication of variable studio acoustics.

A little consideration will show that the use of a directional or a non-directional microphone, as required, increases the latitude in this direction, since it is the relative importance of direct sound from, say, an orchestra, as compared with sound reflected from the walls of the studio, which determines the effect of reverberation. A non-directional microphone tends to respond to the reflected rays of sound reaching it from all directions, whereas a directional one tends to concentrate more upon the direct rays. Between the limits, therefore, represented by a directional microphone close to the source of sound and a non-directional instrument situated some distance away, a whole variety of acoustical effects can be obtained.

Mention must be made of the use, largely experimental, which has been made of what is known as the "baffled microphone." This consists of a condenser microphone of the stretched-diaphragm type mounted in the centre of a large rigid baffle board about five feet square. Such treatment was originally adopted to avoid the results of obstacle effect by extending it to the whole of the audible frequency range. This result was attained, and the frequency characteristic of the microphone was thereby improved without the need for electrical equalisation. It was found, however, that the directional properties of the microphone were also rendered more marked, and use has been made of this property in reducing the effect of what amounted to excessive reverberation for a particular purpose. Certain practical difficulties, however, in the use of so large an instrument as the baffled microphone make it unlikely that it will find a permanent place as broadcasting equipment.

Perhaps the most interesting development in microphone

FRIENDS OF THE POOR

(Incorporated)

40 & 42, Ebury Street,
London, S.W.1

Royal Patron :

H.M. THE QUEEN.

President :

H.H. PRINCESS MARIE LOUISE.

Hon. Secretaries :

MISS COLLIN, C.B.E.

MRS. H. R. BROMLEY-
DAVENPORT, C.B.E., J.P.

Hon. Treasurers :

LORD CHARNWOOD

MR. G. BROMLEY-MARTIN.

Plead for funds to assist the
deserving poor of all classes
and denominations in times of
illness and other emergencies.



"ALL SORTS AND CONDITIONS"

OF HUMANITY ARE HELPED ACCORDING
TO THEIR VARYING NEEDS BY THE

CHURCH ARMY

It aids—

MEN: In Labour Homes; in and out of
Prison; Employment Bureaux;
in Disabled Men's Workshops, etc.

WOMEN: In Classified Homes,
Clubs, etc.

CHILDREN: Motherless,
Rescued, etc.

SUPPORT IS EARNESTLY ASKED.

All Communications to—

PREB. CARLILE, C.H., D.D.,
55 Bryanston St., London, W. 1.

Of all listeners-in none are more interested than the

3958 BOYS AND GIRLS

now in the happy family of the NATIONAL
CHILDREN'S HOME AND ORPHANAGE

Every day adds fresh names to the
WAITING LIST and a

GIFT OF FIVE GUINEAS

will secure the immediate admission of
ONE OF THESE LITTLE ONES

WILL YOU SEND A

Wireless Message of Help and Goodwill
for which some little one is waiting?

Please send me particulars of the child admitted to
the National Children's Home in consideration of
my Gift of Five Guineas enclosed herewith.

NAME

ADDRESS

NATIONAL CHILDREN'S HOME AND ORPHANAGE

[Founded in 1869 by Dr. Stephenson]

Princ. pal: Rev. W. Hodson Smith

General Treasurers:

The Rt. Hon. Lord Wakefield of Hythe,
C. B. E., LL. D.

Sir Thomas Barlow, Bt., M. D., F. R. S.

30 BRANCHES

Chief
Offices: **HIGHBURY PARK, LONDON, N. 5.**

technique is the introduction of a new form of moving-coil microphone, which has already yielded results at least equal to the best that can be obtained by other means. In principle it is similar to the "magnetophone," the use of which was finally abandoned by the B.B.C. six or seven years ago. That is to say, the sound waves set in motion a light diaphragm, to which is attached a coil of wire, which is thus caused to vibrate in a strong magnetic field, provided in the case of the new microphone by a suitable permanent magnet. The currents which are thus generated in the circuit to which the coil is connected are amplified in the usual way. The fundamental difference between the old microphone and the new is that the latter is very carefully designed, as the result of research work carried out in America, and its moving parts are so proportioned that it becomes analogous to an electrical filter circuit, and gives a level response over a particularly wide band of frequencies. Actually the microphone responds from very low frequencies up to about 8000 cycles per second with only a comparatively small increase of efficiency towards the higher frequencies. This may even be an advantage, as tending to compensate for the lack of response of loudspeakers at these frequencies and for cut-off in the circuits of receiving apparatus.

The moving-coil microphone has already been used with considerable success for many important musical broadcast performances, and it is proposed to extend its use considerably in the near future. Its particular merits, apart from its good technical performance, are its simplicity of installation and maintenance, combined with reliability and reasonable sensitivity. It is completely free from inherent background noise, and is small and inconspicuous in appearance.

Finally, there is some evidence that even the carbon microphone itself, which has been tending to become out of date recently, is capable of improvement, so that its apparently fundamental difficulties of non-linearity and high ground noise can be overcome. The tendency thus seems to be towards the development of a number of different types of microphone, each particularly useful in its own sphere and with its own particular advantages. Each will doubtless find a place in the varied activities of broadcasting and represent an improvement on what may be termed the "general purpose" microphones of the past.

THE DRAMATIC CONTROL PANELS

THERE are two rooms at Broadcasting House termed Dramatic Control Rooms set aside for the production of plays. Each of these rooms contains a Dramatic Control Panel (frequently termed D.C. Panel) mounted on a table as shown in the illustration on page 387.

The object of the D.C. Panel is to enable the producer to combine at will the output from various studios. This is necessary, since it would be difficult to produce a play other than a very simple one in one studio alone. For example, where a play includes dramatic speech, crowd noises, incidental music, special sound effects, and special effects obtained from gramophone records, it would be impossible to produce all these things in one studio. The various types of effects are therefore produced each in a separate studio and combined by the producer by means of the D.C. Panel.

The panel allows for the possible combination of eleven different studios. For this purpose there are eleven handles on the front of the panel, each of which operates a potentiometer whereby the output from the associated studio may be varied from zero to maximum. This potentiometer has twenty-four studs in all and is smoothly graded so that as the handle is turned back towards zero the transmission from the studio is gradually reduced until just before reaching the zero stud it is practically inaudible, and disappears unnoticed when the zero stud is reached. This potentiometer is included in the circuit after the A Amplifier output, so that the A Amplifier for each studio in use is permanently switched on for the duration of the play. The combination of the studios therefore takes the form of mixing the outputs from their associated A Amplifiers as determined by the handles on the D.C. Panel.

The eleven handles are made up of two groups of five, one on either side of a central mixer and one by itself placed above the mixer. The combination obtained from the first five channels is taken to one side of this central mixer and that from the second five channels to the other side, so that the producer may mix the resultant combination of the first five with that of the second five. This is particularly useful where

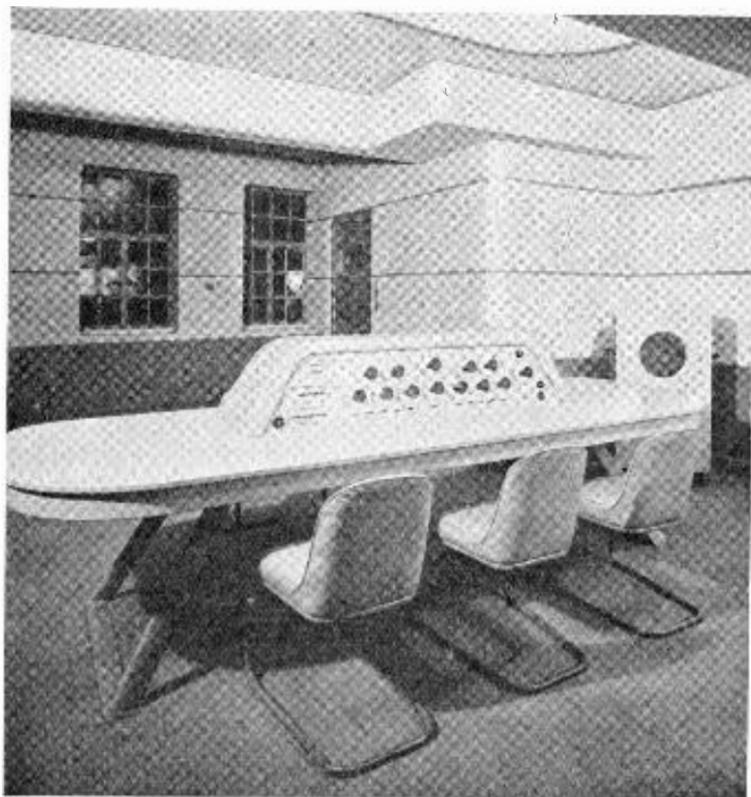
it is required to fade out several studios simultaneously, as, for example, where the action changes suddenly from a scene involving orchestra, chorus, crowd, and effects, to one involving dialogue only. In such a case those studios used for the first "scene" would be allocated to channels in one group of five and that used for the dialogue would be included in the second group of five. The eleventh handle, which is placed above the central mixer, allows a studio to be faded in or out independently of this mixer, and is used when it is required to fade speech from a separate studio on to the transmission while utilising the change-over facilities of the central mixer for the other studios.

In addition to the twelve handles already described (eleven for channels, and one central mixer) there is another located at the right-hand end of the panel. This controls an echo mixer and enables echo to be added to the output from a selected studio as required.

It will be realised that with the various performers and operators located in different studios the producer must be able to give a cue to each studio individually. For this purpose a small key is fitted beneath each of the eleven handles which when depressed switches on (via a relay circuit) green lights in the studio controlled by the particular handle.

In order that the performers in any studio may know what is happening while their studio is not in use, the programme is continuously supplied to headphones fitted in all the studios. In addition the programme is also supplied to a loudspeaker fitted in each studio, but only while this particular studio is not in use. As soon as the producer moves the handle associated with this particular studio off the zero stud the loudspeaker is automatically cut off. This is, of course, essential, otherwise the loudspeaker output would be picked up by the microphone and a howl (singing round the loop) would be produced.

During rehearsals the producer wishes to give instructions to the performers, and for this purpose a microphone is provided on the D.C. table, and the circuits are such that by pressing a key the producer may connect the output of this microphone via its own A Amplifier to all the headphones and loudspeakers in studios. In this way he can speak to all



ONE OF THE DRAMATIC CONTROL PANELS

studios, and he may hear the replies from the performers in these studios on the loudspeaker in the Dramatic Control Room, provided he has these studios faded in on the D.C. Panel, exactly as he would hear these performers speaking during the play. The producer may also wish to give instructions to a studio while the actual broadcast performance is in progress; in this case, by pressing the key he can speak to the performers via their headphones but not via their loudspeakers. On the other hand, the performers cannot reply to the producer under these conditions, since anything they said would be broadcast if their studio were faded in on the D.C. Panel, and if it was not faded in the producer would not hear their reply.

As any of the eleven handles may be associated with any studio for a particular production it is necessary to provide some means whereby the producer may see which studio he has on each handle. Above each handle is a small circular recess containing a lamp, and a number of caps are provided, each engraved to correspond to a particular studio, which will fit into these recesses. It is the duty of the engineer, when setting up the circuits for the producer, to put the appropriate cap into each recess corresponding to a studio to be used, and when the circuits are connected through in the Control Room the lamps light automatically and the engraving on the caps is clearly visible.

In order that the producer may see at a glance which studios he has faded in, a small red lamp is fitted immediately above each cap just described, which lights when the handle is moved from the zero position.

It often happens, particularly when an orchestra is being used, that the producer desires to have warning when the orchestra is reaching a particular point in the musical score where a fade is to be effected. To provide this warning a row of indicating lamps are fitted in the D.C. Room, visible to the producer, each corresponding to a studio. When the conductor of the orchestra reaches an agreed point in the musical score, he presses a button on his stand and the corresponding light glows in the D.C. Room, thus giving the required warning.



UNKINKABLE

Ordinary flex is not really suitable for portable domestic appliances such as vacuum cleaners, irons, fires and kettles. It kinks. This not only causes you vexatious delays in using the appliances, but it injures the flex and leads to danger of shock through the wires breaking. Use Supaflex instead. It is sturdy, safe and unkinkable—and British. Your electrician will tell you that the strong wires inside are thoroughly insulated and waterproof, that the braided covering will not unravel. Supaflex contains cord strengtheners and any strain on the flexible is supported by these cords which are attached to the plug itself. It costs very little to have Supaflex fitted throughout the house—and it enormously increases the reliability of all your electrical appliances.

Provisional Patent No. 12229/32



SUPAFLEX

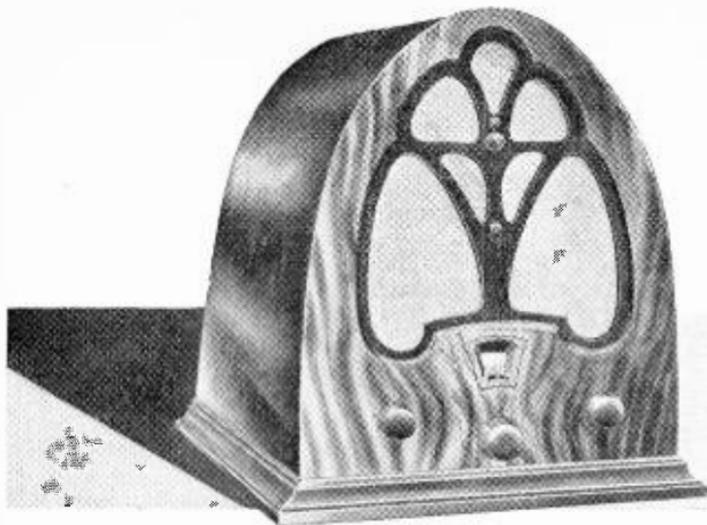
UNKINKABLE, SAFE, SURE and BRITISH.

Manufactured by
BRITISH INSULATED CABLES LTD.
PRESCOT, LANCS.

Telephone No.: Prescot 6571

London Office: Surrey House, Embankment, W.C.2.

Tel. No.: Temple Bar 4793



A "Hundred Station" Battery Set!

A great triumph for Lissen—a battery receiver at last which for power, for immense range, for ease of handling challenges expensive all-mains radio. You may not get a hundred stations on this receiver if you are working under adverse conditions, but you will, wherever you are situated in the British Isles, get such a variety of programmes that it would take you a long time to count them all.

Ask your radio dealer to demonstrate this Receiver; if he cannot do so, send Post-card direct to the factory and we will arrange a free demonstration in your own home.

The Lissen "Hundred Station" Battery Set handles just like the most modern mains set. One knob tuning control—as you turn it the stations come in automatically. One knob volume control. The most powerful valve combination known—Metallised Screened Grid, Detector and Pentode Output. Wavelength calibration of the tuning dial so that you only have to set the scale to the wavelength of the wanted station and adjust the volume control to the required strength. Despite the power of this receiver, the total current consumption is less than that of the average three valve set.

Complete with batteries, valves and loud speaker in beautiful figured walnut cabinet, price

LISSEN

OR

£8-17-6 CASH

£1

DOWN

and twelve equal
monthly payments of 15's

"HUNDRED STATION" BATTERY SET

LISSEN LIMITED, WORPLE ROAD, ISLEWORTH, MIDDLESEX

[390]

THE CONTROL ROOM AMPLIFIERS

THE CONTROL ROOM contains a large number of low-frequency amplifiers which serve to amplify the various transmissions originating in or passing through Broadcasting House. These can be divided into four principal types known respectively as A, B, C, and D amplifiers. The A Amplifier is purely a microphone amplifier and raises the level of the transmission from the very weak microphone output to a level suitable for controlling. The B Amplifier serves to make up the loss introduced by the control potentiometer and any fade unit in use; it can further raise the transmission to a specified level (known as zero level). The C Amplifier is a single stage amplifier only, and its purpose is to separate the outgoing land-lines from the output of the B Amplifier. The D Amplifier is used to raise the level of transmissions incoming by land-line, such as Simultaneous Broadcast and Outside Broadcast transmissions. The general functions of each type of amplifier will be more readily understood by reading the foregoing remarks in conjunction with the diagram shown as Fig. 1. The types of amplifiers will now be considered in more detail.

A AMPLIFIER

This amplifier (see Fig. 2) is a three-stage resistance-coupled amplifier having input and output transformers. Its input impedance is made 300 ohms to suit the output from carbon microphones which, until recently, were used more than any other type. Where a condenser microphone is used it has its associated single-stage amplifier located with it in the studio and the output impedance of this amplifier is made suitable to work into the 300 ohms input impedance of the A Amplifiers. The output level of the condenser microphone amplifier is also attenuated locally, where necessary, so that all microphones in use deliver transmission at approximately the same level to the A Amplifier input for a given sound intensity in the studio. Similarly where gramophones are used the gramophone attachment is followed by a network such that (a) the transmission level is approximately the same as that obtained from a carbon microphone, and (b) 300 ohms forms a satisfactory termination. Normally one particular A Amplifier

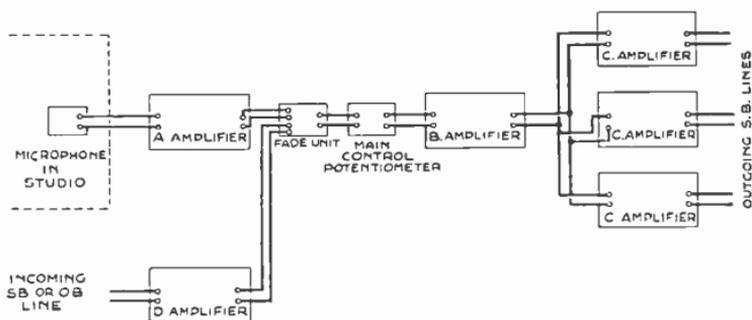


FIG. 1.—TYPICAL ARRANGEMENT OF CONTROL ROOM AMPLIFIERS

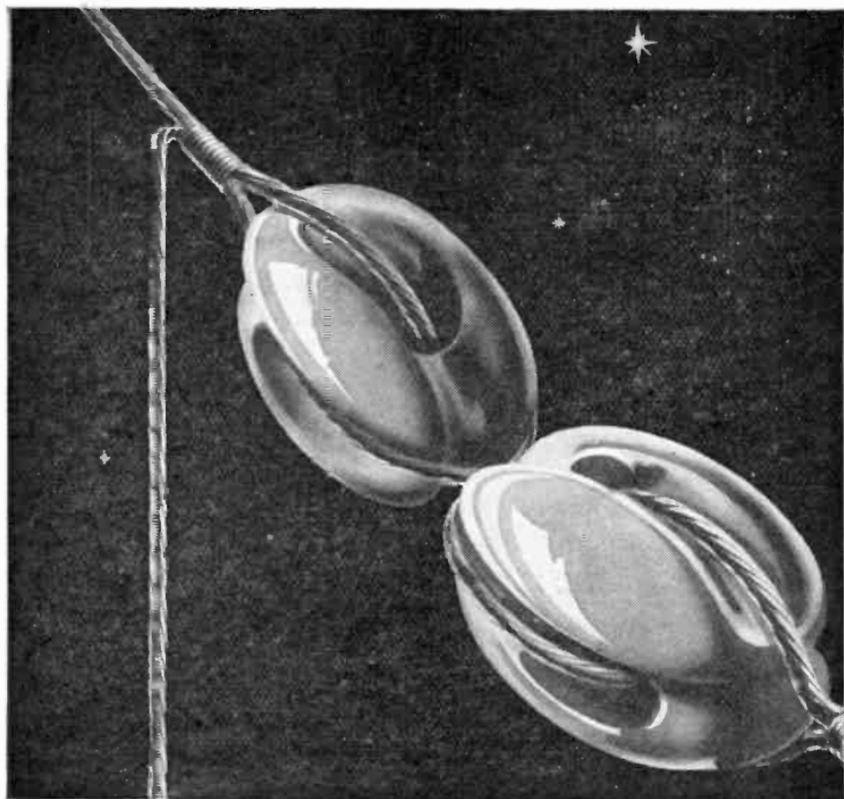
is associated with each studio, but any one may be used for any studio if required, since the input is suitable for all types of microphones, gramophones, and associated mixers, in use.

A switch is provided on the front of each A Amplifier which when operated inserts two correction circuits (see Fig. 2), one in the second grid circuit, and one in the third grid circuit. These circuits are such that when in use they modify the frequency characteristic of the amplifier to compensate for the frequency characteristic of certain microphones.

The third stage is duplicated, the first output being used to pass the transmission to the input of the fade unit and potentiometer used for controlling, while the second output is used to pass the transmission, via a loudspeaker amplifier, to the Echo Room, where it is picked up on another microphone and passed, via a separate A Amplifier, to another input of the same fade unit to provide echo. When echo is not required the second output is not connected through to the Echo Room.

Indirectly heated valves are used to reduce valve noise (that is to say, "ponging") and to minimise interference incoming from the filament supply leads, caused by switching other amplifiers fed from the same battery. To reduce further such interference a decoupling choke and condenser are included in the filament supply to each amplifier. The grid and anode circuits of the first and second stages are also decoupled to minimise interference incoming via grid bias and high-tension supply leads.

The A Amplifier has an overall voltage magnification of approximately 360 (51 decibels). The transmission level at



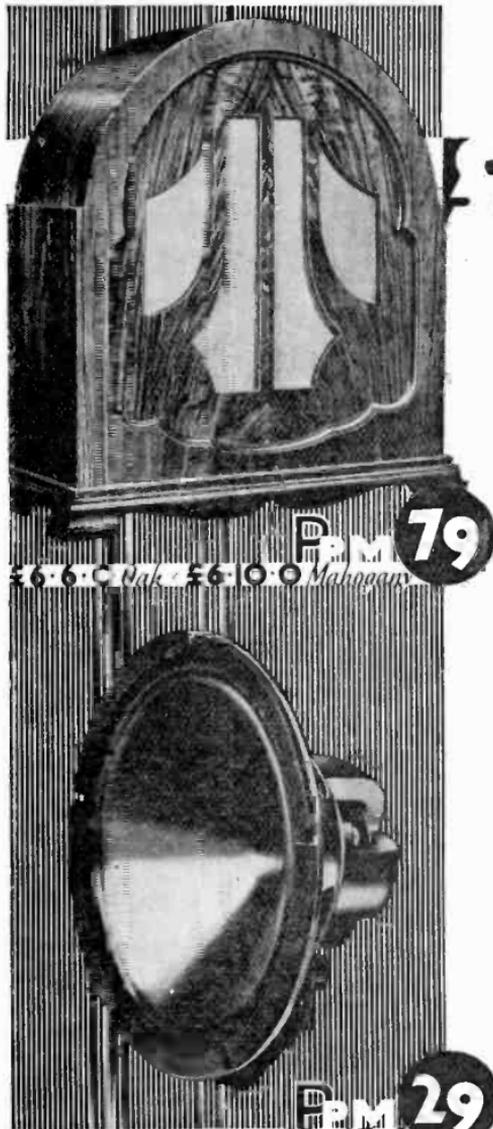
2 MILLION
AERIALS LEAD
DOWN TO
Mullard
THE · MASTER · VALVE

The Mullard Wireless Service Co., Ltd., Mullard House, Charing Cross Road, London, W.C.2

N 2

[393]

ARKS



P.P.M. 79
 £6.6.0 Oak £6.10.0 Mahogany

P.P.M. 29
 £3.17.6

The speakers illustrated are only two examples from the complete range. See them at your local dealer and insist upon a demonstration.

"Spend £1000 on your set"

and be certain of getting the finest possible results—but there's no need to—Celestion have already spent thousands of pounds for your benefit, in their laboratories, to bring their Speakers to the present state of unrivalled efficiency that they enjoy.

The Celestion P.P.M. range is the outstanding achievement of the year.

P.P.M. 79. Incorporates a wonderful magnet and a large Hylflex diaphragm. Housed in a handsome cabinet that will harmonise with any style of furniture. Including universal transformer.

Price—Oak £6 6 0
 Mahogany & Walnut **£6 10 0**

P.P.M. 29. Employs an extra large Hylflex diaphragm and a massive magnet. This instrument is already recognised as the most wonderful Speaker achievement of the Season.

Price, including universal transformer, 77/6

CELESTION

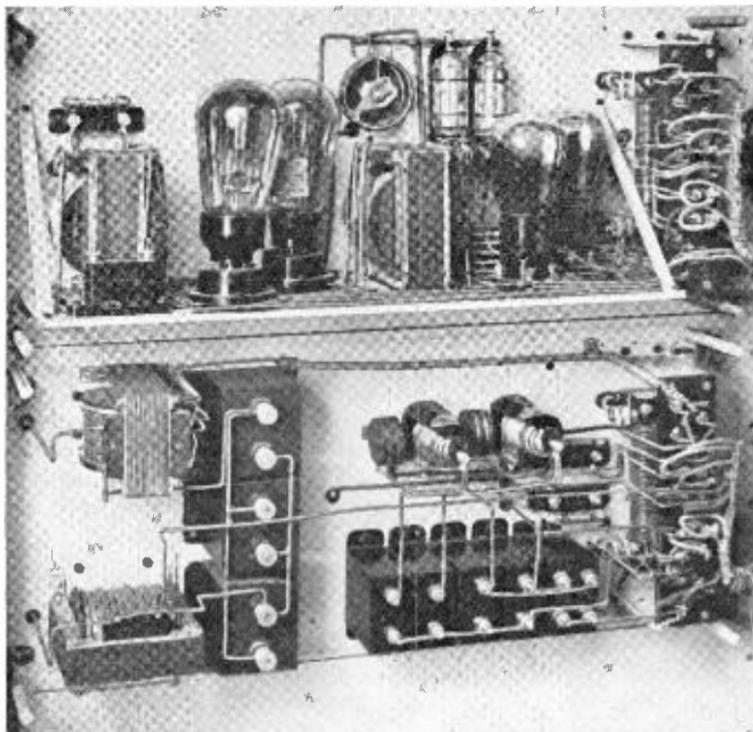
The Very Soul of Music

LOUD-SPEAKERS

THE FOREMOST NAME IN SOUND REPRODUCTION

CELESTION, LTD., LONDON ROAD, KINGSTON-ON-THAMES

London Showrooms : 106, Victoria Street, S.W.1.



BACK VIEW OF THE B AMPLIFIER BAY

level. This level corresponds to 10 milliwatts of A.C. power for a sine wave, so that as the normal output load is 600 ohms, this gives 2.45 volts R.M.S. across the output terminals. This means that during a programme the level at the B Amplifier output will be such that on loud musical passages the mean A.C. voltage across the output terminals will be 2.45 volts. The use of the B Amplifier to overcome the loss in the controlling potentiometer can be seen by reference to the Transmission Level Diagram (Fig. 3).

The voltage magnification of the amplifier is approximately 200 (46 dbs.). In practice the full magnification is seldom required and it is reduced by means of the potentiometer in the first grid circuit to a value of about 80 (38 dbs.).

Directly-heated valves are used in this amplifier as, the general level of transmission being higher, the relative amplitude of microphonic and other interference is less. The filament, grid, and anode circuits are decoupled as in the case of the A Amplifier.

There are in all 16 B Amplifiers; 6 allocated for transmission programmes, 8 for rehearsal programmes and 2 spare. Each B Amplifier, except the spares, is associated with a particular Control Position. As a general rule it can be said that the number of B Amplifiers in use at any time corresponds to the number of programmes (transmission or rehearsal) passing through the Control Room at that time.

The B Amplifier is fed with 6 volts, 300 volts, and grid bias

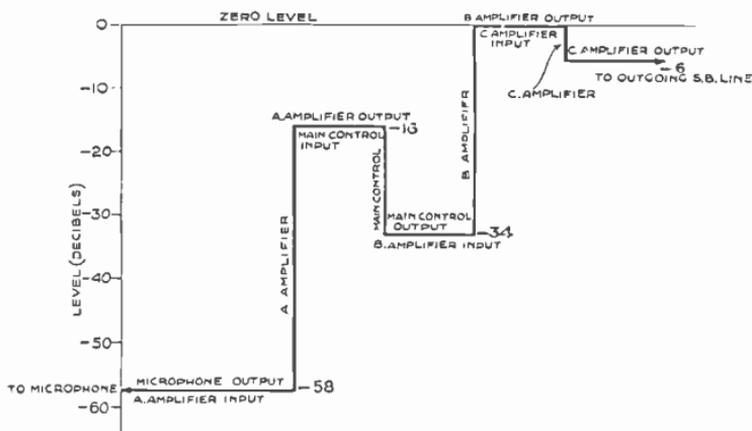
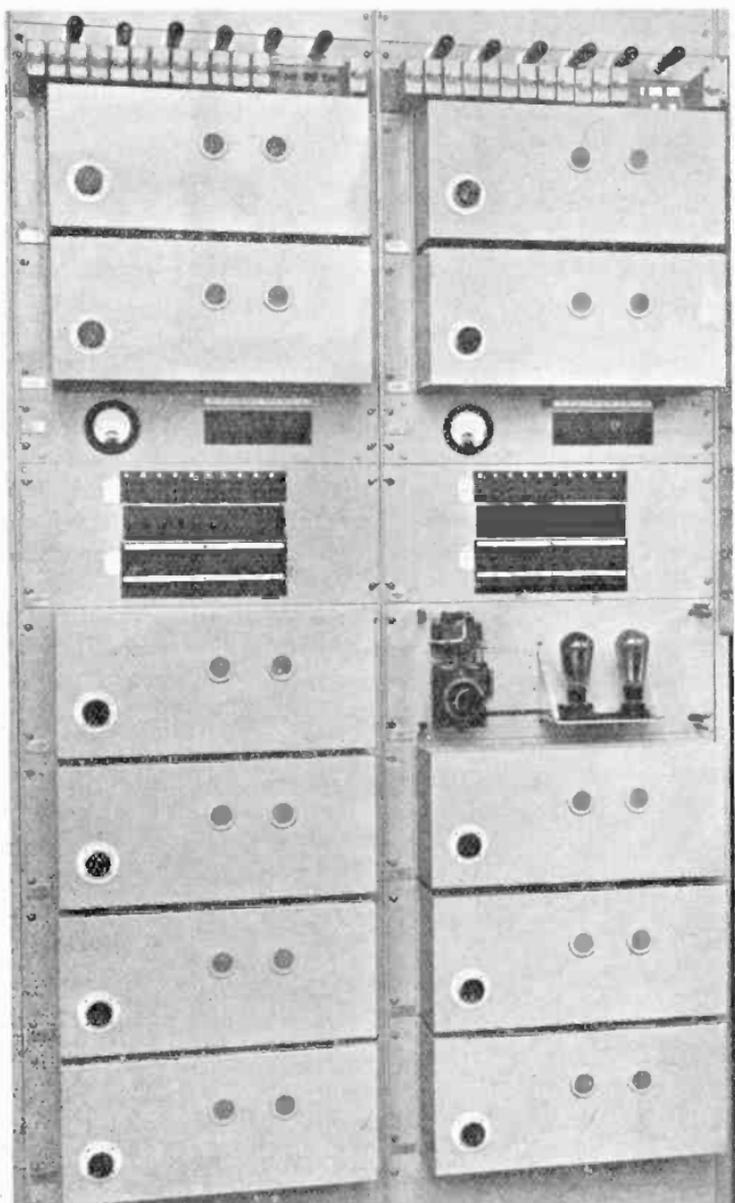


FIG. 3.—TYPICAL LEVEL OF TRANSMISSION



C AMPLIFIER BAY WITH THE COVER REMOVED FROM ONE AMPLIFIER

tappings of 2, 12, and 24, from the Control Room central batteries.

C AMPLIFIER

The C Amplifier is a single-stage trap valve amplifier having no voltage amplification and serving to separate each individual outgoing line from the B Amplifier output. In many cases it is required that the level of the transmission outgoing on a trunk-line shall be less than the specified zero level, and in such cases the level is reduced by means of the C Amplifier input potentiometer.

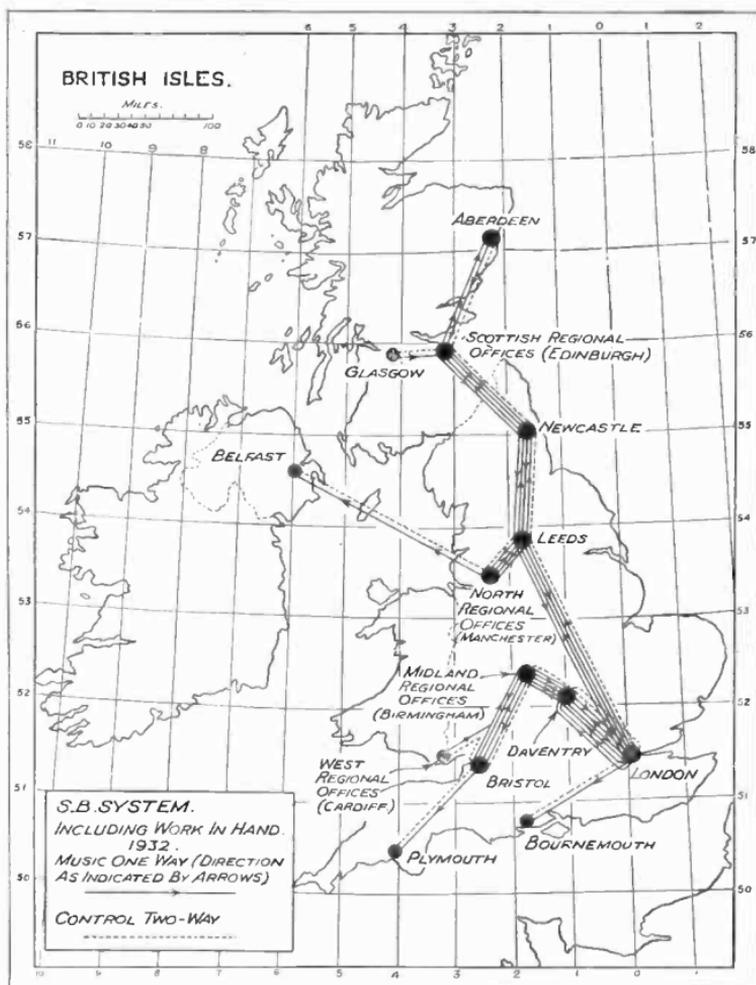
D AMPLIFIER

This is similar to a B Amplifier except that an additional output stage is introduced for echo purposes. It is used to amplify the transmission incoming from any line and has a maximum voltage amplification of 200 (46 dbs.). As the level of such incoming transmissions may vary considerably for different lines the overall magnification of the amplifier can be varied by means of the potentiometer in the first grid circuit.

GENERAL

In addition to the above four main types of amplifiers there are various other amplifiers for special purposes. Among these are Trap Valve Amplifiers which have three separate output stages, one for supplying the "controlling" engineer's headphones, one for supplying headphones in studios and offices in the building, and one for supplying loudspeaker circuits in various parts of the building. Six of these amplifiers are allocated for transmission programmes, one being permanently connected to the output of each of the six transmission B Amplifiers. Thus any headphone or loudspeaker circuit may be supplied with any transmission programme at any time by connecting this circuit to the output of the particular Trap Valve Amplifier. In addition there are three spare Trap Valve Amplifiers which can be used for rehearsals or miscellaneous purposes.

The programme is fed into the loudspeaker circuits from the output of the Trap Valve Amplifier at ordinary headphone strength, and at each loudspeaker point a two-stage amplifier raises the level to full loudspeaker strength. This amplifier is operated from the A.C. mains and has a single valve in the first stage, and two valves in push-pull in its output stage.



THE TELEPHONE TRUNK LINE CONNECTIONS IN THE B.B.C.'S
SIMULTANEOUS BROADCASTING SYSTEM

S. B. D E V E L O P M E N T S

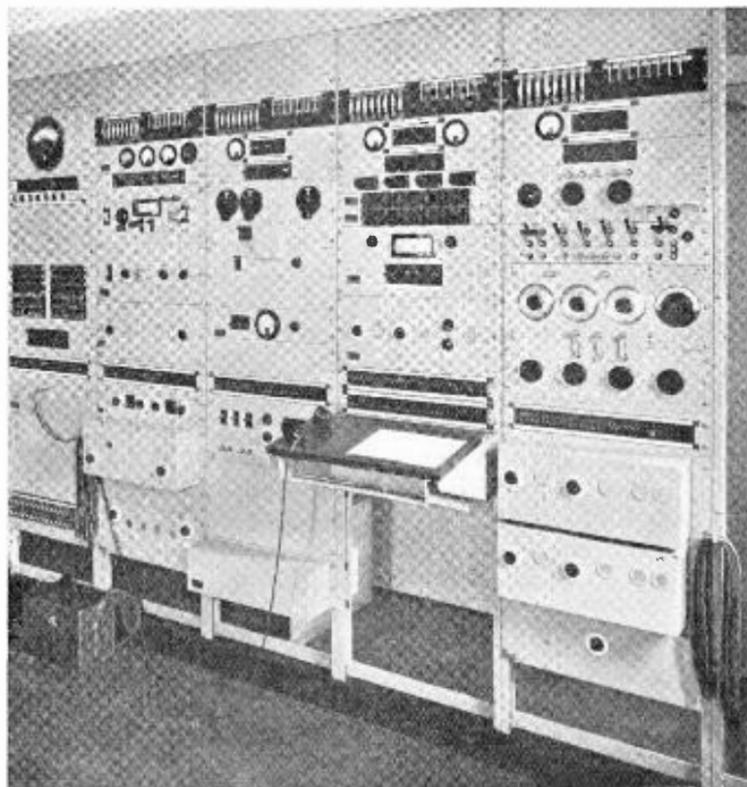
IN JULY OF LAST YEAR the first link, between London and Leeds, in a new system of Simultaneous Broadcasting circuits, designed specifically for music transmission between London and the various Provincial studios and transmitters, came into service. Within the following few weeks the new circuits had been extended to Manchester, and the route from London to Birmingham via Daventry also put into commission. Early in 1932 a further extension from Leeds, northwards, via Newcastle to Edinburgh, was completed, and by the end of March the whole S.B. system north of the Tweed had been replaced by the new underground cable circuits. Today, of all the original overhead lines, which for so many years before last July comprised the S.B. system, only those west of Birmingham, *i.e.* interconnecting Birmingham, Gloucester, Cardiff, Swansea and Plymouth, together with the lines from London to Bournemouth, are still in service. The General Post Office is at present at work on the underground circuits which will soon replace these. The map shows the system as it will be when the work is completed.

The development of any land-line scheme for the interchange of programmes between a number of centres, and for feeding simultaneously any of a number of transmitters, must necessarily keep pace, as far as quality and reliability of transmission is concerned, with the ever-improving quality of reproduction which developments in transmitting and receiving gear and in other branches of the science of broadcasting are making available. The first complete S.B. scheme used in this country consisted of a number of open-wire telephone lines carried overhead on poles similar to the circuits used for ordinary telephony. This type of circuit can often be adapted by the use of special apparatus at the receiving end to give excellent quality of reproduction, but from its very nature it is obviously exposed to interruption and interference from bad weather, road accidents, and many other causes. A considerable amount of trouble of this nature has been experienced in the past, both with broadcasting and in commercial telephony, and, as a result, overhead telephone circuits have been gradually replaced by underground cables. These latter are, of course,

far more immune from interruption, but they introduce very many technical difficulties when transmission over long distances is desired, and a very special technique has been developed to deal with them. The most important features which differentiate the underground telephone transmission system from an overhead system, are the "loading coils" which have to be inserted into the underground circuits every mile or so along the route, and the repeaters or speech amplifiers and associated equipment, which have to be provided every forty or fifty miles. There is, to-day, a very extensive underground cable telephone system interconnecting practically all the important towns in the British Isles, and the whole of this system has been equipped with the necessary loading coils and repeaters designed for the efficient transmission of intelligible speech.

The first steps to be taken to provide, for the broadcasting system of this country, a line network of a reliability greater than that to be expected from any system of overhead lines, are necessarily those of adapting the most modern type of telephone circuit available to meet broadcast requirements, since the cost of manufacturing and installation of a complete cable system for broadcasting alone would be absolutely prohibitive. The band of frequencies which must be efficiently transmitted for intelligible speech required in commercial telephony is approximately from 200 to 3000 p.p.s. It has been found possible, by careful selection of circuits, by redesigning and replacing all loading coils along the route and by developing new repeaters to replace those originally installed for telephone purposes, to modify circuits in the latest types of telephone cables so as to secure the even transmission of all frequencies from 50 to 6000 p.p.s. This latter frequency band corresponds to a quality of reproduction which, with the latest type of loudspeaker and amplifier equipment, is only just distinguishable from the original on a quick change-over test. Experience over the last few months has proved that the quality and reliability obtained with this new system of underground circuits represents a very great advance over that obtainable from the old type.

An interesting feature has been incorporated in the London-Birmingham cable, which is of such recent construction that it was possible, at the time that it was laid down, to visualise



THE BAYS IN THE LINE-TESTING ROOM

broadcast requirements. As a result, four pairs of lines in the centre of this cable were each provided with a special screen, and interaction between these pairs and the remaining circuits in the cable has been very greatly reduced. Thus, it has been found possible to use "lighter" loading coils, with the result that the frequency band transmitted is slightly wider, it being possible to obtain a uniform response up to approximately 8000 p.p.s. At practically all of the new Regional studio centres, special cables containing pairs individually screened one from another are being installed to connect up broadcast studios with the local Post Office Trunk Terminal Station.

Many schemes have been proposed within recent years for still further improving the quality available from underground land-line transmission schemes, and as the telephone system continues to expand and develop, there is little doubt that further improvement in the broadcast S.B. chain will be forthcoming, although the magnitude of the work involved will inevitably mean that the change must be gradual and take perhaps years to complete. Recent developments in cable manufacture have made it possible to provide circuits which are so carefully balanced between themselves, and in relation to other circuits in the cable, and to earth, that special screening becomes unnecessary, the level of interference being already extremely low. By reducing the spacing between loading points to half that at present used, it will be possible to raise the upper limit of frequency transmitted by about 40 per cent., giving a total frequency band up to 9000 p.p.s. or even higher. Further developments are also to be expected in accuracy of equalisation, that is to say, in the evenness of transmission of all frequencies within the band and in the provision of special networks to level up the time of transmission over its cable of all waves in the programme. The repeater equipment provided at the various amplifying points along the lines is already, as judged by present-day standards at any rate, substantially perfect, but as traffic along new routes develops it is expected that there will be very many more points at which repeaters are available. As a result, it should be possible to use underground circuits of new and improved types to points which are at present relatively poorly served as far as land-line facilities are concerned.

The Drum behind the Band



Reproduced by kind permission of the British Broadcasting Corpn.

Callender's Band in the Concert Hall, Broadcasting House.

For your protection, CALLENDERS have recently introduced "ANKAFLEX," a new flexible cable for electric domestic appliances.

"ANKAFLEX" is specially insulated, waterproof protected and strongly braided in a pleasing combination of red and black. It is strong, serviceable, and, what is most important, absolutely unkinkable.

Ask your electrician to show you the particular advantages of "ANKAFLEX."



When requiring insulated wire for your wireless equipment, insist on your dealer supplying you with a CALLENDER product.

Patent application
No. 12229/32



**CALLENDER'S
CABLE & CONSTRUCTION CO., LTD.**
Hamilton House Victoria Embankment London E.C.4
Telephone Central 3241 Telegrams Callender Wire London

—for all that is best in

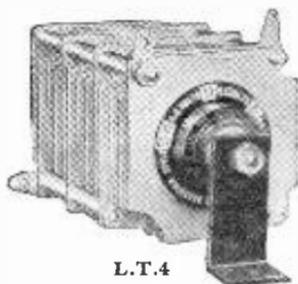
RECTIFIERS—



H.T.8

LONG LIFE

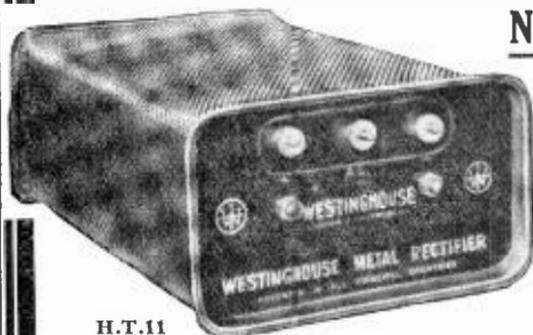
For the man with A.C. Mains who wants trouble-free radio, . . . a Westinghouse Metal Rectifier, whether incorporated in a separate eliminator or fitted in the set itself.



L.T.4

HIGH EFFICIENCY

The set will then be fed by a steady and adequate voltage; and this voltage will not deteriorate, nor will the rectifier require renewing. Westinghouse Metal Rectifiers cost less in the long run, yet give better results all the time; and, now that the new H.T. and L.T. units have been added, the range covers most radio needs. The prices of the H.T. units range from 12/6 to 35/-, and the L.T. units from 10/6 to 47/6.



H.T.11

NO REPLACEMENTS

The 1933 edition of *The All Metal Way* covers the complete range of Westinghouse Metal Rectifiers, and deals fully, both technically and practically, with all forms of A.C. Mains Eliminators and Trickle Chargers.

SEND 3d. STAMP FOR
A COPY

WESTINGHOUSE METAL RECTIFIERS

THE WESTINGHOUSE BRAKE & SAXBY SIGNAL CO. LTD.,
82 YORK ROAD KING'S CROSS LONDON, N.1

ADJUSTING RECEIVERS FOR DIFFERENT WAVELENGTHS

OWING TO the extreme shortage of wavelengths allotted to broadcasting in Europe and the consequent necessity of utilising to the best possible advantage every available wavelength, it has been necessary to bring into use several wavelengths near the lower end of the medium-wave broadcasting band. These low wavelengths are likely to be used also to a greater extent for comparatively high-power transmitters in other countries.

In the past, wavelengths lower than about 250 metres have been considered unimportant by many listeners, and even by some manufacturers, although the medium-wave band allocated to broadcasting at the Washington Conference in 1927 extends from 200 to 545 metres. Consequently there are in existence a number of receivers which will not tune to wavelengths lower than about 250 metres. If such a set is being used in a district where a wavelength lower than this is in use, it will not, of course, be possible to tune it to the local station, but even in other districts the inability to tune down will preclude the possibility of searching what may prove to be an interesting band of wavelengths.

The same difficulty is experienced at the other end of the tuning scale when a receiver only tunes up to a certain wavelength. It is found that a certain station, which perhaps one knows to be easily receivable, is not heard because its wavelength cannot be reached. The following suggestions may possibly be helpful in such cases.

A typical tuned circuit consisting of an inductance and a $0.0005 \mu F$ variable condenser, with a good outside aerial and earth connected directly to it, will tune from, say, 270 metres to 440 metres, and owing to the self-capacity of the aerial-earth circuit it will be difficult greatly to extend this range except by using a larger tuning condenser. If, however, there is a second tuned circuit in the receiver, such as between the high-frequency amplifying valve and the detector, it will be found that, with the same size tuning condenser, it will tune over a much greater range. Actually there is no difficulty in designing such a circuit as this to cover the whole medium-wave broadcasting band of 200-545 metres. It will often be found, therefore,

that it is the aerial circuit of the receiver which makes it impossible to tune up or down to a particular wavelength.

As a closed circuit can be made to cover the whole wave-band, it will be obvious that if the capacity-load of the aerial-earth circuit can be removed from the tuned circuit, and the size of the coil made the same as that in the closed circuit, the aerial circuit also would be enabled to cover the wave-band.

One way of removing part of the aerial load is to connect a small condenser between the aerial and the tuned circuit. The effect of this is, of course, that the capacity of the small condenser and that of the aerial is in series, and, therefore, the total capacity across the tuned circuit will be reduced according to the smallness of the series condenser. A semi-variable condenser with a maximum capacity of $0.0002 \mu\text{F}$ is a useful type to employ. As this method does not remove the whole of the aerial capacity, the circuit will be unable to cover quite the same range as a closed circuit, but it will probably be found that it can be made to cover a sufficient range. There will probably be some loss of the signal strength picked up by the aerial whatever method of removing the aerial-load is employed, but in a valve set this can be compensated for by reaction, or by increased amplification. An advantage is that the selectivity of the receiver will be improved considerably.

Another method of coupling the aerial to the first tuned circuit is to use a semi-aperiodic aerial winding. This can be arranged by winding a few turns of fairly heavy gauge insulated copper wire (20 gauge d.c.c. is quite suitable) over the existing aerial coil and connecting one end of the winding to the earth terminal of the set, and the other end of the winding to the aerial. This winding should be spaced a little from the tuning coil, which can be done by placing strips of thoroughly dry wood or ebonite over the coil winding and putting on the aerial winding over the strips. The outer winding should be kept near the earth end of the tuning coil. The actual number of turns will depend largely upon the size of aerial which is being used, but it is suggested that an initial test be made with fifteen turns for the medium-wave range, assuming an average diameter of about 3". If then the coupling is found to be too great, one or two turns at a time can be taken off until the circuit tunes satisfactorily.

CHOOSE QUALITY—CHOOSE McMICHAEL

You who would enjoy to the full this modern boon—Radio, will naturally look for quality first when buying a receiver. And just as naturally you will come to consider the McMichael. For, above all its many other praiseworthy attributes, a McMichael receiver is a quality product. Twelve years of successful radio manufacture have gone to making it so. Therefore—*choose McMichael.*

THE McMICHAEL GABINET DUPLEX FOUR PORTABLE

(Type C.) This set is contained in an exceptionally handsome Cabinet of modern design, constructed of finely figured and polished Walnut, and mounted on a ball-bearing turn-table. Several unique McMichael features are incorporated, chief among which is the McMichael Duplex Scale. Calibrated in metres and mechanically coupled to the waveband switch, this gives accurate readings of the actual wavelengths, thus making for extreme ease and certainty of tuning. Entirely self-contained with internal frame-aerial. Complete and ready for working.



PRICE
17 GNS.

(Including Valves
and Royalties)

THE McMICHAEL DUPLEX FOUR MAINS TRANSPORTABLE

(For Alternating Current only)

Within a handsome Walnut Cabinet of modern design, the set is entirely self-contained, so that it is easily transportable and may be operated wherever a suitable mains socket or plug is available, neither aerial nor earth being necessary. The circuit employed is similar to that of the Duplex Four battery models, except for the "mains" adaptation. Indicating on the Duplex Scale, this circuit gives maximum range and selectivity with a minimum of controls. Contained in the receiver is a Moving-Coil Loud-speaker, the reproduction from which is quite exceptional—no less than sheer delight. Provision is made for applying a gramophone pick-up, and an external additional loud-speaker or 'speakers.



PRICE
21 GNS.

(Including all
Royalties)

**DEFERRED PAYMENTS MAY
BE ARRANGED**

The McMichael Duplex Four is also available as a Suitcase Model. Incorporates the same principal features as the Cabinet Model, but fitted in handsome case of dark furniture hide. **Price 17 Gns.**
(Including all Equipment and Royalties)

**H.M. THE KING
USES
McMICHAEL
RECEIVERS**

Ask to hear the McMichael Twin-Speaker All-Electric Radio-Gramophone—an amazing innovation in twin-speaker reproduction. **Price 40 Gns.**

(All Royalties included)

Telephone
SLOUGH
441-442.

L. McMICHAEL LTD

Manufacturers of Wireless and Scientific Apparatus
WEXHAM ROAD, SLOUGH, BUCKS.

Telegrams:
RADIETHER
SLOUGH

London Showrooms: 179 STRAND, W.C.2.

Telephone: Temple Bar 6988.

108 VOLTS



9!

LONGER LIFE LOWER COST

The SILVER KNIGHT is the latest development in the field of High Tension Batteries. Its ideal construction, perfected by the famous Silvertown Company, guarantees MORE POWER and LONGER LIFE. Its greater efficiency will improve your Radio, its economy will save your money. Ask your Dealer for

(Registered Trade Mark)

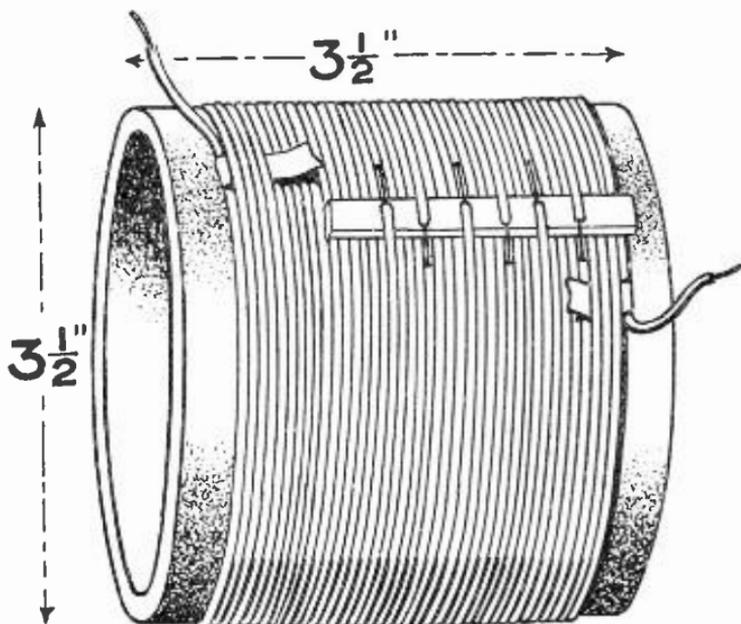
Silver Knight

HIGH TENSION BATTERIES



Prices.			
No.	Type.	Volts.	Price.
2003	Standard	66	5/8
2005	Standard	108	9/-
2006	Standard	120	11/-
2012	Triple Capacity	63	12/-
2015	Triple Capacity	108	21/-
2021	Grid Bias	9	1/-

A PRODUCT OF SILVERTOWN



A TAPPED COIL SUITABLE FOR USE IN THE AERIAL CIRCUIT

If too many turns are used the tuning of the circuit will become very flat towards the lower end of its range, while if too few turns are used the tuning will be very sharp and there will be a lack of signal strength. Another method of adjusting a circuit when a semi-aperiodic winding is used is to connect a semi-variable condenser of about $0.0005 \mu\text{F}$ between the winding and the aerial, and to adjust this until the right condition is obtained. With such an arrangement, and providing that some loss in signal strength can be tolerated, it is possible to make the tuning range of the aerial circuit quite comparable with that of a closed circuit. Indeed this is usually done in sets in which the tuning condensers are ganged, slight differences being made up by the adjustment of small balancing condensers across the closed circuits.

The above methods of extending the tuning range are not, of course, applicable in cases where it is essential that the maximum signal strength be obtained from the aerial, such as in a crystal set, but as such sets will in general be used only

for reception of the local station it will not be necessary to extend the tuning range at both ends, but only to ensure that the wavelength, or the two wavelengths in the case of a Regional Station, can be covered. This can usually be done with an aerial connected direct to the first tuned circuit, or by connecting the aerial to a tapping on the tuning coil so that from half to three-quarters of the turns on the coil are included in the aerial circuit. As a typical example, a coil consisting of 40 turns of No. 20 gauge d.s.c. wire wound on a $3\frac{1}{2}$ " diameter former will, with a $0.0005 \mu\text{F}$ condenser, tune from about 260-570 metres without serious loss in signal strength, with an average size outside aerial connected to a tapping taken at the centre of the coil. Thus, it would be quite suitable for use in the North Region or the Scottish Region, while the removal of a few turns of wire from the coil would enable it to tune down to lower wavelengths. The same coil with the aerial connected to a tapping 12 turns from its earth end will cover the whole medium-wave broadcast band, the actual wave range obtained on test being 199 to 546 metres. The loss in strength, due to the small coupling would, however, make this unsuitable for use in a crystal set. For convenience, the coil could be made up as shown in the illustration, thereby allowing different tapping points to be tried.

In cases where the set in use will not tune down to a low wavelength used by a local station, it can be made to do so by removing a few turns from the existing coil, but it must be remembered that this will also reduce the maximum wavelength to which the set will tune. Should it subsequently be found necessary to make the set tune to a higher wavelength this can be done by connecting a fixed condenser of 0.0003 or $0.0005 \mu\text{F}$ capacity across the aerial and earth terminals. This will have the effect of increasing the wavelength over the whole tuning range; should it be required to make the tuning range easily adjustable, the fixed condenser can be mounted permanently, and connected to the earth terminal through a small switch, so that it can be disconnected when the lower range of wavelengths is required.

CRESSALL RESISTANCES



For D.C. Mains Receivers, Voltage Absorbing, Battery Charging, etc.

“CRESSALL” Asbestos Wire-Woven Resistance Nets provide the most reliable and cheapest form of Resistance known. Other “CRESSALL” Resistance products comprise:—

Sliding Resistances for every conceivable purpose.
“Mica-Wound” Resistance Units. Resistance Wires.

Please write for illustrated Lists.

THE CRESSALL MANUFACTURING CO.,
31 & 32, Tower Street, Birmingham 19.



ROYAL SOLDIERS DAUGHTERS' HOME

ROSSLYN HILL, HAMPSTEAD, N.W.3

Patrons:

T.M. THE KING & QUEEN

Necessitous Children of our Soldiers are maintained, educated and trained for Domestic Service and Trades.

The age of departure is seventeen, when a situation is guaranteed to them and they are supplied with an outfit.

Think of the incalculable value of this work both to the orphan girls and the Nation, and send a gift to the Secretary, Major H. S. Marshall, D.S.O., Rosslyn Hill, Hampstead, N.W.3



Your Problem SOLVED!

IF YOU ARE INTERESTED IN

Settlement Trade
Travel Sport

Kenya, Northern Rhodesia, Nyasaland, Tanganyika, Uganda and Zanzibar offer inducements which defy comparison

Healthy climate, magnificent scenery, reasonable living costs and light taxation, every social amenity, fine sport with rifle and rod (and all home sports)

There may be some Settlement, Business, Travel or Sporting problem which the Eastern African Dependencies could solve for YOU!

Full particulars and illustrated handbooks can be obtained on application

H.M. EASTERN AFRICAN DEPENDENCIES
Trade & Information Office
GRAND BUILDINGS, TRAFALGAR SQUARE, LONDON, W.C.2

SPURGEON'S ORPHANAGE STOCKWELL

Hon. President: Rev. H. Tydeman Chilvers

Hon. Treasurer: Robert P. Higgs, Esq.

A HOME AND SCHOOL FOR FATHERLESS CHILDREN and a Living Memorial to the Founder, Charles Haddon Spurgeon.

TUNE IN. THIS MESSAGE AWAITS YOU.

Stockwell Orphanage provides daily for a family of 420 necessitous fatherless boys and girls, who are here trained to regard Work as a virtue, and Character as the greatest asset they can take into Life. Money spent on this Cause yields dividends of National value.

SPEND ON SPURGEON'S

YOUR GIFT OR DONATION WILL BE GRATEFULLY ACKNOWLEDGED BY

The Secretary, SPURGEON'S ORPHAN HOMES, STOCKWELL, S.W.9.

Our last Annual Report, containing a legal Form of Bequest, will gladly be sent on Application to the Secretary.

*A book which will appeal
TO ALL PARENTS*

"ON LEAVING SCHOOL is concerned with humanity's unending task—that of clearing the way for the younger generation."

On Leaving School

and the Choice of a Career
By Lord Wakefield

A survey of success with a brief glance at the future. Presents a synthesis of shrewd practical wisdom and sound idealism. Unique in its scope.

14th Edition

3/6 NET. OF ALL BOOKSELLERS
HODDER & STOUGHTON

THE SHAFTESBURY SOCIETY

(Ragged School Union 1844)



Patrons:

Their Majesties The King and Queen.

FOR 88 YEARS THE
TRUSTED HELPER
AND FRIEND OF
LONDON'S

POOREST CHILDREN

167 Associated Missions.
8,300 Cripples receiving help.
11,775 Fortnights' Seaside or
Country Holidays given last year.
Barefoot Mission.

Donations are urgently needed and should
be sent to:

ARTHUR BLACK, General Secretary,
John Kirk House, 32, John Street, W.C. 1

Treasurers: SIR EDWIN DODD;
WALTER SCOLES, ESQ.

Legacies Requested.



BEFORE
YOU START
THAT SET—

Send for this

WEARITE

BOOKLET—No. B.H.

WRIGHT AND WEARE, LIMITED,
High Road, Tottenham, N.17

Telephone: Tottenham 3847/8/9

CHILDHOOD'S PROTECTOR

HOME should be the source of Hope and Happiness for every Child—Yet there are still thousands of little ones suffering from the harmful neglect of ignorant parents or the cruelty of guardians.

Such ill-treated ones claim the sympathy and help of

The N.S.P.C.C

Please help the Society's efforts by sending a gift to Sir G. Wyatt Truscott, Hon. Treasurer, or William J. Elliott, Director, National Society for Prevention of Cruelty to Children, Victory House, Leicester Square, London, W.C.

Chairman: **The Viscount Ullswater, G.C.S.**



RECEPTION FOR GROUPS AND SCHOOLS

GOOD RECEPTION is always essential to the success of broadcast programmes. In the field of educational broadcasting it is recognised as a *sine quâ non*. Schools in particular are urged to secure reception of such a high standard "that the voice of the broadcast speaker may be heard by a listening class as clearly and effectively as if he were actually in their own schoolroom speaking to them." Certain Education Authorities only permit schools to listen on condition that such a high standard of reception is maintained. This is a wise precaution; for poor reception is an insidious thing, and it is by no means uncommon for conditions to deteriorate imperceptibly, so that eventually a listener, whether child or adult, may be unwittingly subjected to an aural strain which is not less exhausting because it is not detected. This strain is due to the intense effort of concentration which is required when the listener has to supply from the sense of the context words or passages which are indistinguishable or inaudible. The nature of this strain can be appreciated from the fact that children who have succeeded in following a broadcast talk are frequently unable to record more than half of the sounds contained in twenty-five isolated words broadcast in the form of "Reception Tests."

The work of securing and maintaining satisfactory reception conditions in schools and groups has been the subject of inquiry over a long period by the two Central Councils concerned with educational broadcasting.* There are four main aspects:—the selection of suitable apparatus, its installation, its operation, and its maintenance. These problems are by no means as formidable as they were when the Councils were first established. Improvements in modern receiving apparatus, for instance, render the task of selecting suitable apparatus comparatively simple, although once it was regarded as one of the most serious obstacles to be surmounted.

* The Central Council for School Broadcasting, and the Central Council for Broadcast Adult Education.

SELECTION OF APPARATUS

Selection is, nowadays, more a question of determining the particular needs of groups and schools than of specifying a standard of merit. These needs (in the case of schools) are summarised in a pamphlet * issued by the Central Council for School Broadcasting, which also describes an arrangement whereby any manufacturer of reliable apparatus may, if successful in passing certain tests, secure the inclusion of his name in lists which the Council issues to schools. The following are some of these needs:—

- (1) The quality of reproduction must compare favourably with that afforded by a standard set for school use.
- (2) The set should be designed with special regard to the faithful reproduction of speech.
- (3) The set should be durable rather than ornamental.
- (4) The set should be as simple as possible in operation, as it will be used by people having little technical skill.
- (5) The set will be used mainly for reception from local stations.
- (6) Schools prefer to have sets in lock-up cabinets, allowing the set to be switched on and off without the possibility of interference with other controls.
- (7) In many schools the set is installed in a central position with wiring to the various classrooms, the set being operated by means of remote controls.
- (8) It is desirable to have simple means allowing for the use of a gramophone pick-up without requiring the detuning of the set for its operation.
- (9) When a loudspeaker is built into a set, provision should be made for switching it off and for connection to other loudspeakers when required.
- (10) Loudspeakers should be adequately protected from casual injury.

INSTALLATION

Installation of the apparatus, when purchased, calls for careful consideration. More often than not the set is required to

* "Approval of Wireless Receiving Apparatus for Use in Schools."

This speaks for itself!

THE HOWE BOX BAFFLE

Pat. Appln. No. 378286.

"I have just completed the fitting of the 'HOWE BOX BAFFLE' inside my loudspeaker cabinet. I, along with my friends, many of them leading radio experts of this district, always contended that I had a real engineering job and a superlative instrument, but

*I was not prepared for the
great improvement I have
received from the installation*

There is a great difference now. Everything seems to be more balanced and clearer in every respect. The music does seem to be actually in the room. Every instrument stands out quite clearly and bass notes are registered in true proportion.

I get the real thing now, *i.e.* QUALITY, and I consider it was a very wise investment.

49 Cheltenham St.,
Rochdale.

M. A. Hardman."

*This is the Baffle
which is being used
in Broadcasting House*

Howe Box Baffle Kits from 20/-, including Royalty. With Knockdown Cabinet 30/- or complete in Cabinet, prices on application. Let us send you particulars.

F. McNEILL & CO., LTD., Sole Licencees,
(Radio Dept. 2), Lamb's Passage, Bunhill Row, E.C. 1

o

[417]



I can't afford to buy inferior materials or cheap workmanship—so I choose an

OSBORN radio cabinet



No. 234.

Model No. 234 illustrated above, in beautiful Queen Anne style, Radio-Gramophone Cabinet. 3' 3" high x 2' 6" wide x 1' 6" deep. Takes panel 19" x 12" or smaller. Ample room for any type of gramophone motor and largest H.T. and L.T. batteries made. Storage for 35 Records each side of set. If you desire larger panel space, this Cabinet takes panel 17" long by omitting Records Storage. Prices: *Machined ready to Assemble:* Oak £3 10s.; Mahogany £3 15s.; Walnut £4 10s.; *Assembled ready to Polish:* Oak £4 10s.; Mahogany £4 15s.; Walnut £5 10s.; *Assembled and Polished:* Oak £5 10s.; Mahogany £6 5s.; Walnut £7 5s.

All Models Carriage Paid.

OSBORN SUPER ACOUSTIC BAFFLE BOARD. Prevents 99 per cent. of speaker worry. Guaranteed no vibration even when attached to powerful moving-coil. Any size hole cut FREE. 18" x 18", 3s.; 24" x 24", 5s.; 30" x 30", 8s.; 36" x 36", 11s. 3d. Carriage paid U.K.
SEND FOR FREE SAMPLE!

Cabinet illustrated below is No. 226. A futuristic design Radio Gramophone Cabinet. 3' 4" high x 2' 2" wide x 1' 6" deep. Space for speaker is 24" x 16". Accommodation for the set and any type of gramophone motor 24" x 12½" high. Size of the baffle behind fret is 24" x 16". Special silk Fabric is included. Prices: *Machined Ready to Assemble:* Oak £3 10s.; Mahogany £3 15s.; Walnut £4 10s.; *Assembled ready to Polish:* Oak £4 10s.; Mahogany £4 15s.; Walnut £5 10s.; *Assembled and Polished:* Oak £5 10s.; Mahogany £6 5s.; Walnut £7 5s.

All Models Carriage Paid.



No. 226.

WRITE FOR FREE CATALOGUE OF LATEST MODELS.

CHAS. A. OSBORN (DEPT. Y.B.), REGENT WORKS
ARLINGTON ST., LONDON, N.1. Phone: CLERKENWELL 5095
and at 21 Essex Road, Islington, London, N.1. Phone: CLERKENWELL 5634

supply several rooms, particularly in a large school with two or more departments. In such a case, the set is installed in a central position, this being determined, as a rule, by the location of a suitable site for an efficient aerial. Wires are run from the set to various classrooms, and the set itself, which is kept tuned to the transmitter from which the educational programmes are usually received, is locked and may be switched on and off by a system of remote controls. It is possible, when these arrangements are made, for a teacher or group leader in any room, in a building so wired, to reproduce the broadcast programme by a simple operation of inserting a loudspeaker plug into a wall-socket—the volume of sound being controlled by a volume control across the loudspeaker.

OPERATION

The working of these sets presents no difficulty when the set is accessible only to one or two responsible people. It is a golden rule that such adjustments as may be necessary shall be made *before* and not during any given broadcast item. The control of volume is a critical factor. The voice must not be amplified at the expense of fidelity. A voice which, in the studio, sounds confidential and well-modulated will not convey anything of the speaker's personality if it is subsequently amplified so that it comes from the loudspeaker at perhaps twice its natural volume. For these reasons it is undesirable to attempt to reproduce a talk to more than forty people (children or adults), except in the case of a public address, where the actual volume of the speaker's own voice and the nature of its delivery are such that they gain rather than lose their effect through being amplified.

MAINTENANCE

The maintenance of the apparatus is not less important than the initial choice of the set. Schools or groups which are conspicuously successful in their use of the broadcast programmes are always those which have made arrangements with some reliable local dealer for the regular charging of their accumulators and the replacement of the high-tension batteries, that is to say, unless they have been fortunate enough to have an electric light supply available.

SALVAGING WAR'S WRECKAGE

TIME heals. Memories of the war are becoming dim. But in the complacency of peace we must not forget those who suffer still from THE LINGERING WOUNDS OF MENTAL DISABLEMENT. The Ex-Services Welfare Society is straining its resources to do justice by those who have sacrificed all but life itself. At the Sir Frederick Milner Homes at Beckenham and Leatherhead nervous wrecks are being transformed.

The Society depends solely on the generosity of the public. Will you kindly send a donation to-day to Ralph Millbourn, Esq., Chairman, THE EX-SERVICES WELFARE SOCIETY (Registered under the War Charities Act 1916) 53 Victoria St., London, W.1.

In

One Year

8,500 applicants for help interviewed. Over 3,000 beds and 9,979 meals given to destitute.

3,178 deserving cases given money grants, and 797 issues of clothing made.

1,000 new pension cases investigated and 5,000 old cases reviewed.

Ex-Services Welfare Society

pleads for your Sympathy and Support

SERVICES FOR BROADCASTING

One of the earliest of all B.B.C. activities was the broadcasting of Religious Services: there has been no break in the series of services broadcast since Christmas, 1922. The B.B.C. have recently issued, in book form, a list of prayers, hymns, and epilogues which have been found acceptable in the past. The contents consist of 15 groups of Hallowings, Confessions, Thanksgivings, Prayers, etc., Epilogues, Hymns, and Anthems. The book costs 1s. 2d. in paper covers, and 2s. 3d. bound in stout boards, post free, and can be obtained from the B.B.C. (Publications Dept.)

Broadcasting House, W.1.

ELECTRICAL INTERFERENCE

DURING THE YEAR ending June 30th, 1932, the B.B.C. received from listeners 4,738 complaints of electrical interference.

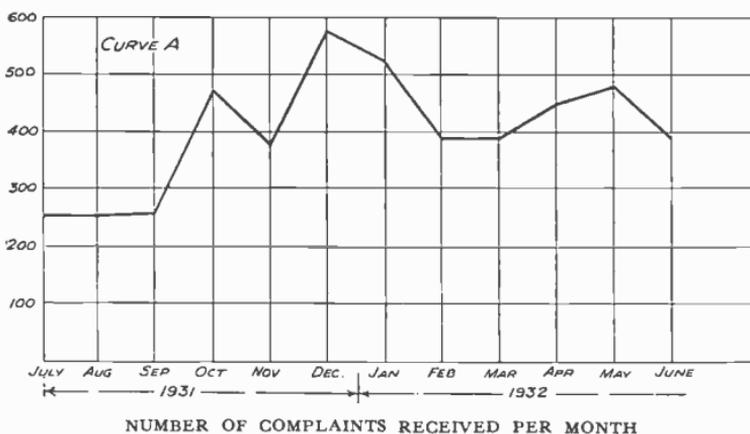
Electrical interference is the term given to the disturbance which can be caused to reception by various types of electrical machinery, such as tramways, lifts, refrigerators, flashing signs, etc. During the past five years there has been a noticeable increase in the number of incoming complaints due, it is thought, to two causes :

1. The increase in the total number of wireless listeners (there were 2,253,845 licence holders on December 31st, 1927, and 4,330,735 on December 31st, 1931).
2. The very great improvement in the standard of reproduction which the modern wireless receiver gives, compared with sets five years ago.

In the early days of broadcasting it was looked upon as rather an achievement to receive a programme at all, and interference either by electrical machinery or by oscillation was generally accepted as being more or less inevitable.

Although information has been given in previous Year-Books as to how complaints are handled, a short account of the system adopted may not be out of place in these remarks.

If a listener suffers from interference and writes either to the B.B.C. or to the General Post Office, he will receive a printed questionnaire. This form is worded so that the complainant's answers will give an indication as to whether the trouble is electrical interference at all, or whether it is due to some unsuspected fault having developed in the receiving equipment. Certain faults in a receiver, such as a run-down H.T. battery, or a faulty contact, can make noises which are almost indistinguishable aurally from some types of electrical interference. On the other hand, if it is interference, the replies will provide the precise information required for the investigation of the complaint. When the questionnaire is received by the B.B.C. it is examined and, if it indicates that the complaint is likely to be due to electrical interference, it is forwarded to the General Post Office for investigation on the site. The Post Office,



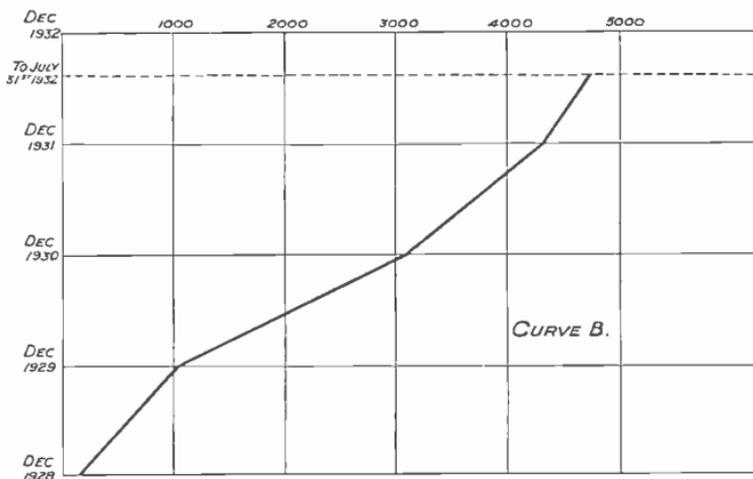
in some cases in co-operation with the B.B.C., has carried out considerable research into the various types of interference, and to-day there are only a few which cannot be cured at a reasonable cost. Quite apart from the research work done in this country, the investigations into similar problems by wireless engineers abroad have been considered and applied where practicable. The engineering headquarters of the General Post Office has been at considerable pains to notify its various district engineers of ways and means of silencing different types of interference, and the system provides for the circulation of the experience gained in one district for the benefit of the others.

It would be impracticable for the B.B.C. to maintain a large staff of "interference" engineers all over the country, as complaints come from the most remote places, and the cost of travelling would be very much more than the cost of the investigation on the spot. It would obviously be uneconomical for an engineer to travel, say, 100 miles merely to try the effect of two condensers across the brushes of an electric motor. On the other hand, it is highly probable that the Post Office would have a competent engineer very much closer to the complainant, and, as the system enables him to know exactly what remedy to try, it becomes feasible for each complaint to be investigated on the spot, and for the most efficient remedies to be applied. The curve "A" shows the variation in the total number of com-

The
Radio
Times

programmes
for a whole week
annotated and
illustrated

*price twopence every Friday
everywhere*



TOTAL NUMBER OF COMPLAINTS RECEIVED EACH YEAR BY THE B.B.C.

plaints received per month by the B.B.C. from July 1st, 1931, to June 30th, 1932; and curve "B" shows the total number of complaints received during the years 1928, 1929, 1930, and 1931. It will be remembered that the Post Office also receives complaints direct from listeners, so that this curve does not represent the total. The total number of complaints recorded by the Post Office and the B.B.C. since November 1928 is 17,000.

In many cases the actual cost of silencing the interference is only a few shillings, and this is usually willingly borne by the owner of the interfering apparatus as an act of good-will. In other cases the G.P.O. engineer demonstrates how the interference can be silenced and the affected listeners themselves pay the small cost of the necessary device. In most cases the elimination of the interference is dealt with in this way, but occasionally the owner of the interfering apparatus will not permit any experiments on his machinery, even though they would not cost him anything or have a detrimental effect on the performance of his equipment. Fortunately these obstinate cases are at present only a few.

Quite apart from research work and the investigation of individual complaints, the G.P.O. is taking all possible steps to co-operate with manufacturers of electrical equipment known

to be likely to cause a disturbance, as it is far more effective to deal with the problem at the source than after the apparatus is marketed and in use by the general public all over the country.

The time has now come when listeners themselves can do much towards helping the Post Office and others who are endeavouring to solve interference problems. If a listener is sufficiently interested to make a complaint of interference to the B.B.C., it seems probable that he will not consciously purchase or hire any electrical equipment which causes electrical disturbances. The B.B.C. therefore recommends all listeners to enquire whether any electrical equipment which they are intending to install is likely to cause interference to the reception of broadcasting, and if there is any doubt about it to ask for a demonstration of the equipment when a programme is being broadcast, so that they can hear whether or not there is any disturbance. In carrying out a test of this sort listeners are advised to tune their receivers to all the transmitters which they habitually receive, as the interference will be more noticeable on some wavelengths than on others and more severe when receiving a weak signal than when receiving a powerful one. For instance it may be found in London that electrical apparatus may cause severe interference when receiving the National programme from Daventry on 1554 metres, but only a very slight disturbance when receiving the same programme from the London National-programme transmitter on 261 metres. If listeners refuse to purchase equipment which causes interference, they will do more towards persuading its manufacturers to silence it than the Post Office or the B.B.C. can do in weeks of negotiation. In some cases protective devices are not fitted to electrical equipment because they increase the manufacturing cost. If, however, the device is manufactured on mass production lines the cost will be very much lower than if it has to be fitted after the apparatus has been installed; quite apart from the fact that the equipment will be easier to sell than equipment which causes interference.

The above suggestion can be taken one step further by really keen listeners who are contemplating changing their homes. Before buying or renting a new house or flat, it might be well to consider whether one is moving into a district where electrical interference is severe. For example, one would not normally

expect to obtain interference-free reception if one took a house beside a tramway route with overhead collectors, unless it so happened that that particular tramway company had fitted protective devices to their cars. Again, one would not normally expect to obtain interference-free reception in a block of flats where certain types of electrical lifts were in constant operation, particularly with an all-mains type of receiver, which would derive its power from the same supply as the lift. A few listeners have already had the foresight to examine the immediate vicinity of their new homes with the possibility of electrical interference in their minds, and being in doubt as to whether some flashing sign or other device would cause trouble, have written to enquire whether it is sufficiently far away to be innocuous in relation to the local strength of broadcast signals.

The B.B.C. or the G.P.O. will always be prepared to give advice on questions of this nature, and in doubtful cases it is possible that the Post Office would be prepared to ascertain reception conditions by means of tests carried out at the listener's proposed new home. It is in ways such as these that the general public can do much to help themselves to achieve freedom from interference.

Finally, where interference is caused by some local authority who will neither modify its apparatus nor permit experiments to be carried out, listeners might bear in mind that, if they are ratepayers, they can themselves bring pressure to bear through their representatives.

WORLD

RADIO

The official technical
& foreign programme
journal of the B.B.C.

The
official organ of
Empire Broadcasting

3d.
EVERY FRIDAY
everywhere

[427]

A TECHNICAL

The B.B.C. has just published an extremely important volume describing technical equipment in Broadcasting House. There are four main sections: Architectural Features of Broadcasting House: Acoustic Treatment of the Studios: Power Supply Equipment: and Programme-input and Control-room Equipment. The book contains a hundred and twelve pages, printed double-column: and seventy-two illustrations from photographs and specially drawn diagrams: and is bound in cloth. It costs 5/-, or direct from the B.B.C. Publications Dept., Broadcasting House, W.1, 5/6 including postage.

[A TECHNICAL DESCRIPTION OF BROADCASTING HOUSE]

DESCRIPTION

THE TRAMWAY PROBLEM

By COL. A. S. ANGWIN, D.S.O., M.C.

THE problem of obtaining good reception of broadcast programmes free from the noises which are associated with the operation of electrical plant has become of increasing interest in recent years, both on account of the large number of listeners who are directly concerned and because of the large amount of experimental work which has been carried out with a view to reducing the disturbance, where practicable, at its source.

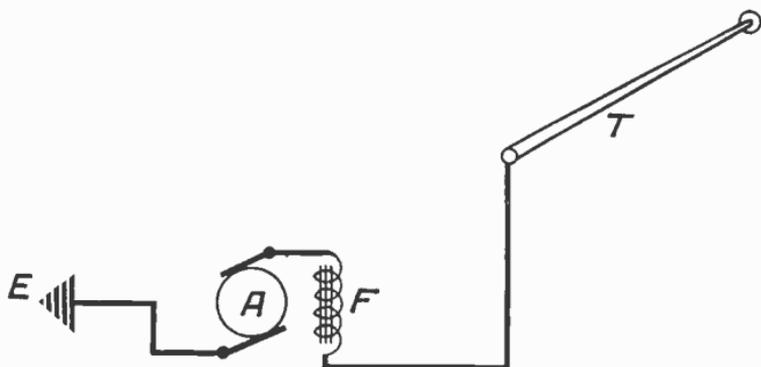
The British Broadcasting Corporation and the Post Office have in the interests of the listener paid special attention to this particular aspect of the general problem of radio interference, and of the many sources of electrical interference which have been investigated, one of the most important is that due to the operation of electric tramways and trolley-bus systems.

The effects of this type of electrical disturbance, in residential districts served by tramways or trolley-buses, are so widespread as to affect seriously the conditions of reception of hundreds of listeners. In some instances, the level of the noise produced by such systems is so high as to spoil completely the reception of even the local station.

In those systems where the electrical energy is conveyed by means of overhead lines and supplied to the vehicles through collectors at the end of trolley arms, the whole arrangement closely approximates to an antenna system, and high-frequency disturbances generated in the electrical mechanism of the vehicle are freely propagated along the overhead lines, acting as a transmitting antenna, and radiated into space, where they are picked up on all receiving aerials in the vicinity.

The investigation and treatment of almost all cases of interference with broadcast reception can only be carried out effectively by close co-operation between all the interests concerned, and this is particularly true of the interference produced by electric traction.

The B.B.C. and the Post Office endeavour to assist the listener as far as possible in the location and elimination of all sources of interference, and have sought the co-operation of the tramway and trolley-bus undertakings as well as that of



- E- EARTH RETURN.*
T- TROLLEY ARM.
A- DRIVING MOTOR ARMATURE.
F- MOTOR FIELD COILS.

FIG. 1.—MAIN CIRCUIT ARRANGEMENT OF A TRAMCAR

the manufacturers in dealing with disturbances from their plant.

The remedial measures which have been taken so far have resulted from this co-operation, the scope of which is being extended with a view to a more complete solution of the problem.

The first experiments were made on tramways, extensive tests being carried out on the Blackpool and Birmingham systems.

One interesting result of these tests was the clear establishment of the fact that the greater proportion of tramway interference arises from the traction and compressor motors, and the operation of the controller, brakes, etc., whilst the collector system generally contributes very little to the total disturbance.

A fairly obvious means of minimising radiation of the high-frequency disturbances generated within a tramcar is to introduce a choke coil of high impedance between the main circuit and the overhead conductors. In order to minimise the extent and cost of alterations to the equipment, an attempt was made to utilise the field coils of the traction and compressor motors

for this purpose. By transposing these coils from the low to the high potential side of the motors, it was found that they could be made to act as high-frequency chokes between the motor armatures and the overhead collector wires, in which position both the volume of interference and the length of route over which such interference extended were considerably reduced. Figure 1 shows in diagrammatic form the circuit arrangement of a tramcar with transposed field coils.

The arrangement described above has been adopted by a number of tramway undertakings. The method cannot be applied to all existing systems owing to difficulty of plant layout, voltage breakdown of coil insulation, and controller sparking. In such cases modifications of the arrangement, such as splitting the field coils and arranging them on each side of the armature, as well as the fitting of an auxiliary stopper coil, have been found to give a marked degree of improvement.

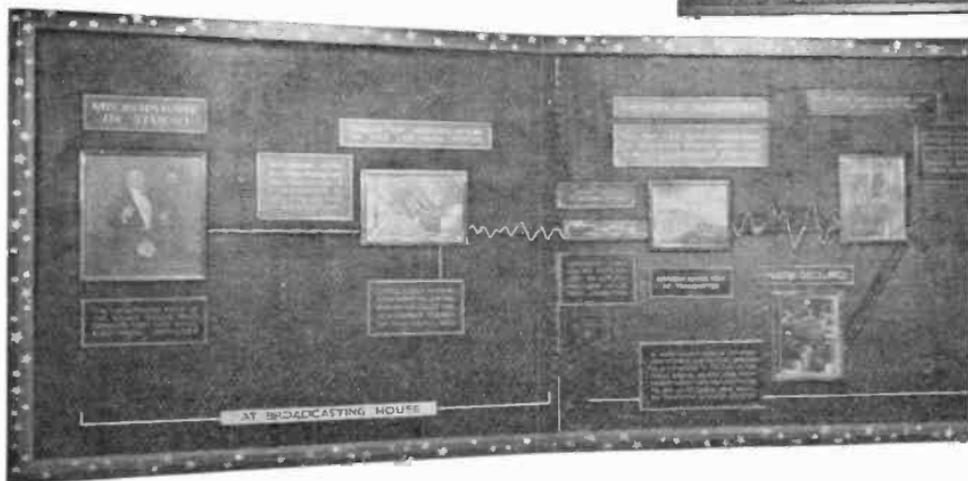
Although a certain measure of success was obtained by the adoption of these expedients on tramways, it was found that similar means were less effective in trolley-buses employing an overhead return.

Following the adoption of this system of traction in the London area, the number of complaints from listeners were so numerous and widespread that a more effective cure was urgently sought for and applied.

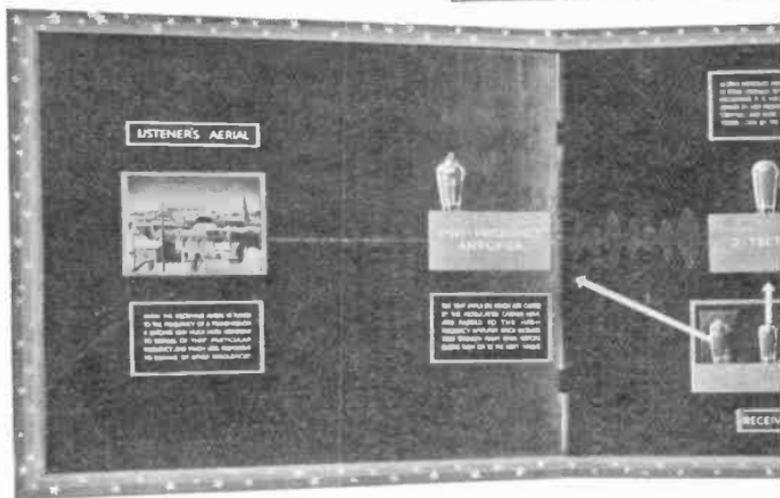
The interference was most pronounced on wavelengths in the neighbourhood of 300 metres, but interference in the nature of clicks was also heard on 1500 to 1600 metres. The interference was high-frequency in character, was produced by various items of electrical equipment of the bus, and then radiated from the overhead feeders. The resulting noise in the receiver consisted of a continuous background roar, fluctuating in volume and punctuated by clicks and crashes of varying intensity.

As an immediate palliative, choke coils, one in the lead to each trolley arm, appeared to be likely to afford relief. A coil having a natural resonance within the lower broadcast waveband and giving a large impedance on the London National and London Regional frequencies was designed for this purpose. The coils consisted of bared copper strip, having a cross section suitable for the peak load currents of the bus and were wound on a $2\frac{1}{2}$ " spider, the insulation between turns being of asbestos

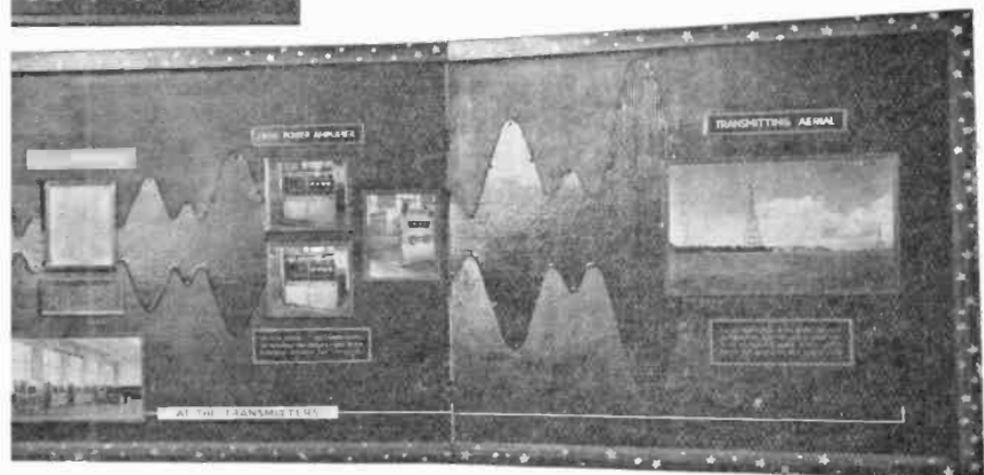
BROAD



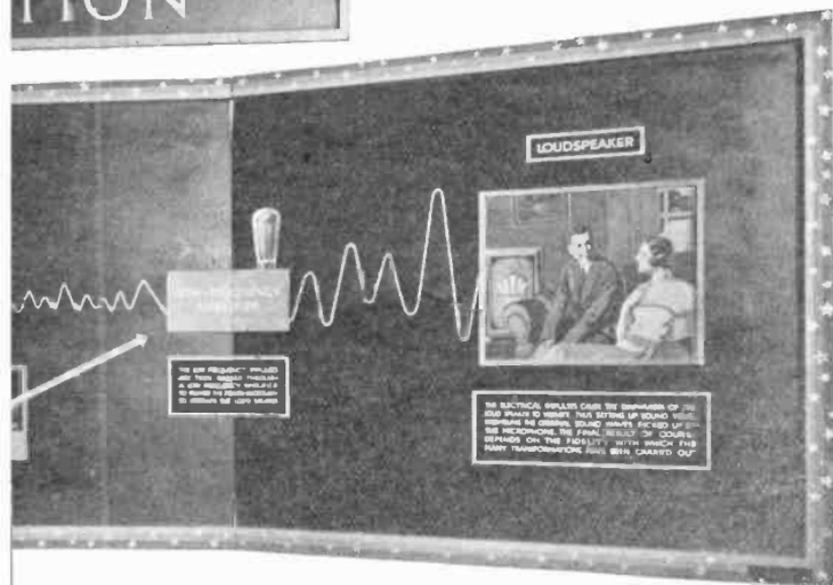
RECE



CASTING



ATION



OF THE CHAIN OF TRANSMISSION

[433]

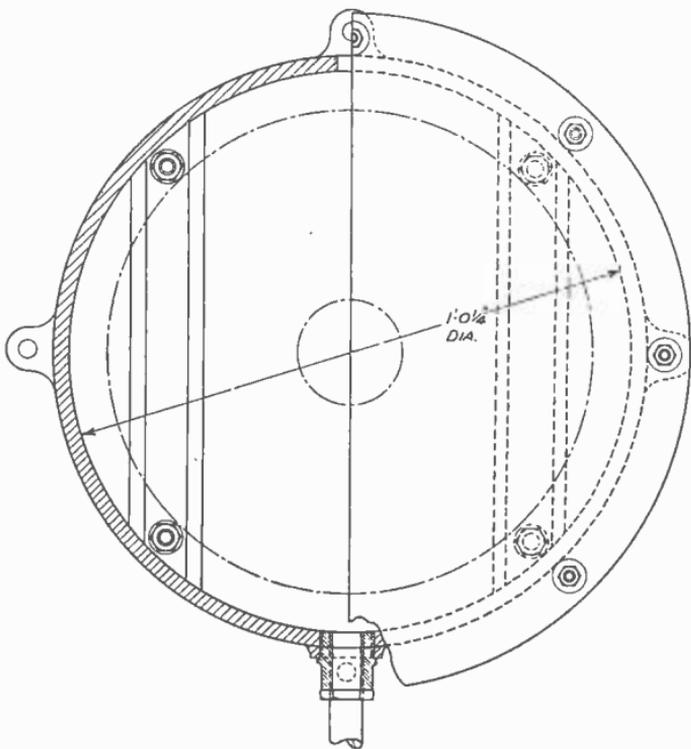
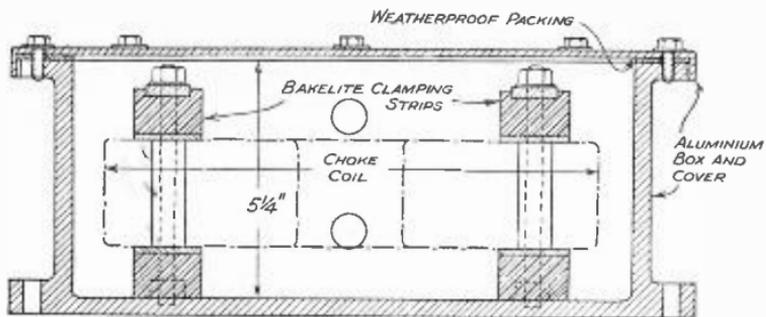


FIG. 2.—CONSTRUCTIONAL DETAILS OF TROLLEY-BUS COPPER COIL

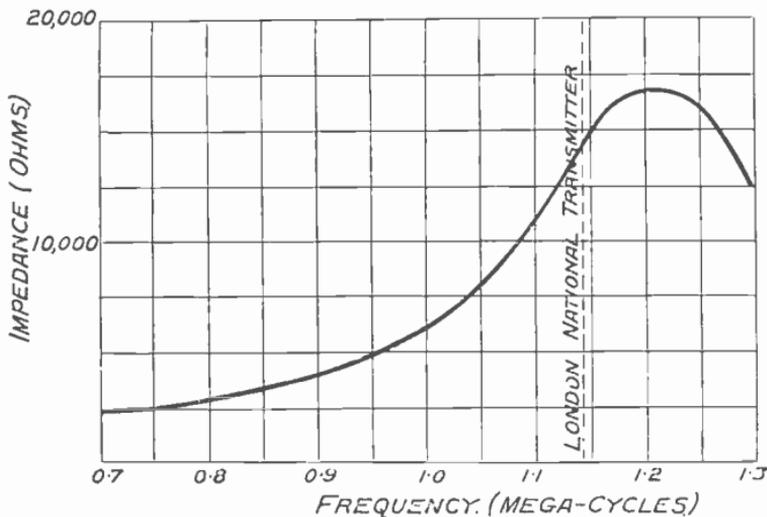


FIG. 3.—IMPEDANCE-FREQUENCY CHARACTERISTICS OF TROLLEY-BUS COPPER COIL

strip $\frac{1}{8}$ " thick. The construction of the coils is shown in Figure 2. Figure 3 shows the impedance-frequency characteristics of the coil.

Preliminary tests with these coils gave considerable satisfaction, as a result of which the London United Tramways Company decided to fit them to the whole fleet of 60 buses on the Twickenham and Kingston-on-Thames routes. Tests made under full service conditions indicated that the interference to the London Regional and London National stations was practically eliminated; the signal (music) to noise (occasional clicks) ratio being of the order of 36 decibels. On the Midland Regional station, faint noises only could be heard and, unless particularly searched for, would not be noticed by a listener. The signal to noise ratio in this case was of the order of 13 decibels.

An oscillographic record of the noise from six buses is shown in Figure 4,

- (a) giving the result for the untreated condition and
- (b) showing the effect of fitting the coils.

In regard to the general adoption of stopper coils, although they have proved satisfactory for the particular types of buses and for the broadcasting service area for which they were

WORLD-RADIO STATION IDENTIFICATION
PANELS

This is a practically complete list of Continental broadcasting stations, with full details of wavelengths, power, opening and closing signals, etc. It has proved one of the most popular of all B.B.C. publications, and has passed through innumerable editions: the latest, in addition to having been fully revised, has been redesigned to make the entry of dial-readings and notes easier. It contains a small, but extremely useful, map of Europe.

WORLD-RADIO CALIBRATION CHARTS

This booklet explains, in the simplest possible way, the scientific method of logging foreign stations—that is by directly calibrating the set. It is fool-proof and easily carried out; specimen graphs are given, together with an ample supply of the squared paper necessary. A pocket is supplied, in which supplementary notes may be kept.

PRICE ONE SHILLING EACH POST FREE

from

The B.B.C. [Publications Dept.] Broadcasting House, W. 1



(a) 6 BUSES RUNNING, NORMAL CONDITION



(b) 6 BUSES RUNNING, TREATED CONDITION

FIG. 4.—OSCILLOGRAPHS OF NOISE FROM A TROLLEY-BUS SYSTEM

designed, further experiments on other types indicate that alternative methods may give better results.

In a certain trolley-bus system, for example, the main interference on the medium waveband was traced to the compressor motors. A cure was obtained by fitting a filter, consisting of two chokes and two condensers, in the compressor motor leads and located as close to the motor as possible. Even with the condensers removed the residual interference was very slight. Main stopper coils were ineffective in this case so far as compressor motor noise was concerned, although they were successful in eliminating noise from the main driving motors which interfered with reception only when running under heavy-load high-speed conditions. A further interesting feature of this case was the interference on the long waveband, caused by the mercury rectifiers at a sub-station feeding direct current to the system.

It is a sound principle in all cases of electrical interference to endeavour to remove the cause of interference at its source or as close to the source as possible, and this policy has been proved to give such successful results in other cases that efforts are now being concentrated on an analysis of the various items of electrical equipment in tramways and trolley buses with this object in view.

So far as the work has proceeded to date, it appears that main circuit chokes will be required to deal with driving motors unless a non-interfering type can be produced. At present some motors cause interference when under load and some when

coasting. In those cases where collector noise at cross-overs and feeding points is troublesome, a considerable reduction has been obtained on a tramway system by connecting a condenser from the high potential side of the circuit to the frame of the car. A condenser connected between the high and low potential sides of the circuit in the case of a trolley bus will probably have a similar effect.

The interference arising from the making and breaking of low current circuits is found to be much greater than from heavy current circuits. Thus a master control circuit causes much greater interference than the operation of contacts in the main circuit. The noise from a master control circuit can, by means of a filter, be reduced at its source and prevented from directly reaching the overhead conductors, but it has been found that the currents in the control circuit induce currents in the main circuit wiring which find their way to the overhead network. Screening may prevent this, but the best way remains to be determined by experiment. In regard to compressor motors or similar auxiliary items, the interference can generally be reduced by a filter at the source, and this is very desirable in those cases where coupling exists between the compressor motor circuit and other circuits such as lighting circuits.

The importance of this problem is indicated by the large number of complaints received from broadcast listeners where reception is seriously affected by the operation of trams and trolley-buses. The extension of trolley-bus systems has emphasised the desirability of effecting as soon as possible such modification of design as may be possible without prejudice to the normal operation of the equipment and without prohibitive cost. In this way the subsequent addition of devices to the equipment to serve as palliatives to disturbances generated in the equipment may be avoided.

The problem is not peculiar to this country alone and has been the subject of much interest internationally. It may, however, be claimed that the co-operation existing in this country between the operating undertakings, the manufacturers of the equipment, and the departments and organisations responsible for the distribution and reception of broadcasting, is likely to produce results which will be of international interest in providing an acceptable solution to the problem.

the Listener

There is no other weekly paper quite like THE LISTENER. For one thing, it has no political bias of any kind. Its political contributions come from the leaders of all parties and from the acknowledged experts—in this country and abroad—on economic questions. The full list of its contributors, on every subject of importance today, is really remarkable. For another thing, it is illustrated, mostly by photographs, carefully chosen, and equally carefully printed.

It costs threepence, every Wednesday, and can be obtained from all newsagents and booksellers.

THE LISTENER, PUBLISHED BY THE BRITISH BROADCASTING CORPORATION.



A SEAL BEING TELEVISED

TELEVISION IN 1932

By J. L. BAIRD, Managing Director of Baird Television, Ltd.

N O O N E W I L L G A I N S A Y that the year 1932 has proved to be a most important landmark in the development of this newest of sciences—television.

After nearly three years of experimental transmissions emanating from the Baird Studios in Long Acre and broadcast by the London Regional transmitter of the B.B.C., a sufficient degree of advancement has been made to justify the B.B.C. taking over the studio side of the work. In my opinion this constitutes the most important step which has yet been taken towards the realising of proper commercialisation and the introduction of television to the public at large.

It may come as a surprise to many to learn that as far back as 1926 television transmissions were broadcast by the B.B.C. These, however, were of an entirely experimental nature and were received only on our own machines; for apparatus at that date was not in the hands of the public. From these crude beginnings we were able to establish that television could be broadcast successfully by the B.B.C. transmitters, and from that date a steady progress commenced.

Negotiations with the B.B.C., which took place over a rather lengthy period, culminated in September 1929, when the first official broadcast of television was made through the new London Regional Station at Brookmans Park. A spirit of friendly collaboration was established and considerable technical knowledge of this important side of television has been acquired.

Steady progress then commenced, one of the results of which was the broadcasting of the play "The Man with the Flower in his Mouth," which was due to the united efforts of Mr. Sydney A. Moseley, Mr. Val Gielgud, and Mr. Lance Sieveking.

Another landmark in television progress was reached in June 1931, when a view of the winning post at the Derby was broadcast. This was repeated in 1932.

The most valuable result of the years of experimental broadcasting which have been gone through has been the acquiring of a vast amount of technical experience. I feel, now that the B.B.C. has taken over the programmes and transmissions,

advancement will be most rapid and the public can look forward to television programmes of sustained entertainment value.

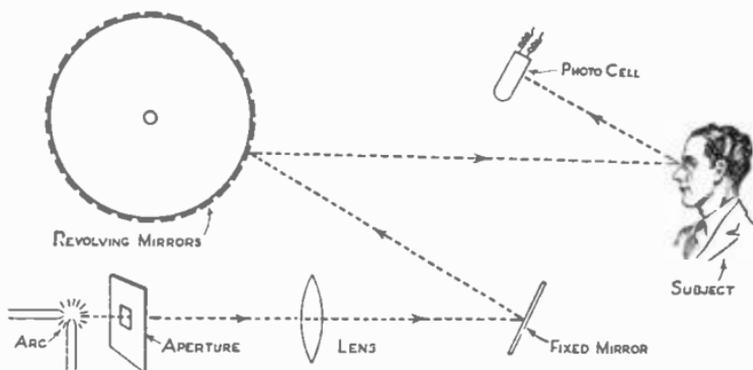
In spite of the large amount of information which has been disseminated on the subject of television, I find that the majority of the general public are still in complete ignorance of what television means and how the process is effected.

In the space at my disposal, therefore, I propose briefly to outline both the transmitting and receiving sides of the problem.

First of all we mean by television the process of being able to see, through the medium of electrical methods of transmission, the reproduction of images of living, moving, or stationary objects which are at some distance from the observer. It can really be looked upon as the reproduction of sight, for it is possible to witness visually what is happening at some distance just as if we were eye-witnesses on the spot.

Coming to the process itself, the subjects to be televised are positioned in front of a Baird spot-light transmitter and explored by a rapidly moving spot of light. For the purpose of explanation let us assume we are televising the head and shoulders of an artist. In front of him is a powerful source of light which is broken up mechanically into a rapidly moving spot. This is effected by having a beam of light projected on to a revolving drum around whose outer edge are positioned mirrors, each one set at a slightly different angle to its predecessor. The effect is to cause a tiny area of light to move from the bottom to the top of the subject's features and thus create a strip of light. Immediately this one spot has finished its movement, a second spot takes its place and performs an identical movement, except that this second strip is displaced to the left of the original strip. In this way 30 strips of light are built up side by side, each strip just touching its neighbour on either side, and although at any one instant only a tiny spot is visible, the process is carried out so rapidly, namely, $12\frac{1}{2}$ times per second, that an onlooker would have the impression that the artist was completely illuminated.

A bank of photo-electric cells is placed in front of the artist, and this "television eye" follows the movement of the spot of light and picks up that amount of light which is *reflected* from the spot playing on the subject being televised. A corresponding current variation is then produced in the cell circuit, and at the

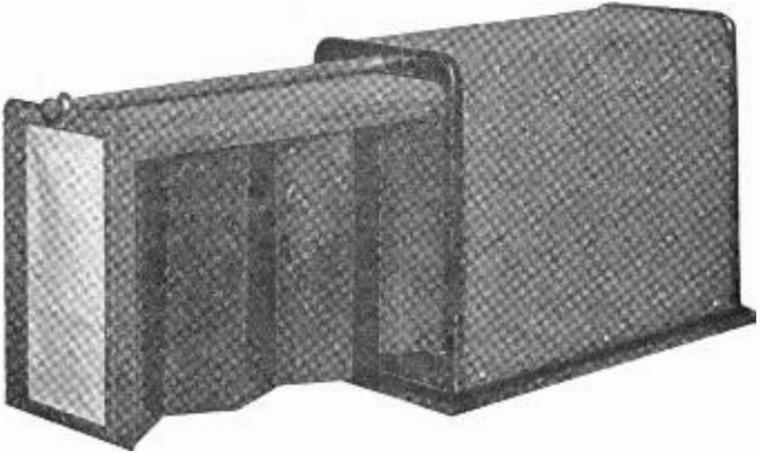


next instant, when the spot has moved to its adjoining position in the light strip, a different amount of light is reflected and the cells respond accordingly.

In this simple way the scene is analysed, and the television signals are made to modulate the carrier-wave sent out by the broadcasting station and are transmitted through space as ordinary wireless signals. These can be detected and received in the normal manner by anyone possessing a wireless receiver. If, however, the individual tuned in vision radio signals and passed them on to a loudspeaker, he would be rewarded with a peculiar note which makes no pretence at being musical. On the other hand, if the signals from the output circuit of the wireless receiver are passed to a "Televisor receiver," then the result will be an intelligible image which, in effect, is a replica in miniature of the artist in the television broadcasting studio.

The vision-receiving apparatus, in order to bring this about, must consist of a source of illumination, the intensity of whose light can be made to fluctuate in exact conformation to the variations which originally take place in the photo-electric circuit at the transmitting end. In the original disc model machine this source of illumination was a flat plate neon lamp whose large electrode glowed brightly or darkly according to the signal strength which was made to modulate it.

In the new model machine, however, this neon lamp has been replaced by a projection lamp whose beam of light is now modu-



THE NEW BAIRD "TELEVISOR" (RECEIVER), WHICH GIVES A BLACK-AND-WHITE IMAGE ON A SCREEN

lated by being passed through Nicol prisms and a glass cell filled with nitro-benzene, in which plates, similarly arranged to accumulator plates, are immersed. These plates are connected to the output of the wireless receiver, and as the voltage varies, the light passed by the cell varies in unison. This grid cell is a modification of the cell used many years ago by the physicist Kerr in his experiments with polarised light, but the use of grids in place of simple plates enables a low voltage to be employed and renders the device practical. The beam of light modulated by the grid cell is projected on to a revolving mirror drum, and this in turn is reflected on to a translucent screen positioned in front of the drum. Since the whole process is effected at a speed of $12\frac{1}{2}$ times per second, the characteristic lag or persistence of vision of the eye interprets this as a continuous movement, in much the same way as the still pictures projected on to a screen at an ordinary cinema are built up into the continuous and apparently unbroken movement owing to this same property of the eye.

TELEVISION ABROAD

In Germany, Fernseh A.G., a combination of the Baird Company, the Zeiss Ikon Optical Company, the Bosch Magneto Company, and the Loewe Radio Company, which was formed in

1929 to develop our system of television, has supplied a transmitter to the German Post Office which is very similar to that used by the B.B.C., and television in Germany is developing along parallel lines to developments in this country and we work in the closest collaboration.

A similar state of affairs exists in France, where Television Baird-Nathan is using the wireless station P.T.T. on the outskirts of Paris for the experimental broadcast of television, and we are now constructing a transmitter for them on the same lines as that being used in Broadcasting House.

In the United States of America extensive work is being done with television by the members of the huge combine known as the Radio Trust, and in addition numerous broadcasting stations are sending out television transmissions similar to those in Europe. The Baird Company of England has an affiliated Company in America, and last year W.M.C.A., one of the large broadcasting organisations of New York, arranged to take up the British system for broadcasting television, in preference to any American system offered them. An agreement was fixed with them, but the British Company was refused permission to broadcast in America by the Federal Radio Commission on the grounds that—to quote one of the leading technical journals:—

“ . . . although the application was made in the name of W.M.C.A., an American Company, the proposed station would be operated jointly with Baird Television Corporation, Ltd., a British concern. According to the Commission, the granting of a licence would, in effect, give undue authority to the British Company in violation of the section of the Radio Law prohibiting alien ownership or directorates of Companies holding wavelength privileges in the United States.”

It might be advantageous to our “Buy British” policy if this country were to adopt a similar attitude towards American-controlled concerns.

TELEVISION FOR THE CINEMA

The application of television to the cinema and places of public entertainment involves the use of a large screen, and considerable development work has been done in this direction.

A MAP

The B.B.C. has prepared, under the advice of Rear-Admiral H. P. Douglas, C.M.G., Hydrographer to the Royal Navy, an important map, designed especially to assist in the reception of European broadcasts. It is really serviceable, and has been designed so that it stands up to hard wear. The size is 36 ins. × 46 ins., and it is printed in colours and mounted on linen.

It will be found invaluable by all users of portable & long-distance sets.

[WORLD-RADIO BROADCASTING MAP OF EUROPE.
PRICE 3s. POST FREE FROM THE B.B.C., BROADCASTING HOUSE.]



MISS AMY JOHNSON AND MR. J. A. MOLLISON BEING TELEVISED ON THE LATTER'S RETURN TO ENGLAND AFTER HIS ATLANTIC FLIGHT

The broadcasting of the play "The Man with the Flower in his Mouth" was not only shown on the ordinary "Televisor" receivers but was also shown to a large audience on the roof of the Baird Long Acre premises on a screen 2 feet by 5 feet, and the same screen was shown in Paris, Berlin, and Stockholm; but while it attracted large audiences, the pictures could not in any way compare with the cinematograph, and the attraction was one of novelty.

Since that time the screen has been so far developed that it is now approaching the perfection necessary to give full entertainment value apart from the curiosity attraction, and I believe that one of the largest fields for television lies in the cinema of the future.

A short while ago the B.B.C. issued, in a handsome edition, a comprehensive description of its new headquarters, Broadcasting House. Altogether, this book contains a hundred and sixteen illustrations, four of which are reproductions from coloured photographs, and another fourteen coloured floor plans and maps, intended to give the reader a complete idea of the lay-out of the building. The remaining ninety-eight illustrations show in detail the exterior and interior: the studios, control rooms, and offices, with particulars of the decorations. There is a thirty page introduction, and the book is bound in a fine vermilion cloth. [Broadcasting House. An illustrated description: price 5/- or by post from the B.B.C. 5/9, including postage.]

APPENDIX

P

[449]

a

B . B . C . A D D R E S S E S



Headquarters

HEAD OFFICE AND NATIONAL AND LONDON REGIONAL STUDIOS	}	Broadcasting House, London, W. 1.	Telegrams: Ethanuze London. Telephone: Welbeck 4468.
---	---	--------------------------------------	---

Regional Centres *Telegrams and Telephone*

MIDLAND REGION	282, Broad Street, Birmingham.	3761 Midland Bir- mingham.
WEST REGION	39, Park Place, Car- diff.	2514 Cardiff.
NORTH REGION	Broadcasting House, Piccadilly, Man- chester.	City 8396 Manchester.
SCOTTISH REGION	5, Queen Street, Edinburgh.	30111 Edinburgh.
BELFAST	31, Linenhall Street.	Belfast 5870.

Other B.B.C. Offices

ABERDEEN	15, Belmont Street.	2296 Aberdeen.
BOURNEMOUTH	72, Holdenhurst Road.	3460 Bournemouth.
BRISTOL	23 Whiteladies Road, Clifton.	23621 Bristol.
(until March 1933)	Midland Bank Cham- bers, 81A, Queen's Road, Clifton.	
GLASGOW	282, West George Street.	5230 Douglas, Glas- gow.
LEEDS	Broadcasting House, Albrecht Buildings, Woodhouse Lane.	Leeds 28131.
(until March 1933)	Cabinet Chambers, Basinghall Street.	
NEWCASTLE	54, New Bridge St.	Newcastle 20961.
PLYMOUTH	Athenæum Cham- bers.	2283 Plymouth.
SHEFFIELD	47, Corporation St.	24227 Sheffield.
SWANSEA	Oxford Buildings.	3107 Swansea.

VISITS TO B.B.C. STUDIOS

Visits fall into two categories: (1) Presence in the studio during a broadcast, usually of a variety programme; (2) conducted tours round the studios. For either, application should be made to the Director of the B.B.C. Station concerned, but the following points may be of interest:—

London. It has been found from experience since the B.B.C. moved into Broadcasting House that, owing to the serious interference caused to transmissions or rehearsals taking place in the various studios, it is impossible to accede to all of the large number of applications for tours round the building.

Variety Audiences: lists closed until further notice.

Manchester. Audiences are allowed. Applicants should state type of programme and number of party, maximum 25: evening visits only.

Edinburgh. Audiences are allowed for both variety programmes and orchestral concerts. Accommodation for about 300.

Cardiff. Conducted parties, but not studio audiences, as accommodation is too limited.

WAVELENGTHS OF BRITISH STATIONS

Wave-length, M.	Power, kW.	Station.	Dial Readings.	
1554.4	30	Daventry National		
480	50	North Regional		
398.9	25	Midland Regional	84	151
376.4	50	Scottish Regional	87	137
356	50	London Regional		
309.9	1	Cardiff		
301.5	50	North National (Manchester)		
288.5	50	Scottish National		
	1	Swansea		
	1	Plymouth		
	1	Bournemouth		
261.6	50	London National	60	110
242	1	Belfast (Ireland)		
214.3	1	Aberdeen		
211.3	1	Newcastle		

WEATHER FORECASTS

- 10.30 a.m. Daventry 5XX. Weather Forecast for ships. Read twice—first at natural speed, second time at long-hand dictation speed.
- 6.0 p.m. General Weather Forecast (National Programme).
- 9.0 p.m. General Weather Forecast (National Programme).
- 10.15 p.m. General Weather Forecast (Regional Programme).
- 11.00 p.m. Daventry 5XX. Weather Forecast for ships only.

In addition:—

Gale Warnings are broadcast with the Shipping Forecasts, and at 1.0, 4.45, 6.0, and 9.0 p.m., and on Sundays at 4.15 p.m., when received from the Meteorological Office.

Navigational warnings are broadcast with the Shipping Forecast at 11 p.m. when received from the Admiralty.

T H E R A D I O C I R C L E

The Radio Circle consists of two sections:—

1. The Junior, for listeners between the ages of 4 and 14 years inclusive.
2. The Senior, for listeners over 14 years of age.

Membership is for one year only, but may be renewed. The annual subscription of ninepence is due on January 1st in each year, but newcomers may join the Circle at any time. The first subscription entitles the newly-joined member to a badge, which takes the form of an enamelled device, common to all Stations—with a special pendant for each local branch. Subsequent subscriptions entitle rejoining members to a card of membership or some other token. Birthday greetings are broadcast to all members of the Junior Section, and to members of the Senior Section who have attained the age of 100 years or more. There are now no membership numbers. Applications for membership should include full name, full address, and, for the Junior Section, the day, month, and year of birth. Some Stations have printed forms which are sent on request and facilitate registering. All applications should be accompanied by the subscription of ninepence.



A MAP OF THE AREAS ALLUDED TO IN THE DAILY SHIPPING FORECASTS BROADCAST FROM DAVENTRY (5XX)

RULES FOR S.O.S. MESSAGES

I. FOR RELATIVES OF SICK PERSONS

The B.B.C. will broadcast messages requesting relatives to go to a sick person only when the Hospital Authority or the Medical Attendant certifies that the patient is *dangerously* ill, and if all other means of communication have failed.

Note.—When the person sought is known to be on board a ship at sea, a message can only be broadcast if the ship is not equipped with apparatus for the reception of messages by wireless telegraphy. Further, there must be a possibility that the return of the person sought can be hastened by the reception of such a message. This is not considered to be the case where the ship is on its way to a known port. In such cases, inquirers are advised to communicate with the owners or agents of the ship or with the port authorities.

In no case can an S.O.S. be broadcast requesting the attendance of relatives *after* death has occurred.

2. FOR MISSING PERSONS

Apart from official messages originated by the police, the B.B.C. does not normally broadcast messages concerning missing persons. Exceptions are only made where there are specially urgent circumstances.

Such circumstances are usually considered to exist when there is a likelihood of harm coming to the missing person because he or she is either :—

- i. Mentally deranged or in a bad state of health, such as suffering from acute depression.
- or ii. Old or feeble.
- or iii. A child.

Such circumstances must be confirmed and certified by the Police, who have been asked by the B.B.C. to judge, in addition, whether the circumstances generally justify a broadcast message, or whether any useful purpose is likely to be served thereby.

All applications in connection with the broadcasting of such descriptions must, therefore, be made to the local Police, and no direct application will be entertained by the B.B.C. The Police, if they are satisfied that the urgent circumstances, described above, exist, will pass the certified message to the B.B.C. through the appropriate channel.

Requests for witnesses of accidents are not broadcast except when contained in official messages originated by the Police.

3. No message can be broadcast regarding lost animals or property.

No message can be broadcast more than once except in special circumstances.

No charge is made for broadcasting S.O.S. messages.

THE TIME SIGNAL SERVICE

Time.	Signals on Daventry National Programme.	Signals on Regional Programme.	Notes.
Week-days.			
10.15 a.m.	Big Ben	Big Ben	<p>The official Broadcasting Time Signal service is that which is received from Greenwich Observatory and radiated from Daventry 5XX. These signals will <i>invariably</i> be radiated by this transmitter at the advertised times.</p> <p>All transmitters radiating the Regional programme will broadcast these signals at the times shown, unless superimposition on a particular programme is strongly inadvisable on artistic grounds.</p> <p>Transmitters operating in accordance with the National programme time-table will radiate the Greenwich Time Signal only when the Daventry National programme is being relayed, and not when the programme is other than that of Daventry.</p> <p>Big Ben will be broadcast in accordance with the chart when possible and will, in addition, be radiated at the beginning of any programme emanating from London should the time be favourable.</p> <p>The Greenwich Time Signal, consisting of six dot seconds, is accurate to one-twentieth of a second: the sixth dot indicates the time.</p> <p>Big Ben is normally accurate to within half a second, and the time is indicated by the first hour stroke of any hour or the first chime stroke of any quarter.</p>
10.30 a.m.	G.T.S.	G.T.S.	
12.00 noon.	Big Ben	Big Ben	
1.00 p.m.	G.T.S.	G.T.S.	
4.45 p.m.	G.T.S.	—	
5.15 p.m.	Big Ben	Big Ben	
6.00 p.m.	G.T.S.	G.T.S.	
6.30 p.m.	Big Ben	Big Ben	
8.00 p.m.	—	G.T.S.	
9.00 p.m.	G.T.S.	—	
10.15 p.m.	—	G.T.S.	
11.30 p.m.	G.T.S.	—	
12.00 midn.	Big Ben	Big Ben	
Sunday.			
10.30 a.m.	G.T.S.	—	
12.30 p.m.	Big Ben	Big Ben	
4.15 p.m.	G.T.S.	—	
5.00 p.m.	—	Big Ben	
9.00 p.m.	G.T.S.	G.T.S.	
10.30 p.m.	Big Ben	Big Ben	

FORTHCOMING B.B.C. PUBLIC CONCERTS IN THE QUEEN'S HALL

1932

December 31, Opening Concert of the Christmas Season of
New Year's Promenade Concerts, conducted by Sir Henry
Eve Wood.

1933

January 2	Promenade Concert—Wagner.
January 3	Promenade Concert—Russian.
January 4	Promenade Concert—Miscellaneous.
January 5	Promenade Concert—Delius.
January 6	Promenade Concert—Beethoven.
January 7	Promenade Concert—Handel.
January 9	Promenade Concert—Wagner.
January 10	Promenade Concert—Miscellaneous.
January 11	Promenade Concert—Bach.
January 12	Promenade Concert—Miscellaneous.
January 13	Promenade Concert—Beethoven.
January 14	Promenade Concert—Miscellaneous.
January 25	Symphony Concert—Adrian Boult—Huberman.
February 1	Symphony Concert—Adrian Boult—Harriet Cohen, Roy Henderson—The Philharmonic Choir.
February 8	Symphony Concert—Arnold Schönberg, Adrian Boult—Elena Gerhardt.
February 15	Symphony Concert—Adrian Boult—Schnabel.
February 22	Symphony Concert—Sir Henry Wood—Lamond.
March 8	Symphony Concert—Sir Henry Wood—May Blyth, Adolf Busch.
March 15	Symphony Concert—Adrian Boult—Cortot.
March 22	Symphony Concert—Sir Henry Wood—Adelheid Armhold, Parry Jones, Arthur Cranmer, Harold Williams, The B.B.C. Chorus.
March 29	Symphony Concert—Adrian Boult—Backhaus.
April 14	Good Friday Concert.
May 8	London Music Festival—Adrian Boult—Brahms Centenary Concert.
May 10	London Music Festival—Adrian Boult—Brahms Centenary Concert.
May 12	London Music Festival—Adrian Boult—Brahms Centenary Concert.
May 15	London Music Festival—Serge Koussevitzky.
May 17	London Music Festival—Serge Koussevitzky.
May 19	London Music Festival—Serge Koussevitzky.

[456]

THE B.B.C. SYMPHONY ORCHESTRA

Conductor: ADRIAN BOULT

<i>First Violins</i>	<i>Violoncellos</i>	<i>Heckelphone and Bass Oboe</i>	<i>Piccolo Trumpet in D</i>
Catterall, Arthur (<i>Leader</i>)	Kennedy, Lauri		
Turner, L.	Gauntlett, A.	Field, John	Hall, Ernest
Wilson, Marie	Shinebourne, J.		
Hill, F. W.	Clark, Raymond		
O'Donnell, M.	Muscant, P.	<i>Clarinets</i>	<i>Cornets</i>
Rutledge, E.	Beers, B.		
Peatfield, T.	Nifosi, A. P.	Thurston,	Mackintosh, Jack
Hinchliffe, Jessie	Beattie, C. D.	Frederick	Hamilton, H.
Cass, W. J.	Ford, A.	Clarke, R.	
Washbourne,	Revell, H. A.	Tschaikoff, A.	
Kathleen	Blackford, G.		<i>Bass Trumpets</i>
Blech, H.	Briggs, R.		
Houghton, Doris		<i>E flat Clarinet</i>	Falkner, A.
Bor, S. H.			Shackleton, A.
Bates, Doris	<i>Double Basses</i>	Clarke, R.	
Meachem, J.	Cruft, Eugene		<i>Trombones</i>
Bailey, Enid	Hobday, C.		
Good, R.	Sutton, S.	<i>Bass Clarinet and Saxophones</i>	Langston, Sidney
Mason, Lena	Powell, F. G.		Falkner, A.
Tookey, W.	Chesterman, E. D.	Lear, Walter	Garvin, S.
Braham, Editha	Burton, D.		Shackleton, A.
	Murray, G. T.		
	Conhoff, C.	<i>Clarinet and Saxophones</i>	<i>Bass Trombones</i>
<i>Second Violins</i>	Cokerill, A. E.		
Squire, Barry	Robinson, R. E.	Whelan, P.	Taylor, Frank
Ungerson, J.			Risdon, J.
Caprara, E. G.	<i>Flutes</i>		
Hamilton, J.		<i>Bassoons</i>	<i>Tuba</i>
Stratford, E.	Murchie, Robert		
Malcolm, E.	Almgill, F.	Newton, Richard	Glynn, Frank
Sherman, A.	Whittaker, K.	Wilson, A. E.	
Thornton, Evelyn		Hinchliff, E.	
Browne, L.		Fawcett, N.	
Hepton, A.	<i>Piccolos</i>		<i>Tympani</i>
Lones, Gwen		<i>Contra-Bassoon</i>	
Young, J.	Walker, Edward		
Ellingford,	Almgill, F.	Dickie, Thomas J.	Gillegin, E.
Constance		Hinchliff, E.	Franklin, R. G.
Kenning, H.	<i>Bass Flute</i>		
Pirani, Leila			<i>Percussion</i>
Pusey, Violet	Stainer, Charles		
		<i>Horns</i>	Wheelhouse, F. H.
<i>Violas</i>			Lees, J. B.
Shore, Bernard	<i>Oboes</i>	Brain, Aubrey	Bender, C.
Sainton, P.		Alexandra, J. F.	
Bray, E.	Whittaker, Alec	Thonger, A.	
Wolfe, Anne	Pantling, J.	Thornton, H. F.	
Harding, K.	Field, J.	Graydon, M.	<i>Harps</i>
Gladden, Mary	Gaskell, Helen	Cursue, A. J.	
Carrell, N.			Goossens, Sidonie
Hart, Muriel	<i>Cor Anglais</i>	<i>Trumpets</i>	Chevreau, Jeanne
Southworth, L.			
Copperwheat,	MacDonagh,	Hall, Ernest	<i>Organ and Celesta</i>
Winifred	Terence	Pritchard, E.	
Wyand, H. B.	Pantling, J.	Barr, H.	Mason, Berkeley
Lucas, Patience	Gaskell, Helen		
Knowles, J. G.			
Edwards, G.			

THE B.B.C. THEATRE ORCHESTRA

Conductor: STANFORD ROBINSON

First Violins	Brearley, Montague (<i>Leader</i>). Kelley, S. Kneale (<i>Sub-leader and sub-conductor</i>). Davidson, Belle. Macpherson, Ernest.	Clarinets	Kealey, Wilfred. Clarkson, George. Butler, Alfred G. Walding, Frank. Chapman, W. Merriman, Richard. Dudley, J. W.
Second Violins	Busfield, Leonard. Pringle, Elsie. Wyatt, Ernest.	Bassoon	
Violas	Lowe, Harold. d'Oliveira, Louis.	Horns	
'Cellos	Collins, Michael. Goddard, Cecil H.	Trumpets	
Double Bass	Merrett, James.	Trombones:	
Flute and Piccolo	Flack, Lambert.	Tenor	Sherringham, Robert.
Oboe and Cor Anglais	Black, John.	Bass
		Timpani and Percussion	Wilson, Herbert J.
		Saxophones:	
		First alto	Clarkson, George.
		Second alto	Goddard, Cecil H.
		Tenor	Kealey, Wilfred.
		Guitar and Banjo	Collins, Michael.

THE WIRELESS MILITARY BAND

Conductor: B. WALTON O'DONNELL

Oboes	B flat Clarinets	Bassoons	Trumpets
Brand, J. Macarthy, J.	Draper, H. Matthews, W. Anderson, G.	Draper, P. Vinter, G.	Wild, H. Harman, H.
Flutes	Horns	Trombones	
Cleghorn, A. Smith, W.	Booth, L. Crosoer, R. Jifkins, A. Chilton, R. Mangen, C.	Bryan, C. Williams, R. Jones, P.	
E flat Clarinets	Cornets	Basses	
Hughes, F. Johnson, A.	Leggett, C. (<i>Deputy Conductor</i>).	Ash, F. Constable, J. Smith, H.	
Euphonium	Saxophones	Drums	
Thorpe, T.	Bryant, L. Macdonald, C.	Macken, J. Amsden, A.	Kennings, F.

THE WIRELESS SINGERS

Conductor: STANFORD ROBINSON

Sopranos	Contraltos	Tenors	Basses
Hamlin, Mary Rowsell, Rosalind	Winmill, Gladys Owens, Doris	Reach, Edward White, Bradbridge	Riley, Stanley Dyson, Samuel

THE WIRELESS CHORUS

Chorus Master: CYRIL DALMAINE

Sopranos	Contraltos	Tenors	Basses
Hamlin, Mary Rowsell, Rosalind Otley, Elsie Robinson, Hilda Collen, Dora Marshall, Sybilla Clements, Rae Buck, Alison Ayers, Ivy Prowse, Violet MacDougall, Mary Simpson, Hebe Rees, Margaret	Owens, Doris Winmill, Gladys Hay, Elsie Roper, Jean Downer, Winifred Bowen, Frances Garside, Gladys Wood, Anne	Reach, Edward White, Bradbridge Scott, Mountford Baker, Felix Mitchell, Reginald Purvis, Tom Congdon, Joseph	Riley, Stanley Dyson, Samuel Smart, Graham Utting, Victor Woodgate, Jack Harding, Victor Masters, Frederick Bond, James Gove, Radley Treharne, Charles Henderson, Alexander Cracroft, Alan

T H E B. B. C. C H O R U S

Hon. Secretary: ERNEST WOOD

Sopranos:

Aimer, P.	Console, L.	Huckle, E.	Pendlebury, E.
Ballam, A. J. G.	Cook, A.	Jackson, J.	Percival, A. C.
Beeby, D. M.	Cox, F. M.	Jones, O.	Price, N. G.
Betsworth, Mrs. E. I.	Deacon, P.	Kemp, A. J.	Prior, H. M. T.
Bignell, J. P.	Dean, O. A.	Kemp, M. D.	Reeve, J. M.
Blareau, M.	Dickens, P. E.	Knights, R. K.	Shaw, M.
Booth, K.	Drury, E.	Lance, F. M.	Slade, M.
Bourgat, M. J.	Fellingham, G. E.	Lander, E. D.	Smith, E. H.
Brooks, D. L. P.	Fricker, L.	Lawrence, E.	Taylor, C. E.
Burke, D. M.	Garnsey, G. M.	Leach, F. H.	Thake, M.
Butler, E. E.	Goodey, E. M.	Lodge, A.	Tomlinson, C. E.
Calow, D. C.	Hall, A. D.	Longden, M.	Wade, I. M.
Carter, G. E.	Hall, H.	Luhman, H.	Ward, V. A.
Carter, P. V.	Heard, V. A.	Nettleship, M.	Warner, E. M.
Chibnall, C.	Henderson, I.	Newall, F.	Williams, J. E.
Clarke, C. E.	Hewson, D.	Orgles, E. C.	Williams, M.
Clements, R.	Hill, Mrs. A. M.	Page, D.	Wood, K. B.
Colle, M.	Hodges, C.	Palmer, M. H.	Woodin, V. G.
Collen, D. M.	Holgate, J.	Palumbo, O.	Wright, D. E. J.
	Hooper, M. B.	Pearson, H. M.	

Contraltos:

Adams, W.	Downer, W.	Kirk, D. E.	Salthouse, B.
Arran, F.	Franklin, D.	Labdon, G. I. A.	Shier, M. A.
Bagley, B.	Fredericks, E.	Leeson, W.	Smith, G. M.
Bailey, L. M.	Goodale, W. J.	Leigh Hunt, B. R.	Stewart, N. E.
Billson, L.	Gordon-Ruggins, W.	Lewis, E.	Stone, N.
Bowden, V. B.	Hammond, L.	Lovibond, J.	Swain, R. G.
Burnicle, D. L.	Hay, D. M.	Mason, M. E.	Tingley, C.
Butler, V.	Hodder, M. P.	Nicholas, K. M.	Waggett, W.
Catanach, E.	Innes, M. M.	O'Connor, M.	Walshe, W.
Conquest, C. A.	Jackson, E.	Perry, C. E.	Waterer, D.
Crawford, A.	James, D. M. T.	Price, A.	Western, M. K.
Dale, L. M.	Jarrett, W. E.	Roadnight, H. F.	Williams, E. M.
Dorée, P. B.		Rodway, E.	

Tenors:

Becket, F. H.	Dunn, H. H.	Inskip, J. M.	Richardson, D.
Bergen, F. v.	Edburne, C. H. G.	Labdon, R. M.	Riddick, L.
Birkett, S. J.	Everitt, W.	Latham, B. S.	Scopes, A. T.
Bray, E. M.	Fowler, B. H. C.	Leet, R. G.	Skelton, J. S.
Brooke, F.	Gibbon, J. N.	Martin, G.	Smith, P. E.
Cable, C. J. E.	Gibson, S. V.	Miles, T. F.	Smith, R. J. E.
Carpenter, S.	Grundy, F.	Neville, L. R.	Sowerbutts, H. II.
Carroll, W. H.	Hale, A.	Orchard, A.	Toms, A.
Cozens, J.	Hubbard, F. A.	Pitchford, R. W.	Watson, H. W.
Dacre, R.	Hunter, A. T.	Ratcliffe, W. H.	Williams, A. E.
Dedrick, C. H.	Isaacson, F.		

Basses:

Atkinson, F. D.	Flindall, W. G.	Mascall, P.	Stevens, W. J.
Baker, S. O.	Harrison, H. C.	Oliver, W. C.	Steward, A. P.
Bell, C. J.	Hassum, A. S.	Powley, T.	Syrett, H. G.
Bowyer, C. T.	Helin, J.	Prangnell, G. C.	Tappin, J. P.
Brigden, J. H.	Hill, G. F.	Ramsey, G. A.	Taylor, G. J.
Cooper, A. A.	Hilton, J. B.	Rapp, R. B.	Taylor, J. A. G.
Cory, H. E.	Hixson, W. H.	Rees, W. T.	Thorpe, A.
Crees, H. V.	Holland, A.	Rolton, E. H.	Thorpe, F. W.
Cullen, W. F.	Holland, R. H.	Sack, T. J.	Trodd, H. B.
East, H. A.	Hughes, J. L.	Salmon, A. T.	Ward, L. H.
Eaton, W.	Kerridge, H. H.	Selleck, F. J.	Willson, F. G.
Edwards, O. J.	Keyte, C. F.	Sheriff, H. B.	Winter, A. C.
Edwards, S. C.	Lloyd, J.	Smart, E.	Woods, C. R.
Ellis, C. J.	Lorn, H. E.	Stevens, P. A. S.	Wright, H. F.
Fletcher, W. W.			

S O M E B . B . C B O O K S

- BROADCAST ENGLISH, I, Second Edition (The pronunciation of doubtful words). Price 3*d.*, by post 4*d.*
- BROADCAST ENGLISH, II (The pronunciation of some English place names). „ 1*s.* „ 1*s.* 2*d.*
- BROADCAST ENGLISH, III (The pronunciation of some Scottish place names.) „ 3*d.* „ 4*d.*
- BROADCASTING HOUSE. An illustrative volume containing 116 plates—18 of which are coloured. „ 5*s.* „ 5*s.* 9*d.*
- BROADCASTING HOUSE. A complete technical description. „ 5*s.* „ 5*s.* 6*d.*
- HOUSEHOLD TALKS. A useful book full of household hints and recipes. „ 1*s.* „ 1*s.* 3*d.*
- NATIONAL LECTURES: „ 1*s.*, post free.
- No. III. “The Parliamentary Union of England, 1707,” by Professor G. M. Trevelyan, F.B.A.
- No. V. “Law, Ethics, and Legislation,” by Lord Hewart of Bury, Lord Chief Justice of England.
- No. VI. “Monetary Policy,” by Rt. Hon. Reginald McKenna.
- No. VII. “Biology and Statecraft,” by Sir Walter Morley Fletcher, K.B.E.
- No. IX. “Whither Painting,” by Sir William Rothenstein.
- No. X. “Vitamins as Necessities for Life,” by Sir Frederick Gowland Hopkins.
- (Nos. I, II, IV, and VIII out of print.)
- SERVICES FOR BROADCASTING (a list of Hymns, Prayers, etc., for Broadcasting). Paper Edition Price 1*s.*, by post 1*s.* 3*d.*
Cloth bound „ 2*s.* „ 2*s.* 4*d.*
- TECHNICAL TABLES AND GLOSSARY. A technical dictionary with 31 technical tables. Price 1*s.*, post free.
- WORLD-RADIO MAP OF EUROPE. Revised Edition, mounted linen printed in colour, 36" × 24", absolutely accurate. Price 3*s.* post free.
- WORLD-RADIO IDENTIFICATION PANELS. An entirely new revised edition, giving call signs, wavelengths, frequencies, and other details of European stations and of some American stations; with map and additional space for marginal notes. Price 1*s.* post free.
- WORLD-RADIO CALIBRATION BOOK. A novel publication enabling listeners to plot every station that their set will receive and thereby record details for rapid tuning. With four graphs, in a neat wallet. Price 1*s.* post free.

EUROPEAN STATIONS IN ORDER OF WAVELENGTHS

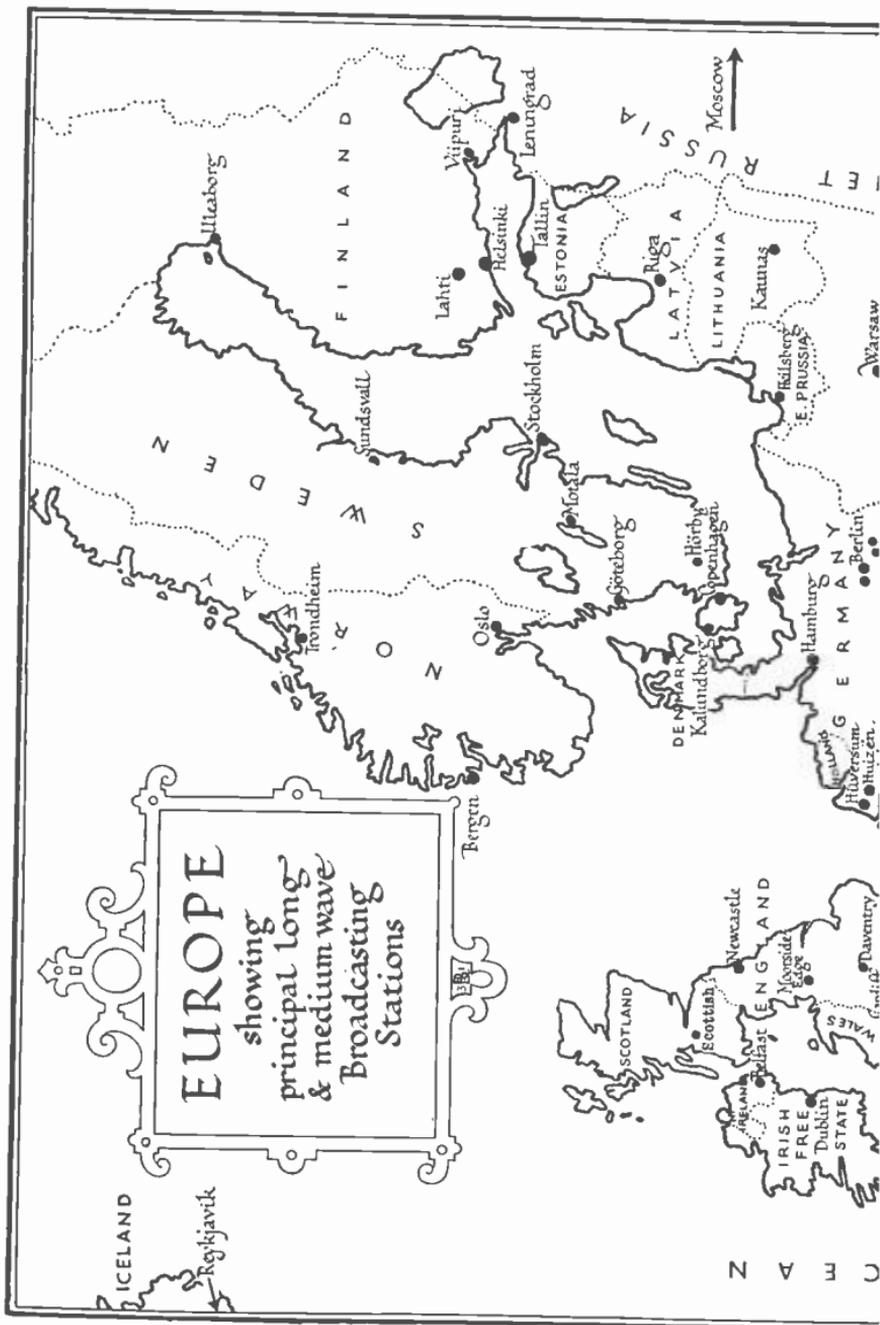
(For British Stations see p. 451)

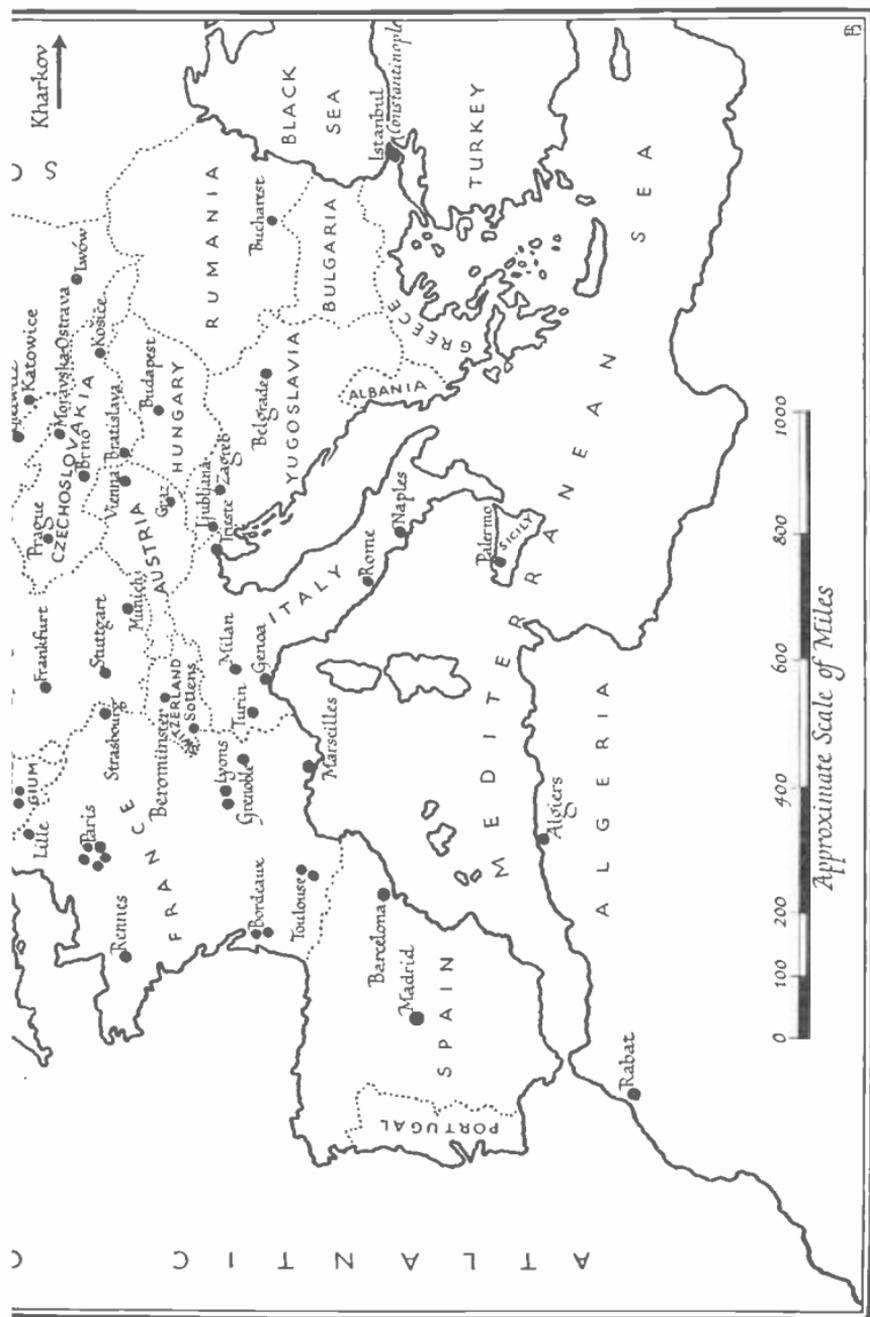
Wave-length, M.	Power, kW.	Station.	Dial Readings.
1935	7	Kaunas (Lithuania)	96 = 171
1875	8.5	Huizen (Holland)	
1796	40	Lahti (Finland) (relays Helsinki)	
1725	75	Radio-Paris (France)	
1635	60	Königs Wusterhausen (Zeesen) (Germany) (relays Berlin)	
1538	7	Ankara (Turkey)	
1481	100	Moscow (Old Komintern) (Russia)	
1445.7	13	Eiffel Tower (Paris) (France)	
1411	120	Warsaw No. 1 (Poland)	
1348	30	Motala (Sweden) (relays Stockholm)	
1304	100	Moscow (Trades Union) (Russia)	
1200	5	Istanbul (Turkey)	
	21	Reykjavik (Iceland)	
1171.5		Tashkent (Russia)	
1153	7.5	Kalundborg (Denmark) (relays Copenhagen)	
1116	40	Moscow, Popoff (Russia)	
1083	60	Oslo (Norway)	
1071	10	Tiflis (Russia)	
1034	36	Kiev (Russia)	
1000	100	Leningrad (Russia)	
937.5	20	Kharkov (Russia)	
720	20	Moscow (Experimental) (Russia)	
574.7	2.5	Ljubljana (Yugoslavia)	
560	2	Grenoble (PTT) (France)	
563	16	Wilno (Poland)	
560	1.5	Kaiserslautern (Germany) (relays Munich)	
550	18.5	Budapest No. 1 (Hungary)	
542	3	Palermo (Italy)	
	10	Sundsvall (Sweden)	
533	60	Munich (Germany)	
525	15	Riga (Latvia)	
517	15	Vienna (Rosenhügel) (Austria)	
509	15	Brussels No. 1 (Belgium)	
500.8	20	Florence (Italy)	
493.4	1.2	Trondheim (Norway)	
488.6	120	Prague (Czechoslovakia)	
473	60	Langenberg (Germany)	
465.8	1.5	Lyons (La Doua) (France) (relays PTT)	
459	60	Schweizerischer Landessender (Bermünster) (Switzerland)	

Wave-length, M.	Power, kW.	Station.	Dial Readings.
450·1	4	Odessa (Russia)	
447·1	0·7	Paris (PTT) (Ecole Supérieure) (France)	
441	50	Rome (Italy)	
436	55	Stockholm (Sweden)	
431	1·5	Parede (Portugal)	
430·4	2·8	Belgrade (Yugoslavia)	
	2	Madrid (Union Radio) (EAJ7) (Spain), 7-8.30 p.m. and (except Mon.) 10 p.m. to 12 midnight	
424·3		Madrid (Radio España) (Spain), 5-7 p.m. (Mon. 5 p.m. to 12 midn.)	
	100	Moscow-Stalin (Russia)	
419·5	1·5	Berlin (Witzleben) (Germany)	
416	6	Rabat (Morocco)	
413	1·2	Dublin (Ireland)	
408	16	Katowice (Poland)	
403	25	Radio-Suisse Romande (Sottens) (Switzerland)	
394	12	Bucharest (Romania)	
	10	Archangel (Russia)	
390	150	Leipzig (Germany)	
385	8	Toulouse (Radio) (France)	
381	16	Lwów (Poland)	
372	1·5	Hamburg (Germany)	
370·4	1·2	Radio LL (Paris) (France)	
	10	Helsinki (Finland)	
368·1	1·5	Seville (Union Radio) (EAJ5) (Spain)	
364	1	Bergen (Norway)	
363·3	13	Algiers (N. Africa)	
360·5	60	Stuttgart (Mühlacker) (Germany)	
352·1	7	Graz (Austria) (usually relays Vienna)	
351	1·2	Leningrad (Russia)	
349	8	Barcelona (Radio Barcelona) (EAJ1) (Spain)	
345	11·5	Strasbourg (Brumath) (France)	
342	35	Brno (Czechoslovakia)	
338·2	15	Brussels No. 2 (Belgium) (Flemish programme)	
335	5·5	Cadiz (Spain)	
331·5	60	Milan (Italy)	
328·2	60	Poste Parisien (Paris) (France)	
325	60	Breslau (Germany)	
322	10	Göteborg (Sweden) (relays Stock- holm)	
319	1·5	Naples (Italy)	

Wave-length, M.	Power, kW.	Station.	Dial Readings.
315	1.6	Marscilles (PTT) (France)	
312.8	1.5	Cracow (Poland)	
	10	Genoa (Italy)	
307	0.75	Zagreb (Yugoslavia)	
304	13	Bordeaux-Lafayette (PTT) (France)	
298.8	11	Tallinn (Estonia)	
296.1	20	Hilversum (Holland)	
	2.5	Kosice (Czechoslovakia)	
293	0.7	Limoges (PTT) (France)	
291	13.2	Viipuri (Viborg) (Finland) (relays Helsinki)	
	2	Lisbon (Portugal)	
281	0.75	Copenhagen (Denmark)	
279	14	Bratislava (Czechoslovakia)	
276.5	60	Heilsberg (Germany) (relays Königsberg)	
	7	Turin (Italy)	
272	1.3	Rennes (France)	
270	20	Bari (Italy)	
265.4	1.3	Lille (PTT) (France)	
263.8	11	Moravská-Ostrava (Czechoslovakia)	
	17	Frankfurt-a-M. (Germany)	
259	10	Hörby (Sweden) (relays Stockholm)	
257	0.7	Toulouse (PTT) (France)	
255	5	Gleiwitz (Germany) (relays Breslau)	
253	1	Almeria (Spain) (E.A.J18)	
	1	Barcelona (Association Nat. (E.A.J15))	
252	10	Trieste (Italy)	
247.7	0.5	Berne (Switzerland)	
246	0.5	Basle (Switzerland)	
244.1	0.5	Stavanger (Norway)	
240.6	1.5	Radio Beziers (France)	
240	2	Nürnberg (Germany) (relays Munich)	
239	3	Bordeaux-Sud-Ouest (France)	
	1	Radio Nimes (France)	
237.2	0.5	Christiansand (Norway)	
235.5	2	Lodz (Poland) (Experimental)	
235	1.25	Malmö (Sweden) (relays Stockholm)	
231	1	Cork (Ireland)	
224.4	10	Fécamp (Radio Normandie) (France)	
223	0.5	Salzburg (Austria) (relays Vienna)	
218	0.5	Königsberg (Germany)	
217	3	Radio Chatelineau (Belgium)	
216			

NOTE.—The above wavelengths and power-figures are liable to frequent change. To verify them consult the current editions of *World-Radio* and of the Identification Panels Booklet. (See pp. 427-8.)





PRINCIPAL SHORT-WAVE STATIONS

Wave-length, M.	Power, kW.	Station. (See footnote on p. 463)	Dial Readings.
80	—	Rome (Italy), I2RO	
76	—	Maracaibo (Venezuela), YV	
70.2	20	Khabarovsk (U.S.S.R.)	
62.56	—	London (Ontario), VE9BY	
62.5	—	Long Island, W2XV	
58	—	Prague	
54.52	—	Brooklyn (N.Y.), W2XBH	
52.7	0.5	Tananarive (Madagascar), FIUI	
52.5	—	Quito (Ecuador), HCJB	
51.22	20	Chapultepec (Mexico), XDA	
50.6	—	Medellin (Colombia), HKO	
50.26	10	Vatican City (Italy), HVJ	
50	—	Barcelona Radio Club (Spain), EAJ25	
50	—	Barranquilla (Colombia), HKD	
50	0.3	Bucharest (Roumania)	
50	—	Kuala Lumpur (F.M.S.), US2AB	
50	—	Moscow, RW59	
49.96	4	Drummondville, VE9DR	
49.96	2.5	Tegucigalpa (Honduras), HRB	
49.83	5	Chicago (Ill.), W9XF	
49.8	—	Mexico City (Mexico), XEW	
49.67	2.5	Miami Beach (Florida), W4XB	
49.59	0.02	Halifax (N.S.), VE9HX	
49.5	10	Cincinnati, W8XAL	
49.5	—	Havana (Cuba), CMCI	
49.5	5	Nairobi (Kenya), 7LO	
49.5	0.5	Philadelphia (Pa.), W3XAU	
49.43	—	Vancouver (B.C.), VE9CS	
49.4	—	Vienna Experimental, UOR 2	
49.34	0.5	Chicago (Ill.), W9XAA	
49.22	0.2	Bowmanville (Canada), VE9GW	
49.2	5	Johannesburg (S. Africa), JB	
49.18	20	Bound Brook (N.J.), W3XAL	
49.1	0.5	Calcutta (India), VUC	
48.95	—	Maracaibo (Venezuela), YV11BMO	
48.86	40	Pittsburgh, W8XK. Relays KDKA	
48.8	3.5	Winnipeg (Canada), VE9CL	
48.65	—	Mexico City, X1F	
48.35	—	Bogotá (Colombia), HKC	
48.2	9	Rome (Italy), 2RO	
48.05	—	Barranquilla (Colombia), HKD	
48	—	Casablanca (N. Africa), CN8MC	
47	—	Quito (Ecuador), HC1DR	
46.69	—	Bound Brook (N.J.), W3XL	
46.67	—	London (Ontario), VE9BY	
45.38	—	Moscow (Russia), REN	

Wave-length, M.	Power, kW.	Station.	Dial Readings.
45·31	—	Riobamba (Ecuador), PRADO	
45	0·01	Guatemala City (S. America), TGVW	
45	0·2	Constantine (Algeria), 8KR	
43	—	Madrid (Spain), EAR110	
41·6	0·05	Tenerife Radio Club, EAR58	
40·3	—	Radio Nations, Prangins (Switz.)	
39·7	—	Bogotá (Colombia), HKF	
39·4	—	Nucvo Laredo (Mexico), X26A	
34·68	—	London (Ontario), VE9BY	
34·68	—	Long Island, W2XV	
33·5	—	Guatemala City (S. America), TGX	
33	0·5	Radio LL (France)	
32·5	—	Paris (France), FLJ	
32·26	6	Rabat (Radio Maroc)	
31·58	—	Rio de Janeiro (Brazil), PRBA	
31·55	5	Melbourne (Australia), VK3ME	
31·51	0·5	Skamlebaek (Denmark), OXY	
31·48	40	Schenectady (N.Y.), W2XAF	
31·38	8	Zeesen (Germany), DJA	
31·35	1	Poznań (Poland), SR1	
31·35	5	Springfield (Mass.), W1XAZ	
31·28	0·5	Philadelphia (Pa.), W3XAU	
31·28	12	Sydney (Australia), VK2ME	
31·26	—	Eindhoven (Holland), PCJ	
31·25	2	Lisbon (Portugal), CT1AA	
31	0·015	Heredia (Costa Rica), TI4NRH	
30·43	20	Madrid (Spain), EAQ	
30	—	Belgrade	
28·98	20	Buenos Aires, LSX	
26·83	0·05	Funchal (Madcira), CT3AQ	
25·63	—	Radio Coloniale (Paris)	
25·6	2	Winnipeg (Canada), VE9JR	
25·53	12	Chelmsford, G5SW	
25·5	20	Chapultepec, XDA	
25·4	—	Bowmanville (Canada), VE9GW	
25·4	9	Rome (Italy), 2RO	
25·27	40	Pittsburgh, W8XK	
25·2	—	Radio Coloniale (Paris)	
23·38	2·5	Rabat (Radio Maroc)	
20·5	20	Chapultepec, XDA	
19·9	—	Heredia (Costa Rica), TI4NRH	
19·84	10	Vatican City (Italy), HVJ	
19·73	8	Zeesen (Germany), DJB	
19·72	—	Pittsburg, W8XK	
19·68	—	Radio Coloniale (Paris)	
19·56	20	Schenectady, W2XAD	
16·87	20	Bound Brook (N.J.), W3XAL	
14·47	—	Buenos Aires (Argentine), LSY	
13·92	—	Pittsburgh, W8XK	

TAKING WIRELESS SETS ABROAD

MANY travellers abroad wish to take with them their wireless receiving-sets, only to find that Customs barriers make it necessary for them to comply with certain formalities on entering a foreign country. In most, if not all, European countries, a set or some component of the set is normally subject to duty, and all intending travellers are advised before they leave home to consult the nearest consulate of the country to which they are going, and also the consulates of any transit countries, in order to inform themselves of the latest regulations in regard to the temporary introduction of a set. In certain countries no duty is payable but the set must be declared; in others the full duty must be paid and may be reclaimed on leaving the country, but sometimes only at the port or frontier station of entry; and there are other variations. A set is considered to be temporarily introduced if the stay is not to exceed three, or in some cases, six months. The traveller on arrival at the port or station of entry should in any case be prepared to prove his identity and to satisfy the authorities that he is to make only a limited stay and that the apparatus is for his personal use. Early application should be made to the consulates, since in some cases more favourable treatment is obtainable by correspondence with the postal authorities before entering the country; in some cases, also, motorists benefit from special regulations. Different organisations, notably the International Broadcasting Union, have been endeavouring for some considerable time to have formalities minimised in the interests of listeners, and within the last year or two more than one country has, in fact, made things easier. A recent international Customs conference made a recommendation in this sense to Postal Administrations.

Travellers should be particularly careful to find out whether they must take out a licence in a country where a licensing system is in force; but many countries issue short-term licences at small cost and, in general, so long as one learns the rules beforehand, and keeps them, one may include one's receiver in the luggage without meeting much difficulty or incurring much expense.

REVENUE ACCOUNT for the Year ended 31st December, 1931.

	£	s.	d.
EXPENDITURE.			
To Expenditure on Programmes (including payment of Artists, Orchestras, News Royalties, Performing Rights and Simultaneous Broadcast Telephone System, Salaries and Expenses of Programme Staff)	657,935	7	11
„ Maintenance of Plant, Power, Salaries and Expenses of Engineering Staff, Development and Research, &c.	211,735	5	7
„ Rent, Rates, Taxes, Insurance, Heating and Lighting, Upkeep and Expenditure upon Premises, Telephones, &c.	100,569	15	0
„ Administration Salaries and Expenses	64,014	9	10
„ Contributions to Staff Provident Fund for nine months and to Staff Pension Scheme for three months	13,824	18	1
„ Governors' Fees	5,947	10	0
„ Provision for Depreciation and Renewal of Premises, Plant, Furniture and Fittings, &c.	67,760	0	0
„ Provision for Income Tax	73,995	2	8
„ Balance carried down, being Net Revenue for year	229,567	2	1
	£1,425,349	11	2

REVENUE APPROPRIATION ACCOUNT.

	£	s.	d.
To Depreciation on Investment in 5% War Loan	11,793	12	6
„ Transfer to Capital Account as a provision towards meeting Capital Expenditure	220,000	0	0
„ Balance (unappropriated Net Revenue) carried forward at 31st December, 1931, as per Balance Sheet	1,217	1	1
	£1,425,349	11	2
INCOME.			
By Licence Income (Net)	1,179,931	19	5
„ Net Revenue from Publications, after providing for Bad and Doubtful Debts	237,834	3	0
„ Interest Receivable and Sundry Receipts, less Loan Interest payable	8,483	8	9
<i>Note.</i> —Grants amounting to £22,500 which have been made by the Postmaster-General during 1931 out of Licence Revenue in respect of the production of Grand Opera for the years 1930 and 1931 are not included in the Licence Income shown above, nor are the corresponding payments to the Covent Garden Opera Syndicate (1930), Ltd., included in the expenditure.			
	£1,425,349	11	2

BALANCE SHEET

	£	s.	d.	£	s.	d.
LIABILITIES.						
CAPITAL ACCOUNT—						
Value placed upon Premises and Plant, Furniture and Fittings, Musical Instruments, Music, Stores, &c., taken over (without payment) from the British Broadcasting Co., Ltd.	174,938	0	0			
Appropriated from Revenue towards meeting Capital Expenditure—						
Appropriated to 31st December, 1930 (per last Balance Sheet)	575,161	2	3			
Appropriated at 31st December, 1931	220,000	0	0			
				970,099	2	3
PROVISION FOR DEPRECIATION AND RENEWAL OF PREMISES, PLANT, FURNITURE AND FITTINGS, &c.—						
Balance at 31st December, 1930, per last Balance Sheet	130,201	17	10			
<i>Add</i> : Further provision during 1931, per Revenue Account	67,760	0	0			
				197,961	17	10
<i>Less</i> : Book value (net) of Plant and Furniture discarded during 1931	21,211	7	0			
				176,750	10	10
BANK LOAN (secured by a mortgage on the Undertaking of the Corporation)				500,000	0	0
CREDITORS AND RESERVE FOR CONTINGENCIES—						
Sundry Creditors (including provision for Income Tax)	186,902	8	10			
Reserve for Contingencies	20,000	0	0			
				206,902	8	10
REVENUE ACCOUNT—						
Balance (unappropriated Net Revenue) at 31st December, 1931, carried forward as per Account				1,217	1	1
<i>Note.</i> —There are Contingent Liabilities in respect of Capital Works in progress.						
(Signed) J. H. WHITLEY } HAROLD G. BROWN } Governors. J. C. W. REITH, Director-General.						

£1,854,969 3 0

REPORT OF THE AUDITORS TO THE MEMBERS

We have examined the above Balance Sheet dated 31st December, 1931, and have obtained all the information and explanations we have required. a true and correct view of the state of the Corporation's affairs according shown by the books of the Corporation.

5, LONDON WALL BUILDINGS,
LONDON, E.C. 2.
16th March, 1932.

as at 31st December, 1931.

ASSETS.

	£	s.	d.	£	s.	d.
FREEHOLD LAND AND BUILDINGS—						
Acquired from the British Broadcasting Co., Ltd., as valued by the Corporation's Officials, plus additions made by the Corporation to 31st December, 1930, at cost, per last Balance Sheet	144,535	17	0			
Additions during 1931, at cost including Broadcasting House (£723,678—Site, Building, Special Structural Equipment, &c.), Regional Stations and other properties	817,855	5	4			
				962,391	2	4
PLANT—						
Acquired from the British Broadcasting Co., Ltd., as valued by the Corporation's Officials, plus additions made by the Corporation to 31st December, 1930, at cost, per last Balance Sheet	251,568	7	9			
Additions during 1931 at cost (<i>less</i> book value of Plant discarded during the year)	81,274	16	1			
				332,843	3	10
FURNITURE AND FITTINGS—						
Acquired from the British Broadcasting Co., Ltd., as valued by the Corporation's Officials, plus additions made by the Corporation to 31st December, 1930, at cost, per last Balance Sheet	61,362	9	4			
Additions during 1931, at cost (<i>less</i> book value of Furniture discarded during the year)	3,746	8	1			
				65,108	17	5
MUSICAL INSTRUMENTS, MUSIC AND BOOKS—						
Acquired from the British Broadcasting Co., Ltd., as valued by the Corporation's Officials, plus additions made by the Corporation to 31st December, 1930, at cost, per last Balance Sheet	28,993	10	3			
Additions during 1931, at cost	4,494	5	6			
				33,487	15	9
STORES ON HAND AND WORK IN PROGRESS, at cost or under						
				10,006	17	2
DEBTORS AND UNEXPIRED CHARGES—						
Sundry Debtors, <i>less</i> provision for Doubtful Debts	74,279	1	10			
Unexpired Charges	15,000	9	6			
				89,279	11	4
INVESTMENTS—						
£250,000 5% War Loan, 1929/47, at Market Value at 31st December, 1931, <i>less</i> accrued interest				238,660	2	1
CASH AT BANK AND IN HAND				123,191	13	1
				<u>£1,854,969</u>	<u>3</u>	<u>0</u>

OF THE BRITISH BROADCASTING CORPORATION.

with the books and vouchers of the British Broadcasting Corporation, The Balance Sheet is, in our opinion, properly drawn up so as to exhibit to the best of our information and the explanations given to us and as

DELOITTE, PLENDER, GRIFFITHS & CO., Auditors,
Chartered Accountants.

BUYER'S GUIDE AND INDEX OF ADVERTISERS

GENERAL

APPEALS, CHARITABLE	<i>See page</i>	BOOKS	<i>See page</i>
Alexandra Orphanage	374	Hodder & Stoughton	414
Cancer Hospital	373	GRAMOPHONES AND RECORDS	
Church Army	383	Columbia Graphophone Co., Ltd..	349
Church Lads' Brigade.	374	Gramophone Company, Ltd.	345
Dr. Barnardo's Homes	377	PIANOS	
Ex-Services Welfare Society	420	Challen Pianos	370
Friends of the Poor	383	Chappell Piano Co., Ltd.	378
Hospital for Epilepsy and Paralysis	<i>(on wrapper)</i>	ORGANS	
Imperial Cancer Research Fund	377	The John Compton Organ Co., Ltd.	339
Lord Mayor Treloar Cripples' Hospital and College	335	TEA	
Marie Curie Hospital	378	Mazawattee Tea Co.	374
Moorfields Eye Hospital <i>(on wrapper)</i>		TRAVEL	
N.S.P.C.C.	414	Canadian Pacific Railway, Ltd.	359
National Children's Home and Orphanage	383	H.M. Eastern African Dependencies	413
Royal Soldiers' Daughters' Home.	413		
Shaftesbury Homes and "Arcthusa" Training Ship	373		
Shaftesbury Society	414		
Spurgeon's Orphan Homes	413		
Waifs and Strays Society	378		
Western Ophthalmic Hospital <i>(on wrapper)</i>			

WIRELESS

ACCUMULATORS (L.T. & H.T.)	<i>See page</i>	ACCUMULATORS, STATIONARY BATTERIES	<i>See page</i>
Ever Ready Co. (Great Britain), Ltd.	360	Exide Batteries	346
Exide Batteries	346	General Electric Co., Ltd.	352
General Electric Co., Ltd.	352	Lissen, Ltd.	390
Lissen, Ltd.	390	Pertrix, Ltd.	350
Pertrix, Ltd.	350	AERIALS	
ACCUMULATORS, STATIONARY BATTERIES		British Insulated Cables, Ltd.	389
Exide Batteries	346	J. J. Eastick & Sons	374
General Electric Co., Ltd.	352	CABINETS	
Pertrix, Ltd.	350	J. J. Eastick & Sons	374
ACCUMULATORS (L.T. & H.T.)		Lissen, Ltd.	390
Ever Ready Co. (Great Britain), Ltd.	360	Chas. A. Osborn	413
Exide Batteries	346		
General Electric Co., Ltd.	352		
Lissen, Ltd.	390		
Pertrix, Ltd.	350		
ACCUMULATORS, STATIONARY BATTERIES			
Exide Batteries	346		
General Electric Co., Ltd.	352		
Pertrix, Ltd.	350		
AERIALS			
British Insulated Cables, Ltd.	389		
J. J. Eastick & Sons	374		

	<i>See page</i>
CABLES AND WIRE	
British Insulated Cables, Ltd.	389
Callender's Cable	405
General Electric Co., Ltd.	352
London Electric Wire Co. & Smiths, Ltd.	342
Standard Telephones & Cables, Ltd.	368-9

CHARGERS FOR ACCUMULATORS	
Exide Batteries	346
General Electric Co., Ltd.	352
Lissen, Ltd.	390
Westinghouse Brake & Saxby Signal Co.	406

COILS	
General Electric Co., Ltd.	352
Lissen, Ltd.	390
London Electric Wire Co. & Smiths, Ltd.	342
Wright & Weaire, Ltd.	414

COMPONENTS	
J. J. Eastick & Sons	374
General Electric Co., Ltd.	352
Lectro Linx, Ltd.	373
Lissen, Ltd.	390
London Electric Wire Co. & Smiths, Ltd.	342
Westinghouse Brake & Saxby Signal Co.	406
Wright & Weaire, Ltd.	414

CONDENSERS	
British Insulated Cables, Ltd.	389
General Electric Co., Ltd.	352
Lissen, Ltd.	390

ELIMINATORS, BATTERY	
General Electric Co., Ltd.	352
Lissen, Ltd.	390

GRAMOPHONE PICK-UPS	
Celestion, Ltd.	394
Columbia Graphophone Co., Ltd.	349
General Electric Co., Ltd.	352
Lissen, Ltd.	390

HOUSE WIRING	
British Insulated Cables, Ltd.	389
Callender's Cable	405
General Electric Co., Ltd.	352

	<i>See page</i>
LOUDSPEAKERS	
Celestion, Ltd.	394
General Electric Co., Ltd.	352
Gramophone Co., Ltd.	345
Lissen, Ltd.	390
L. McMichael, Ltd.	409
Standard Telephones & Cables, Ltd.	368-9

LOUDSPEAKER EQUIPMENT	
Lissen, Ltd.	390
F. McNeill & Co., Ltd.	417

MICROPHONES	
Standard Telephones & Cables, Ltd.	368-9
Wright and Weaire, Ltd.	414

RADIO-GRAMOPHONES	
Columbia Graphophone Co., Ltd.	349
Gramophone Company, Ltd.	345
General Electric Co., Ltd.	352
Lissen, Ltd.	390
L. McMichael, Ltd.	409

RECEIVERS, BATTERY	
Columbia Graphophone Co., Ltd.	349
J. J. Eastick & Sons	374
General Electric Co., Ltd.	352
Gramophone Company, Ltd.	345
Lissen, Ltd.	390
L. McMichael, Ltd.	409
Standard Telephones & Cables, Ltd.	368-9

RECEIVERS, MAINS	
Columbia Graphophone Co., Ltd.	349
General Electric Co., Ltd.	352
Gramophone Company, Ltd.	345
Lissen, Ltd.	390
L. McMichael, Ltd.	409
Standard Telephones & Cables, Ltd.	368-9

RECEIVERS, PORTABLE	
General Electric Co., Ltd.	352
Lissen, Ltd.	390
L. McMichael, Ltd.	409

RECTIFIERS, METAL	
Westinghouse Brake & Saxby Signal Co.	406

	<i>See page</i>
RESISTANCE NETS	
Cressall Mfg. Co.	413
RHEOSTATS	
Cressall Mfg. Co.	413
Lissen, Ltd.	390
London Electric Wire Co. & Smiths, Ltd.	342
SHORT-WAVE APPARATUS	
J. J. Eastick & Sons	374
General Electric Co., Ltd.	352
Lectro Linx, Ltd.	373
London Electric Wire Co. & Smiths, Ltd.	342
L. McMichael, Ltd.	409
Wright & Weaire	414
SLIDING RESISTANCES	
Cressall Mfg. Co.	413
TELEPHONES	
General Electric Co., Ltd.	352
Lissen, Ltd.	390
Standard Telephones & Cables, Ltd.	368-9
TERMINALS	
J. J. Eastick & Sons	374
General Electric Co., Ltd.	352
Lissen, I.td.	390
Lectro Linx, Ltd.	373

	<i>See page</i>
TRANSFORMERS	
General Electric Co., Ltd.	352
Lissen, Ltd.	390
London Electric Wire Co. & Smiths, Ltd.	312
Wright & Weaire, Ltd.	414
TRANSMITTERS	
Marconi's Wireless Telegraph Co., Ltd.	339
Standard Telephones and Cables, Ltd.	368-9
TRANSMITTING VALVES	
General Electric Co., Ltd.	352
Mullard Wireless Service Co., I.td.	393
Standard Telephones and Cables, Ltd.	368-9
VALVES	
General Electric Co., Ltd.	352
Lissen, Ltd.	390
Mullard Wireless Service Co., Ltd.	393
Standard Telephones and Cables, Ltd.	368-9
WAVE TRAPS	
General Electric Co., Ltd.	352
Lissen, Ltd.	390
London Electric Wire Co. & Smiths, Ltd.	342
Wright & Weaire, Ltd.	414

LIST OF ILLUSTRATIONS

	PAGE		PAGE
King and Queen at Broadcasting House	8	Time Signal Apparatus	144
Lord Gainford	11	A Dramatic Audition (i) in the Studio; (ii) in the Listening Room	151
Locking-up at Savoy Hill	15	Lener Quartet	157
Savoy Hill during the General Strike	23	Music Library	163
Paderewski at Savoy Hill	33	B.B.C. Dance Orchestra	167
George Robey in the Studio at Marconi House	40	Gramophone Effects Studio	173
Original 2LO at Marconi House	42	Studio 6D (two views)	175-176
Second 2LO on the Roof of Selfridge's	45	Reading the News Bulletin	179
Largest Studio at Savoy Hill	48	Liverpool Cathedral	189
Sir John Gordon Nairne	55	Religious Studio	196
Reading the News in the Early Days	57	Eucharistic Congress	213
Dr. M. J. Rendall at Edinburgh	60	Artur Schnabel	217
The Sower	63	Prince of Wales at Stratford	218
View from the Roof of Broadcasting House	80-81	A Record Afternoon of Sport	221
Mr. J. H. Whitley at Manchester	82	Dr. Scott Lidgett at the Methodist Uniting Conference	222
Broadcasting House:		The Scottish Regional Station:	
West Front	89	Exterior	226
South Front	90	Transmitter Hall	229
Entrance Hall	94	A Control Desk	234
Board Room	96	The Power House	237
Eric Gill	99	The Motor Generator Room	239
A Water Spray	100	Cables in a Corridor	243
Air-conditioning Plant		The Opening of the Ottawa Conference	258
Fan	103	The Empire Station:	
Concert Hall	106, 109	Exterior	262
General Typing Office	110	Transmitter Hall	265
Council Chamber	110	Canadian Zone Aerials	277
Vaudeville Studio, BA	112-113	Inspecting a Record of an Empire Programme	288
Studio 8A	117	Mr. C. Lloyd Jones and Australian Officials	293
A Listening Room	119	Commemorative Tablet at Barcelona	298
Sixth Floor Lounge	119	Glass Door at Rome	301
Religious Studio, 3E	120	Herr Giesecke	304
Library Studio, 3D	123	Delegates at Montreux	306
Talks Studio, 3B	125	Old Palace of the Senate at Madrid	308
News Studio, 4B	125	President Hoover Broadcasting	315
Discussion Studio, 8B	127	Control Room at Broadcasting House	322
Third Floor Lounge	128		
Somme Memorial at Thiepval	130		
Bruno Walter	133		
President Hindenburg	137		

	PAGE		PAGE
Television Equipment	327	Condenser Microphone	381
Daventry 5XX	330	A Dramatic Control Panel	387
Daventry 5GB	333	Back View of B Amplifier	396
Ultra-Short Wave Transmitter:		C Amplifier Bay	398
General View	336	The Line-testing Room	403
Master Oscillator	341	Pictorial Diagram of Broadcasting and Reception	432-433
Rectifier Units	343	A Seal being Televised	440
Details of a Control Position	354	A Baird Televisor	444
Two Check Receivers	356	Miss Amy Johnson and Mr. J. A. Mollison	447
Building Board	362		
Eel Grass in Walls	365		

MAPS, DIAGRAMS, ETC.

The Old and New Schemes of Distribution	43	List of Scottish Concerts	248
The Year's Licences	64	List of Scottish Plays and Music	253
Population Map of Wales	67	List of Recorded Programmes	269
Wireless Trade Associations	76	Map of the British Empire	272-273
Wireless Trade Statistics	79	Empire Statistics	274
Graph of Exhibitors at Olympia	83	Lay-out of the Empire Station	278
Map of Licences in Great Britain	84	Diagram of the Heavside Layer	284
Diagram of Licence Revenue	87	Plan of Control Room	325
Some Statistics	105	Concert Hall Reverberation Chart	366
General Plan of the Organ	108	Microphone Frequency Curves	375-376
Plan of Sub-Basement at Broadcasting House	111	Arrangement of Control Room Amplifiers	392
List of Studios at Broadcasting House	114	Diagram of an A Amplifier	395
List of International Relays	138	Diagram of Transmission Level	397
Diagram of Number of Relays	141	Map of British S.B. System	400
List of Musicians	154	A Tapped Coil	411
List of First Performances of Music	160	Graphs of Complaints of Interference	422, 424
List of Restaurants and Cinemas	169	Diagram of Circuit of Trolley-Bus Copper Coil	430
List of Broadcast Plays	170	Graph of its Impedance-Frequency	435
Plan of Studios 6D and 6E	174	Oscillographs of Interference	437
S.O.S. Statistics	180	Diagram of Television	443
List of Preachers and Churches	186	Weather Forecast Map	453
A Vesper Hymn	194-195	Map of Europe	464-465
North Regional Events	201-202	Calendar	480
Midland Events	205		
West Regional Events	208		
Northern Ireland Events	210		
Population Map of Scotland	230		
List of Scottish Talks	244		

INDEX

A

ABERDEEN, 41, 46, 228, 230, 233, 242, 249, 250, 450, 451
Acoustics, 49, 325, 363-367, 382
Actors, 34, 150
Advertising, 59-64, 300
Aerials, 235, 276, 277, 285, 287, 343, 347, 408, 419, 445
Air-conditioning plant, 100, 101, 102
Amateurs, 34, 36
America, United States of, 10, 18, 25, 30, 37, 78, 139, 140, 142, 159, 206, 261, 263, 292, 302, 309, 313, 338, 357, 361, 384, 445
Amplifiers, 240, 344, 354, 379-384, 385, 391-399
Announcing, 30, 148, 260
Artists, 34, 35, 154
Auditions, 149-153
Australia, 142, 259, 260, 263, 266, 268, 274, 292, 314
Austria, 140, 142
Authors, 32, 303

B

Bach, 18, 23
Balance Sheet, 470, 471
B.B. Company, 9, 12, 13, 23, 26, 30, 36
B.B. Corporation, 13, 17, 30, 31, 36
B.B.C. Mark, 12
Beethoven, 62, 158
Belfast, 4, 13, 16, 42, 46, 49, 211-214, 245, 450, 451
Big Ben, 143, 261, 455
Birmingham, 49, 203, 206, 332, 334, 401, 430
Blattnerphone, 145
Bournemouth, 41, 401, 450, 451
Braille, 183
Breakdowns, 329
Bristol, 49, 326, 450
Broadcasting House, 49, 63, 80, 81, 89-128, 173, 176, 179, 196, 323, 363, 364
Brookmans Park, 235
Brown, H. G., 7
Brussels, 47

C

Canada, 259, 268, 274, 291
Capital Expenditure, 37, 470-471
Cardiff, 41, 49, 66, 326, 401, 450, 451
Carnegie Trust, 246
Carrier Wave, 279
Charity Appeals, 26, 190
Charter, 13, 16, 57, 61, 136
Chelmsford, 13, 42, 50, 82, 270
Children's Hour, 22, 28, 209
Chorus, B.B.C. (or National), 161, 459
Coils, Loading, 401, 440
 Tapped, 408, 411, 412
Commercial Broadcasting, 10, 38
Committee, Advisory, 38
 Appeals Advisory, 26
 Crawford, 24, 30
 Eccles, 44
 Music Advisory, 38

Committee, Religious Advisory, 28, 38
 Sykes, 12
Composers, 32, 34, 303
Compton, John, 107
Concert Hall, 49, 99, 100-109, 121, 366, 367
Concerts, 20, 134, 155, 158, 456
Condensers, 407, 412
Conference of Group Leaders, 181, 182
Control Board, 16
Control Room, 97, 161, 240, 278, 283, 322, 323, 325, 375, 391-399
Controller, 16
Controversy, 23, 24
Copenhagen Rating, 348, 351
Copyright, 32, 34, 69, 70, 302
Council, Central, for Broadcast Adult Education, 26, 181
Council, Central, for School Broadcasting, 25, 38, 185, 415, 416
Council Chamber, 110
Councils, Area, 181-184
Covent Garden, 20, 157
Coverage, 13, 38, 41, 44
Criticism, 131, 132
 Literary, 135
Crystal Set, 411
Current, Alternating, 78, 282, 347, 397
 Direct, 78, 236, 284, 344, 351, 399

D

Dance Music, 161, 165
Dance Orchestra, B.B.C., 165-168
Daventry
 5GB, 29, 44, 278, 324, 332, 435
 5XX, 13, 38, 42, 46, 66, 68, 144, 233, 251, 278, 324, 326, 330-334, 425, 451, 452
Davies, Sir Walford, 25
Debates, 135
Denmark, 18, 299, 314
Derby, The, 145
Diesel Engines, 236
Director-General, 15, 53
Directors, 9, 12, 13
Direct Ray, 285
Drama. *See* Plays.
Dramatic Control Panel, 21, 98, 385-388
Dundee, 227, 240

E

Eccles, Dr. W. H., 44
Echo, 392, 395
Edinburgh, 49, 231, 232, 235, 240, 242, 245, 249, 250, 251, 326, 401
Education, Adult, 25, 181-184
Effects, 21, 173-176
Electrical Engineers, Institution of, 76
Empire Broadcasting, 40, 50, 145, 258-296
 Marketing Board, 259
 Station, 40, 50, 82, 260, 275-283, 324
Engineering, 14, 20, 38, 41-50, 323-329
Entertainment, 31
Epilogue, 28
Europe, 10, 12, 39, 42, 46, 47, 65, 135, 138-142, 305-312, 313, 461-467

- Exchequer, 12
Exhibitions, 82, 83
- F
- Fading, 286, 334, 337
France, 140, 302, 314, 445
French Broadcasts, 25
Frequencies, 335, 376-384, 402, 404
- G
- Gainford, Lord, 7, 15
General Strike, 23
Generators, Motor, 238, 281
Geneva, 47, 65, 305
Germany, 25, 71, 140, 142, 260, 299, 301, 316, 338, 361, 444-445
Gill, Eric, 94, 98, 99
Glasgow, 41, 49, 65, 227, 231, 232, 235, 240, 241, 242, 245, 249, 250, 326, 450
Government, 23, 30, 31, 35, 52, 58, 64, 136, 313-320, 334
Governors, 7, 9, 13, 15, 53
Gramophone, 31, 78, 289, 290, 391, 416
Groups, Discussion, 26, 181-184, 416
- H
- Hague Rating, 348
Highlands, 65, 228, 233, 255, 256
Holland, 71, 300
- I
- India, 264, 268, 274, 295
Indirect Ray, 285, 286
Insurance, 73, 74
Interference, Electrical, 328, 340, 421-438
International Broadcasting, 138-142
 Relations, 39
 Relays, 40, 138
 Union, 39, 40, 47, 140, 141, 305-307, 309-312, 347
Irish Free State, 300, 314
- K
- King, H.M. the, 8, 9, 52
- L
- Layer, Ionised, 285, 286, 337, 338, 361
League of Nations, 39
Leeds, 49, 200, 401, 450
Licences, 12, 18, 64, 66, 77, 83-86, 88, 291, 292, 294-296, 421
Lines, Trunk, 328, 357-361, 400-404
Listener, The, 37, 191
Listeners' Societies, 73
Listening Room, 119
London Regional Station, 4, 16, 42, 46, 47, 347, 450, 451
London 2LO, 9, 43
Loudspeakers, 33, 69, 70, 78, 419
- M
- Madrid Conference, 46, 305, 308-312, 329
Main Stations, 4, 16, 41
Management, 9, 12, 14
Manchester, 49, 199, 326, 401, 450, 451
- Marconi Company, 9, 42, 50, 263, 287, 338, 343
Marconi House, 27, 47
Metropolitan Vickers Company, 9
Microphones, 49, 176, 326, 371-384
Midland Regional, 4, 203-206, 324, 450, 457
Military Band, 161, 458
Modulation, 49, 78, 238, 344, 353
Monopoly, 54, 56
Moorside Edge, 68, 199, 235
Music, 18, 20, 21, 30, 34, 49
 Auditions, 149
 First Performances, 160
 Library, 161-164
 London Festival, 134
 Publishers' Association, 32
 Talks, 134
- N
- Nairne, Sir Gordon, 55
National Programme, 4, 16, 29, 270
Newcastle, 41, 46, 200, 401, 450, 451
News Agencies, 70, 177
News Bulletin, 16, 22, 24, 177-180, 261, 270
New Zealand, 259, 263, 266, 268, 274, 291
North Regional Station, 4, 46, 199, 202, 412, 450, 451
Northern Ireland, 38, 44, 211-214
- O
- Opera, 20, 32, 35, 241
Orchestras, 66, 82, 155-159, 161, 203, 211, 228, 246-250, 457, 458
 B.B.C. Dance, 20, 165-168
 B.B.C. Symphony, 157, 158, 159, 457-458
 B.B.C. Theatre, 20, 458
 Scottish, 228, 246-250
Organ, 107, 108
Organisation, 4
Oscillator, 279, 344
Outside Broadcasts, 4, 61, 204, 214, 329, 391
- P
- Pamphlets, 37
Parliament, 31, 52, 53, 58, 136
Performing Right Society, 32, 69
Plays, 21, 35, 49, 132, 150-151, 170-173, 212, 241, 247, 385, 441
Plymouth, 326, 401, 450, 451
Politics, 72, 136
Postmaster-General, 9, 12, 13, 31, 52, 71
Post Office, 9, 10, 12, 13, 46, 49, 314, 328, 329, 357, 358, 401, 421, 438
Power Rating, 347-351
Prague, 47, 305
Press, 13, 36, 54, 56, 60, 131, 138, 177
Prince of Wales, 130, 206
Productions, 21
Profits, 12
Programmes, Alternative, 29
 Empire, 263-271
 Events, 154, 160, 169, 170, 186, 201, 202, 205, 208, 210, 215-224
 Presentation, 30
 Wireless Exchanges, 71

Promenade Concerts, 35, 154, 155, 157, 164
Winter, 134
Publications, 14, 37, 460
Publicity, 34

Q

Queen, H.M. the, 8, 9
Queen's Hall, 4, 35

R

Radio Association, 73
Circle, 22, 452
Manufacturers, 76, 77
Society of G.B., 75, 76
Wholesaler's Federation, 76
Radio Times, The, 12, 51, 164
Readings, 135, 152
Receivers, 73, 74, 77, 78, 407-419, 468
Reception, 49
Records, Empire, 269, 288-290
Rediffusion, 69, 70
Regional Programme, 4, 16, 29, 270
Scheme, 44, 68, 231-233
Regions, 4, 17, 28, 38
Reith, Sir J. C. W., 7
Relay Stations, 16, 41, 42, 46
Religious Advisory Committee, 193
Broadcasts, 22, 26, 28, 186-198
Cathedrals and Churches, 186, 189
Daily Service, 197, 198
Preachers, 186, 188, 190
Services, 207, 212, 215
Vesper Hymn, 194, 195
Rendall, Dr. M. J., 7, 60
Research, 14, 20, 323, 326, 328, 424
Revenue, 18, 19, 37, 469
from Licences, 87
Royalties on Sets, 12
Russia, 32, 318, 320

S

Sankey, Lord, 26
Savoy Hill, 11, 39, 47, 57, 145, 372
Schools, 25, 72, 145, 185, 415
Scots Vernacular, 251-254, 255, 256
Scott, Sir Walter, 227, 247, 254
Scottish Regional Station, 4, 225-256, 324,
412, 450, 451
Selectivity, 78, 407-412
Shakespeare, 150, 171, 206
Short-wave Broadcasting, 50, 260, 263,
285-287, 357-361, 466, 467
Sidebands, 78
Simultaneous Broadcasts, 4, 141, 241, 326,
391, 400-404, 416
Snowden, Viscountess, 7
Societies, Listeners', 73
S.O.S. Messages, 26, 180, 454
Sound Insulation, 104
South Africa, 259, 264, 268, 274, 294, 314
Spain, 299
Sponsored Programmes. *See* Advertising.
Studios, 47-49, 101, 102, 104, 112, 113,
114-128, 173-176, 179, 196, 200, 214,
240, 246, 302, 323, 326, 363-367, 386

Summer School, 183
Sunday Broadcasting, 28, 131
Sykes Committee, 12
Synchronised Broadcasting, 42

T

Talks, 14, 22, 23, 24, 26, 30, 37, 72, 135,
146, 181-185
Tatsfield, 357
Television, 50, 76, 114, 128, 132-134, 153,
329, 440-447
Tenth Anniversary, 9
Theatres, 31-32, 203, 204
Time Signal, 26, 143, 144, 455
Trade, The Wireless, 36
Trans, 429-438
Transmission, 9, 397
Transmitters, 238, 278, 332, 343, 347, 351
Treasury, 259
Tuning, 40
Note, 353

U

Ultra-short Waves, 329, 336-344
Union Internationale de Radiodiffusion.
See International Union.

V

Valve Manufacturers' Association, 76
Valves, 77, 105, 240, 280, 283, 354, 392,
397, 399
Vaudeville, 21, 22, 34, 35, 152
Ventilating. *See* Air-conditioning.
Voice, 145, 147, 148

W

Wales, 35, 44, 46, 65-68, 207-209, 324
Washington Convention, 47
Wavelengths, 42, 44, 46, 47, 65, 231, 235,
240, 275, 286, 305-312, 329, 331, 337,
338, 407, 412, 431, 461-463, 466, 467
Weather Forecasts, 26, 30, 452, 453
Welsh Programmes, 207-209
West Regional Station, 4, 324, 450
Westerglen, 226, 227, 229, 230-240, 243,
245, 246, 334
Western Electric Company, 9
Whitley, J. H., 7, 82
Wireless Chorus, 20, 458
Exchanges, 34, 71, 72
League, 74
Link, 357, 361
Retailers, 76
Singers, 20, 458
Technology, Institute of, 76
Trade, 76-83
World-Radio, 37, 261

Y

York, Archbishop of, 26
Yorkshire, 182, 200

Z

Zones, Empire, 267, 268, 274, 276-278

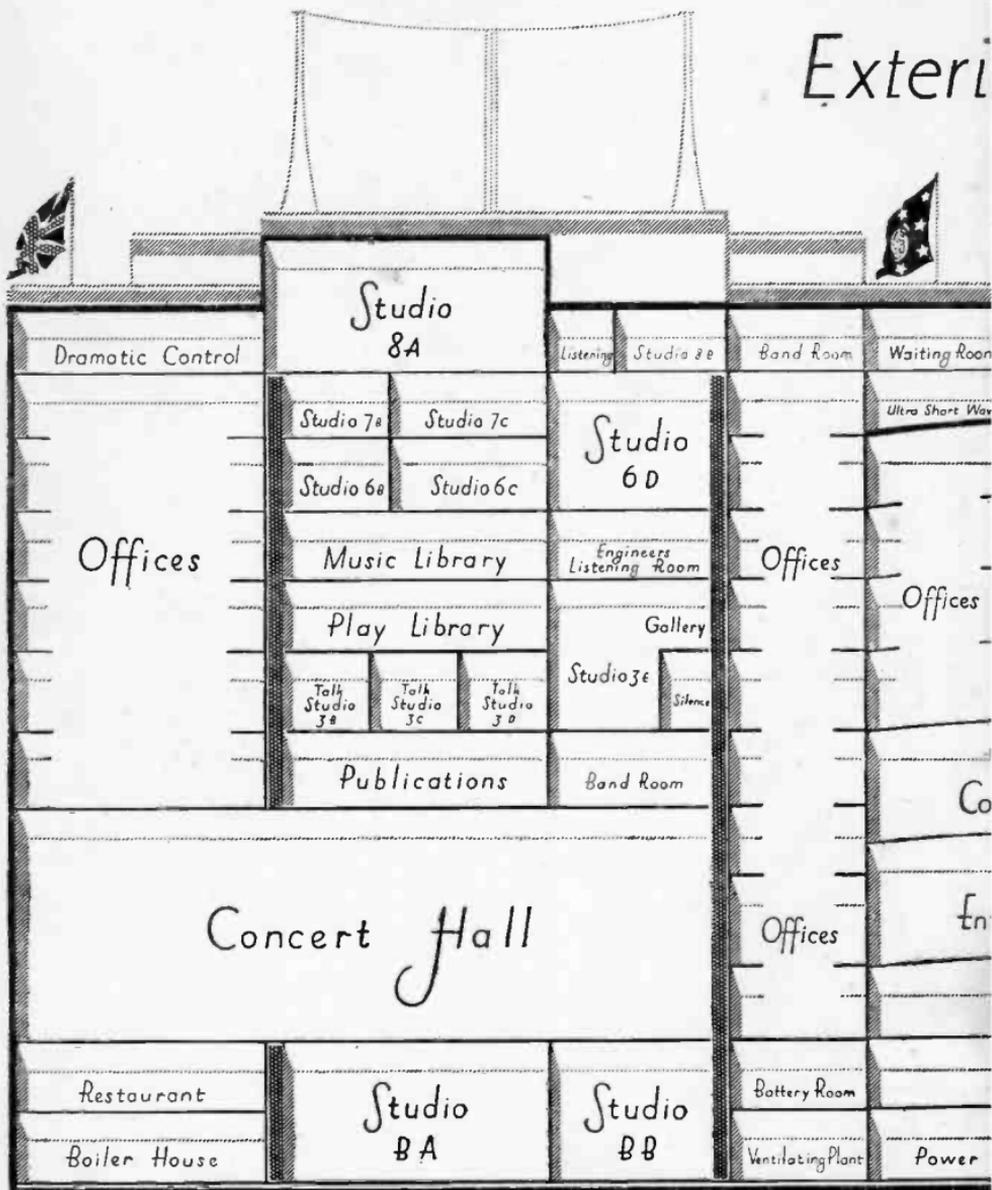
*Published by the British Broadcasting Corporation, Broadcasting House, London, W.1.
Printed by Richard Clay & Sons, Limited, Bungay, Suffolk.*

[No. 584]



	<i>January</i>	<i>February</i>	<i>March</i>	<i>April</i>
S	1 8 15 22 29	5 12 19 26	5 12 19 26	30 2 9 16 23
M	2 9 16 23 30	6 13 20 27	6 13 20 27	3 10 17 24
T	3 10 17 24 31	7 14 21 28	7 14 21 28	4 11 18 25
W	4 11 18 25	1 8 15 22	1 8 15 22 29	5 12 19 26
T	5 12 19 26	2 9 16 23	2 9 16 23 30	6 13 20 27
F	6 13 20 27	3 10 17 24	3 10 17 24 31	7 14 21 28
S	7 14 21 28	4 11 18 25	4 11 18 25	1 8 15 22 29
	<i>May</i>	<i>June</i>	<i>July</i>	<i>August</i>
S	7 14 21 28	4 11 18 25	30 2 9 16 23	6 13 20 27
M	1 8 15 22 29	5 12 19 26	31 3 10 17 24	7 14 21 28
T	2 9 16 23 30	6 13 20 27	4 11 18 25	1 8 15 22 29
W	3 10 17 24 31	7 14 21 28	5 12 19 26	2 9 16 23 30
T	4 11 18 25	1 8 15 22 29	6 13 20 27	3 10 17 24 31
F	5 12 19 26	2 9 16 23 30	7 14 21 28	4 11 18 25
S	6 13 20 27	3 10 17 24	1 8 15 22 29	5 12 19 26
	<i>September</i>	<i>October</i>	<i>November</i>	<i>December</i>
S	3 10 17 24	1 8 15 22 29	5 12 19 26	31 3 10 17 24
M	4 11 18 25	2 9 16 23 30	6 13 20 27	4 11 18 25
T	5 12 19 26	3 10 17 24 31	7 14 21 28	5 12 19 26
W	6 13 20 27	4 11 18 25	1 8 15 22 29	6 13 20 27
T	7 14 21 28	5 12 19 26	2 9 16 23 30	7 14 21 28
F	1 8 15 22 29	6 13 20 27	3 10 17 24	1 8 15 22 29
S	2 9 16 23 30	7 14 21 28	4 11 18 25	2 9 16 23 30

Exteri



of Broadcasting House

