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THE
B. B. C.
YEAR-BOOK
1932

THE PROGRAMME YEAR COVERED
BY THIS BOOK IS FROM NOVEMBER 1,
1930, TO OCTOBER 31, 1931

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SAVOY HILL

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BROADCASTING HOUSE NEARING COMPLETION
The South Front facing Upper Regent Street

I N T R O D U C T I O N

WITH THE OPENING of the Scottish Regional Transmitter at Westerglen, near Falkirk, 1932 will see the addition of another instalment of the new plan of high-power transmission. Meanwhile, in the North of England, the high-power twin-wave transmitters established in 1931 continue to consolidate their service to thickly-populated areas. Simultaneously in the West Country, at Washford Cross, Watchet, progress is being made with the final main instalment of the plan. Broadcasting House, in Portland Place, with its 22 studios and up-to-date equipment of all kinds, becomes the new permanent headquarters of British broadcasting.

The number of wireless receiving licences in force at 30th September, 1931, was 3,930,577. The average increase from May to August, 1931, was over 37,000 per month, nearly double the figure for the corresponding period of 1930. The progress is continuous and unrelaxing.

The economic crisis of 1931 affected the B.B.C. in several ways. The voluntary foregoing of an additional £50,000 for the financial year ending 31st March, 1932, and £150,000 for the next year, for the benefit of the Treasury, imposed the exaction of stringent economies. But there was another more important contribution from the B.B.C. Much was done to encourage composure and to discredit rumours of the kind which are apt to be the basis of panic. The B.B.C., with reduced resources, goes on steadily collecting, preparing, and radiating wholesome entertainment and accurate information.

The new B.B.C. Symphony Orchestra, now firmly established, is already recognised throughout the world. With further specialisation in programme building, the main orchestra has been adapted for particular purposes into groups entitled the B.B.C. Studio Symphony Orchestra,

the B.B.C. Light Orchestra, and the B.B.C. Bach Orchestra. There has been formed in addition the B.B.C. Theatre Orchestra as an auxiliary to dramatic productions.

With continuous improvement of technical facilities and the acceptance of reciprocal proposals, the regular interchange of programmes internationally will be established in 1932. Hitherto, a programme from America radiated by the B.B.C. was an attraction chiefly because of its novelty interest. In future, programmes of this kind will be part of the normal programme fare and should be accepted on their service merits.

The increase in the number of European high-power broadcasting stations on the medium waveband has aggravated the problem of interference, particularly in Great Britain. The B.B.C. continues to do all in its power to remove the causes of this trouble; but remedial measures must be international in character. Although progress has not been as rapid as was expected, there is some hope of an abatement of the interference nuisance in 1932.

NOTES OF THE YEAR

THE EVENT OF THE YEAR *par excellence* has been the completion of Broadcasting House. Unfortunately the decoration and fitting of its twenty-two studios had not advanced beyond the preliminary stages at the time of going to press, and many finishing touches remained to be added to various parts of the building. It has not, therefore, been possible to give a really full account of Broadcasting House in this Year-Book and many of the illustrations show the building in an incomplete form. The B.B.C., however, hopes to issue a souvenir of Broadcasting House early in 1932, and the B.B.C. Year-Book of 1933 will repair the omissions of the present year.

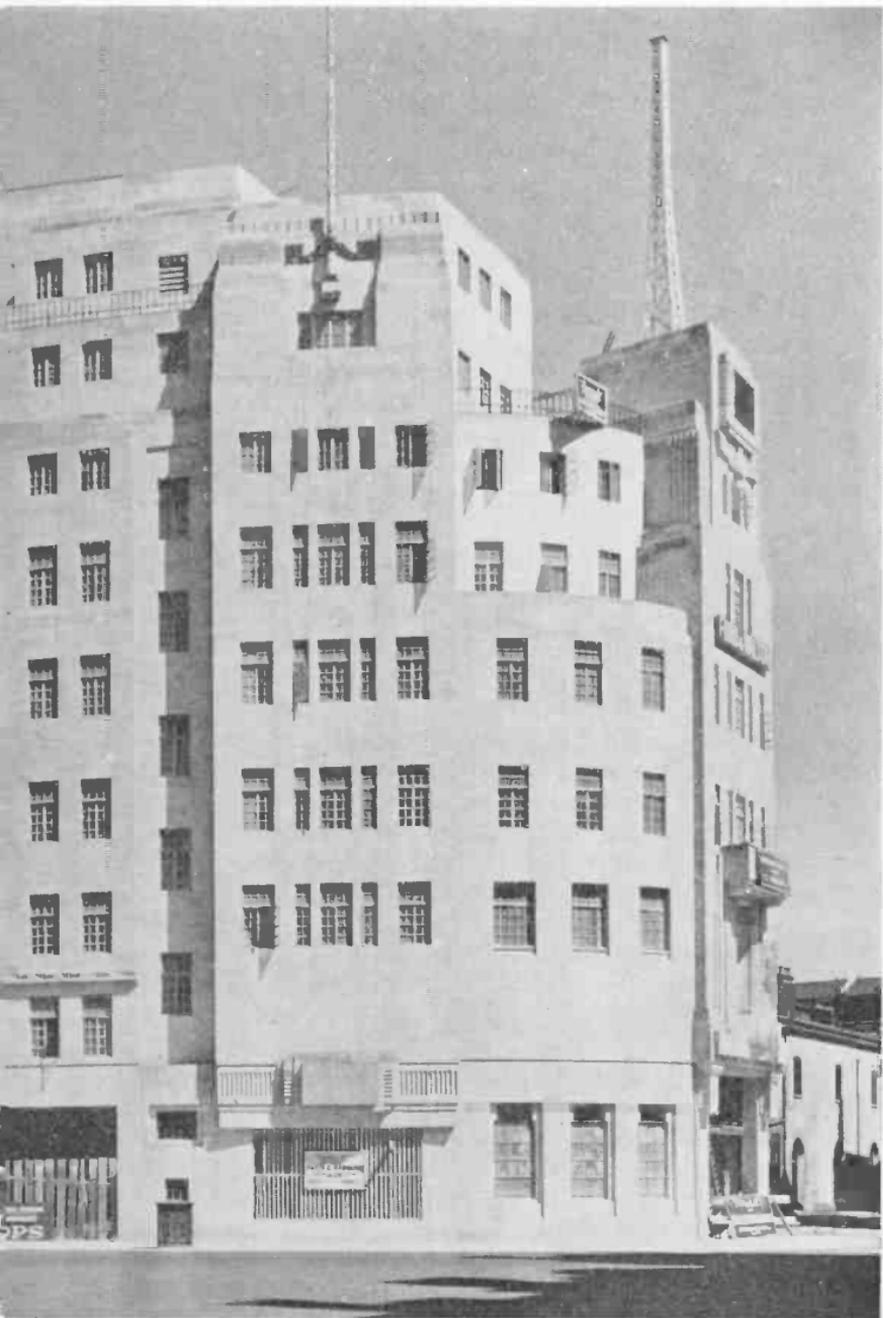
* * *

It is now taken as a matter of course that broadcasting should be made use of in every national or political emergency. During the past year Mr. MacDonald broadcast a memorable appeal to the nation immediately after the forming of the National Government. Mr. Snowden described his two budgets and broadcast an explanation of the causes and effects of the decision to abandon the gold standard. During the General Election in October, after prolonged negotiations among those principally concerned, arrangements were made for representatives of all the Parties to address the nation in the final stages of the campaign.

* * *

The Arsenal Football Club has had a large share in the broadcasting of Association football, and there can be no doubt that it has benefited from its co-operation with the B.B.C. Three facts may be of interest. Firstly, on January 10th, 1931, although a commentary on the third round of the F.A. Cup was being broadcast, the crowd of would-be onlookers burst the gates of the Arsenal ground at Highbury and poured in everywhere. Secondly, at the beginning of the autumn football season of 1931 a man in Sweden rung up a London newspaper office (broadcasting having been banned by then) to know if the Arsenal had beaten West Bromwich: the telephone call must have cost him £15 at least. Thirdly, the Arsenal Football Club made a record profit last season. If only for this reason, it is not





NT OF BROADCASTING HOUSE

By Courtesy of Architecture Illustrated

surprising that the shareholders of the club should be strongly in favour of broadcasting.

* * *

It is an accident of time that broadcasting has been preceded for a century or more by the daily newspaper, which in its long period of growth has secured immense privileges which the Press finds it convenient at times to forget. In the matter of commentaries, for instance, the B.B.C. should logically be treated on exactly the same footing as a newspaper. If the Press is allowed special facilities for reporting a football match, the B.B.C. should be allowed the same. If the Press pays no fee for the privilege, the B.B.C. should not be asked to pay either. In fact, although the B.B.C. only claims equality of treatment it should be entitled, as a public service not working for profit, to more favourable treatment, if any question of discrimination arose.

* * *

The Press has long been privileged in other ways, of which there has naturally been no emphasis in its own columns. For instance, at the time of the publication of the B.B.C.'s literary weekly, *The Listener*, a great deal was said in the Press, and argued officially by representatives of the Newspaper Proprietors Association, to the effect that the publication of *The Listener* was unfair, as it was in effect subsidised by public money, *i.e.* by the B.B.C.'s revenue handed over by the Postmaster-General after deducting 12½ per cent. for collection and another 20 per cent. or so as a direct tax by the Exchequer. No mention was made of the tremendous annual subsidy which the same Postmaster-General hands over to the Press in the form of reduced Press telegram rates and cheap postal facilities.

* * *

On November 25th, 1931, *The Listener* published its 150th issue. Those of the public who remember the opposition it met with when it was first published will by now have realised how little ground there was for that opposition. Proof of this is afforded by the steady support of the public, who read *The Listener* because it performs the very definite and necessary service of committing to print the best of the broadcast talks. *The Listener* has the advantage, or disadvantage, of being non-political, and maintains the B.B.C.'s rigid impartiality on all matters of Party politics. With this

exception, it provides every intellectual service to be expected from a weekly review, and at one time or another traverses the whole field of knowledge; in other words, it is an accurate reflection of the authority and the breadth of outlook of the broadcast programmes.

* * *

Mention should also be made of the phenomenal progress of the B.B.C.'s two other weeklies, the *Radio Times* and *World-Radio* in the same period. On January 16th, 1929, the date on which *The Listener* was first published, the net circulation of the *Radio Times* was 999,000 in round numbers. On the same day in 1931 it was 1,603,000. The corresponding figures for *World Radio* were 127,000 and 258,000, and the circulations do not seem to have reached saturation point.

* * *

From these figures it may legitimately be assumed that broadcasting is in a flourishing condition, and the experience of the wireless trade during the past year gives ample confirmation. A feature of the year has been the unusually successful exhibition held in September at Olympia. The attendance was 50,000 in advance of the previous year, and business done is said to have amounted to £20,000,000, or an increase of about 50 per cent. Not only this, but the demand for an exhibition in the North was so strong that on finishing at Olympia the whole exhibition was transported in a fleet of motor-lorries to reopen at the City Hall, Manchester, on October 7th. These and the annual exhibition at Edinburgh are sponsored by the Radio Manufacturers' Association. Other provincial centres at which wireless exhibitions are held include Bristol, Belfast, Newcastle, Leeds, and Cardiff. There will be no surprise at the estimated sale of over a million sets in 1931 as against 649,000 in the previous year.

* * *

The quality of reproduction has also improved noticeably in the past two years, but there is still much to be done in the way of substituting good sets for out-of-date ones throughout the country. Except in districts where interference demands compromises at the ultra-treble end of the scale, good reception should now give natural reproduction of sounds over the normal ranges of intensity and frequency. That is to say that, with a properly adjusted re-

ceiver, a solo piano should sound as if it were being played in the room, and, for instance, the drums in the second movement of Beethoven's Ninth Symphony should sound loud, natural, and exciting. It may be added as a generalisation that any loud-speaker that makes music sound as if it were coming through a funnel is entirely out-of-date.

* * *

The practice of international visits for the exchange of views between broadcasters may be said to be developing. Visitors to the B.B.C. from America included Mr. John W. Elwood, Vice-President and programme manager, and Mr. Hanson, engineering operation manager, of the National Broadcasting Company, Mr. William S. Paley, President of the Columbia Broadcasting System, with Mr. A. Lowman; and from Europe Dr. Bredow, State Commissioner for broadcasting in Germany, with his colleague Dr. Magnus, and Dr. Wanner; Dr. Raestad of Norway; Mr. Chamiec of Poland; Mr. Chiodelli of Italy; Dr. Horváth of Hungary; Mr. Baize of the French Post Office; from overseas Mr. Harper of Ceylon.



THE PRIME MINISTER SPEAKS TO THE NATION

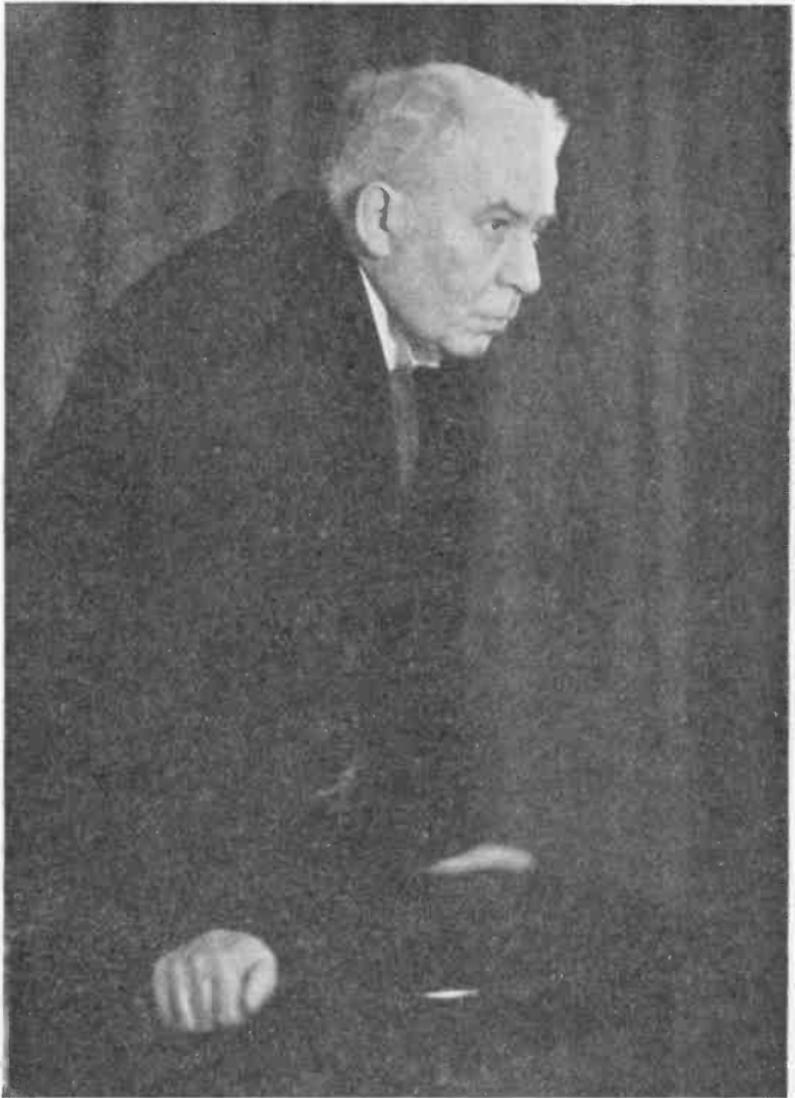
(August 25, 1931)

O B I T U A R Y

IT HAS SO HAPPENED that the deaths have occurred during the past year of several public men and women to whom the B.B.C. has been indebted for administrative co-operation or for their artistic services. Sir Laming Worthington-Evans, Mr. Vernon Hartshorn, and Sir William Bull were all connected with the wider aspects of broadcasting and could be said to have helped to shape its destiny: Melba, Pavlova, and Arnold Bennett contributed to the programmes in one way or another.

* * *

Sir Laming Worthington-Evans was one of eight Postmasters-General upon whose interest and goodwill the B.B.C. has been in some measure dependent. To none has it more cause to be grateful. The early difficulties of the Company are now almost forgotten; nor perhaps are they worth remembering except in tribute to Sir Laming for the decisive step he took in 1923, a step which had a profound influence upon the future of British broadcasting. Early in that year the Company was faced with considerable opposition, based largely upon misconception of its constitution and intention, although there can be no doubt that the licensing regulations had proved unpractical. Sir William Joynson-Hicks, then Postmaster-General, appointed a Committee to investigate the matter. By the time that the Committee had prepared its report he had been succeeded in office by Sir Laming Worthington-Evans. The report exonerated the B.B.C. from all the charges levelled against it, approved the monopoly system, but recommended that a uniform licence fee of 10s. should be put into effect. The existing regulations authorised only complete sets manufactured by firms which were members of the Company; it was upon this guarantee that the member-firms had first established the service. Large numbers of individuals, however, had, contrary to the regulations, made up their own apparatus, and it was estimated that a quarter of a million of such sets were in use without any licence at all. Sir Laming decided that he could not accept his Committee's recommendations wholesale; in response to an appeal from the B.B.C., he took the bold line of instituting a 15s. Constructor's Licence for those lis-



THE LATE SIR WILLIAM BULL
who was one of the Directors of the old B.B.C.

teners who wished to make up their own sets but who would be under obligation not knowingly to use foreign components, and an Interim Licence of 15s. to cover any sort of apparatus then in use which might not come within the definition of the original regulations. He appealed to the public to support him, and within a month 334,000 new licences had been taken out, the B.B.C.'s finances placed upon a sound basis, and the licensing system restored to efficient working. Further, he decided to continue the system whereby manufacturers paid a royalty to the B.B.C., although he welcomed, in July 1924, the B.B.C.'s offer to abolish it and adopt a uniform licence of 10s. for apparatus of any type. His prescience and courage were amply justified; much of the progress made in 1924 and 1925 was due to his keen interest and active co-operation.

* * *

Mr. Vernon Hartshorn was another Postmaster-General to whose interest the B.B.C. has owed so much. Mr. Hartshorn was Postmaster-General in the Labour Government of 1923-24. While in office he showed keen interest in the B.B.C., paying frequent visits to Savoy Hill with a view to acquiring a close personal acquaintance with its organisation and operations. Although during the nine months of his tenure of office broadcasting encountered no emergencies, the B.B.C. was conscious of the co-operation of one who would have proved a sympathetic and interested adjudicator had conditions been otherwise. It was Mr. Hartshorn who, on the occasion of the General Election of 1924, when the Labour Government went out of office, authorised the broadcasting of controversial political speeches, an important precedent. It was then that Mr. Ramsay MacDonald, Mr. Stanley Baldwin, and Mr. Asquith as he then was, gave the first uncensored political broadcasts in this country.

* * *

The B.B.C. lost one of its oldest friends with the death of Sir William Bull, who had been closely connected with broadcasting in this country from its earliest days. Sir William, as a director of Messrs. Siemens, had a long-standing interest in the wireless industry; and he was one of the two independent directors elected to the Board of the old British Broadcasting Company when it was constituted in

1922. As Director and Vice-Chairman he took a prominent part in the Company's affairs until 1926, when its functions were taken over by the present Corporation. His interest in wireless did not cease with his duties on the Board, and for the last four years he had been President of the Radio Manufacturers' Association. In the sphere of programmes Sir William Bull had the distinction of having been responsible for the introduction of story-telling; he himself having broadcast the first story. One of the results of this was that he was visited by A. J. Alan, and it was through him the latter obtained his first opportunity of broadcasting. Sir William Bull also appeared before the microphone on other occasions, and many listeners will remember his energetic championship of the Channel Tunnel scheme in a debate two years ago.

* * *

It might almost be said that Dame Nellie Melba was the first concert artist to broadcast. She was certainly the first artist of world-wide reputation. She broadcast from the experimental Chelmsford Station of the Marconi Company in 1920 before the days of the B.B.C., and tales are still told of the difficulty of coping with the volume of her voice in a small studio, and that with an experimental transmitter once described as "tied up with string." Melba broadcast again in 1923 with the B.N.O.C. and in 1926 at a performance at the Old Vic in aid of the Sadler's Wells Fund, and her farewell performance in "La Bohème" was broadcast from Covent Garden on June 8th, 1928. The B.B.C. will always remember that she was one of the world-famous artists who co-operated with it in the early days in spite of the opposition of nearly all the vested interests of the concert industry. Sir Landon Ronald broadcast a tribute to her on February 24th, 1931.

* * *

An equally famous artist in another sphere was Madame Anna Pavlova, whose connection with the B.B.C. was also a long-standing and happy one. Had she been born a generation later the public might possibly have had their eyes gladdened by the sight of her actual dancing, but in her Ballet seasons at the Covent Garden Opera House in the years 1924-5 and 1927, listeners had to be content with the sound of her feet and the music of the Don

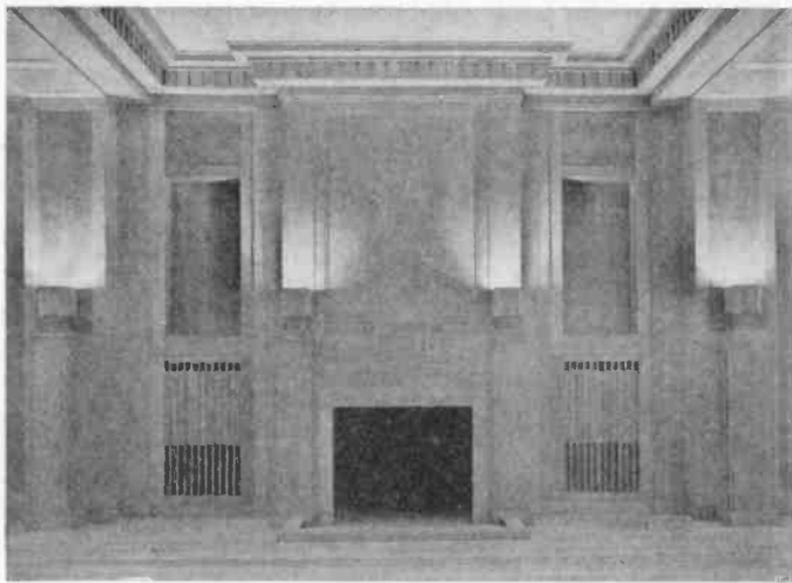


THE LATE MADAME ANNA PAVLOVA

Quixote or Christmas ballets to which she was dancing. Pavlova's own voice was heard in an interview in her dressing-room at Covent Garden in September 1925. A broadcast of music from the last night of the 1927 season was her farewell to the microphone, except for the Memorial Concert conducted by Walford Hyden on March 30th, 1931.

* * *

Arnold Bennett's connection with broadcasting was less direct. He himself, for personal reasons, never broadcast, although at one time he nearly made up his mind to select and arrange a programme for broadcasting. That in the end he did not co-operate with the B.B.C. in that way was always a matter of regret, as he was a lover of good music with a fine critical taste for it. His work, however, could not escape the microphone, notably his play "Milestones," which was last broadcast in January 1930, and his libretto for Goossens' opera "Judith," broadcast from Covent Garden in the same year. Mr. Desmond MacCarthy broadcast an appreciation of him on March 30th, 1931.



THE PANELLED COUNCIL CHAMBER IN BROADCASTING HOUSE

F I N A N C E

IT HAS BEEN TAKEN FOR GRANTED in recent issues of this book that the basis and nature of the Corporation's finances were common knowledge. But apparently, even in quarters which might have been expected to be well informed, there is still sufficient misunderstanding to make desirable a short re-statement of the financial conditions under which the Corporation operates. Current finances are also discussed briefly in view of recent outside events which have altered the position greatly.

The basic conditions applying to broadcasting determine generally the way its money must be administered. Wireless plant depreciates rapidly and has to be renewed at comparatively short intervals. Broadcasting is still young; improvements in all branches of its technique are constantly being made and engineering plant, studios, and methods become very quickly obsolete. Besides the changes taking place from within, changes from without must also be reckoned with. New inventions, international conditions and arrangements, the ever-rising standard attained—all these have their influence. The financial system must therefore be flexible and capable of meeting heavy capital expenditure, to a great extent as it is incurred, as well as providing adequately for increasing demands on revenue.

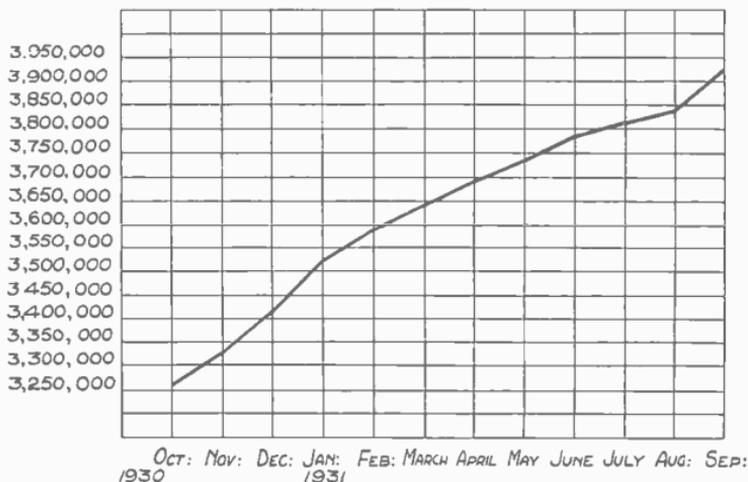
The resources with which the Corporation has to meet these demands are limited to its income. The whole cost of the service has to be provided out of income, and careful planning and control are needed to ensure that both running costs and capital expenditure get their due share of the funds available. An adequate reserve for capital purposes has, therefore, to be budgeted for equally with revenue requirements, and the balance of income not absorbed by revenue expenditure is in no sense a "surplus."

In 1930 (the Accounts for which year are reproduced in the Appendix) out of an income of £1,224,355 1s. 9d., revenue expenditure absorbed £1,038,352 7s. 8d., and £184,459 16s. 10d. was transferred to Capital Account. Of this amount £180,000 represents the provision for future expenditure and, for reasons given above, a lesser provision for this purpose would have been inadequate. It will be noted that from the inception of the Corporation to 31st

December 1930, £575,161 2s. 3d. has been appropriated for capital purposes, of which amount £311,522 4s. 4d. has been expended. To complete the Corporation's capital programme, the balance of £263,638 17s. 11d. will require to be increased by even greater annual reserves in future years.

With regard to the revenue figures mentioned above, the amounts on both the income and expenditure sides show increases over the previous year in accordance with the operation of the factors hitherto affecting the Corporation's finances. It should be noted, however, that expenditure, especially engineering maintenance, etc., still reflects the effect of only partial realisation of the Regional Scheme.

Notwithstanding the increasing requirements of the service, the Corporation has decided, in view of the present state of the national finances, to forego voluntarily, for the benefit of the Exchequer, part of the revenue from licences due to it under existing arrangements. During the fiscal year 1931-32, £50,000 will be given up and in 1932-33, £150,000. The necessary development of the service, including the provision of adequate capital reserves, must not, however, be hindered unduly. The strict control of finance hitherto in operation is no longer sufficient, and economies in revenue expenditure, justified only by the present exceptional circumstances, are being effected.



TWELVE MONTHS' INCREASE IN LICENCES

LICENCE STATISTICS

N O T E S

IT is not to be supposed that any reader of this book is a "sneak," but no one denies that there are many unlicensed listeners in this country. Estimates of the number have varied from time to time, but even so lately as September 1931 the official estimate for the London area alone was as much as 400,000. It is probable, however, that, owing to the greater facilities for evasion, the percentage in London and other urban areas is phenomenally high. The loss of revenue is a very serious one at any time, and it is not surprising, therefore, that in conditions of financial stringency the Post Office should be determined to detect and prosecute these "sneaks" by every means within its power. Fortunately detection is simple, and depends on the persistence with which detector vans and other devices are used.

* * *

There is little to be said for the person who is mean enough to use a wireless set without contributing the small fee of 10s. a year which makes it possible for that set to receive British programmes, but it is permissible to sympathise with those listeners who have failed to buy their licences merely because they have found it difficult to produce the money at the right time, especially as it is listeners who are unemployed or suffering temporary hardship who probably get the most benefit from their wireless sets. But at the same time their position is an irregular one. The results of the Post Office drive have already been evident in the returns for the last few months of 1931, but the increased figures are not included in the statistics given below.

* * *

The proportion of crystal to valve sets in this country has always been a question of practical importance. The more valve sets there are, of course, the more people are able to

get alternative programmes and the easier programme building becomes. Unfortunately no statistics are available from this country, but some figures elicited by the German Post Office, by means of a questionnaire sent out with the last census, provide at least a basis for conjecture. They show an average for all Germany of approx. 19 per cent. crystal sets to 81 per cent. valve sets, 53 per cent. of the latter being fed from the mains. The conditions of programme distribution in Germany are not dissimilar to those in this country, and it may be that here valve sets comprise some 75 per cent. or so of the total: an assumption that is supported by the fact that at the 1931 Radio Exhibition at Olympia there were only three exhibits of headphones. If this proportion had obtained five or six years ago, when the alternatives lay in the receiver rather than the transmitter, it would have been more valuable from the programme point of view than it is now, when, under the B.B.C.'s Regional Scheme and the increasing stress of wavelength conditions, the emphasis is more and more on the direct reception of the "home" station rather than the obtaining of alternative programmes from various more distant sources by the use of high-powered sets.

* * *

A point of interest in connection with licence statistics is the size of the average family. The United States Census Bureau reports that the average American family at the moment is four persons. It is probable that under the present conditions of population in this country the same average holds good for the British Isles. In computing, therefore, the maximum audience, it is reasonable to assume four persons per wireless set, thus making the present maximum for Great Britain and Northern Ireland some 13,000,000 listeners, to which, as pointed out above, many thousands of members of "pirate" families may be added. On great occasions, of course, such as moments of national emergency, great sporting events, or public events in which H.M. the King takes part, this audience is considerably increased by friends and casual listeners.

* * *

Attention may be drawn to the licence figures for Scotland, Wales, and Northern Ireland, which are respectively 4, 3 and 1 per cent. of the total. These are worth mention-

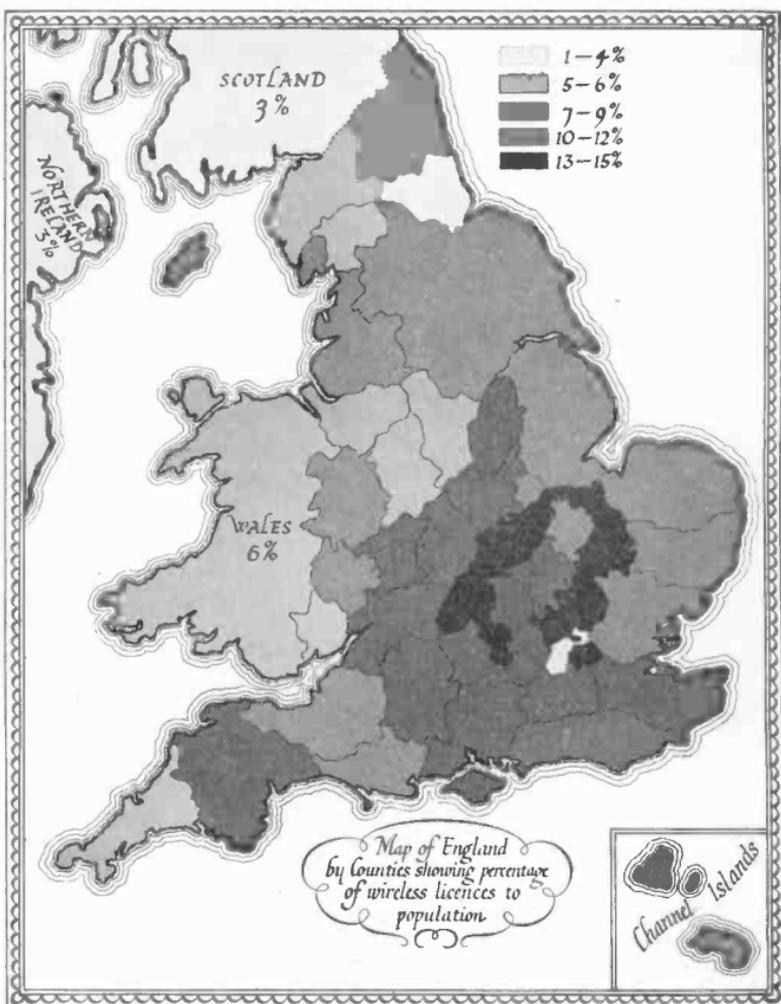
ing as presenting a peculiarly difficult problem for the B.B.C.; the problem of what material concessions can be made to the fact of nationality, and to the obviously greater need for wireless in the remote country areas, in the face of relative lack of support of broadcasting.

* * *

The problem has been brought to the notice of the B.B.C. during the past year in relation to both Scotland and Wales; in the former more favourable treatment has been demanded for the Highlands, which are represented by about 12,500 licences or 0·3% of the total figure. In the latter the complaints have been mainly in relation to North and Central Wales (licences 35,500, percentage of the whole 1%), and the demand has been on nationalist lines for a station devoted solely to the service of Wales and containing a large proportion of broadcasts in the Welsh language. The B.B.C. has always recognised arguments from the prevalence of the Welsh language, and the Daventry Station 5XX, as well as the Cardiff Station, has for several years broadcast religious services and other matter in Welsh. At the same time the B.B.C. is faced with increasingly difficult problems of distribution, and the limitation of the available wavelengths makes the granting of these minority demands definitely impossible.

* * *

By the end of October 1931 the number of licences in Great Britain and Northern Ireland had passed the total of four millions. The actual figures for October are not available at the time of going to press, but those for September 30th show 3,904,361 paid licences, plus 26,216 free licences issued to the blind, the total being 3,930,577. The detailed figures by counties which are given on pp. 33-4 are only available up to August 31st, and the total of them does not, therefore, correspond with the September total shown here and in the graph on page 28. They do not include the free licences.



THIS MAP IS A VISUAL SUMMARY OF THE STATISTICS GIVEN ON THE OPPOSITE PAGE

PERCENTAGES OF LICENCES TO POPULATION AS AT
AUGUST 31ST, 1931

	Licences.	Population.	%.
Bedfordshire	26,919	220,474	12
Berkshire	37,463	311,334	12
Buckinghamshire	29,224	271,565	11
Cambridgeshire	27,673	217,709	13
Cheshire	59,485	1,087,544	5
Cornwall	20,277	317,951	6
Cumberland	14,312	262,897	5
Derbyshire	44,397	757,332	6
Devonshire	70,956	732,869	10
Dorset	22,082	239,347	9
Durham	47,697	1,485,978	3
Essex	118,173	1,755,240	7
Gloucester	78,773	785,656	10
Hampshire	108,380	1,102,515	10
Herefordshire	9,465	111,755	8
Hertfordshire	61,109	401,159	15
Huntingdon	4,945	56,204	9
Kent	135,789	1,218,565	11
Lancashire	410,922	5,039,097	8
Leicestershire	54,374	541,794	10
Lincolnshire	57,735	624,553	9
Middlesex	68,702	1,638,521	4
Monmouthshire	24,889	434,821	6
Norfolk	43,461	504,846	9
Northamptonshire	45,240	361,273	13
Northumberland	57,926	756,723	8
Nottinghamshire	68,111	712,681	10
Oxfordshire	27,663	209,599	13
Rutland	1,213	17,397	7
Shropshire	21,858	244,162	9
Somerset	37,559	475,120	8
Staffordshire	86,382	1,431,175	6
Suffolk	31,854	401,114	8
Surrey	133,938	1,180,810	11
Sussex	79,553	770,078	10
Warwickshire	163,939	1,534,782	11
Westmorland	3,460	65,398	5
Wiltshire	30,871	303,258	10
Worcestershire	39,953	420,156	10
Yorkshire	338,305	4,389,465	8
London Area	666,859	4,396,821	15
	<hr/>	<hr/>	<hr/>
	3,411,866	37,789,738	9
	<hr/>	<hr/>	<hr/>
Isle of Man	4,265	49,338	9
Channel Islands	7,769	93,061	8

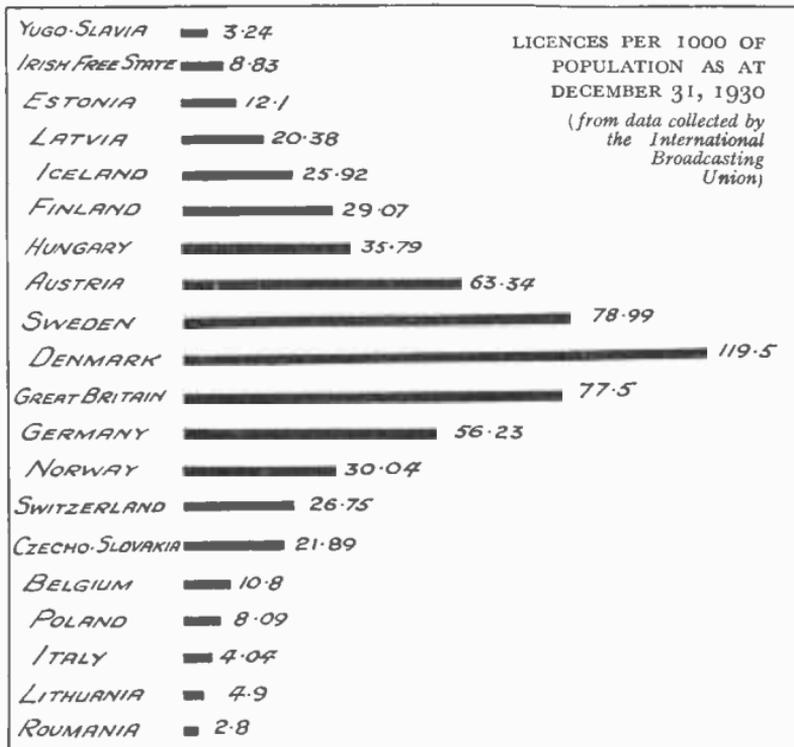
	Licences.	Population.	%.
Aberdeen & Kincardine	19,439	340,294	6
Angus	16,462	270,190	6
Argyllshire	2,535	63,014	4
Ayrshire	11,818	285,182	4
Banffshire	1,550	54,835	3
Berwickshire	499	26,601	2
Bute	763	18,822	4
Caithness	595	25,656	2
Clackmannan	1,090	31,947	3
Dumbartonshire	3,271	147,751	2
Dumfriesshire	3,430	81,060	4
Edinburgh	38,019	526,277	7
Fife and Kinross	11,137	283,715	4
Haddington	2,113	47,369	4
Inverness-shire	1,788	82,082	2
Kirkcudbright	1,167	30,341	4
Lanarkshire	11,763	1,585,968	1
Linlithgow	1,604	81,426	2
Morayshire	1,684	49,099	3
Orkney	582	22,075	3
Peebles	564	15,050	4
Perthshire	5,038	120,772	4
Renfrewshire	12,262	288,575	4
Ross and Cromarty	810	62,802	1
Roxburgh	2,133	45,787	5
Selkirk	1,943	22,608	9
Shetland	511	21,410	2
Stirlingshire	8,511	166,447	5
Sutherland	287	16,100	2
Wigtownshire	1,505	29,299	5
	164,873	4,842,554	3
Anglesey	987	49,025	2
Breconshire	1,356	57,771	2
Caernarvonshire	12,784	120,810	11
Cardiganshire	2,268	55,164	4
Carmarthenshire	9,344	179,063	5
Denbighshire	7,760	157,645	5
Flintshire	5,600	112,849	5
Glamorganshire	75,246	1,225,713	6
Merionethshire	1,860	43,198	4
Montgomeryshire	3,228	48,462	7
Pembrokeshire	4,374	87,179	5
Radnorshire	1,057	21,314	5
	125,864	2,158,193	6
Northern Ireland	33,630	1,256,561	3

EUROPEAN LICENCE SYSTEMS

THE INTERNATIONAL BROADCASTING UNION publishes a chart that shows the proportion of licences to population in European countries. On the left of this large sheet is a scale to read off the number of licences for each thousand inhabitants; along the foot are printed, in the due diplomatic order of the French alphabet, the names of the countries. On each name stand four columns (numbers of licences in force in 1927, 1928, 1929, 1930); some soar, some squat: in their diversity of height they suggest a stylised drawing of the chimney-stacks and serrated roofs of some immense industrial area.

Gazing, you see one black column soaring to the top of the scale on the left: Denmark, at the end of 1930, had 119.5 licences, or, if you count five people to the household, 600 listeners, out of every thousand people; and even if the statisticians will only allow you four-and-a-half people in the family the ratio is striking. The Danish licence costs about eleven shillings a year.* The gentle reader may think that's an easy one: cheap licences, most listeners. Not at all. England, Sweden, Austria, Germany follow Denmark: in Austria you pay nearly 15 shillings and in Germany 24! (And Germany is the B.B.C.'s neck-and-neck rival for the greatest absolute number of licences, both nearly four millions.) In most of the countries with rather expensive licences—in Poland, Hungary, Czecho-Slovakia, Latvia, as well as Austria and Germany—you can pay in instalments, usually by the month, and in some of these countries the licence fee entitles you to privileges beyond that of listening to the programmes. In Germany, for instance, if you have been a licensed listener for some months and become unemployed, you are given a free licence. (It is fairly general to excuse the blind from paying licence fees, and in some countries totally disabled people, war invalids and hospitals are also excused.) In Germany, also, you are insured up to a large sum by the broadcaster against personal injury or material damage caused to third parties, through your receiving set, including aerial: and 7,000 qualified and organised volunteers will help you either to cut out the noises made in your re-

* This and subsequent figures are based on the par value of the £.



ceiver by artificial sunlight, hot-air, or vacuum-cleaning, or else to come to an amicable arrangement with the owners of these competent machines. In Denmark (O touchstone!) you have all the fun of writing on your application for a new licence your views on the composition of the programme, *e.g.* "more vaudeville," "the same number of language-lessons," "less opera," or "much more contemporary music," and the implication is that the broadcaster acts accordingly. If you had the means, the opportunity alone would be worth the money, and, so far as is known, rude remarks do not, as it were, disqualify the voting-paper. In a number of countries, including Belgium, Lithuania, and Roumania, it costs less to licence a simple receiver than an elaborate one, and in Austria, Bulgaria, Hungary, and the Irish Free State the private individual knows that he pays a smaller sum than the owner of premises where col-

lective listening habitually takes place. The one generalisation it is possible to make is that an expensive licence fee, not payable in instalments, and no privileges (as we believe is the case in Norway), mean fewer licences than the country's standing in our civilisation should produce. But the Norwegian system, like the Spanish one, will be changed. The country is notoriously difficult to serve—unlike, say, Hungary or Holland. In Holland there is no licence; it is usual to register as a listener to your favourite programme company—basically religious or political, or just general—and to support it by subscription. There is thus one country in which there cannot be pirates. They, however, are usually blamed for the situation in Italy—the Italian licence fee is high, but not out of reach—where there are a mere 200,000 or so licensees out of forty million people, and this in the presence of perhaps the most elaborate and well-thought-out licensing scheme in the world. All the same, it seems that European broadcasting—Russia being conveniently and appropriately regarded as another continent—succeeds most surely where a licence exists and where a fair share of the revenue is handed to one programme organisation. Belgium and Switzerland have recently recognised this. It is hoped that those other countries—Greece, Albania, Bulgaria—whose licence system enables them to be shown on the Union's orderly chart, but where the creation of the licence has perhaps not yet had time to lead to the creation of a broadcaster, will do likewise. The comprehensiveness of the chart is the simplest proof of the recognition of the argument. Comprehensive-ness? The chart, as an international document, is done in French—that clear and exact language—and the most notable omission from it is France.

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No wireless receiving apparatus, crystal or valve, fixed or portable, or radio gramophone, may be installed or worked without a Post Office licence. Such licences may be obtained at any Post Office at which Money Order business is transacted, price 10s. Neglect to obtain a licence is likely to lead to prosecution.  
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DR. EREDOW

State Commissioner for Broadcasting in Germany, who visited England in May 1931

INTERNATIONAL

N O T E S

THE OLD REGIME in Spain had set up a committee to draft a plan for the technical and constitutional reorganisation of broadcasting. This committee was dissolved by the present government shortly after it came into power, and the future is not clear. It is noticed that Union Radio has been co-operating closely with the Republican Government, to which—and to the nation in general—it was of great service last spring by broadcasting reliable and well-informed news of the progress of the revolution. Union Radio's microphone has now been set up in the Spanish parliament.

* * *

Most of the information available on broadcasting in Soviet Russia is general rather than detailed. It is known that the service exists to propagate (externally as well as internally) the enthusiasms of the nation's leaders, and the B.B.C. has now received from the International Broadcasting Union a list of music commissioned for broadcasting, which shows that propaganda is not limited to the spoken parts of the programme. Some titles are:—"Song of the Tractor Driver," "By the Trans-Siberian Railway Line," "Bloody Sunday," "Girl and Boy of the Komso-mol," "Lenin's Parade" and "March of the Irreligious." The different composers include Feinberg, Mossolov and Polovinkin.

* * *

Elsewhere in this book it is stated that every third school in Germany listens to the broadcasts to schools. The central office in Berlin directs this work, but regional initiative is by no means discouraged. A collaborator in mid-Germany (Leipzig and Dresden area) described in the journal *Schulfunk* the educational plays produced there with much

success. The subjects presented in dramatic form included the Olympic games as they were held in Greece 2,380 years ago; a discussion in a barber's shop in Rome in B.C. 64 when Cicero had been elected Consul; the theatre of Dionysius in 472 B.C. (the play within the play was Æschylus' "Persæ"); Charlemagne receiving ambassadors; and many others nearer to us in date, including (from a North-German station) the representation of a meeting of creditors in the board-room of a large bank.

* * *

So far as can be judged, opera is the favourite broadcast in Italy. But the season in the Opera Houses is very short, and the broadcasters have been in a difficulty. Accordingly, they have created a season of their own for the summer and autumn. About 50 works are apparently to be performed during the season that opened on May 20th, 1931, of which no less than 44 are by Italians, including the youngest composers. Rome station has formed an opera company of about 70 singers.

* * *

A contributor to the German journal *Funk*, who has travelled in Palestine, reports that, although there is no broadcasting station there, considerable interest is taken in wireless. Power is available along the valley of the Jordan, and he says that every encampment of tents has its receiving set, many of these being mains sets. In the evening the whole settlement gathers round the loud-speaker. In the typical Arab café in Jerusalem enthusiastic listeners are causing the once inevitable gramophone to be replaced by a receiver. Oriental music from Stamboul and Angora is popular, but the programmes of the North African stations are too strange, and of European music apparently only brass and wind are favoured. The stations of Southern Russia can be picked up with some ease, but are not very popular on account of their political propaganda. A number of the Jewish population are interested in short-wave work, and although it is difficult to obtain transmitter licences, there is apparently a growing market for short-wave receivers.

* * *

The Reichs-Rundfunk-Gesellschaft, which gives valuable help to listeners in the struggle against electrical interfer-

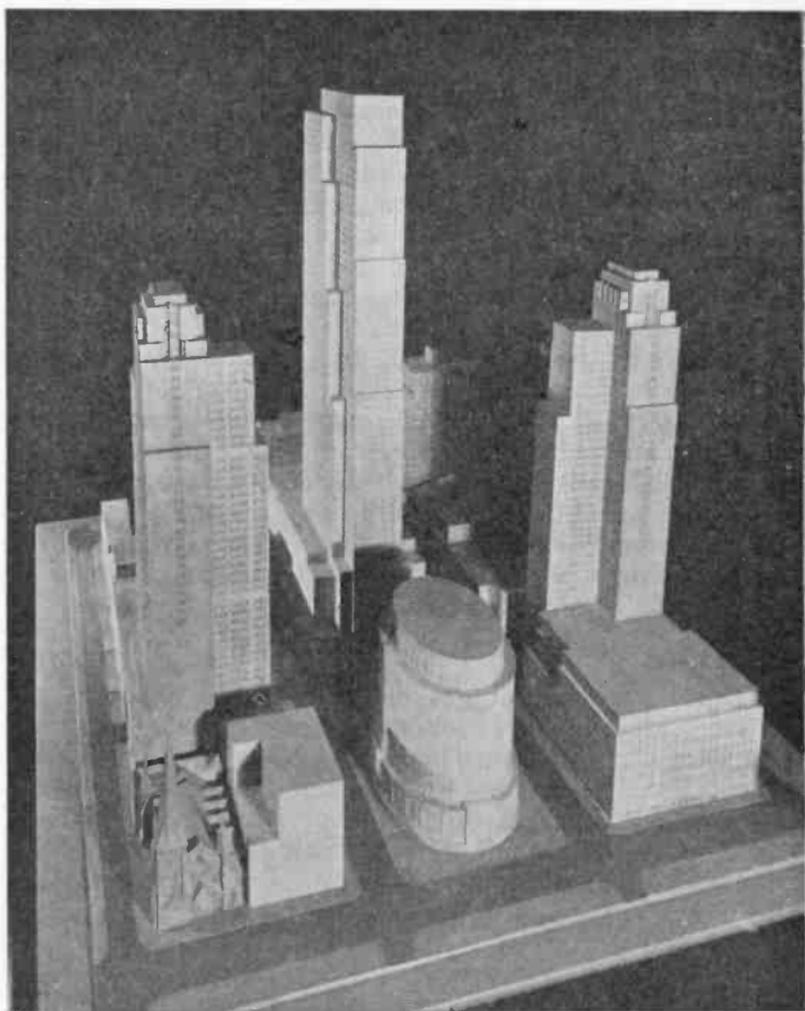
ence, has prepared some gramophone records to illustrate to listeners, and to the volunteer workers who help them, the exact type of interference caused by a number of different installations. The records were made from a receiving set functioning normally, but the interference was of great signal strength in order that its characteristics might more easily be recognised. There was recorded interference from high-frequency therapeutic apparatus, electric bells, sewing-machine motors, hair-drying apparatus, lift motor, tramways, and a number of other sources.

* * *

The population of Iceland is not much more than one hundred thousand, and the broadcasting service has been operating for only a comparatively short time, but people are already taking out licences. In a community so closely interested in fishing, weather reports are one of the most valuable services that can be rendered by broadcasting; another is school broadcasting, from which the children of the scattered settlements must benefit. But the broadcaster is by no means limiting himself to services of this kind, for which one expects the resources to exist; he is transmitting every evening a programme so varied and so enterprising that Iceland's isolation must seem to its listeners almost a delusion.

* * *

If France has not yet got its broadcasting statute (M. Guernier, the present Postmaster-General, has promised it very soon now, but how many P.M.G.'s have seen their projects perish!), it is not for any lack of interest displayed by the wireless press, which is always remarkable for its vigour and occasionally for its brilliance, particularly critical brilliance: many solidly-established broadcasters may envy France critiques, mostly on literary subjects, which often gracefully disguise a considerable erudition. In this connection, it is worth mentioning for the benefit of listeners in this country who speak French, that Radio Paris publishes *Les Cahiers de Radio Paris*; these contain representative talks of the preceding weeks and are published on the 15th of each month at the price of 4 francs.



A PHOTOGRAPH OF THE DESIGN FOR "RADIO CITY," NEW YORK

AMERICAN BROADCASTING

BROADCASTING in the United States suffers, like so many sides of American activity, from there being too much rather than too little information about it available. Facts and figures abound to beguile the mind with superficial comparisons and lead it away from the real question: what is the essential quality of American broadcasting? Only the conviction that the purpose of a Year-Book is informative and not interpretative encourages one to drive a way through the mass of miscellaneous material at one's disposal, with the idea of presenting, at best, a skeleton outline of broadcasting as it appears across the Atlantic.

To begin then at the beginning, broadcasting in the now well-understood sense of the word came into being in the States in the autumn of 1920. If a single event can be taken as marking the moment of birth, it was the broadcast of the returns of President Harding's election in November 1920. These were radiated by the Pittsburg station, KDKA, which claims it is entitled to be called "the pioneer broadcasting station of the world." From that time onwards, radio, as it is most commonly called in America, grew by leaps and bounds. It was like the spread of fire, equally imperceptible in its beginnings and uncontrollable in its results. It began naturally enough with electrical and communication interests (KDKA was operated by the Westinghouse Electric Company, and WEAf, another famous pioneer, by the American Telephone and Telegraph Company), but within two years it had spread to newspaper proprietors, department stores, manufacturers, churches, universities and even private individuals—to everyone indeed who had anything to tell the world. Everybody wanted to start a radio station, and at that time there was little to prevent them from doing so. The only form of control exercised by the Government in those early days was the necessity of obtaining a licence from the Department of Commerce before beginning to operate a station. But as the qualifications were easy, this stood in nobody's way. The consequence was that by the time the Government, the public and the trade realised the need for control, the situation was already out of hand and "chaos in the ether" a household phrase. By 1924 there were 1,105

stations in operation; fortunately the mortality rate was high, and by 1926 the total had fallen to 560. During that year, however, a legal decision was given according to which the Department of Commerce had no power to refuse transmitting licences and "anyone desiring to go on the air had a legal right to do so." Thus encouraged, the total rose again to 722 and commercial competition continued to tear the 89 wavelengths (all that were available) to shreds and pieces. One can only marvel at the comment on public endurance which the picture presents.

The first indication of approaching order came not from Government at all but from a combination of electrical interests, the American Telephone and Telegraph Company and the Radio Corporation of America, which conceived of the idea, peculiarly suited to American needs, of chain-broadcasting. This means simply the establishment of one or more powerful key stations transmitting full-time programmes and linked by telephone line to a number of smaller stations usually under other ownerships in different parts of the country. The smaller stations are "fed" with programme matter prepared by the key station, and can relay as much or as little as they can adapt to their local needs. A.T.T. experimented with the idea, but it was not until late in 1926, when R.C.A. and associated interests purchased WEAf and formed the National Broadcasting Company to operate it, that its potential significance was realised. N.B.C. started with two key stations, WEAf and WJZ, both in New York, and seventeen associate stations; now, in the autumn of 1931, they have developed two networks, stretching from end to end of the States and including over eighty stations. The other big chain is the Columbia Broadcasting System, which began about a year later than N.B.C. and has developed a single network consisting of eighty odd stations. In addition, there are many stations which work independently of either chain, some of them with romantic histories and distinct individualities. But these two, the N.B.C. and the C.B.S., are referred to as the "national" chains and correspond for all comparative purposes to the B.B.C. or to the Reichs-Rundfunk-Gesellschaft in Germany. Although highly competitive, as between themselves, they constitute America's nearest approach to centralisation, for national service. The chains between

them include news bulletins, weather reports, religious services, market reports, farmers' bulletins, etc., and the fact that most of these services are sponsored by commercial bodies need not prejudice for us their intrinsic value.

This brings us to the great question of radio advertising, a red flag in all such discussions. So much has been said both for and against a system that get its revenue not from licence money, as in most European countries, but from selling time on the air to commercial interests, that we may for once consider ourselves justified in giving it a miss, at least so far as its merits or demerits are concerned. The laments and righteous indignation of listeners have penetrated across the Atlantic often enough for us to feel that we know all about it. Obviously the subject lends itself endlessly both to humour and to exaggeration. But the really striking feature of the system as adopted by America is its inevitability. Given the broadcasting situation as it had developed by 1926, with 528 stations already on the 89 available channels and 650 new applications filed, it was no longer (if indeed it ever had been) a question of choice. The selling of time was the obvious answer to two questions which had gradually come to the surface of the floating chaos. One, who shall pay for broadcasting? The other, how are all the people who want to use radio as a mouth-piece for telling the world to be satisfied? The two questions were, of course, interdependent. Not everyone who wanted to broadcast his wares, his religion, or his personality could afford to run a station, even if there had been room for him; and, on the other hand, no station, however well established, could continue unless its activities produced revenue, and at an increasing rate, for as novelty died out the public demanded ever higher standards of performance and transmission. Whether, if the Government had made serious efforts to control radio while it was still controllable, the position by 1926 would have been very different is, of course, a debatable question. But American horror of anything approaching Government monopoly or supervision can be gauged by the note of opposition that appeared when, in the midst of chaos, the Radio Bill was introduced, which led later to the formation of the Federal Radio Commission. "Hoover will be Czar of the Air" is a typical headline from a newspaper of the day.



MR. A. R. BURROWS

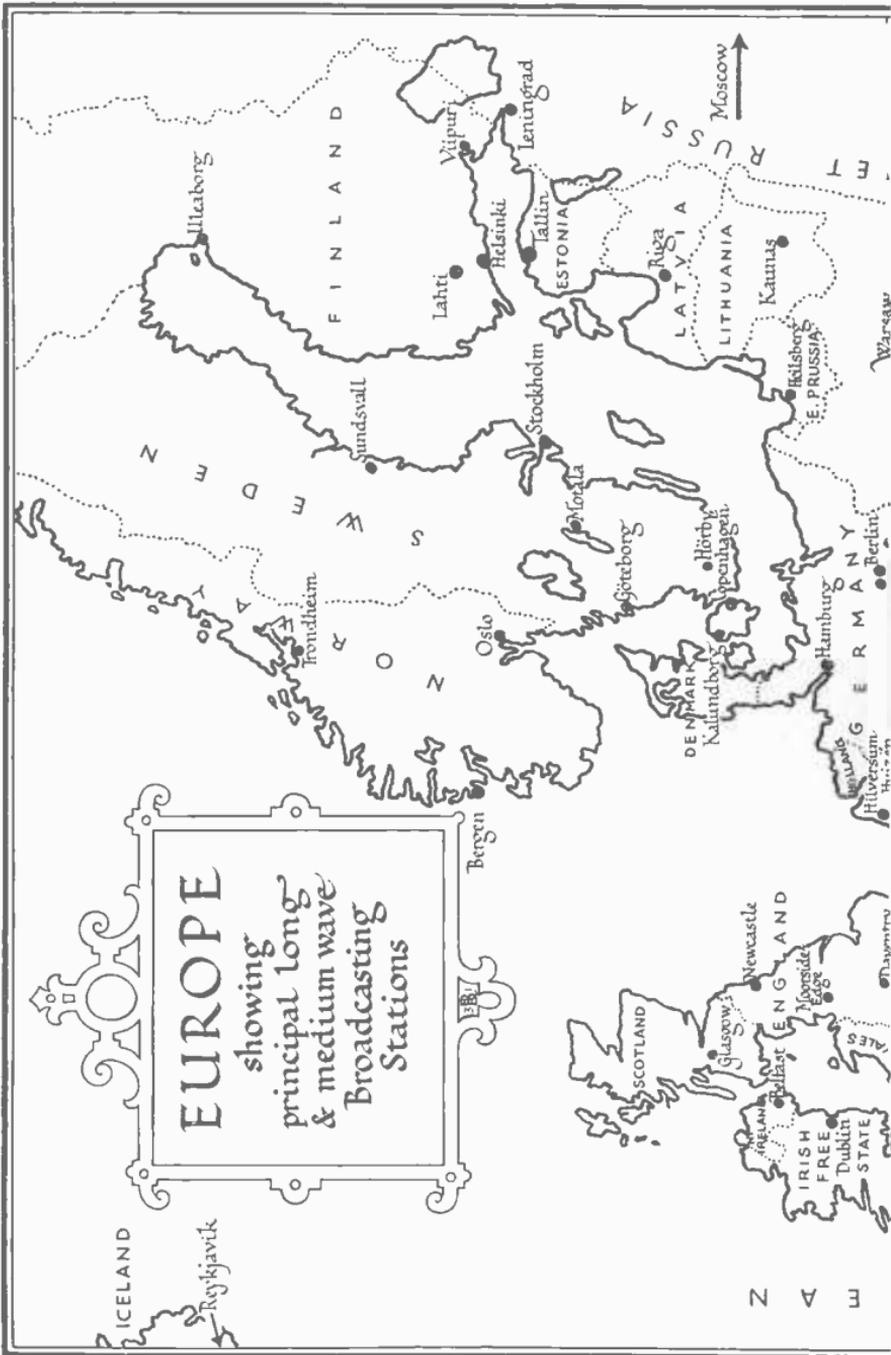
the Secretary-General of the International Broadcasting Union, who was the original Director of Programmes of the B.B.C. He returned to the microphone on April 22, 1931

In spite of such alarms, however, the Federal Radio Commission came into existence at the beginning of 1927. It was created in the first place as an emergency measure and more or less as a compromise until the whole problem of broadcasting could receive further attention. It consisted of five members appointed by the President and representing the five zones into which for the purpose the country had been divided (a scheme which has since been modified), and had authority to classify radio stations, prescribe the nature of services to be rendered, assign wavelengths to various classes of stations, regulate kind of apparatus to be used, make regulations to prevent interference, etc., etc. It was created, in fact, as a grand tidying-up body, and its function was no less a one than to reduce chaos to order during the first year of office. The life history of the Commission would fill volumes; as was to be expected, it has been a very eventful one, full of almost insurmountable difficulties, and the end is not yet.

Finally, after this bird's-eye view of the general structure of American broadcasting, we might perhaps narrow the

vision a little by concentrating on the actual programmes issued by the two chains. These offer certain similarities to British programmes and certain dissimilarities, which, if followed out, must lead to significant conclusions. Very little thought produces one conviction at least which grows stronger as one reads: that to understand a people's broadcasting one must first understand the people. What our programmes have in common with American programmes, we, as a nation, have in common with America; for instance, music, both good and bad. The types of programme that seem most unfamiliar and that strike us as curious rather than attractive are probably those that spring from a side of American thought and character with which we have no real sympathy. To take one instance, the great number of stunt broadcasts, often justified by their living and immediate interest, but sometimes seeming in their effort to attain novelty to lose all sense of the usefulness or otherwise of the achievement. As early as 1925, when plain studio broadcasting was still something of a miracle to British listeners, America was arranging a complicated O.B., or "Nemo" as they call it, from the bottom of the Atlantic: "Deep Sea Broadcasting" was the Press description. More recent efforts have included a running commentary on a prison fire given by one of the convicts, and an interview out at sea with a rum-runner! Quite another aspect of the essential difference between listeners, and therefore between programmes, is exemplified by a programme of the semi-religious, semi-sentimental type, of which "Sunday Night at Seth Parker's," a weekly N.B.C. feature, is the most popular and famous example. This strikes a note which, while perfectly sincere in origin and intention, is entirely alien to British minds.

We may carry the idea further and say that the whole system of American broadcasting where it appears to us strange is merely a reflection of American life still outside our comprehension; the public consciousness which, on the one hand, submits to what we in this country could only describe as the tyranny of commercial competition, and, on the other hand, solemnly declares that "the American sense of freedom would not permit of applying set licences and licence fees," clearly springs from a specifically American conception of democracy.



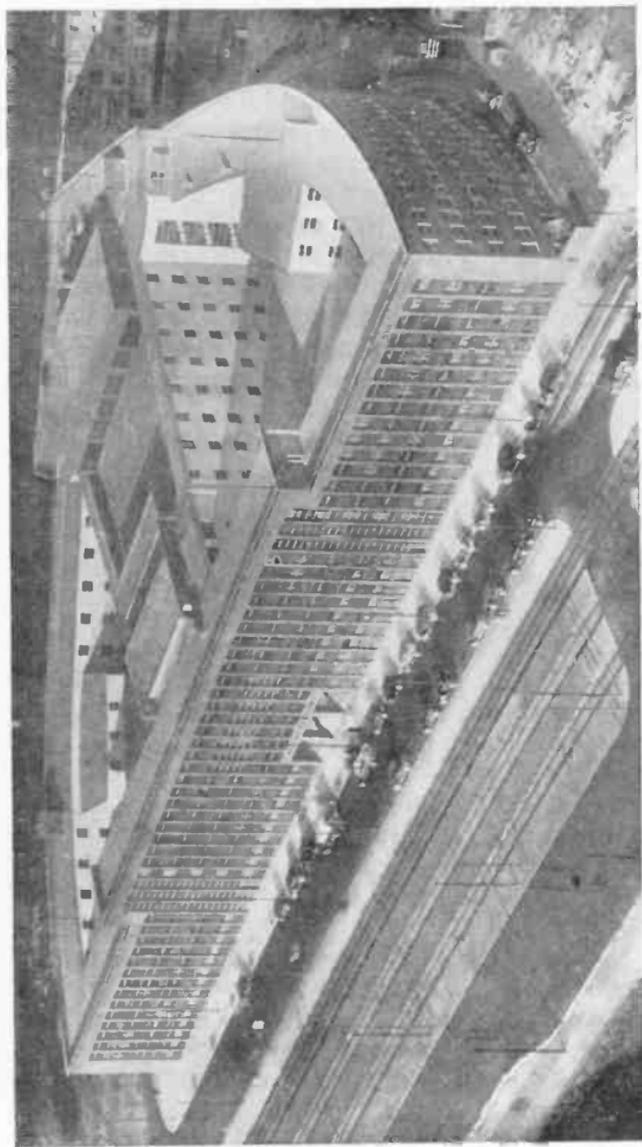
BROADCASTING IN GERMANY

By MINISTERIALRAT A. D. H. GIESECKE, Director of the Reichs-Rundfunk-Gesellschaft

THE ENGLISH OBSERVER comparing German broadcasting with his broadcasting at home will be struck by one difference: the allotment of a separate organisation to different parts of the country. In Great Britain, the central office in London undertakes the detailed organisation of the broadcasting system and supervises in principle the programmes of all stations; but in Germany each of ten separate companies bears complete responsibility for the programmes radiated within its own area. Is this apparent dismemberment deliberate or adventitious?

It may be recalled that the invention of wireless telephony did not, in Germany, lead at once to the introduction of broadcasting; the political and economic situation at the time pointed to the necessity of placing this new gift first of all—in the form of a system of wireless communication—at the service of trade and commerce. Only when the utilisation of wireless telephony for economic purposes had been sufficiently secured was it possible to liberate some wavelengths for broadcasting. Broadcasting thus began one year later in Germany (in the autumn of 1923) than in Great Britain, and at its inception English experience was already available. In spite of this, we did not follow the example of centralisation set by England, preferring, after thorough weighing of the pros and cons, to found the individual companies. The decisive consideration was that of the disposition of artistic activity and talent, which in England are to a great extent concentrated in London, but in Germany are distributed among a number of different cultural centres, so that a rigid centralisation would make it extremely difficult to do sufficient justice to the racial peculiarities of the different provinces. Once this consideration was taken into account, it could only result in *decentralisation*, with the ultimate object of gradually linking the companies together later on to such an extent as future developments, the exact nature of which could not then be foreseen, would indicate.

The principle of the independence of the companies was



Meter.

THE GERMAN BROADCASTING HOUSE (FUNKHAUS) IN BERLIN

always maintained, but as the service grew, a partial fusion of this kind did in fact develop in parallel with it and with the heightened technical requirements and the improvement, in telephone-circuits; for example, the Reichs-Rundfunk-Gesellschaft was founded, technical operation was concentrated on this company, and a common programme committee, a central office for school broadcasting, and a Central Aid Station for listeners were established.

How then does our German organisation now function in practice? The transmitters are operated by our Post Office, but, with this exception, all business common to the companies, including questions of organisation, management, and engineering, is handled by the Reichs-Rundfunk-Gesellschaft as "roof company"; it also supervises broadcasting finance in its entirety and represents the broadcasters in all common causes. The task of the regional companies is to create the programmes; each of them is assisted by a political supervisory committee and a cultural council. Problems connected with programmes and presenting themselves to all companies alike are handled directly either by the programme committee or by the Reichs-Rundfunk-Gesellschaft, according to their nature. School broadcasting is administered by a central office in co-operation with the companies. The ultimate responsibility for broadcasting *as a whole* is laid upon the Broadcasting Commissioner of the Postmaster-General.

German broadcasting is thus, in fact, much more unified than appears at the first view. Whether the present form is one to be indefinitely continued will depend upon future developments: at the moment, it seems capable of meeting any demands made on it, of whatever kind.

The problems that occupy German broadcasters are essentially the same as in England. There are first the many and various technical tasks, which, although in the first place the business of the Post Office, are of the greatest importance to the future of broadcasting. They include completion of the network of high-power stations, the elimination of interferences with reception, the possibilities of synchronisation and of ultra-short-waves, and television. And we have the additional task of further developing wireless checking-technique, and of perfecting studio acoustics and the technique of recording outside broad-

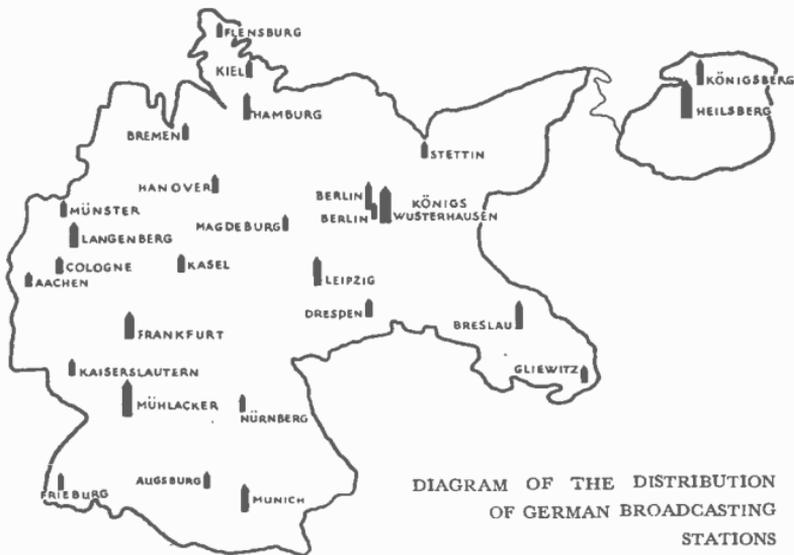


DIAGRAM OF THE DISTRIBUTION
OF GERMAN BROADCASTING
STATIONS

casts on gramophone records, while we are studying also the place of recorded performances in raising the artistic level of the transmissions. An interchange of views on these questions is continually taking place between English and German engineers.

The question of electrical interference is the cause of much work and worry. It may be of interest to mention that the organisation created and directed by the Central Aid Station now comprehends 2,000 local Aid Stations with about 7,000 assistants—most of them unpaid volunteers—who in the first half of 1931 disposed of more than 75,000 cases of interference.

To create something new in the programme field, after eight years of broadcasting, is not simple. All the same, each of the companies is continually searching for new forms or endeavouring to improve upon experiments already made. Among these efforts we may refer to the musical works commissioned specially for broadcasting, to comply with the particular requirements of its technique. In response to the clamour for the creation of a dramatic art of the microphone we commission and produce works of the most varied types, including radio plays, "radio sequences," "cross-sections," and dialogues, in which two,

three, or four people take part. The treatment of questions of the day also is steadily gaining in importance.

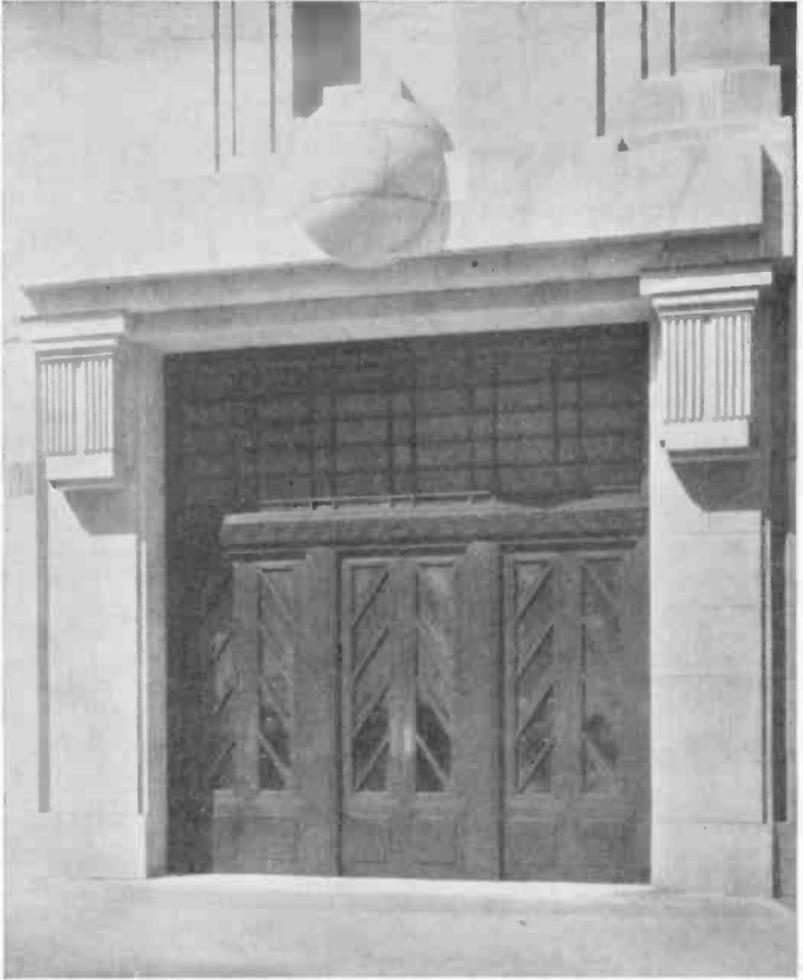
Devoted care has recently been given to school broadcasting, in which we co-operate very closely with the education authorities. Every third school is to-day in a position to complement and vivify the usual instruction with the special broadcasts to schools. In order that the fullest use may be made of educational talks, listening-groups have been formed in many places, in which communal listening is followed by discussion, under adequate direction, of what has just been heard. An innovation of recent days is the move by the Government to avail itself of broadcasting for pronouncements of especial significance.

It need scarcely be said that in these times of pressure deeper attention is paid to the transmission of advice on agriculture, handicrafts, and other callings. The same motive leads us to use unemployed musicians as much as possible.

And, lastly, relays. Nowadays, with perfected telephone lines, all German stations can exchange technically irreproachable programmes—one recalls the evening programmes, "In our Part of the Country," given by each station in turn and relayed by all the others; the Bach Cantatas from Leipzig; the national programmes of every sort. In the same way, technical progress enables us to exchange programmes with most of the sister-organisations in the rest of Europe, and even, with the aid of the short-wave, with other continents. German stations are very active in this give-and-take—let us instance the performance of "Tristan" at Bayreuth this summer, which was re-broadcast by 200 stations in three continents.

Broadcasting in Germany, as everywhere in the world, is thus marching onwards, striving to do justice to its great responsibilities. And the continual, and even more and more rapid, increase in licences seems, in these times of hardship and economic pressure, to prove beyond argument that broadcasting has never been more necessary to the people.

BROADCASTING
HOUSE



Larkia

THE MAIN ENTRANCE

NOTES ON THE BUILDING

By the Architect, LT.-COL. G. VAL MYER, F.R.I.B.A.

IT IS IMAGINED, in many quarters, that "modern" architecture has revolutionised the whole of present-day practice, whereas the truth is that good architecture has always been a matter of common-sense, plus a leavening of æsthetic instinct. In reality, its vital principles are no different today from those which guided the old Egyptians, Greeks, and Romans.

In planning a building, the first essential, of course, is to make it suitable for the purpose for which it is intended. That it should be pleasing to the eye is, obviously, a further necessity, but, if it looks suitable, its designer is already half-way towards achieving his object.

In the case of Broadcasting House, we had first to consider its functions. These are twofold; the actual broadcasting, and the administration of broadcasting. Obviously, the studios, Control Room, and the accommodation of technical equipment come first, with the actual studios as the most important factor of all.

Accordingly, it was the planning of the studios which had to be the key to the whole scheme. At the outset, it was thought that the ideal arrangement would be to place all the studios on one floor and, as protection against inter-studio interference, to surround each by a complete circuit of brick-built corridor. As protection against extraneous noises, the studios would be placed at the top of the building. The site of Broadcasting House, however, though picturesque in form, is irregular, which fact would have caused studios so grouped to be of awkward shape. Besides this, although the B.B.C., at that early stage, contemplated fewer studios than have now been built, the system of individual insulation by corridors and walls would have been so extravagant that the areas left for studios would have been quite inadequate. Moreover, owing to the high value of a site in the heart of London, the space available for the studios is necessarily limited. Hence the open-area system of insulation, adopted elsewhere, was out of the question.

After exploring scores of different systems of planning, the problem of accommodating a large number of studios and their suites within the space available was quite sud-

denly solved. Instead of the studios being all on one floor, or on two floors, they would be all in one tower, so that, given a good service of lifts, circulation would be actually easier than if they had been all on the same level, and, of course, larger and more shapely studios could be provided.

Once this key idea had been found; the plan was rapidly developed and, one after the other, its benefits appeared. The evolution of the plan proceeded on simple lines which can best be expressed as follows :—

Studios must be insulated from sound—Put a thick brick wall round them, omitting the usual steel framework.

Studios must be artificially ventilated, so need have no windows—Put them in the centre of the building, where there is least daylight to waste.

Offices must have daylight—Put them all round the outside of the building, where plenty of daylight is available.

Studios need to be sound insulated from one another—Put between them horizontal layers of rooms such as Music Libraries, Book Stores, etc., which neither create noise nor are disturbed by it.

In this way, item by item, the plans were wrestled with and were slowly developed to their present form. Sometimes, as a result of much thought, whole features had to be discarded. Such was the fate of a huge parking garage, at one time accommodated in the basement.

I could fill many pages with the history of planning this building, with all its exacting requirements, but, interesting as this would be to myself, this is, perhaps, hardly the place for such a story.

Before speaking of the exterior, I will just say a word about the internal decoration of the principal apartments. The Entrance Hall, semi-circular in plan, is simplicity itself, devoid of ornament, and depends for its effect upon the grace of the natural curves which arise from its circular form and the rhythm of its vertical lines. The beauty of the English marble (Hopton-Wood stone), which lines the walls, is an added charm. The central feature of the Hall is to be a lovely figure of "The Sower," for which Eric Gill has already made his model.

The Council Chamber, sixty feet across, is of semi-circular shape, like the Entrance Hall. This room, whose acoustic qualities are strangely happy to the naked ear, is



THE OLD—SHOWING FOLEY HOUSE ON THE SITE



THE NEW—THE CHURCH REMAINING, BUT LITTLE ELSE



LT.-COL. G. VAL MYER, THE ARCHITECT

Willing

lined with Tasmanian oak and, at night, is entirely illuminated by reflected light from lamps concealed in wrought-oak urns. The pedestals of these urns serve as relieving accents of interest to the simple panelled walls.

The Concert Hall, in the heart of the building, is wedge-shaped in plan. The splay is not sufficient for one to realise, at first sight, its existence, but it has the strange perspective effect of making the Hall appear very much longer from the back than from the stage.

As will be seen from the photograph of the preliminary model of this Hall on p. 333, the treatment of the ceiling is entirely novel; it is hoped that, with the semi-indirect lighting indicated, the ceiling will provide a very distinctive feature.

At the time of writing, this Hall is being finished in the rough for my scientific colleagues to test its acoustic qualities, and it is only after we have their results that a decision will be made as to the actual materials with which the design will be clothed.

Now, a word as to the exterior. First, let me explain the reason for the eastern side being cut away as with a draw-knife. This part of Langham Street is narrow and, not only have the opposite owners rights of light which had to be respected, but there are three-sided mutual covenants with other neighbours which could not be broken. Hence, the whole of the building above the fourth floor had to be sloped back and restrained within a limiting angle.

In Portland Place, the only limit of height was that imposed by the London Building Act.

The south end of the building, facing down Regent Street, suffered under the same difficulties as the Langham Street front, but at this vital point, realising my troubles, the parties concerned made certain concessions of real value.

In the circumstances, the obvious course seemed to be to design a symmetrical façade to Portland Place which would dominate the whole building, to emphasise the main doorway facing south by placing a Clock Tower above it, and to be satisfied with a modest elevation to Langham Street which, without being striking, would be suitable.

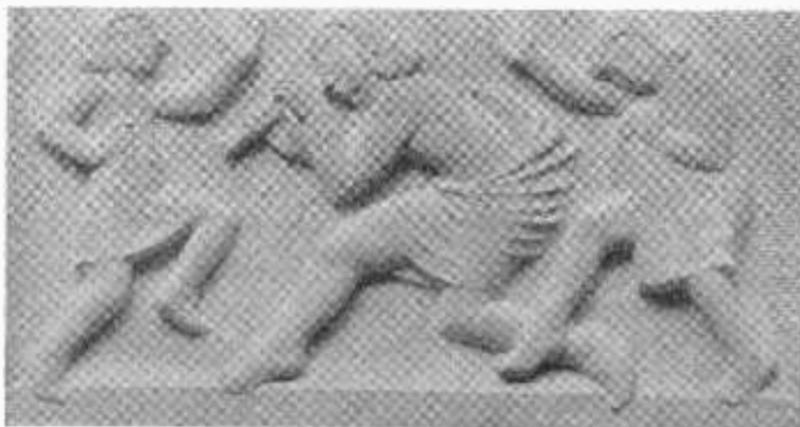
The marrying together of these three components was a particularly interesting problem, which was helped by the provision of a third aerial mast over the Clock Tower.

At an early date I realised that the site possessed a rare virtue in the long curve of the western side, and so, in organising the proportion of my masses and the play of light and shade, I tried to make full use of the gracious horizontal lines which this curve suggested.

Broadcasting House is said to look bigger than its actual dimensions. This is due to the scale and number of the windows, necessitated by the provision of an immense number of small offices. Endless flexibility of subdivision of offices was required by the Corporation, which fact, naturally, weighed with me in preparing my design for the façade.

Although economy was essential to the whole scheme, and the sculpture at my disposal limited, I insisted that it be as good as possible, and then placed it, with other architectural features, at the most effective points, hoping to set it off to advantage by the contrast of plain walling and the considered rhythm of the windows referred to above.

Before concluding, I must pay tribute to the courtesy and extraordinary ability of Mr. M. T. Tudsbery, Civil Engineer to the B.B.C., who has been associated with me in the work for nearly four years. Another debt of gratitude is due for the many excellent suggestions which I have received from Dr. M. J. Rendall in matters of artistic taste.



Howard Coster

ARIEL PIPING TO CHILDREN (EAST ENTRANCE)

S O M E S T A T I S T I C S

Material excavated for three floors below street level, and for foundations	43,000 tons
Number of blocks used	2,630,000
Weight of building	24,000 tons
Cubic capacity of building	2,260,161 cub. feet
Length of corridors	1 mile
Stairs	1,250
Doors	800
Panels of glass	7,500
Electric wiring, apart from technical wiring for microphones, etc.	50 miles
Total lighting load for studios is equivalent to	100 H.P.
Number of rooms served by ventilation supply or extract, or both	180
Total number of people in Tower if rooms are fully occupied	1,700
Moisture given off by the people in the Tower	1 ton in 12-hr. day
Quantity of air admitted to studios, etc. in Tower	134 tons per hr.
Extract of air from lavatories	130 „ „

If the Tower were to be ventilated in the usual manner—without special precaution for cooling the air in summer—the temperature inside the Tower would rise to about 12° above the prevailing outside temperature.



THE BROADCASTER
(for the Entrance Hall)



PROSPERO AND ARIEL
(for niche above the main entrance)

Photographs by Howard Coster of models by Eric Gill

THE SCULPTURES

THE ARCHITECT'S PLAN for Broadcasting House included various positions for groups of sculpture and carvings. The carvings, viz. the B.B.C.'s coat of arms on the West front of the building and the "birds of the air" and wave symbols on the balcony beneath it, were executed by Mr. E. Aumonier to the architect's designs. The groups of sculpture were entrusted to Mr. Eric Gill, the distinguished sculptor and letter-carver, whose best-known works are perhaps his Stations of the Cross in Westminster and Bradford Cathedrals. Mr. Gill accepted a suggestion put forward by the B.B.C. that the "literary" subject of the carvings should be centred round the figure of Shakespeare's Ariel, the invisible and ubiquitous spirit of the air who may well serve as the classic impersonation of broadcasting.

The most important group of sculpture is that to be placed in the niche above the main entrance of the building looking South towards Upper Regent Street. For this the chosen content is a figure of Prospero, Ariel's master, sending him out into the world. Prospero has been interpreted as a draped and bearded figure, symbolic of wisdom and benevolence. Ariel is conceived as a young child, slim and graceful ("in a cowslip's bell I lie"), holding in his right hand the pipe on which he plays unearthly music. The figures are to be ten and seven feet high respectively and carved in Portland stone, of which the façade is constructed.

The two panels to be erected on the Western front are artistically homogeneous, each representing Ariel between two angelic figures: the first between Wisdom and Gaiety, the latter having taken Ariel's pipe, Ariel's outstretched arms symbolising his willingness to embrace both. The second shows Ariel, with his hand to his ear and upheld by two figures of angels, listening to celestial music. In both, the angels are denoted by a formalised representation of wings.

The panel over the Eastern entrance represents Ariel piping to children, an analogy which needs no explanation. It gives an admirable effect of happiness and dancing.

There remains one internal piece of sculpture, a figure, unconnected with the Ariel theme, of a broadcaster, resting in the work of scattering the seed. This figure is to be placed in the Entrance Hall facing the main doors.

The Inscription in the Entrance Hall

DEO OMNIPOTENTI
TEMPLUM HOC ARTIUM ET MUSARUM
ANNO DOMINI MCMXXXI°
RECTORE IOHANNI REITH EQUITE
DEDICANT
PRIMI COLLEGII HUIUS GUBERNATORES,
DIVINUM AUXILIUM ORANTES
UT MESSEM BONAM BONA HABEAT SEMENTIS,
UT IMMUNDA OMNIA ET INIMICA PACI
EX HAC DOMO EXPELLANTUR,
UT, QUAECUNQUE SINCERA SUNT, QUAECUNQUE
PULCHRA, QUAECUNQUE BONAE FAMAE ET AMABILIA,
AD HAEC AUREM INCLINANS POPULUS
VIRTUTIS ET SAPIENTIAE
CONTENTO ANIMO SEMITAM INSISTAT.



Howard Coster

ARIEL BETWEEN WISDOM AND GAIETY



Howard Coster

ARIEL HEARING CELESTIAL MUSIC
The two panels on the Portland Place front



AN ARTIST'S PENCIL NOTES ON WORK IN PROGRESS
(Mr. Gill in the top left-hand corner.)

T H E S T U D I O S

THE PROBLEM of decorating and furnishing studios in Broadcasting House is not a simple one. It is much more complicated than that of the Savoy Hill studios and far removed from the simple problem of decorating a private house. It is not a question of distempering, painting, and upholstering "to taste," for the simple reason that the decorator's choice is severely limited in two directions. Firstly, all his work must conform to acoustic requirements laid down by the B.B.C. engineers. This means that certain fabrics and materials are barred, and any suggested plan of treatment is liable to be modified on theoretical grounds, and quite possibly to be completely upset when practical tests have been instituted. Secondly, every studio is artificially lighted, heated, and ventilated, and these mechanical necessities often obtrude themselves in such a way that the problem of designing the decoration is immensely complicated. Great square-cornered ventilating pans break the wall surface, thermostatic instruments must be placed where the air freely circulates, and the proposed microphone positions must be kept a sufficient distance away from the electric-light points and their wiring to obviate electrical interference. There is also an interaction between the acoustic and mechanical necessities, as the arrangements of the furniture and microphone positions in relation to the latter may have a marked acoustic effect.

It will be seen that the main considerations in designing the decorations of the studio are of a mechanical and architectural nature. Building materials play an important part and experience of dealing with structural problems is necessary. It was for this reason that the consultant chosen to advise the B.B.C. on decoration was an architect, Mr. Raymond McGrath, B.Arch., A.R.I.B.A., who has worked in close association with the B.B.C.'s Civil Engineer and a Decoration Committee familiar with the B.B.C.'s requirements.

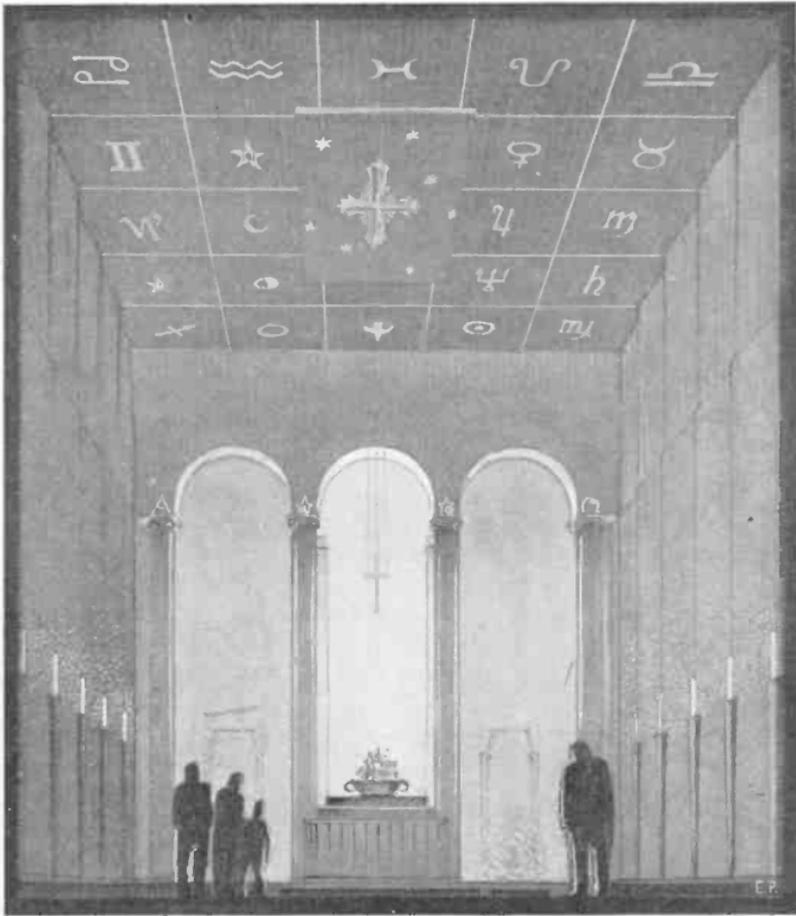
The architect of Broadcasting House is responsible for the decoration of the Concert Hall* on the Lower Ground Floor, known as Studio No. 1. Mr. McGrath has been responsible for advising the B.B.C. on the treatment of the remaining

* A description of the Concert Hall is given in the article on p. 61.

twenty-one studios and the listening halls and artists' waiting-rooms. He has enlisted the help of several well-known architects, each of whom has provided plans for the decoration of a particular studio or studio group. The unification of the whole is being secured by Mr. McGrath, who himself has been responsible for the Basement Group of studios, which includes those intended for vaudeville and for dance bands. Mr. A. Randall Wells, whose most recent success has been the fine Lloyds Bank building at Teddington, has been responsible for the Children's Hour and one of the Talks Studios, both in the Third-Floor Group. In the same group Mrs. Philip Trotter, of the Warren Gallery, has designed a library type of Talks Studio in a modernised Empire tradition, and Mr. Edward Maufe, M.A., F.R.I.B.A., one of the five selected architects for the Guildford Cathedral Competition and the creator of St. Saviour's Church, Acton, the studio which is to be used for religious services. Mr. Wells Coates, B.Sc., Ph.D., who is perhaps best known to the public by his striking modern designs for the shops of Messrs. Cresta Limited, has been responsible for the News Studios on the fourth floor and the Effects Studios on the sixth and seventh floors. Finally, Mr. Chermayeff, the decorator of the Cambridge Theatre, which has one of the finest modern interiors in Europe, has been responsible for the Eighth Floor Group, the most important of which is the Military Band Studio.

Each studio is accompanied by a Silence Room, which (except in the Talks Studios) has a window looking on to the actual studio, and is in telephonic communication with the main Control Room at the top of the building. Most of the important studios also have Listening Rooms attached to them for the use of producers, announcers, and other people concerned with the actual programme in the studio. These are not to be confused with the Listening Halls, a new feature, which are intended to provide comfortable rooms where members of the Press and privileged visitors may hear the programme on first-class apparatus.

At the time of writing the decoration of the studios is not advanced beyond the stage of architects' plans and it is not possible to describe the interiors with any accuracy or finality. It will therefore perhaps be best to mention the



THE STUDIO FOR RELIGIOUS SERVICES

(from a wash drawing)

most interesting studios* (other than the Concert Hall) and describe their special features.

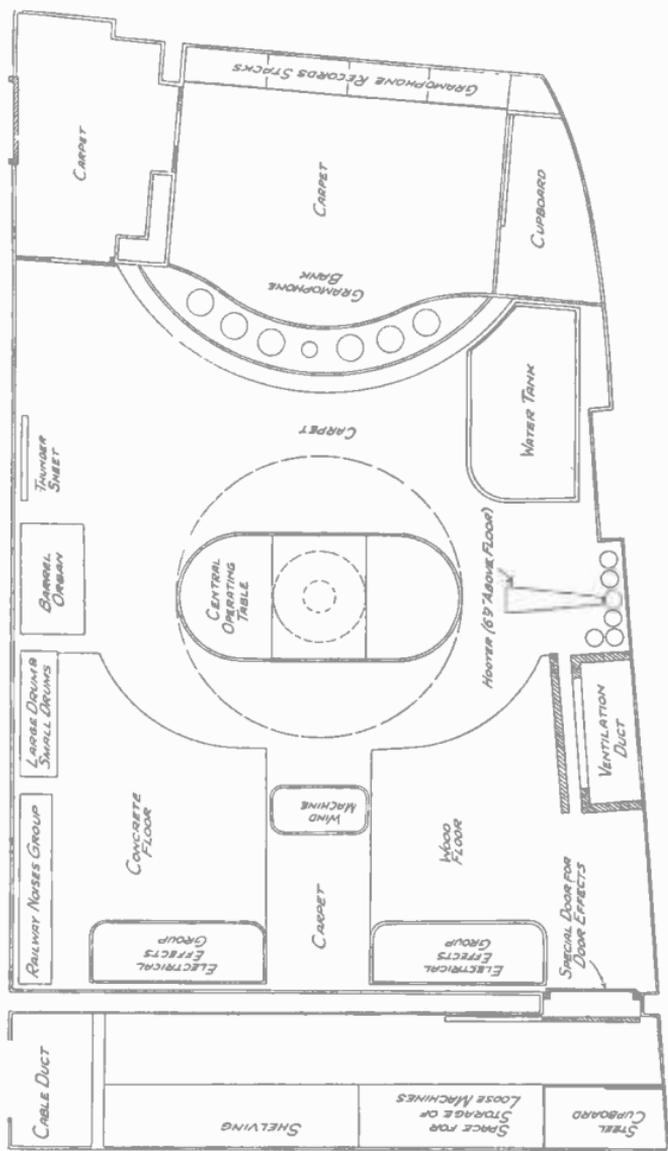
In the Basement Group the Vaudeville Studio is the most interesting, partly because it contains arrangements for seating an audience, and partly because it is designed to give the performers a sufficient illusion of being in their more familiar environment of stage and footlights. The audience is accommodated partly on the floor level of the studio (45 seats) and partly in the gallery (32 seats). A permanent stage is provided, but four-leaved folding screens hinged to the wall on either side take the place of the usual stage wings. Spotlights are focussed on the stage from the gallery. A drawing of the studio is reproduced on p. 80.

In the Third-Floor Group interest is centred in the Religious Studio, which is a double-height studio with three tall arches at its "East" end (actually the North) and an opening in the centre arch with a silver curtain covering a recess lighted to produce an infinite distance. High in this recess will be hung a glass cross. At the "West" end there is a gallery for a small congregation. The main article of furniture is a table shaped for a choir of eight.

The studios on the fourth floor, of which a plan is shown on p. 108, form an interesting unit designed specifically for the reading of the news bulletins and emergency broadcasts of gramophone records. They contain three small rooms, two of which are studios and one a central news-editor's lobby. Double doors opening on to the corridor have a central peephole showing the interior of all three rooms, the angle of vision giving a direct view, through the lobby and its observation windows, of the persons sitting at the desks inside. In the studios special desks have been devised for the double purpose of reading the news and playing records, two turntables being provided for each desk. The announcer sits in the curve of the desk and can turn to right or left to adjust needles, start records, etc. without leaving his seat. Signal lights are visible both in the studios and lobby, and the corridor; and an ingenious new device is a pencil beam of light carried to the needle points of the gramophone and focussed from a distance of over three feet from the microphone to avoid electrical interference.

In the Productions Group of studios on the sixth and

* A complete list of the twenty-two studios is printed on p. 330.

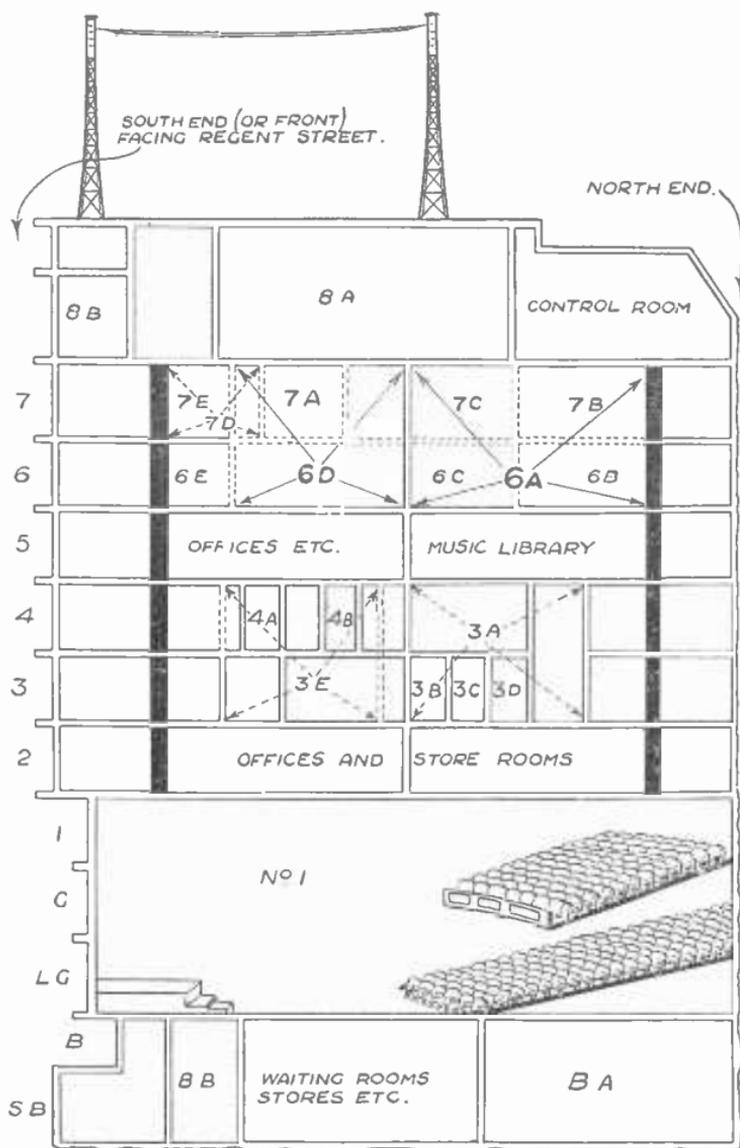


PLAN OF THE EFFECTS STUDIO, 6D, WITH THE GRAMOPHONE EFFECTS STUDIO, 6E

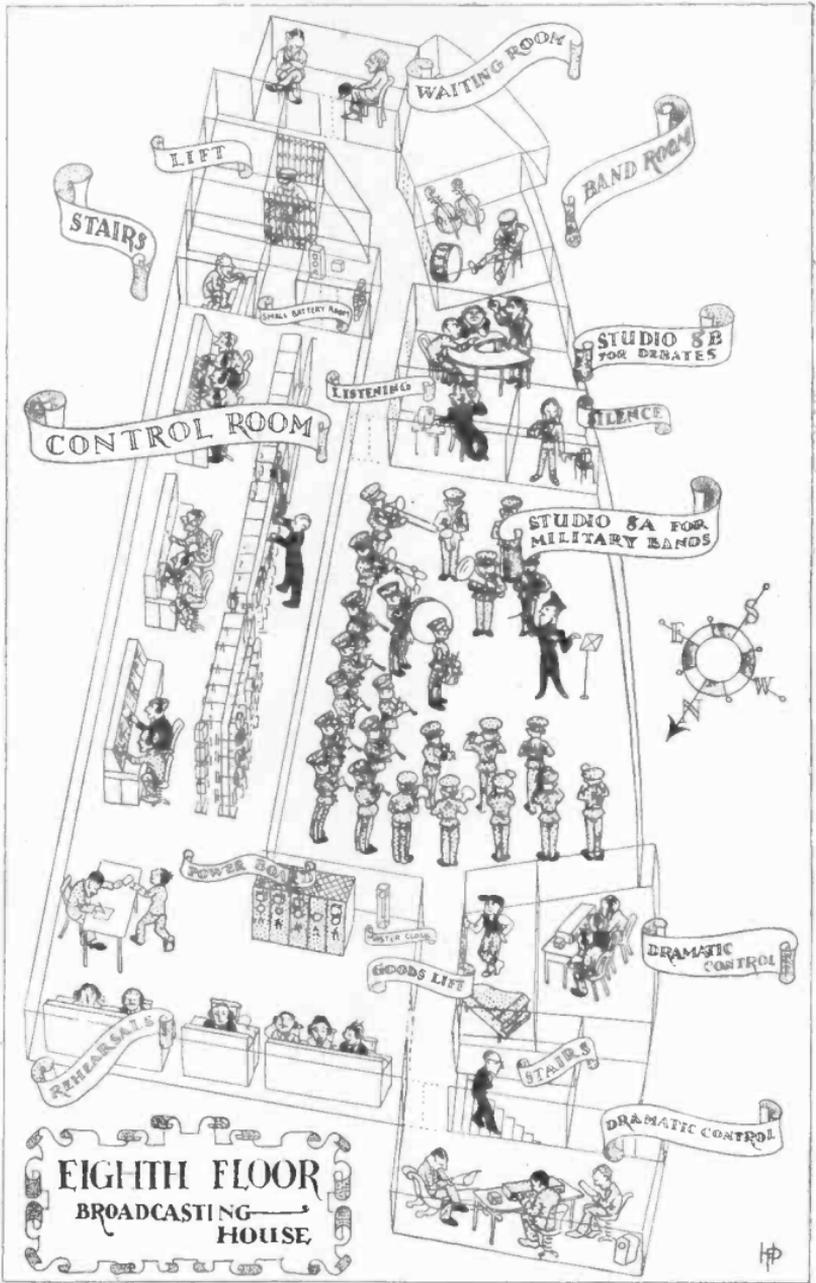
seventh floors the most interesting, perhaps, is the large Effects Studio, 6D, which has a subsidiary Gramophone Effects Studio, 6E, connected to it. The main studio is equipped with machines for the production of every conceivable noise, and an important feature is a central elevating and rotating table, the top of which is fitted for the convenient manipulation of various small machines. The equipment also includes a large tank for water noises; an elaborate electrical effects group; a wind machine; a railway noises group; various types of floor materials for floor effects; a compressed air group, including hooters and foghorns; a small piano; a barrel organ; special doors for opening, shutting, slamming, etc.; suspended sheets for thunder; and drums of various sizes. The Gramophone Studio contains six turntables to be used for "mixing" a variety of noises such as Bank Holiday noises, applause, etc. Secondary Effects and Gramophone Studios, 7D and 7E, are provided, the former being largely a miniature edition of Studio 6D. All are fitted with special microphone arms suspended from points in the ceiling and designed on a new principle which allows the microphone to be pulled out in any direction, where it remains automatically balanced without further adjustment.

The Musical Comedy Studio, 6A, is the largest in the Productions Group and occupies the height of two floors. Beyond the large size necessary for accommodating the crowd of performers who may be taking part in a musical comedy, there is little that calls for notice except a curved screen projecting in front of the entrance door and forming a convenient anteroom with a cubicle for the producers at the end of it. Mention should also be made of the two Dramatic Control Rooms on the eighth floor, which contain the now familiar multiple control panels at which the producer and his assistants mix sounds produced in as many as ten studios at a time.

Finally, on the eighth floor is the Military Band Studio, which is the only studio in the building to be lighted with daylight as well as artificial light. The studio is a large one and, as in all the orchestral studios, great care has been taken to arrange the lighting in such a way that no shadow will be cast anywhere on the music-stands which normally occupy the floor space.



SKELETON DIAGRAM OF THE INTERIOR OF BROADCASTING HOUSE
LOOKED AT FROM THE EAST, *i.e.* FROM LANGHAM STREET



R A N D O M N O T E S

BROADCASTING HOUSE stands on the site of the second Foley House which was built in the gardens of the original house after that had been pulled down to make way ultimately for the present Langham Hotel. The second Foley House was built by the distinguished architect Wyatt, a contemporary of the Adam brothers, with whom he is often confused owing to a similarity of style. Many of the old mantelpieces and fittings were sent to the Victoria and Albert museum when the building was demolished.

* * *

The neighbourhood has many pleasant literary and artistic associations. At a house in Portland Place Byron courted Miss Milbanke, whom he eventually married. Richard Wilson, the great English landscape painter, at one time lived at the corner of the present Langham Street, and Sir Charles Barry, architect of the Houses of Parliament, had his offices at 27, Foley Place. What would he have thought of the great rounded structure which has arisen within a stone's throw of them?

* * *

The foundations presented some interesting problems. An old brick conduit, which carries a stream from Hampstead, traverses practically the whole length of the site. The problem was not only to cover this with a casing of concrete sufficiently strong to resist the weight of the building, but also in laying bare the conduit during the excavation to avoid the possibility of its bursting under the inward pressure to which it is subjected after heavy rain. Traffic vibration and subsoil water provided another problem, which was solved by the expedient of encasing the whole of the basement portion of the building in a "tank" constructed of brickwork, covered with asphalt. In accordance with tradition, various documents were buried under the foundation-stone of Broadcasting House. These included copies of agreements in regard to the building and site, B.B.C. documents of historical interest, the first copy of the *Radio Times* and other B.B.C. publications, and copies of the first three issues of this Year-Book.

* * *

As far as possible British materials have been used in the construction, furnishing, and decoration of Broadcasting

House. At one time it looked as if it would be necessary to obtain from abroad some of the special fabrics and materials required for decorating the studios. The reason for this will be readily understood by anyone who visited the "Why not?" Exhibition in London in October 1931; an exhibition organised to display, both to the public and to the trade, various articles, such as Swedish glass and foreign textiles, of qualities which definitely cannot be obtained in this country. When, however, the financial emergency arose in the latter half of 1931, the B.B.C. renewed its attempts to get satisfactory British substitutes. Eventually the efforts of the decorators employed resulted in persuading two firms to undertake the manufacture of articles of the same quality as the foreign ones.

* * *

The Concert Hall was originally planned to seat about a thousand people, but owing to the enlargement of the B.B.C. Orchestra it will now seat exactly 751 when the full orchestra is performing. Of these, 544 are accommodated on the floor of the hall and 207 in the gallery. The B.B.C. has not yet come to any decision as to the arrangements under which members of the public will be admitted to concerts broadcast from the hall, but some time ago the B.B.C. took out a dance and music licence to enable public concerts and entertainments to be held in the Hall if desired.

* * *

Provision is being made for a room to house various records of the B.B.C.'s work, both documents of utilitarian value and objects of historical interest such as photographs of the staff, old microphones etc. The move into Broadcasting House is also being made the occasion of starting a system of broadcasting archives, which are being prepared retrospectively under a comprehensive scheme.

* * *

The B.B.C. is faced with a complex problem in transferring a large organisation from one building to another in such a way that the programmes will not suffer from the various complications which must inevitably accompany the change of studios. A gradual transfer is inevitable, and this makes it impossible for Broadcasting House to have an official opening on a given date, and the B.B.C. has therefore decided against any form of opening ceremony.

VENTILATION AND HEATING

A BROADCASTING STUDIO is essentially an enclosure of sound-proof construction, having suitable acoustic properties. It is obvious, therefore, that no windows or openings communicating with the outside are permissible. Hence at Broadcasting House a virtue has been made of a necessity: the studios have been placed in a vast brick tower which occupies the heart of the building, remote from extraneous noise. Thus the twenty-two studios—ranging in size from a large Concert Hall to a small Talks Studio—occupy a position which on such a site would in other circumstances have been devoted to a light-well, the studios being by this simple but ingenious expedient accommodated on a valuable West-end site at a reasonable cost. Since the studios are wholly dependent on artificial ventilation and light, unsparing attention has been devoted to perfecting the installations which will contribute so materially to the comfort of artists when broadcasting.

To be perfectly sound-proof every studio must be substantially air-tight; the sound-proof construction involves the use of heavy walls, ceilings, and floors, which generally have to be covered with some form of sound-absorbing material or fabric. The studio is therefore not only practically air-tight, but its construction insulates heat.

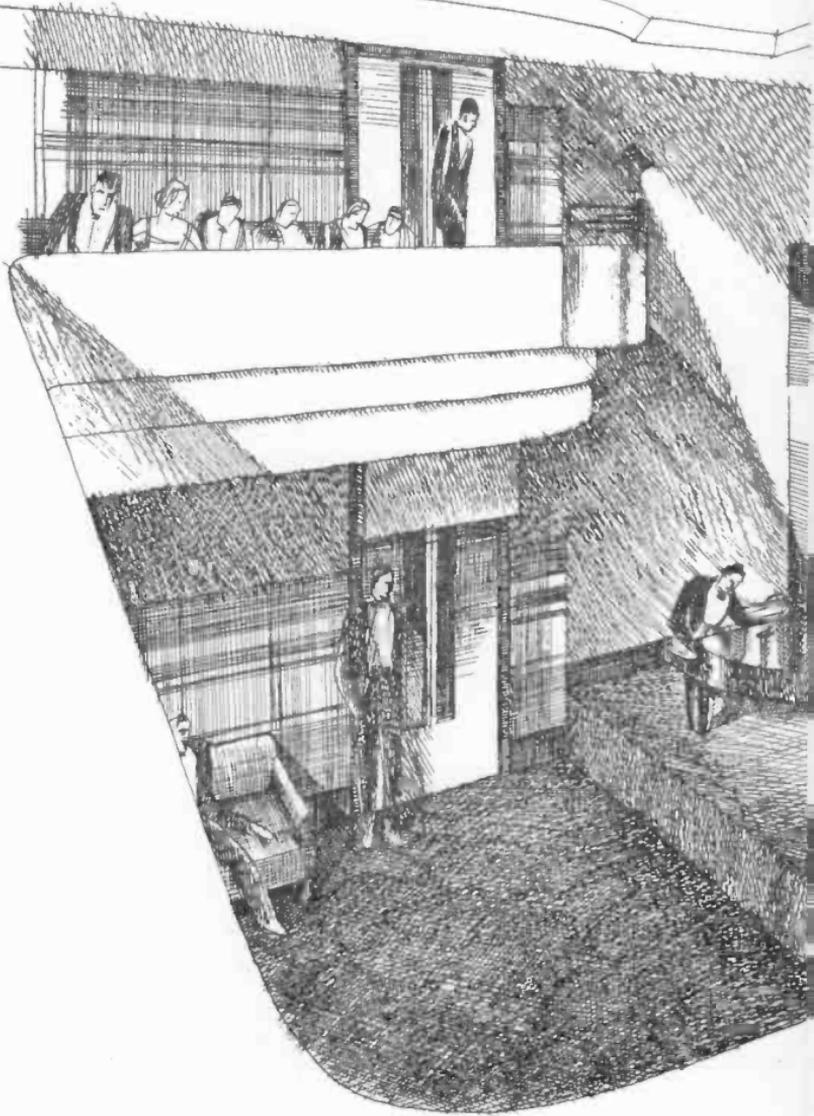
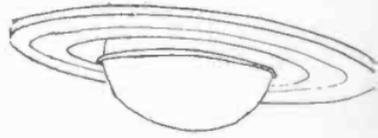
The presence of people in the studio is in itself the cause of a considerable amount of heat which, added to that liberated by the electric lights, causes the temperature to rise to a very uncomfortable degree. It is, therefore, absolutely necessary to supply an adequate amount of cool conditioned air if the atmospheric conditions are to be kept comfortable and healthy, and this must be done without letting in sounds from outside.

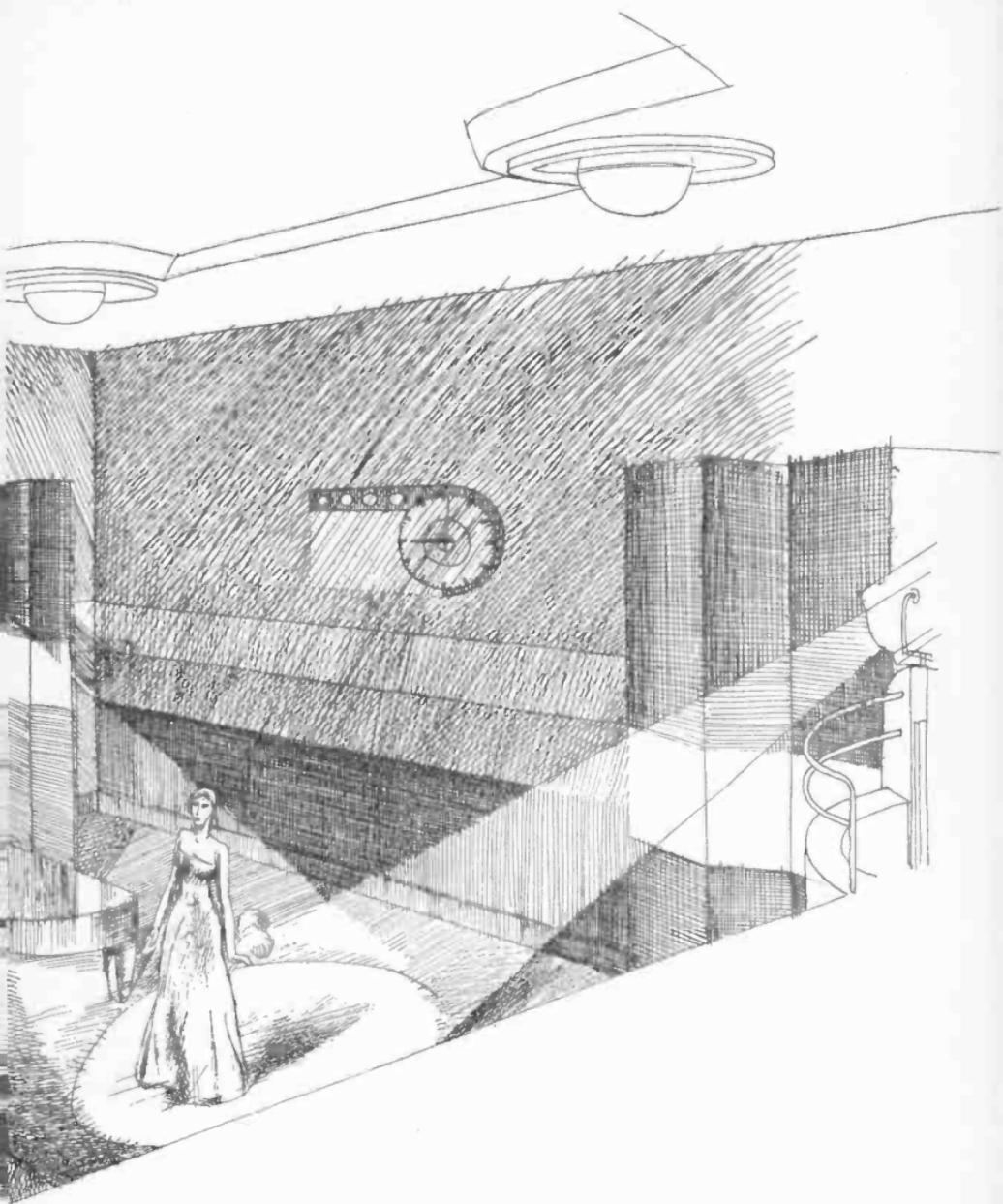
Cooling of the studios is necessary, even in winter, since the construction is generally so heavy and the internal sources of heat from powerful lighting, and, say, a large orchestra, so great, that the internal conditions are practically independent of the external temperature.

VENTILATION

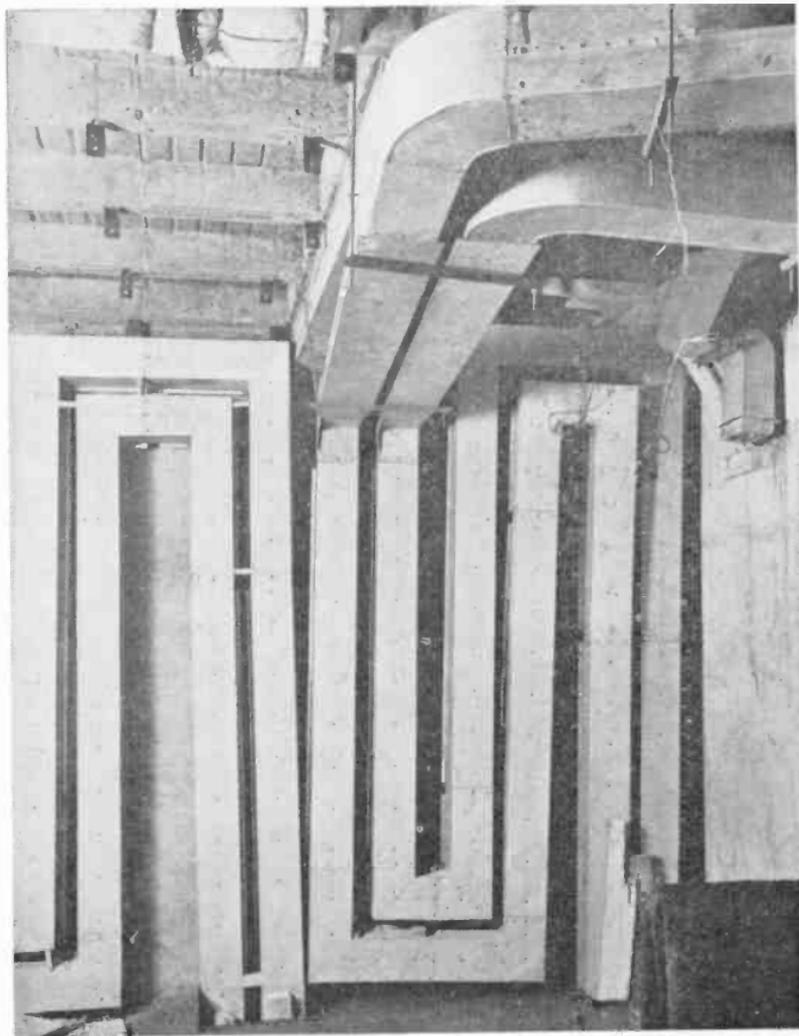
In Broadcasting House every one of the twenty studios will be supplied with conditioned air, so that at all times of the

Raymond M. Smith. 1931





THE VAUDEVILLE STUDIO IN BROADCASTING HOUSE
from a sketch by the architect responsible for the decoration and furnishing of it.



Kilching and Clayton

VENTILATION DUCTS

year the internal conditions will be ideally comfortable. Not only the temperature, but also the humidity of the air supplied is artificially controlled according to the variations of the outside weather.

For example, during the warm summer months, the air, in passing through the specially designed "Carrier" air-conditioning apparatus, has both its temperature and humidity reduced prior to its being distributed to the studios. In winter, on the other hand, the temperature and humidity of the outside air is correspondingly increased.

All the air drawn into the air-conditioning apparatus is thoroughly washed and all the dust and dirt precipitated from it, this washing being an essential part of the conditioning process.

For serving the studios, all built within the central sound-proof tower, there are four air-conditioning plants. Each of these plants consists of a supply and extract fan, a dehumidifier, steam heater battery, and various automatically controlled dampers.

The whole of the air drawn in from outside passes through the dehumidifier, wherein it is thoroughly washed and its temperature and humidity increased or reduced as may be required. The air then passes through heater batteries where, if necessary, it is further warmed prior to delivery to the studios.

Each air-conditioning plant supplies a number of studios, and in view of the variation in the heat load—according to whether the studios are fully occupied or not—means are provided for individual automatic control of the volume and temperature of the air-supply.

The whole process of conditioning the air, so that it has precisely the correct moisture content and temperature, is regulated automatically by special instruments placed in the studios themselves and connected with controls on the air-conditioning plants. These instruments regulate the quantity of steam supplied to the various heater batteries and the volume of air supplied to the individual studios so that, irrespective of the outside weather conditions and the number of people present in the studios, the internal atmospheric conditions are automatically maintained perfectly comfortable.

Since during the summer it is desirable, for maximum



Kitching and Clayton

PUTTING UP SOUND-INSULATING FABRIC IN A CORRIDOR

comfort, to maintain in the studios both a temperature and humidity below that outside, it is obviously necessary artificially to cool and dehumidify the air drawn into the apparatus. A "Carrier" refrigerating machine has been installed to provide the necessary cooling capacity. This refrigerating machine is a self-contained unit of very special type. It is electrically driven; and water is used as the medium for conveying the cooling effect from it to the four air-conditioning plants.

The refrigerated water is sprayed in the dehumidifiers and comes in contact with the air in a finely atomised state when it cools the air and condenses moisture from it. This refrigerated water is automatically controlled on each of the four plants independently.

The air-conditioning apparatus inevitably involves machinery such as fans, pumps, and electric motors, and in view of the fact that the plants are connected with the several studios by means of ducts, it will be obvious that very great precautions have to be taken against noise. On this account every moving part of the apparatus is designed and balanced to ensure that it will run with the absolute minimum of noise and vibration. As a further precaution, the various moving parts are flexibly connected together and mounted on anti-vibration foundations.

Apart from mechanical noise which may be set up in the apparatus and which, in any case, is reduced to the absolute minimum, the sound-intensity allowed in the studios is so low that the mere movement of the air in the ducts feeding the studios is a factor which has had to be contended with. All the ducts, therefore, are of a special design and, as a further precaution against noise, the branches to the various studios have had sound eliminators arranged in them.

In addition to the noise which may enter the ducting systems from the machinery and from miscellaneous external sources, mutual interference between studios has to be prevented. This is perhaps the most difficult problem, since inevitably a number of studios have to be interconnected by the ducting system. The design and arrangement of the inter-connecting ducts and the sound eliminators are such that it is possible to play a full brass band in

one studio without the noise from this band being perceptible in other studios on the same ducting system.

In addition to the special air-conditioning apparatus exclusively used for serving the studios, a ventilating plant is provided for serving all the rooms in the Tower other than studios, and the areas below street level, namely, on the lower ground floor, basement and sub-basement. This installation consists of two plants and a system of supply and extraction ducts connected with the rooms served. Automatic control is provided to regulate the temperature in the individual rooms.

The four air-conditioning plants serving the studios and the two special ventilating plants, together with the refrigerating machine, steam-raising equipment, and auxiliary machines are all installed in the sub-basement, external to the central sound-proof tower.

On the roof there are water-coolers for providing circulating water to the refrigerating machine and a large number of exhaust fans extracting from spaces beneath street level, rooms in the central tower, and lavatories. It will be understood, therefore, that the air-conditioning and ventilating installations, together with the necessary auxiliaries, involve an immense amount of machinery.

In order to facilitate the operation of this elaborate plant, an electric control-panel is installed in the sub-basement, from which the House Engineer can start and stop any plant by simply pressing a button. On this same panel two large dial indicating-thermometers are installed to indicate the outside temperature and humidity. Coloured lamps will show the engineer which of the plants are running.

The capacity and extent of the installation can be appreciated from the following figures.

The refrigerating machine used for cooling the studios in summer would be capable of freezing 200 tons of water per day.

The total power consumption when the whole installation is working to full capacity exceeds 450 H.P.

The total quantity of air handled by the installation amounts to 260 tons per hour.

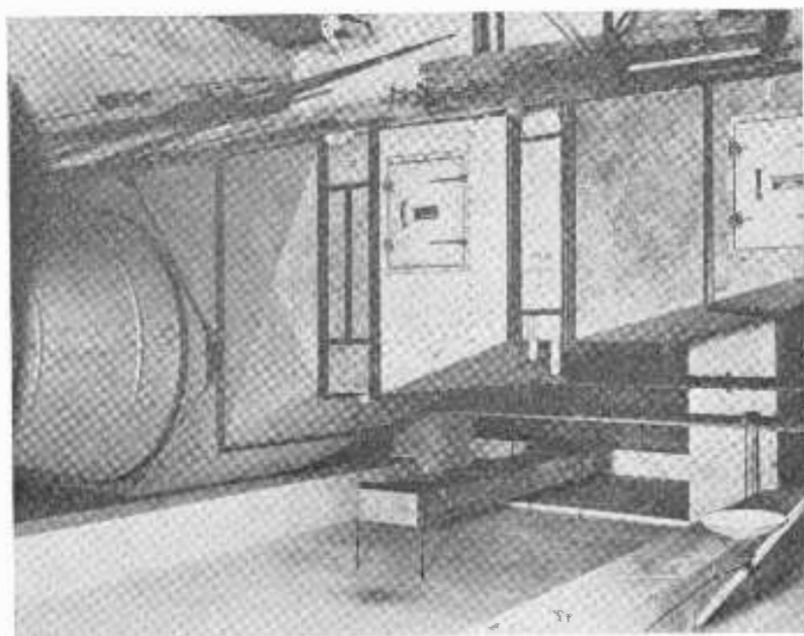
The various plants serve 180 individual rooms.

There are more than 100 tons of steel ducting installed in the building and many miles of pipe.

HEATING

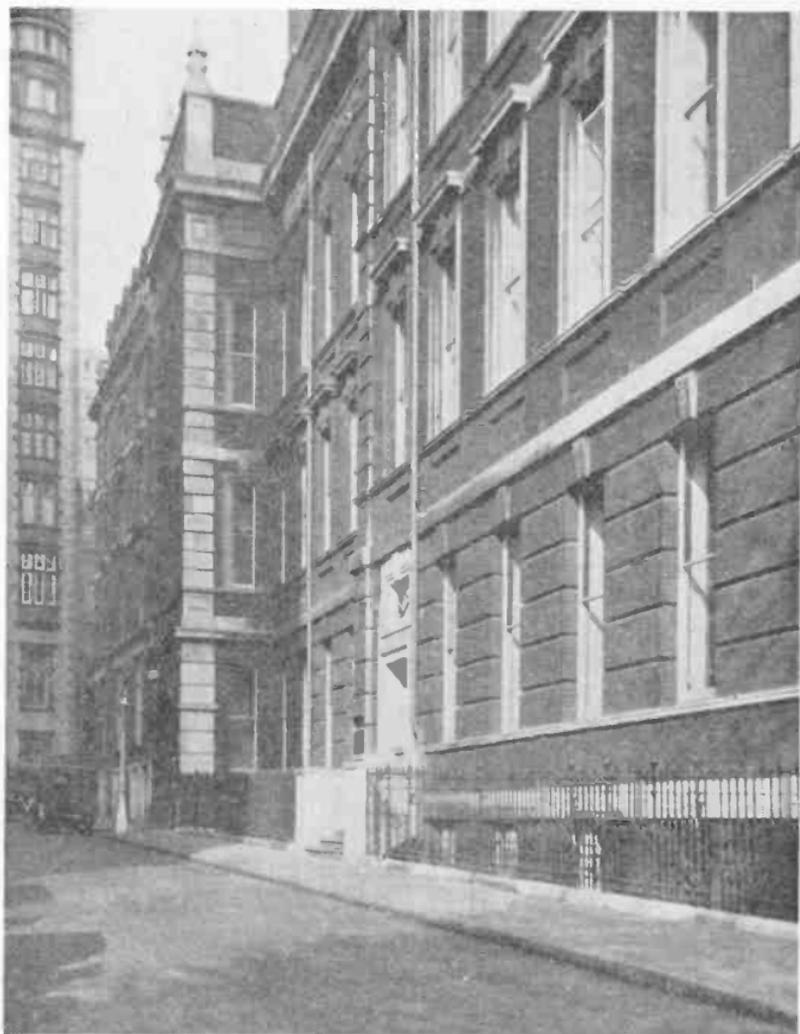
Intimately associated with the air-conditioning and ventilating plants is the steam-raising and heating installation. This comprises two oil-fired steam boilers each capable of raising 7,000 lbs. of steam per hour. These boilers provide the heat necessary for the radiators installed in the offices, corridors, entrances, etc. throughout the building, the steam for the air-conditioning and ventilating plants, and for supplying hot water to the lavatories and kitchen. The radiators work on the accelerated hot-water system, the necessary water heaters and circulating pumps being installed in the boiler-house. There are 840 radiators in the building.

In connection with the hot-water service, there is a storage capacity of 1,000 gallons available to meet the peak demand which occurs at lunch-time and when the offices close for the day. Three oil storage tanks holding 70 tons of fuel oil have been installed, providing a capacity sufficient for several weeks under normal winter conditions.



AIR-CONDITIONING APPARATUS

Kitching and Clayton



THE WEST WING OF "SAVOY HILL"
to which the B.B.C. came in March 1923

GOODBYE TO SAVOY HILL

THE OLD ORDER CHANGETH

*The setting sun, and music at the close,
As the last taste of sweets, is sweetest last.*

IN THE FIRST FEW WEEKS of 1932 the B.B.C. will have moved to Broadcasting House and an association of nearly nine years with the Strand, Savoy Hill, the Embankment and the River, will have come to an end.

The new prospects are good, but the older members of the staff will find it difficult to forget the happy and strenuous times spent in the friendly environment of the old offices and studios, now to be exchanged for the cold dignity of Portland Place.

The B.B.C. came to Savoy Hill in March 1923. In the previous December, only a month after the formation of the B.B.C. when the studios and offices were in Marconi House and Magnet House respectively, it became necessary to look for new premises where they might be in the same building. One of the directors of the B.B.C., who was also a member of the Institution of Electrical Engineers, had mentioned the possibility of there being some room in their building on the Embankment. The General Manager went there, and after much difficulty in finding the caretaker, and still more in meeting him at a particular side door, found himself surveying a most unpromising set of rooms which had been previously used as L.C.C. medical offices of some kind. He saw the possibilities, however, and immediately decided to take the whole of the empty west wing, with an option on space about eight times greater.

The first studio to be built was a small one on the top floor, unnumbered at first, but later for some occult reason known as No. 3. It was heavily draped and acoustically

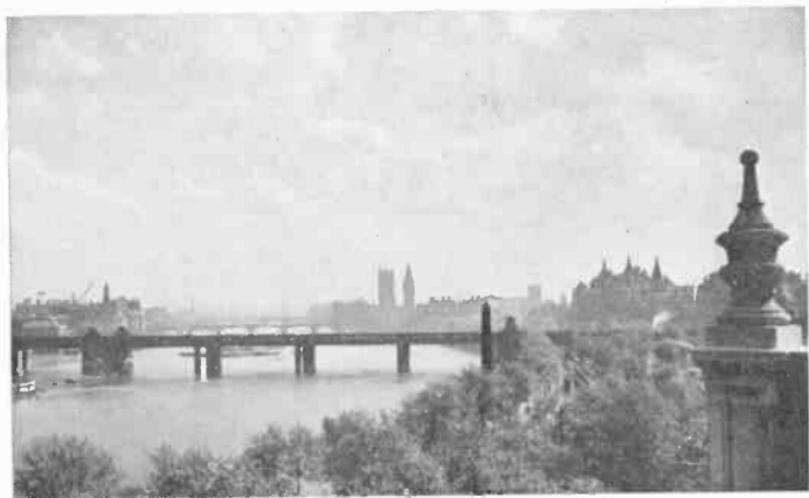
oppressive, and damped the ardour of singers and speakers alike; in fact speaking in it was almost like hearing a voice disembodied from one's self. This studio was opened on May 1st and, incredible though it may seem to a later generation of broadcasters, large orchestras used to be squashed into it, and at times a chorus and soloists would be added for the performance of operas.

Some of the offices were very pleasant, that of the Managing Director enjoying a leafy outlook over the afterwards familiar Embankment Gardens across the River towards Waterloo Bridge. Later on one of the show features of the premises, at least in working hours, was an enormous general office, also fronting the Thames, and full of so many bright young ladies tapping typewriters that a visiting engineer was inspired to ask whether the B.B.C. had ever estimated the total attraction in "millivamps"!

The studio known as No. 1, 45 × 30 ft., was put into service in the autumn of the same year, and was then regarded as really enormous. It was a large studio as they went then, and it was always a popular one, but even in it there were times when the crowd of performers and the consequent heat and stale atmosphere prompted jokes about the Black Hole of Calcutta. In those days, of course, everything happened more or less in the same studio, and, in looking back, one can see the orchestra or military band filing out rather noisily at the door while an imperturbable announcer kicks a few chairs away and arranges his table before sitting down to read the news in a studio littered with music-stands, drums, and trombones.

Those were inevitably the days of "Just one moment, please," and "There will be an interval of three minutes," though sometimes the reason was given, "while we move the piano." Occasionally there would be obscure, but always tactful, references to a "technical hitch," and often at the news period people living in a certain road in a certain town would be entreated to "look to their sets, as they are causing disturbance to their neighbours."

Children spent their time looking "under the sofa" and "in the sideboard"; aged couples were congratulated on golden weddings; greetings were broadcast to fêtes and carnivals; "To-day's Anniversary" followed "To-day's chess move" and it was still "London calling the British Isles."



LOOKING EAST AND WEST FROM THE TOP OF THE SAVOY HILL BUILDING

The new offices and the two studios were not sufficient for more than a few months, and in 1924, after a certain amount of infiltration, the B.B.C. took over the northern wing, the offices looking on to the historic Savoy Chapel, with a privileged view of many picturesque weddings.

The north-west corner of the block had been demolished by a Zeppelin bomb in the War and the B.B.C. was the first to rebuild it. Another part of the site had been occupied by flats, in one of which the tragic death of Billie Carleton had occurred. The B.B.C. took over this part of the building and practically gutted the interior before turning it into offices and several studios of different sizes. In the course of time there came to be seven more studios in the new wing, of which the two oldest were No. 5, a small studio in which the news used to be read, and No. 4, a long narrow studio memorable for the programme of thanksgiving after the finish of the General Strike.

The Military Band studio, No. 7, was the most unusual of the new studios, as it was a double-decker, two floors high, with a distinctive type of decoration which led to its being known affectionately as "The Corner House."

It was at this period that the Press paid the B.B.C. the compliment of making it responsible for the weather, and for quite a long time some people believed that the infinitesimal power radiated by the B.B.C. transmitters was responsible for producing rain and thunderstorms by some secret process of electrifying the clouds. On this assumption the areas immediately surrounding the B.B.C. stations should have been the wettest; but before this point was absorbed by the public a fine summer came along and the memory of the standard summers of the previous years was evaporated in (presumably electrified) sunshine. In real fact the only electrification for which the B.B.C. can be held responsible was that of a crane on some new flats under construction in Orchard Street, which, at one time, got charged with electricity from the London transmitter a couple of hundred yards away.

In one sense, those were halcyon days for programmes—perhaps too much so, because public enthusiasm and appreciation were apt to be indiscriminate. Many listeners of the present day have no idea of those early enthusiasms; have never heard of, say, Arthur Burrows or Philemon;



THE EMBANKMENT FROM HUNGERFORD BRIDGE

showing the Savoy Hill Building directly behind Cleopatra's needle, and between the Savoy Hotel and Somerset House



THE EMBANKMENT GARDENS

so familiar to the B.B.C. staff and artists (the Camel Corps Memorial on the right and the top of Cleopatra's needle behind it)

and in the staid B.B.C. of to-day cannot recognise the B.B.C. which used to hold Radio Revels and wireless man-hunts and all manner of Guess, Query, Request, and Lucky Dip programmes.

It was the period before "Valencia" had succeeded in ousting "Yes, we have no Bananas"; when a broadcast by "Veterans of Variety" produced several thousand letters of appreciation; when John Henry was a household name, and the Roosters were almost still an army concert party. Programmes sometimes had funny names (as indeed they do still), but headings like "Singbad the Wailer" were perpetrated quite often, and there is record of one musical programme simply entitled "—ation," the names of all the items in which boasted that unenlightening termin-ation.

In those days A. J. Alan strolled into the studio in response to a request for people who could tell stories, and staggered the ether with his Adventure in Jermyn Street, to be followed by the cataclysmic "B.B.I." (British Burglars' Institute), which moved some dear old things to protest that the B.B.C. was encouraging crime. Then there was another of the name, a Mr. Allen Walker, who gave a talk on the architecture of the Houses of Parliament and casually at the end of it said, "If any of you like to be there at ten o'clock to-morrow I will show you round." Long before that time a queue of 7000 people stretched down Westminster Bridge Road, and the B.B.C. was reluctantly compelled to advise greater caution in his future talks.

Then Philemon must not be forgotten, with his weekly moralisings, and Ruby Helder, the Lady Tenor, who sang with a vocal passion few men could compass. De Groot and Sandler, too, really belong to this period, and it will never be possible to recapture the enthusiasm of their first broadcasts from the Piccadilly Hotel and the Grand Hotel, Eastbourne, respectively. Perhaps it was the contrast with the then very dead conditions of the studio which made those early hotel broadcasts so thrilling, but whatever the cause, psychological or physical, their popularity was unlimited, and has rarely been equalled since.

Then there were the musical comedy programmes called "Winners," and the series of "Radio Radiance Revues" with a chorus of rather small young ladies (known in programme circles as the Miniature Suite), dancing on boards



THE VIEW OF SAVOY CHAPEL FROM THE NORTHERN WING OF
"SAVOY HILL"

in the actual studio. The "Gather Rounds" were an early effort at a Saturday evening informality in the studio, and to the same period belongs the £50 play competition won by "Hunt the Tiger," and various mystery plays broadcast in three or four weekly instalments with a substantial prize at the end. The Savoy Bands were a household word, and Santos Casani used to broadcast dancing lessons, illustrated by an unwilling but invisible announcer.

Few of the B.B.C. staff will ever forget the General Strike of 1926, a milestone in the history of broadcasting, when the B.B.C. grew up as it were in a night and the public at large realised that broadcasting could no longer be considered an eccentric toy but had proved itself a force of national importance. Savoy Hill presented a queer appearance during the strike. First came the revelation that almost every member of the orchestra had a car and they were parked all round the building. Then there were casual policemen here and there, who were fortunately never faced with the desperate duty of drawing their truncheons to defend the microphone. Within the building, the studios and corridors seemed to be one long succession of news bulletins and time-tables, and no doubt the announcers, some of whom slept on the premises, had nightmare sequences of perpetual trains leaving Waterloo at 2.22 p.m. and calling at so-and-so and so-and-so and so-and-so.

The General Strike was almost a spiritual successor to the sack of London as described by Father Ronald Knox in an imaginary news bulletin broadcast in the previous January. Such is the power of wireless that listeners who switched on their sets to hear a solemn voice saying, "The crowd is now burning Savoy Hill . . . it is now advancing up Whitehall looting the Government offices," never paused to reflect on the various quite obvious improbabilities, but rang up the B.B.C. or friends in town in frenzied inquiry, or in some cases jumped into their cars and drove in to see what was happening.

Savoy Hill has had its own excitements. There have been one or two fires, luckily nothing serious, and from time to time minor alarms, as when bombs were exploded in the basement, without warning, as one of the effects for "R.U.R.," or the occasion when a producer ran up and down the corridor ringing a firebell for a similar purpose.

Strange objects like lawn-mowers have also been trundled about the passages to get a required effect; but in the matter of noises the *tour de force* was undoubtedly the Radio Military Tattoo put together entirely in the studio at the time of the first tattoo at Wembley. Barrel-organs, Punch and Judy shows, and the paraphernalia of street entertainers have been taken into Savoy Hill from time to time; and honourable mention must be made of the tremendous feats of sleight-of-hand performed with grand pianos in the days before a goods lift was installed for the purpose.

Something might be said of the fauna of Savoy Hill. Historically first (and last) were the rats, the villains in the piece of many ferocious tales about heroic nightwatchmen, or B.B.C. engineers lingering late into the night for the 2 a.m. dance music or the broadcasts to America in the early days. Then there was Uncle Jeff's dog, whose bark was certainly better known than his bite—not that there was any evidence as to the latter. Then the starlings in the trees in the churchyard, who could be expected to arrive in thousands out of the blue at about 5 p.m. on October 5th each year, and whose twitterings (broadcast in the Children's Hour) were considered deafening by the occupants of offices on the north side until the pneumatic drill taught them better. Finally, there was the parrot, a dignified grey bird of guaranteed loquacity solemnly purchased by the B.B.C. for conversation in the Children's Hour. But alas! with its view limited to aunts and uncles, mounds of silver paper, and the tower of the Savoy Chapel, it pined in its gilded cage. For a long time it resisted all blandishments, and then when an evening paper announced that it had not spoken for three weeks and was going to be appointed to high office in the B.B.C., it turned its face to the wall and died.

There have been many distinguished visitors in the eight years. His Majesty the King has often broadcast, but never from Savoy Hill. The Prince of Wales has been to the studios several times, as have other members of the Royal Family. Among the more picturesque visitors have been King Feisal of Irak, Prince Tamatsu of Korea and his consort, and Ras Tafari, the present King of Abyssinia.

Amongst the visitors who might be considered unusual were the West Africans, who came to play tom-tom music

for the broadcast of the play "Congo Night," the Red Indian chiefs in full war-paint, complete with gaudy blankets, beads, and feathers, and llamas from Tibet who made music on long horns; to say nothing of the mosquito and the ticking beetle, the canaries and other animals which turned up at various times to make their contributions to the programmes.

The last phase at Savoy Hill has been one of dust from demolitions and staccato noises from pneumatic drills. No sooner had the buildings over the Kingsway tram tunnel been pulled down than the housebreakers got to work on the Hotel Cecil, and the dust from the latter settled on office tables and chairs to the accompaniment of riveting machines at work on the steel structure of the former. There has been a certain sporting interest to the staff in the rivalry of noise and rubble, and consolation in the thought that the B.B.C.'s contractors were doing the same to other people at Portland Place: but, taken as a whole, the old-world slopes of Savoy Hill have been an inferno of ferro-concrete frightfulness in the last two years.

In October 1931, when these lines are written, the end has not yet come, but some of the departments, which had overflowed into scattered offices in the Strand, have already crossed the Rubicon; and for the rest the passage is booked for early in 1932. However splendid the new quarters, the B.B.C. will always remember its years at Savoy Hill with pride and affection, as the home in which it spent its childhood and grew up to man's estate.



The Times

SOMERSET HOUSE FROM THE OFFICE OF THE "RADIO TIMES"

The demolition of buildings over the Kingsway tram tunnel temporarily disclosed this view.

PROGRÀMME
SECTION



Hoppé

RICHARD STRAUSS

(October 21, 1931)

[100]

P R O G R A M M E N O T E S

QUITE THE MOST UNSAFE question to ask the B.B.C. is why such and such a person or thing has never been broadcast. In nine cases out of ten the answer is that it has. The public has a short memory, and sometimes even the members of the B.B.C.'s own staff have been surprised to find that something they imagined to be a new suggestion has been carried out some time in the past. Listeners may not have yet forgotten the broadcast by Chaliapin, but how many know of or remember the broadcasts by Paderewski, Ysaye, Tetrzzini, Clara Butt, Tom Mix, Mary Pickford, Marion Davies, or the broadcasts from an aeroplane, a coal mine, a customs barrier, the bottom of the Thames, and the thousand and one outside broadcasts of this nature which have been carried out from time to time?

* * *

In some ways the most important event of the year has been the adoption by the B.B.C. of the Blattnerphone recording apparatus described in the Technical Section. For years the B.B.C.'s programme officials have longed for a machine which would be useful on the one hand for recording outside events such as commentaries, speeches, etc., of which normally no record existed, and on the other for rehearsals, and in particular for enabling certain broadcasters to hear themselves as others hear them. Nowadays this last use would be mainly for corrective purposes. A few years ago, however, it would have been valuable for convincing unwilling artists that the microphone would not distort their voices or submerge their personalities. The apparatus is, of course, also of great value in enabling the broadcaster to make small improvements and adjustments in his technique, the necessity for which he otherwise would never have realised.

* * *

The activities of the Central Council for Broadcast Adult Education are dealt with in the Talks Section, but it is not out of place to mention here the important innovation for which the Council was responsible in the programmes for the autumn of 1931 and the spring of 1932. This consisted in the planning of talks on six separate but inter-related subjects under the heading of "The Changing World." It

was arranged for each subject to be carried through the whole six months, the twenty-four talks in each series being contributed by a variety of first-rate broadcasters. Five of the subjects were accompanied by preparatory pamphlets, and the B.B.C. has been able to arrange for a publisher to issue the whole symposium in book form, in several volumes. These will naturally not appear until the autumn of 1932, a few months after the broadcasts have been completed.

* * *

There are people who think that the B.B.C. receives a great many complaining or abusive letters. This is far from being the case. In a typical week the B.B.C. receives about 2,000 letters, of which 50 to 100 can be classed as critical. Of these many merely criticise one particular detail, such as the cutting of a favourite item owing to lack of time, and are otherwise complimentary in tone. The really unfavourable letters do not amount to 1 per cent. of the whole. This is not mentioned in any spirit of complacency, but merely to show that as long as any value is conceded to these letters the case from correspondence is in favour of the B.B.C.

* * *

How far can attention be paid to correspondence? The B.B.C.'s own experience is that few people are consistent in this matter: most cite correspondence when it endorses their own particular view, and when it does not favour them they dismiss it as of no value, often with the remark that "everyone knows the kind of person who writes to the papers"; which is, of course, irrelevant. Only the B.B.C. knows the kind of people who write to the B.B.C., and none of them write for publication except those who write direct to the *Radio Times*, a separate branch of the B.B.C.'s correspondence which is ignored in the figures given above. The writers are usually ordinary people who have been carried out of themselves by some particular broadcast and have been moved to write to the B.B.C. and say how much they appreciate the programmes. The B.B.C. itself regards its programme correspondence as symbolical or symptomatic; in fact it nearly always confirms the B.B.C.'s own expectation or judgment. Sometimes unexpected symptoms are manifested and they are always taken into consideration.

* * *



THE B.B.C. TENNIS COMMENTATORS—COL. R. H. BRAND (STANDING) AND CAPTAIN H. T. B. WAKELAM, WHO IS ALSO THE B.B.C.'S CHIEF COMMENTATOR ON "RUGGER"

An example of anticipated correspondence is that received whenever a controversial subject is handled on the microphone. The B.B.C. is sometimes accused of not being controversial enough; but the fact remains that during the past year talks have been broadcast on subjects such as India and Russia, in which as far as possible every point of view has been represented. Those who think that progress has been slow, should remember that unless it is gradual it will not find acceptance among millions of listeners who in the first five years of the B.B.C.'s existence became accustomed to a colourless treatment of rather neutral subjects and the avoidance of controversy altogether.

* * *

In the spring of 1931 a newspaper which was apparently opposed to progress in the B.B.C.'s handling of controversial subjects selected as one of its grounds of attack alleged political partiality shown by the B.B.C. in helping the *Daily Herald* to secure considerably over a million votes on programme preferences in a competition which resulted in

£20,000 being handed over to the hospitals. The impeachment was a weak one, as the B.B.C. in nine years of broadcasting has always shown itself ready to co-operate with any newspaper conducting a ballot or other form of competition which might throw light on the preferences of listeners in the matter of programmes. In the past year such competitions have been held by the *Manchester Evening Chronicle*, *Manchester Guardian*, *Everyman*, the *Daily Mirror*, and the *Daily Mail*, as well as the *Daily Herald*. In each case the B.B.C. has co-operated in some appropriate way, and where the results have merited it has published them in its own periodicals. Precedents for such co-operation go back to the beginnings of broadcasting.

* * * *

Sometimes the effects of broadcasting take the uninitiated by surprise. The best example of this in the past year was that of the opening of the new Zoo at Whipsnade. In a talk broadcast a day or two before the opening, the speaker told the public that it was quite easy to get to Whipsnade and that no one should miss going there. The direct result of this was the arrival of far greater crowds than could be handled under traffic arrangements worked out without reckoning with the stimulus of broadcasting. Later in the year, a broadcast talk on the floodlighting of London had a similar effect and the police and traffic authorities were taken by surprise. Perhaps the most startling example, however, was the slump in the sale of National Saving Certificates, from 250,000 to 170,000 a day, after a talk by Mr. J. M. Keynes, construed by some people as advising them to spend and not to save. The effect was so serious that Sir Josiah Stamp was asked to broadcast a second talk a few days later on the significance of "A Thousand Million Saving Certificates," pointing out that this was one of the methods of saving which would not create unemployment. Three days later the sales of certificates went up to 450,000 and on the next to the record figure of over 500,000.

STUDYING LISTENERS' TASTES

FEW LISTENERS can criticise helpfully the actual handling of a programme. That is a technical question of craftsmanship to be thrashed out between experts. But the listener's like or dislike of the programme as a whole is the programme-maker's guide to its effect, since he has no applause, no box-office receipts, by which to measure it. In its general application, the study of listeners' tastes has an even more important aspect. The individual's preferences make too slender a foundation to build on in themselves, but when looked at in relation to the preferences, habits, powers of understanding and enjoyment of the other individuals who make up the wireless audience they are inevitably reflected in broadcasting policy. Obviously the assessment of what various types of listeners do find valuable and stimulating in broadcasting is of prime importance.

The first means of judging in this light the general health of broadcasting lies in the statistics of the number of licence-holders. A steady increase in this number may be taken to indicate general approval and support of existing policy. But this is not enough. The contemplation of these figures will not tell the B.B.C. which part of its policy has won this approval, and in what respect a change would be welcomed.

The tastes of known sections of the community can be assessed. Specially chosen Advisory Committees on, for instance, music, religion, schools, adult education, pass on to the B.B.C. the fruits of their great experience in their various spheres, together with suggestions of how this experience can be used to the best advantage in the new medium of broadcasting.

Correspondence and conversation with listeners have both the advantage and the disadvantage of producing fresh and first-hand information. The advantage is obvious; the disadvantage lies in the fact that the most honest and sincere opinions can and do conflict with one another so radically. No system of counting votes can give any final or equitable result where minorities are themselves so large that they cannot possibly be ignored. Moreover, the information gained in this way is too often purely negative. "I

didn't like that programme. I don't know why, but I didn't," is not a very helpful foundation for building up a system, though it may be a salutary, and even an entertaining, corrective. Newspaper criticism has increased considerably in the last twelve months. It is a valuable addition to the B.B.C.'s sources of information. In many instances it is well-informed and constructive. Its chief limitation, which should tend to disappear, is that it is hardly seasoned enough yet to stand completely on its own feet without too close a reference to the preferences, real or imagined, of its readers. It has not yet won for itself the independence of the best kind of general dramatic and musical criticism.

Newspaper competitions, of which there have been a number in the last three years, aim at producing the considered opinion of a great number of readers. Their potential value tends to be destroyed by a human desire to win a prize. The temptation to arrange a given number of programmes in the order thought to be popular with other people, instead of in the order secretly preferred by the individual, is almost irresistible. Moreover, the terms of such competitions are inevitably too restricted. Mr. Jones may know that at times he would put orchestral concerts at the head of the list, and at times he would put them last. But on his ballot paper he must give them a definite place for all time.

The information given by a wireless exchange was interesting. It was a factual record of the action of a given group of listeners within a given area whose loudspeakers were fed from a central exchange. The times at which they switch their sets on and off can be recorded at the exchange, and a chart made which indicates their apparent preference for one or another programme. Unfortunately such records are too conditioned by considerations unknown to the recorder—such as weather, engagements, accidental happenings of all kinds—for them to be a reliable basis for general deductions.

It is true to say of all sources of information that they provide a great deal of valuable material for checking conclusions already arrived at, but are not conclusive in themselves. One can go a step further, and say that there is nowhere to be found any final and infallible method of

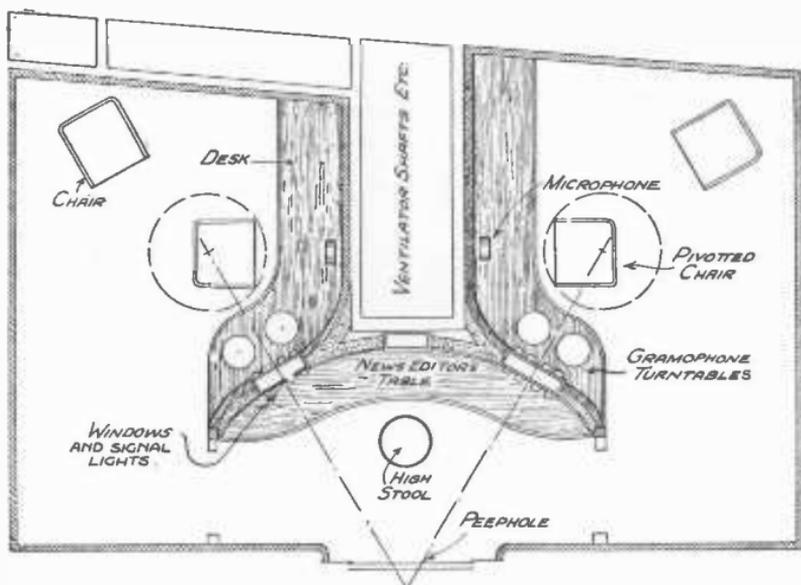


MARY PICKFORD AND GEORGE GROSSMITH AT HOLLYWOOD

*Mr. Grossmith described his experiences in America in a series of talks in September 1931.
The above is a snapshot from his album.*

ascertaining listeners' likes and basing policy on the discovery.

The method which is used is one of correlating all information, from whatever source it comes, about the general structure of society—the habits, tastes, interests of listeners and potential listeners. It is by the examination of all such evidence that the B.B.C. tries to determine what is the proper proportion to the whole of this or that programme ingredient, what is the best time of the day or night for this particular programme, granted that the listeners most interested in it normally listen at this or that time. Finally, the body of opinion acquired by these means is tested against that sense of responsibility to the country as a whole which is the central conception of British broadcasting. From it emerge a policy of impartiality which has never seriously been challenged, and a readiness to listen to criticism and to make policy follow conviction.



PLAN OF THE DUPLICATE NEWS STUDIOS 4A AND 4B (see p. 72)

PROGRAMME RESEARCH

IN THE ORGANISATION of programme building it is essential to have two or three people, each of whom should be, in more senses than one, what is called a free-lance. Two or three people who, not being entirely at the mercy of a set routine, are able to get outside the great machine and to see the programme as a whole; to get a sense of how it appears to the listening public. It is this getting outside the machine which has such a vital function. For machine it is—a ruthless and accurate machine, spinning on day after day, month after month, demanding unceasing fuel, unceasing attention. And the free-lance steps aside from the wheels, returning intermittently only to pop a fresh idea into the machine. His day may take him to the reading room of the British Museum, there to trace all possible information about a subject that seems to him to be waiting to be made into a broadcast programme—such as the history of sport, or the Black Death. Or he may pass the morning with a Spaniard, discussing the psychological state of Spain, in order to give a true idea of that country in a topical “actuality” programme. He spends his time talking to all sorts of men and women about all sorts of things: about poetry or music or crime; politics or mythology; economy, cricket, abstract painting, stage lighting, gramophones, sound-recording on films, bee-keeping, or the spirit of adventure in the second century. Always he telephones or reads, talks or listens, with half an eye on the broadcast programmes.

To a certain extent, the results of his activities merge into the general stream of broadcasting technique; an idea here, a suggestion there, adopted, acted upon—and broadcasting is slightly changed, slightly intensified or deflected at certain points. But at a given moment in the future, as far as those fruits of research are concerned, it would be a hard job indeed to analyse and separate them from the cumulative whole.

Thus it may be seen that Programme Research can roughly be divided into two categories—two forms of contribution to broadcasting:

- (1) The *direct* contribution, individual and concrete: items actually heard through the microphone; and

(2) The *indirect* contribution: reports, suggestions, inventions, developments, criticisms.

It may be interesting to give some account of the former, with examples.

Walking in the street one day X. observed two blind piano-concertina players, one of whom had on his hat a label: "In Total Darkness." X. took their names, and later the idea came to him: Why not have a concert for the Blind, given entirely *by* the Blind? So he set about to discover all the blind musicians that existed. Then he wondered who would be the best person to speak and make the appeal. After which a maze of detail supervened in which fees, times, dates, rehearsals, etc. had to be decided. Final result: a good concert by the Blind for the Blind was broadcast (which, incidentally, brought in over £5,000 for the Blind Fund).

It occurred to Z. that the pleasures of our forefathers were fundamentally the same as ours, just as ours will be the same as those of posterity. He recalled the basic principles of popularity, namely, that people in listening to a wireless programme like to have Fun, the Past, and Things They Know Already. He therefore searched for old songs; old games; old places; old characters; collaborators who were authorities on the various dates involved. Then he wrote the book; engaged singers and actors; rehearsed them. And the result was a programme called "The Pursuit of Pleasure."

Again, Y., who had specially interested himself in the bringing of dramatic actuality to the microphone, and had already executed several "National Programmes" which entailed a good deal of reading about the countries concerned, and had even necessitated his going to one country to make sure, suddenly realised that the recent events in Spain could be thrown into a closely-knit form and produced exactly as they had just happened. So he addressed himself by post to everyone who knew about those things, and in person to all who were in London. He then sent for Spanish records of national music, and studied the scores of Spanish composers. He read the newspapers of ten countries. The result was a programme called "Crisis in Spain."



Ernst Schneider

RICHARD TAUBER

(July 20, 1931)

[III]



AN AERIAL VIEW OF BROADCASTING HOU



Aerofilms

KING EASTWARDS FROM THE AEROPLANE

[113]

On another occasion, while shaving himself, Z. abruptly came to the conclusion that the world to a dog must look quite different from what it does to a human being. From that, as he sat at breakfast he turned to specialised human beings. He took a tube lift conductor, a charwoman in a Girls' school, and a newspaper reporter. Of what, Z. asked himself, did the lives of these people largely consist? Answer: of the sound of lifts, scraps of conversation, and trains; of six pianos being practised at once, and the sound of floors being scrubbed; of the din of printing machines. So he got the sounds of the Underground Railway and of printing presses put on gramophone records; thought some more, talked to some people, wrote the book, chose some music—and the result was broadcast.

Examples of the indirect contribution of Programme Research may be given with even greater brevity.

Being, in company with a great many other people, the actual manipulators of the apparatus used for transmitting wireless programmes, members of the Programme Research staff occasionally come upon things which they want to do, but which for some reason or other cannot be done at present. Feeling that these things *should* be possible, they consult with the people whose special province it may be, and between them the obstacle is sometimes overcome. For example, it was felt that a good dramatic effect could be obtained by being able to impose artificial echo suddenly on to a part of a broadcast play. Up to that time echo had been set permanently on a given studio throughout the performance. But now, by means of attaching the echo room to one of the controls on the Dramatic Control Panel, the producer is enabled to put echo upon a single word in a speech if he so desires.

THE B.B.C. DOES NOT FORECAST THE WEATHER

The Weather Forecasts and Forecasts for Shipping are supplied by the Meteorological Office. They are specially prepared by that Department for broadcasting.

INTERVALS BETWEEN PROGRAMMES

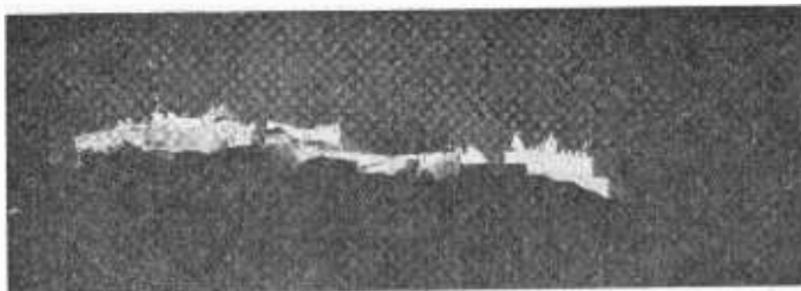
"THERE SEEM TO BE many more gaps in programmes than there used to be," says a careful listener. "No," replies the B.B.C., "gaps *in* programmes, no; gaps *between* programmes, yes." The answer is not a quibble. On the contrary, the distinction is of great importance. Every announcer knows that to have any but the smallest gaps between items or groups of items in a programme makes the whole programme sound slovenly and shapeless to listeners who hear no applause and see no artist or orchestra preparing to start the next item. He takes the greatest care to prevent such a gap taking place, and many an ingenious decision, many a scamper from studio to studio, lies behind a programme which to the outside world runs smoothly along the appointed lines. There are no considerable gaps *in* programmes if ingenuity and forethought can prevent them.

Gaps between programmes are a different story altogether. The B.B.C. definitely aims at having an interval of four or five minutes between programmes. There are two main reasons for this policy, one of which appeals primarily to those who listen to the second of the two programmes but not to the first, the other to those who listen to both programmes. It is obvious that it is irritating to a listener who switches on his set to hear, say, the News to find himself listening to the last five minutes of an opera or a vaudeville turn. The News is what he switched on to hear and he does not want to listen to a fraction of some other programme which for him has no beginning and no middle. Any given programme ought to start at the advertised time, and, provided the B.B.C. can control what goes before it, that rule is strictly observed. Accurate timing is the first step towards a solution of the problem, but it is not enough. An error of only thirty seconds in each of six groups of items can arise from the mere variation of speed at which a piece is played at rehearsal and at performance. It is not a great error, but it can make the News three minutes late. Therefore an interval of five minutes is allowed, and is necessary, as a factor of safety. This practice has prevented scores of late starts in the last eleven months.

Now turn to the listener who wants to hear both programmes. The reason for the interval in his case is a more positive one. If a tragic or pathetic play ends at one minute to nine, the listener who has been gripped by it does not want to hear an unemotional voice reading the Weather Forecast at nine o'clock. An interval of four or five minutes gives him time to adjust his mind to what is to follow, or to walk across the room and switch off his set if he decides to give the News a miss. The same applies to such a sequence of programmes as piano recital, vaudeville, talk. Such programmes must come side by side because so many tastes must be catered for within the space of an evening's broadcasting. But one does not need to be a peculiarly sensitive listener to be jarred by the running of one programme into another. The common-sense listener, who realises that the way to get the best out of broadcasting is to choose the programmes which appeal to him and let those which are distasteful pass unheard, is particularly hard hit by an arrangement which allows programmes to rush helter-skelter through the evening without a moment's breathing-space.

These, then, are the two main reasons for having intervals between programmes. An interval is also used, and advertised in the *Radio Times* when a space of time is left before an important event too short to supply a programme which is satisfying in itself. For example, if a talk ends at 8 o'clock and a Queen's Hall concert begins at 8.15, ten or eleven minutes, which is all that can be allowed if the concert is to begin promptly on time, is too short to satisfy those who do not like Symphony Concerts, and is an unwanted distraction for those who are looking forward to the concert.

There is one danger inherent in having intervals between programmes. A listener may switch on his set during an interval, hear nothing and presume that his set, or the transmission, has broken down. For his benefit an interval signal has been adopted. This signal is intended to serve the purely utilitarian purpose of assuring the listener in an inoffensive way that all is well with his set and with the transmission: criticism of it on the score that it is not exciting in itself is beside the point. An article on the Interval Signal will be found on p. 373.



EDINBURGH CASTLE BY FLOODLIGHT

A SEARCH FOR SCOTTISH TALENT

As the implications of the Regional Programme policy have become more apparent, it has become increasingly clear that if a regional station is adequately to reflect in its programmes the colour and characteristics of its region, on its independent wavelength, it must not rely overmuch on the supply of talent in the cities and industrial districts. It is true, of course, that it is in such centres that the greatest amount of talent and technique are to be found, but there is also the tendency there towards an ever-increasing stereotyping of artistic output and the losing of characteristic work in an attempt to look like the singers and players of the South who set the fashion. It is in the more outlying parts of rural Scotland that there is the greatest demand and appreciation for really Scottish programmes, and it is often from them also that we must seek the most authentic supply.

Accordingly, the B.B.C. has been engaged in a regional survey and search for new material for its Scottish programmes. Officials have journeyed to the most likely spots in the Highlands and on the Borders, in Ayrshire and in Galloway, looking not so much for new pianists and new singers as for genuine folk material orally cherished, and for the good old Scots worthies whose personalities still enrich many a local concert and Burns night.

Time and again the visiting officials have been met with a shake of the head. "I'm afraid you've come twenty years too late. We used to have some grand types such as you speak of, but they're a' dead lang syne." One friend even

vouchsafed the information that the only real characters in his part of the world had long ago entered the local asylum! In almost every case contacts were formed with the editor of the weekly local newspaper, or the minister or the dominie, or even an artist who, sketching the district, had got in touch with the lives and eccentricities of the people. After an unpromising reminiscence of the days that were gone when worthies had been plentiful and appreciated, tentative suggestions would begin to pop out. The seedman told of a pawky farmer whose conversation was always a delight to the shop assistants when he came to buy seed; the dominie recalled a net fisherman who always sparkled at the annual Burns festivities; and so the list grew and grew. Signalmen, carriers, shepherds, gardeners, fishermen, and small shopkeepers; an infinite and rich variety, and yet all clearly members of one and the same family. It was striking how often the characters in one region, on hearing the mention of other names many miles distant, would confess that they had heard tell of the fame of the person in question, and looked forward to meeting them at a gathering of cronies at a local centre for a broadcast programme.

When the B.B.C. officials approached the place of business of one of the Ayrshire worthies, a local carrier descended on both his father's and mother's side from well-known Burns characters, they were greeted with a look of disapproval and dismay. "Ye'll be frae the Income Tax, I suppose," he remarked ruefully; but on having his mind set at ease on that point accepted their invitation and put them in touch with local traditions and personalities. Again and again one could not but be struck by the marked similarity of types in the different districts. Jock McCrindle, the blue-jerseyed Dunure fisherman, who stood in his little rock garden facing the sea, puffing at his pipe and denouncing the B.B.C. for the meagre quantity of its characteristic Scottish programme in a high-pitched tenor voice, would have much in common with Adam Birrell of Creetown, Galloway, who nets the salmon on the shore below his house. Both are deeply versed in the bird lore of their districts and possessed of rich doric speech, of which they are in no way ashamed, and a superabundance of personality and native humour. Walter Barrie of Sund-



Ian Smith

GENERAL DAWES

*the United States Ambassador opening a new gymnasium at Kirkcudbright
(August 27, 1931)*

[119]

hope, the sheep farmer, who has already taken part in several broadcast programmes, found his counterpart in many a farmer in Ayr and Galloway, and there was no little rivalry in these parts and evidence of a desire to prove that each district had its own prince of story-tellers and its own ideal chairman.

If this search has yielded a rich crop of characters which has brought a new note of distinctiveness and "regional" quality into the Scottish programmes this winter, it has also been fruitful in another way. It has given to those whose task it is to arrange the programmes many new and lively opportunities of seeing themselves as others see them; for the broadcast programmes have no more keen and caustic critics than those rural folk among whom the search was made. With greater quiet and leisure for listening in many cases, they make the week's programme's features as prominent a topic of discussion in the howf and at the hearthside as current political events; and what is more, they are not too blasé to express themselves forcibly.

This survey has been a most stimulating adventure, and it is hoped that regular character broadcasts will be arranged in the near future from Ayr and Kirkcudbright, Dumfries and Selkirk, Beaully and Aboyne, and from any other centres from which suitable talent is forthcoming. After the broadcasts have begun, it is more than likely that experience will make them more and more authentic and characteristic, and that, furthermore, suitable names from all over the country will be forthcoming to make possible the maintenance of variety. It will be interesting to find whether this type of programme will find acceptance with Scots listeners in the same way as the written-up character duologues such as Sandy and Andy, Peter and Neil, George and Wullie, or the one-act Scots comedies, of which so many examples have been broadcast. One thing is certain, that the visits of those making the survey have resulted in a stimulation of interest in broadcasting in general in the outlying areas and have brought to the notice of the B.B.C. much promising musical talent and much shrewd and friendly criticism of their stewardship.

DRAMA AND MUSIC IN WALES

MANY IMPULSES are stirring in Wales at the present time, and of these none is more vital than the interest taken by all classes of the people in drama. It is characteristic of the people of this energetic little nation that they do not so much want to see or to hear as to do. While Wales resembles Scotland in that the poorest families make great sacrifices cheerfully in order that the talented members of the family may have a University education, the satisfaction gained from academic achievement is not the same. Wales, it is true, sends her sons and daughters so that they may get on in life, so that they may have the necessary hall-marks; but fundamentally the genius of the country lies in drama in all its forms, rather than in knowledge for its own sake. One of the reasons for the present outburst of energy is that the chapels of Wales, which had for many years frowned upon drama, dancing, and instrumental music, have lifted their ban, and there are now amateur dramatic societies connected with nearly every place of worship of any size.

The time has come when these young actors of Wales want to go further, they are feeling the need for tradition as well as experiment, for experience more than dynamic impulse. The hardships of recent years have but served to throw the people back upon their own resources, and if these resources could be developed and given scope for expression, the art of the world would be enriched.

Wales is not a young country seeking to find a place in the sun. She is an old country with a store of legends, folk-songs, and traditional beliefs, from which pageants, mystery plays, and operas could be created. It is worth noting, too, that one of the tendencies of the leaders of the new Wales is to regard life as a whole and not to separate the arts from religion. Nearly all the best poets of Wales are also famed as preachers; some of the most humorous writers in Wales are also ministers of religion.

Wales certainly breeds politicians and preachers, but there is something more fundamental which is another key to the genius of this little nation: it is the love of music. One may well question if church- and chapel-going would have held sway for so long were it not for the opportunities for

congregational singing which are given in full measure. And because Church societies and Eisteddfodau have brought the nation so far, the nation wants to go further. The old bottles are likely to burst and the new bottles are not prepared. In plain words, Wales, as a nation, needs the highest equipment for musical and dramatic culture, and she has not got it.

There is a great need for a Welsh Academy of the Arts. Such a centre would differ fundamentally from anything of the kind in England or abroad. It would more closely resemble a School for Opera than a School of Dramatic Art. It would be a centre for instruction and also a place for demonstration and entertainment.

It may be said that the present is not the time for such schemes, that they should be deferred until the trade depression lifts and until the situation in the industrial areas approaches normality. To say that is to ignore the best interests and the best resources of young Wales. Wales has undoubtedly a contribution to make to international culture, marked by a distinctive idiom.

But a central workshop on her own soil is essential, governed at first perhaps by the most experienced men and women available without respect to their nationality, but gradually taken over by the men and women of Welsh blood when their gifts were supplemented by experience.

For too long Wales has allowed herself to believe that her best resources are mineral, and it may be that posterity will consider the period of the reign of King Coal as the least productive in the history of the Principality.



A LAST GLIMPSE OF THE NATIONAL ORCHESTRA OF WALES

R H A G L E N N I C Y M R E I G

O s edrychir dros raglenni Gorsaf y Gorllewin, gwelir bod rhestr hir o gyngherddau, dramâu Cymraeg ac anerchiadau byrion yn Gymraeg wedi eu trefnu yn 1931. Wele ychydig enghreifftiau :—

Rhaglen a berfformiwyd gan fuddugwyr Eisteddfod Genedlaethol Llanelli.

Rhaglen Gymraeg gymysg: canu a chomedi fer “P’un,” gan Idwal Jones a chwaraewyd gan Gwmni Llangeitho.

Nos Gwyl Ddewi: Rhaglen Gymraeg wedi ei threfnu gan Dr. David Evans.

“Priod yr Ellyll,” gan Dvorak, a ledaenwyd o Landŵr, gan Gôr Capel Siloh Newydd, Glandŵr, gyda Cherddorfa Genedlaethol Cymru.

Cyngerdd Cymraeg a ledaenwyd o’r Paviliwn, Caernarfon: Perfformiad o “Cambria,” gan Dr. Joseph Parry.

Tri chyngerdd o Wyl y Tri Chwm, a ledaenwyd o Bafiliwn Mountain Ash.

Rhaglen gan rai o fuddugwyr y Dê yn Eisteddfod Urdd Gobaith Cymru.

Cyngerdd a ledaenwyd o’r Eisteddfod Genedlaethol ym Mangor.

Dathliad Gwyl Ddewi yng Nghaerdydd: Pedrog yn anerch.

“Amddiffyniad Castell Caerdydd, 1646.” Sketch a drefnwyd gan athrawon y Coleg ynglyn a Phasiant Coleg Caerdydd.

Dwy ddrama fer gan Gwmni Abertawe, wedi eu trefnu gan yr Athro Ernest Hughes.

Drama yn Saesneg “The Beaten Track” gan J. O. Francis. Eisteddfod Genedlaethol Bangor: Cadeirio y Bardd: anerchiad gan Miss Megan Lloyd George.

Cyngerdd o Neuadd y Farchnad, Llanelli, gan Gôr Llanelli a’r Gerddorfa Genedlaethol.

Rhaglenni gan rai o fuddugwyr Eisteddfod Genedlaethol Bangor.

Rhaglen wedi ei threfnu gan Gymrodorion Caerdydd.

Cyngerdd Cymraeg o Gapel Pantteg, Ystalyfera, gan Gymdeithas Gorawl Ystalyfera a’r Cylch.

Rhaglen o weithiau David Jenkins.

Rhaglen Gymraeg wedi ei chyflwyno gan Arglwydd Faer Caerdydd.

Cyngerdd ynglyn â Gwyl Gerddorol Ceredigion, a ledaenwyd o Neuadd Coleg Aberystwyth.



Fisk-Moore

THE CLOISTERS, CANTERBURY CATHEDRAL

where the B.B.C. String Orchestra played during the Commemoration Week, July 22, 1931

M U S I C

N O T E S

THE REVIVAL OF "KITESH" on April 10th, 1931, brought back memories of one of the greatest events of the early days of broadcasting. It was just five years since the B.B.C. arranged the first performance of this opera in England in a concert version given at Covent Garden on March 30th, 1926. The performance was in the hands of Albert Coates, who had conducted the opera previously at Barcelona, and the principal characters were all members of a Russian operatic company who were already familiar with the work. A feature of the performance was the fine singing of Alexander Mosjoukin, bass, as the Tartar Chief, and George Pozemkovsky, tenor, who acted his part most realistically in spite of the absence of costumes and stage movement. Many listeners will still remember the excellence of the transmission, which was technically worthy of a great artistic occasion.

* * *

That John MacCormack, the famous Irish-American tenor, should not have broadcast before December 1930 was a matter for surprise, inasmuch as he has broadcast regularly in the United States, but on his previous visits to this country the B.B.C.'s efforts to persuade him to broadcast were always unsuccessful. When he did consent to broadcast in 1930 it was at a public dinner, which is generally an unfavourable environment for the successful transmission of songs, and this occasion did not prove an exception. Nevertheless a broadcast by a singer of his world-wide popularity takes its place as an outstanding event.

* * *

There have been general talks on music from the earliest days of the B.B.C., ranging from Sir Walford Davies' now

historic capture of the "ordinary listener" to Mr. Percy Scholes's fortnightly pronouncements as the B.B.C.'s first music critic. Mr. Scholes's mantle has fallen on Mr. Ernest Newman's shoulders, and ill-health has caused Sir Walford Davies to hand his torch to Dr. Dyson and others. The tendency during the past year has perhaps been towards reinforcing the regular general talks on music by broadcasts on particular composers or particular works. In the former category came, for instance, the series of talks on "New Friends in Music" introduced by Mr. Constant Lambert speaking on Debussy; in the latter Mr. Arthur Bliss's exposition of his new choral work "Morning Heroes" on the day before the broadcast.

* * *

The music profession, as everyone knows, is passing through times of difficulty. The chief cause of this among orchestral players is probably the almost universal substitution of recorded music for cinema orchestras, while concert artists have suffered from the competition of the many cheap and highly organised forms of popular entertainment which are available to-day. On the other hand, there are favourable influences at work, such as broadcasting, the general effect of which is beneficial, owing to its being the cause of the employment of musicians and of the creation of audiences through the rapid spread of the appreciation of music. At the same time the B.B.C. is anxious to take immediate steps to help the musical profession in a time of difficulty. It has accordingly agreed that wherever possible it will employ professional musicians in preference to amateurs, the criterion being roughly whether the musician is earning his living by music or by some other means. There are some fine amateur performers in this country, and the B.B.C. naturally cannot make any sacrifice of the best possible standards of performance in carrying out its undertaking. But the B.B.C. feels that the distinction is a valid one, for the reason that it is difficult for any performer to attain the front rank without devoting his whole time and energies to the art of music.

* * *

It may be argued that broadcasting has brought success to certain amateur singers who, for reasons of physique or



E.N.A.

MANUEL DE FALLA

the famous Spanish composer, conducted a concert of his own works on June 24, 1931

temperament, have not been able to exploit their natural talents on the concert platform. These have in many cases found a more congenial environment in the intimate conditions of the studios. At first sight it may seem that these amateurs provide a type of singing which the professional, with his training perfected for the acoustics of large halls and opera houses, cannot give, and this might appear to be an argument for the encouragement of this class of singer. The truth is, however, that such amateur singers lack both the technique and the qualities of experience which distinguish a professional, and though some professionals may not be able to adapt themselves to the conditions of the studio, such instances are very rare in the history of broadcasting. The B.B.C. has not forsworn amateurs altogether, and in fact its undertaking only applies to London, where the majority of professionals live. It would not be possible to carry out the undertaking in the Provinces without obtaining artists from London. Amateurs will still broadcast, even from London, but only when no equally good professional is available.

* * *

The National Chorus, which consists of amateur singers, has already won laurels in the B.B.C. Symphony Concerts at the Queen's Hall. In its third season, the winter of 1930-31, its performances included Beethoven's Choral Symphony and Mass in D, Arthur Bliss's "Morning Heroes" and Elgar's "Dream of Gerontius." A reference to the Appendix, where the names are printed, will show that it numbers some 250 members. The personnel is not static and auditions are frequently held with a view to filling vacancies which arise, tenors particularly being required. The Chorus rehearses and performs in London, at Broadcasting House, or Queen's Hall, or somewhere equally central; there is no subscription and music is provided free. The B.B.C. is always glad to consider applications from amateur singers who are prepared to undergo an audition in singing and sight reading.

* * *

Nine years ago the International Society for Contemporary Music was formed under the presidency of Professor E. J. Dent. This was a sequel to the First Inter-

national Music Festival held at Salzburg a short while previously. The Society, which exists for securing public performances of the best modern music under favourable conditions, has had a vigorous career. Up till 1931 its annual festivals have been held at various places on the Continent. That of the past year, however, was held in England at two centres, Oxford and London. The B.B.C. gladly co-operated in both parts of the Festival, its Chamber Orchestra and the Wireless Singers contributing to the Oxford concerts a performance which a leading critic described as "truly magnificent," and the B.B.C. Symphony Orchestra and the National Chorus bearing the brunt of the concerts in London.

* * *

It may be said without exaggeration that broadcasting has revolutionised military band music in this country. The process may not have been a conscious one except in the mind of the conductor of the Wireless Military Band, Mr. B. W. O'Donnell. Two factors were operative; the personality of the conductor and the circumstance that the B.B.C.'s band was recruited from members of the various symphony orchestras in London. The lesser consequence of this was that the pitch of the band was the symphonic pitch and not the higher pitch used in the army. The greater consequence was that the players were thoroughly conversant with symphonic music and were therefore enthusiastic in supporting a conductor who was determined to rescue the military band from the tradition of xylophone solos, cornet duets, and selections from the more hackneyed operas, which has prevailed for years in park and pier. The process was facilitated by the superior technical ability and sight-reading powers of the members of the band, and the fact that they were engaged on a continuous contract. The first result was that the band attracted attention by its extremely good playing; the second was that well-known composers were moved to write specially for the military band, and other fine musicians to arrange orchestral work for it, attracted by the quality of the performance and the obviously musical intentions of the conductor. In time the whole complexion of the ordinary military band programme has been changed without any loss of popularity; in fact it has been

a new experience recently for listeners to recognise with pleasure in Promenade concerts some piece of music made familiar to them by the Wireless Military Band.

* * *

That this band has given and is giving a lead to the country is beyond dispute, witness, if nothing else, the lowering of the army bands to symphonic pitch. The reader must not assume that no other military bands have worked for the same object. Two Service bands, in particular, those of the Grenadier Guards and the Royal Air Force, have done excellent work in their long association with broadcasting. It is with great regret, therefore, that the B.B.C. chronicles the retirement of Flight-Lieutenant Amers, who conducted his farewell performance of the R.A.F. Band on Sunday, August 16th, three days before leaving the Service. His band has always been one of the best-known and most popular in the country, and the success of its activities in the studio, at wireless exhibitions, and elsewhere, has been almost entirely due to his personality and enterprise as a conductor.

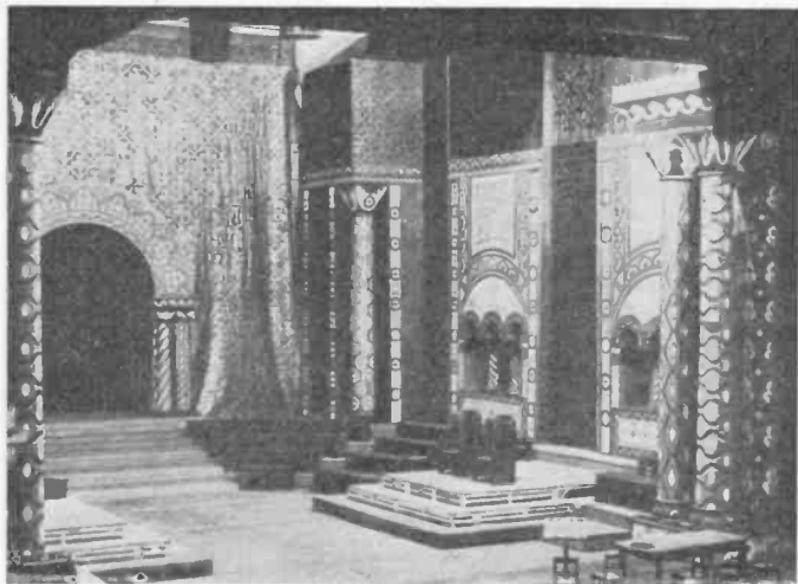
* * *

It has been a Golden Year for lovers of Wagner, as on August 19th two acts of "Tristan and Isolde" were relayed from the Festival at Bayreuth. The transmission to this country was by trunk telephone lines, and the result as heard by the listener was very good indeed. The acoustics of the Festspielhaus proved to be good except for a slight prominence of the soloists in relation to the sunken orchestra. In the hall itself this has the effect merely of adding a richness of quality to the voice, but by wireless it was exaggerated into a slight loss of balance. The microphone has now brought music to this country from Vienna, Salzburg, Cologne, Bayreuth, and other famous Continental centres. This last relay proves that these transmissions have now gone beyond the experimental stage.

* * *

It is sometimes alleged that broadcasting is killing amateur musical activities, and that organisations such as choral societies are losing members and passing through difficult times. The best practical answer to misrepresentations of this kind is the fact that a school for conductors organised by a joint committee of the National Federation of Women's

Institutes, the National Council of Social Service, and the British Federation of Musical Competition Festivals, was held in London in November last. These bodies, which are very closely in touch with life in the country, report that the love of music in rural areas has become so active, and societies, both instrumental and choral, are being formed so rapidly, that the demand for leaders and conductors has far outstripped the supply. In one Midland county, where brass bands are the most popular form of music, there are no fewer than fifty bands, and the county authorities started a school which was attended by thirty of the bandmasters. Other counties also started their own schools for would-be conductors of choral societies and orchestras. The London school, presided over by the B.B.C.'s Music Director, Dr. Adrian Boult, proved a great success.



E.N.A.

THE FESTIVAL THEATRE AT BAYREUTH

from which two acts of Wagner's "Tristan and Isolde" were relayed by the B.B.C. on August 19, 1931



Lassalle

FLORENCE AUSTRAL

who made her debut before the microphone on October 14, 1931.

THE PROBLEM OF OPERA

VARIOUS EXPERIMENTS have already been made by the B.B.C. in the attempt to solve the problem of broadcasting opera. Listeners have heard selections and parts of operas from the studio, whole operas from the studio, with and without a narrator, and relays of parts of operas from opera houses. This last method is the one in use at the moment, and while it is still too soon to reach a final judgment on its merits and drawbacks, there is general agreement that the relays from the Covent Garden International Summer Season were a success; in fact, letters are often received asking why complete operas are not given in this way.

Before answering this question it is necessary to contradict an impression which seems to be firmly fixed in the minds of most listeners. It is this: that the B.B.C. has all day long for broadcasting; it has several wavelengths; it must often be at its wits' end to know how to fill up the programmes; and surely therefore it cannot be hard to find an occasional few minutes to put in . . . whatever the particular speaker happens to want. Now readers of this book are, on the contrary, assured that the B.B.C. often reaches the other end of its wits in trying to find space for all the excellent material at its disposal. It sometimes takes six months for an obviously wise suggestion to find its way into the programmes; simply because it must take its place in the queue, which is always a long one.

Here then is the main difficulty: the problem of time. Opera-lovers must realise that many things—talks, plays, revues, bands, symphonic and chamber music—must all be found their weekly quota of space, and it would not be fair to other listeners if opera took too large a proportion. Further, everything heard by wireless seems to last longer than when heard directly, and a whole evening of opera through the loud-speaker would bore many of those listeners who would enjoy an equal time spent in the opera house.

In spite of this difficulty, a great deal of opera has found a place in the programmes. In fact, it is probable that a listener who looks at the season as a whole will agree that the list of relays is an impressive one. Every effort is always made to choose that part of an opera which loses least by

being heard without being seen—in other words the part most suitable for broadcasting.

To come now to the problem of studio opera, mention has been made already of some of the reasons why a complete opera can rarely, if ever, make a successful broadcast for a large number of listeners, and these are equally applicable to the studio performance. In certain ways the problem is simpler: for instance, there is no excuse for a single inaudible word (as there might be in the opera house, when some singer contrived to turn his back on all the microphones at once!), and the help of a narrator can be used to call up the stage picture, though here again opinions are sharply divided as to the suitability of this. But the basic fact remains: that to many listeners the studio opera fails completely to convey any of the life and soul of the work, any of the excitement that “comes over” so readily from Covent Garden. This is not saying that it cannot be made a success. Experiments are going forward now in Germany, with versions of operas, specially adapted for studio purposes, performed by artists who have often taken part in the original stage version of the work, and can thus easily recreate their parts. These experiments are being watched by the B.B.C. in the hope that useful developments may emerge, although they do not differ greatly from the materials used by the B.B.C. for studio operas in the past. In the meantime, programmes of operatic selections are always one of the most popular studio broadcasts; fragments taken in succession from well-known operas in such a way that the listener can reconstruct the plot and chosen so that every fragment will stand as music apart from its dramatic significance. The operatic scholar, and experienced opera-goer, may feel impatient with a programme of this kind, but its justification is the knowledge that new opera-lovers are being created by this means.

In certain circles it is the fashion to sneer at opera as a mongrel art which does scant justice to any of the arts it tries to combine. That may be, but it is undeniable that opera has often been the first introduction to music of those who have later become lovers of symphonic and chamber music. It is the duty of the B.B.C. to provide opera in the best way its medium can allow, and to work continuously towards any possible improvement in the manner of its presentation.

SONGS IN A FOREIGN LANGUAGE

THESE are two problems to which attention is always being directed by the broadcast programmes: that of the language in which foreign songs and operas should be sung to a British audience; and the subsidiary problem of the language in which titles of foreign music should be printed and announced. In fact there are three problems—opera, songs, and titles. The first is perhaps the easiest, mainly because the man-in-the-street regards opera as something essentially foreign and is accustomed to its being unintelligible, which he regards as one of its necessary conventions. Ideally an opera should be sung in English, but this is often impracticable because, firstly, as so often happens, there is no worthy translation; secondly, in the interests of getting the best possible cast (as at Covent Garden), foreign singers are engaged who are unable to sing the operas in English. In such circumstances the B.B.C. is content to present the opera to its listeners in the original foreign language, regarding that as the least disadvantage.

The problem of songs is a more difficult one, chiefly because of the lack of really good translations into the English, many of the best songs being settings of lyrics which are perfect works of art in their own language, and to that extent almost untranslatable. For this reason it is the custom of the B.B.C. to allow foreign artists to sing in their own language, and to allow English artists to sing *lieder*, for instance, in German when there is no adequate translation in English. But when a foreign language is used there can be no doubt that the English listener loses almost the whole of the literary content of the song. This is a far greater disadvantage than in opera, where the exact meaning of a particular aria is relatively unimportant as long as the listener is familiar with the plot and the general circumstances in which the aria is sung.

Something, however, can be done to lessen the adverse effect of a song sung in a foreign language by printing and announcing an English title for it and by giving, in a note by the mouth of the singer or announcer, a short paraphrase of the words. No one objects to the principle of giving English titles to foreign music, and in practice the only difficulty is to determine how far to apply it, par-

ticularly with regard to the titles of operas and orchestral music. The rigid application of this principle gave rise to many of the programme jokes in the early days of the B.B.C., as, for instance, when a Station's advance programmes arrived in London with titles like "Mrs. Butterfly." It is obvious that some titles are untranslatable and some so familiar that any alternative version would be misleading, but other nations translate the titles of English music into their own language, and this is the only country which, through a long-standing inferiority complex about music, has been satisfied with the foreign titles.

The translation itself is sometimes difficult and a paraphrase is often the best equivalent of the original: "To be pretty" fails as the English title for "Etre jolie." Above all, the translation should be poetical and rhythmically convincing. "When I was taken to the summer-house" was once printed as a translation of "Quand je fus pris au pavillon." Suppose R. L. Stevenson's story had been called "The Summer-house on the Links"!



THE PRO ARTE STRING QUARTET

(December 14, 1930)

THE NORTHERN "PROMS"

THE QUESTION why the Northern Promenade Concerts, started in 1930, were not repeated in 1931, is one that merits explanation. The concerts were a great success as an initial effort to provide the public in Manchester, Liverpool, and Leeds, with first-class music at the cheapest possible prices: in all these cities they were attended by large and enthusiastic audiences. But at the prices offered they could not be a financial success, apart from subsidies earned as contributions to the B.B.C. programmes.

From the outset, however, the B.B.C.'s attitude had been to experiment with a view to seeing whether there was a public for such concerts, and whether, if it attempted pioneer work in this direction, it could rely in future years on the financial co-operation of musical organisations and municipalities in the North for the furtherance of such activity and the possible establishment of first-class orchestral concerts all the year round. In addition, the B.B.C. realised that problems of various kinds, involving the need for friendly co-operation between itself and orchestral music societies in the North, would have to be decided sooner or later. For these reasons the Director-General of the B.B.C. publicly announced in a speech opening the Manchester Radio Exhibition on October 8th, 1930, that the B.B.C. would be ready to attend any conference in which Northern municipalities would care to collaborate, to discuss the orchestral amenities of the North. The Lord Mayor of Manchester subsequently stated in a public speech that he was prepared to convene such a conference, if any interested parties cared to approach him. The B.B.C. again expressed, through the Press, its willingness to attend such a conference. But owing to an insufficient response on the part of Northern organisations to the Lord Mayor's offer, no conference was held, and the B.B.C. felt obliged not to commit itself to further large-scale orchestral projects without indications of eventual co-operation from Northern interests. It did, however, continue its financial support (during the 1930-31 season) of the Halle Concerts Society (nine concerts broadcast), the Liverpool Philharmonic Society (four concerts broadcast), and the Leeds Symphony Orchestra (three of whose concerts were broadcast).



THE LATE PETER WARLOCK

a memorial concert of whose music was broadcast on February 23, 1931

MUSICIANS ON THE B.B.C. STAFF

CRITICS OF BROADCASTING, who themselves may not have any professional qualifications, sometimes allege that the B.B.C. is administered by amateurs. This accusation (if it be one) has several times been made in regard to the musical staff of the B.B.C., and it may therefore be of interest to survey this one department and expose the complete lack of foundation for any such statement. Before examining the strictly musical administration of the B.B.C. it is as well to remark that the musical programmes are not primarily intended for the professional musician. They are broadcast for the benefit of the general public, in the underlying belief that the art of music is one of the greatest pleasures of life and has a mission of personal satisfaction to carry out through all the stages of musical appreciation from the most elementary to the most abstruse. There is, therefore, every justification, both from the point of attracting the listener to the most significant music and from that of catering for his simple but quite important and legitimate pleasures, for subjecting purely musical arrangements to the scrutiny of laymen experienced in assessing the public taste.

This consideration defines the position of the directors and administrators of programme activities in the B.B.C. many of whom have had seven or eight years of intensive experience of the public taste. It is needless to mention that this experience has little affinity with that gained in a West-End box office or a cinema in a provincial manufacturing town. It is experience of a new public which figuratively goes to the theatre or concert-hall almost every night by wireless, many of whom perhaps have never been to such places outside their own homes. A lengthy experience of their likes and dislikes, founded on over a million individual letters and years of newspaper suggestions and criticisms, cannot but be unique.

Subject to safeguards and control of this kind, the musical policy of the B.B.C. is guided by its Music Director, Dr. Adrian Boult, and the B.B.C. Music Advisory Committee consisting of Sir Hugh Allen, Sir Walford Davies, Sir John McEwen, Sir Landon Ronald, Colonel J. C. Somerville and Dr. Whittaker. Apart from his record as a con-

ductor, the B.B.C.'s Music Director has many professional qualifications, notably the Doctorate of Music of Oxford University and a Professorship at the Royal College of Music, while the other members of the Advisory Committee are all honoured and famous in their profession.

At this point it is pertinent to ask, what constitutes a professional musician? In one of the notes printed at the beginning of this section of the Year-Book it is stated that, *vis-à-vis* the Incorporated Society of Musicians, the rough criterion is that a person should entirely, or substantially, earn his living by the art of music. If this definition is accepted, it obviously includes every full-time member of the musical staff of the B.B.C., and no more need be said about their being amateurs. Their musical qualifications, however, are a matter of legitimate interest.

Excluding Dr. Boult and the regular B.B.C. conductors, all of whom do administrative work at times, there are five officials concerned with the general administration of the musical programmes, and of them all five are composers whose works have had public performance; two are also concert pianists; three have been conductors, apart from broadcasting; one has been a singer, actor, and producer; two have won musical scholarships at Oxford and Cambridge, one of whom afterwards held a professorship at Cape Town Conservatoire. Another has also had long experience of musical administration at a famous publishing house, and another has studied on the Continent under musicians of the calibre of Schonberg. There remain the managers of the B.B.C.'s Queen's Hall Concerts and of the B.B.C. orchestra, and two officials engaged in booking artists. Both of the former are trained musicians and of the latter one came to the B.B.C. from the concert industry; the other from the Beecham Opera Company in which he was a principal.

It will be seen that almost every kind of qualification, both academic and practical, is represented on the B.B.C. musical staff. This survey has, of course, laid too much stress on qualifications, when all the emphasis should be on performance and results, which the B.B.C. regards as the final criterion of efficiency in every department. It is published as a matter of interest to lovers of broadcast music who sometimes reflect on the staff that provides it.

ORCHESTRAL DEVELOPMENTS

THE FORMATION OF the new B.B.C. Orchestra in 1930 was a new departure of considerable magnitude and importance. It was pointed out in the last Year-Book that, while certain general principles had been laid down, it was probable that modification would be made in these in the light of actual experience in the working.

The B.B.C.'s aim was to have an organisation capable of dealing with the entire orchestral needs of its programmes, either working as a whole or in subdivisions. With this object, an orchestra of 114 players was engaged, and the variety of music which it was required to play may be summarised as follows:—

1. Symphony concerts requiring full modern orchestra (at least 100 players).
2. Symphony concerts requiring medium-sized orchestra (say eighty players).
3. Dramatic programmes (Musical Comedy, etc.) requiring between thirty and forty players.
4. Light orchestral and light Symphony concerts (forty to seventy players).
5. Miscellaneous work (*e.g.* Incidental music for plays, etc.), the combination required for which is variable.

In most weeks in the year all these types of programme are represented, and they were mostly catered for by two alternative subdivisions of the orchestra, respectively into 78 + 36 and 67 + 47 players. Experience has, however, shown that the repertoire of the smallest section of the orchestra could be very greatly enlarged by the addition of one extra instrument, and accordingly the total strength of the orchestra has now been raised to 115. The newly engaged members, like the original ones, have been most carefully chosen and have all received individual audition. The present system of subdivision is shown on the next page.

A most important feature of the players' contracts was the "no-deputy" clause. This provided that no player might ever be absent from any concert or rehearsal except in case of illness. Substitute players have only been engaged in cases of accident or sickness. The advantage of a "no-deputy" system is continuous and increasing, in that the same players, performing constantly together, gain a

FULL ORCHESTRA AND SUBDIVISIONS

	A.	B.	C.	D.	E.
First Violins	20	14	6	12	8
Second Violins	16	12	4	10	6
Violas	14	10	4	8	6
'Cellos	12	8	4	7	5
Basses	10	7	3	6	4
Flutes	5	3	2	3	2
Oboes	4	3	1	2	2
Clarionets	5	3	2	3	2
Bassoons	4	3	1	2	2
Horns	6	4	2	4	2
Trumpets	5	3	2	3	2
Trombones	6	3	3	3	3
Tubas	1	1	—	1	—
Harps	2	1	1	1	1
Percussion	5	4	1	3	2
	115	79	36	68	47

mutual sympathy which cannot be achieved with constant changes in personnel. Only by preserving an unchanged personnel can the ensemble, which is the essence of orchestral building, be properly built up.

The full orchestra, lead by Arthur Catterall, plays weekly during the winter season in the B.B.C. Symphony concerts at the Queen's Hall. In 1930-31 there were twenty-three of these concerts, nine of which were conducted by the permanent conductor, Adrian Boult.

In 1931-32 there are again twenty-three of these concerts, run on similar lines, except that Adrian Boult will conduct twelve concerts. The guest conductors are Ernest Ansermet, Nikolai Malko, Sir Landon Ronald, Bruno Walter, Felix Weingartner, and Sir Henry Wood.

Another weekly series of orchestral concerts is given on Sunday evenings in the studio during the winter season. There were thirty of these last year, and this year there will be the same number. The conductors include not only some of those who conduct the Queen's Hall Symphony concerts, but also certain of the most distinguished of the younger British conductors.

The 1931 series of Promenade concerts at the Queen's Hall, lasting eight weeks, was given by a contingent of

ninety players of the B.B.C. Orchestra, under the direction of Sir Henry Wood.

These three series may be differentiated from the rest of the orchestral programmes by reason of their greater musical importance, and the consequently more extensive rehearsal which it is necessary to give them. It should, however, be emphasised that these concerts and the work they imply are never allowed to prejudice the satisfactory performance of the regular studio orchestral programmes (popular orchestral, light symphony, etc.) which occur several times a week. It is the constant endeavour of the B.B.C. to give all orchestral programmes, whatever their nature, full and equal care in preparation and performance.

The orchestra has also taken part in the 1931 Festival of the International Society for Contemporary Music at Oxford and London, and the Canterbury Commemoration Week of 1931.

In view of the fact that the size of the orchestra as broadcast varies so greatly, it has been decided to differentiate its sections by name, and the following system has been adopted. The full orchestra of 115 players (orchestra "A" on the chart) will be known as the "B.B.C. Symphony Orchestra": this full combination only plays in the Queen's Hall. The two larger sections (orchestras "B" and "D" of seventy-nine and sixty-eight players respectively) will be known as the "B.B.C. Studio Symphony Orchestra." The duties of these two orchestras are sufficiently indicated by their name. The remaining two sections (orchestras "C" and "E" of thirty-six and forty-seven players respectively) are to be known as the "B.B.C. Light Orchestra," and will give light symphony and popular orchestral concerts. The section which undertakes the Bach Cantatas will be known as the "B.B.C. Bach Orchestra." This is made up from the strings of orchestra "C," together with an *ad hoc* allocation of wind instruments as required for each cantata.

It was the B.B.C.'s aim in founding their new orchestra last year that it should set a standard for English orchestral playing, and should bear comparison with the finest orchestras in the world. It may be claimed that this hope has already been realised, but that does not mean that the orchestra has yet reached the limit of its powers. The skill

and experience of the players, the regularity and frequency with which they play together and, not least, the qualities of their permanent conductor, Adrian Boult, give every reason to expect that a steady and continued improvement in the standard of performance will be maintained.



B.B.C. THEATRE ORCHESTRA

The experience of the past year has shown that, for various reasons, the same orchestra cannot undertake both symphony work and the lightest music required, such as musical comedy. Apart from the question of the amount of work involved, the style of playing required is quite different, and it is impossible for a player to adapt himself constantly to both. Accordingly, it was decided to relieve the symphony orchestra from the responsibility for the lightest musical programmes, and to cater for these with a separate orchestral organisation.

With this object the B.B.C. Theatre Orchestra of twenty-four players has been formed under the permanent conductorship of Leslie Woodgate with S. Kneale Kelley as leader. This combination is undertaking much of the incidental music plays and vaudeville programmes generally, and is also giving purely musical programmes of a similar character. The players, like those in the Symphony Orchestra, have all been engaged after careful individual audition, and are placed on a full-time contract. The composition is shown on the opposite page.

First Violins	4	
Second Violins	3	
Violas	2	
'Cellos	2	First 'Cello also plays Banjo and Guitar; Second 'Cello also plays Saxophone)
Bass	1	
Flute (and Piccolo)	1	
Oboe	1	
Clarinets (and Saxophones)	2	
Bassoon	1	
Horns	2	
Trumpets (and Cornets)	2	
Trombones	2	
Percussion	1	
	—	
	24	

THE NORTHERN STUDIO ORCHESTRA

This came into being on April 1st, 1931, replacing the Northern Wireless Orchestra for the purpose of regular studio-produced orchestral concerts in the North Regional programmes. To arrange any orchestra of nine players to take the place of the exceedingly popular orchestra of twenty-seven players, under the conductorship of Mr. T. H. Morrison, was no light matter. A special combination was decided upon, one suitable for the performance of as wide a variety of works as possible. The leader of the orchestra is Mr. John Bridge (violinist) and the other members are—Don Hyden, 2nd violin, Frank Park, viola, Clyde Twelvetrees, 'cello, Alfred Stott, double bass, Pat Ryan, clarinet, Otto Paersch, french horn, Sam Holt, trombone, and Eric Fogg, piano.

The formation of the studio orchestra led to difficulties with the Halle Society. With the larger orchestra it had been possible in past years to release the members, seven of whom were also Halle players, for practically all the Halle concerts. But to allow deputies in a nonet is not the same thing as in a much larger combination. The B.B.C. offered, however, to release the seven players concerned for all the Halle Concerts in Manchester, and to consider releasing them for such concerts outside Manchester as did not conflict with the Regional programme commitments. The Halle Society, not accepting this compromise, approached the Lord Mayor of Man-

chester to use his influence with the B.B.C. The B.B.C., as the result of this approach, offered to release the players for a minimum of ten of the concerts outside Manchester, and also for the Halle Pensions Fund Concert. The Halle Society intimated that this further concession was not workable, and asked for two of the most essential members of the Studio Orchestra for all the Halle concerts throughout the season, offering to provide efficient substitutes. The B.B.C. could not see its way to a concession such as this, which would have vitally affected the ensemble playing of the studio orchestra. It would also have entailed a virtual reorganisation of the orchestra, which was not possible owing to the fact that the members had already accepted their contracts.

THE NATIONAL ORCHESTRA OF WALES

During the past year the N.O.W. reached a crisis and, unhappily, at the June meeting the Council decided that the orchestra must be disbanded. It is recognised on all sides that a tremendous effort has been made to establish an orchestra in Wales, and although lasting success has not been achieved, those who have been associated with the venture have the satisfaction of knowing that no stone has been left unturned.

The orchestra was formed in 1928, and for that year the B.B.C. agreed to bear the entire cost. At the end of the year the position could not be regarded as satisfactory. It had to be confessed that the attendances at the public concerts had been disappointing. It was nevertheless urged that the National Orchestra should be continued, and it was felt that in time more support would be forthcoming. The Council of the orchestra was not in a position to provide funds and take over control, and the B.B.C. agreed to bear the entire cost for a second year.

At the end of this period some progress had been made, but still the position was far from satisfactory. The B.B.C. agreed to bear the remaining cost of the orchestra for a third year if a sum of £2,000 could be obtained in Wales by public subscription. This sum was eventually secured. In making this offer the B.B.C. informed the Council that after the third year control of the orchestra must pass into

the hands of the representative Welsh Council and that the B.B.C. could no longer bear the whole or the greater part of the cost as hitherto. The total deficit of the National Orchestra scheme was £14,000 a year, and the B.B.C. offered to provide half this sum for the first year, the subsidy to diminish by £1,000 a year in succeeding years to a minimum of £2,000. During the third year the Council endeavoured to find a source of income to enable the N.O.W. to continue with the subsidy offered by the B.B.C. No success attended these efforts, and towards the end of 1930 the Council decided to seek the advice of a number of prominent Welshmen.

In the opinion of these consultants there was no chance of raising a sum of £7,000 in Wales at the present time. They recommended that applications be sent to the Pilgrim and Carnegie Trusts for a grant of £3,000 between them. If this grant could be secured, the consultants felt that an appeal might be launched in Wales for the remaining sum of £4,000. If the grant could not be obtained, the consultants were definitely of opinion that no public appeal should be launched. The application sent by the Council to the Trusts was unsuccessful and it seemed inevitable that the orchestra must be disbanded in April 1931. In March, however, the B.B.C. agreed to extend the life of the orchestra for still a further six months in order that no possible chance of saving it might be lost. It was recognised that unless the existence of the orchestra could be assured for a reasonable period, its work would be restricted, as it could not even accept an engagement such as the National Eisteddfod a year ahead.

Accordingly, an appeal for £14,000 was launched, and with a similar subsidy from the B.B.C. this would have kept the orchestra in existence for two years.

The final appeal to the people of Wales was unsuccessful. When the appeal closed on June 30th, a sum of only £2,500 was in sight, and this amount included the grants from the Cardiff and Swansea Corporations.

The facts of the situation had to be faced. It was realised that there was no strong public demand for the retention of the National Orchestra, and it was agreed that the B.B.C. had done more than its share in trying to put the orchestra on a permanent basis.



SIR HENRY WOOD
A new caricature by Kapp

MUSIC IN NORTHERN IRELAND

THE year 1930-31 has seen unprecedented musical activity in Belfast. Never before has there been a season so rich in public orchestral concerts. Nor has good music ever been offered to the public on so large a scale and at so low a price.

In the autumn of 1930 the B.B.C. and Mr. Herbert J. Ireland, the General Secretary of the Belfast City Y.M.C.A., agreed to pool their respective resources for the public benefit. The Y.M.C.A. possessed a magnificent concert hall capable of seating 1,500 persons, and an organisation able to handle the innumerable details connected with the running of public concerts: the B.B.C. employed a highly skilled orchestra and solo artists for studio work. A dozen concerts were billed, each on a Saturday night. At each concert one thousand seats were set apart for sale at 6*d.*, the remainder being offered as reserved seats at 1*s.* 3*d.*

The scheme was a success. Houses were packed. On many occasions hundreds were turned away at the door. The series finished with a bumper performance on March 7th, when Sir Henry Wood conducted the orchestra before the Duke and Duchess of Abercorn and a large and enthusiastic audience.

The Belfast Corporation, inspired by the success of the Y.M.C.A. series, approached the B.B.C. with proposals for a similar scheme, and a series of concerts was embarked upon in the spring. Saturday again was chosen and the prices of the seats were 6*d.* and 1*s.* 3*d.* as before. At first some doubts were expressed as to whether the public would support concerts during the long summer evenings in sufficient numbers to justify the venture, but the doubts were without foundation. On each Saturday night during the months of April, May, and June, 1931, the Belfast Wireless Symphony Orchestra played to large audiences, this time in the Ulster Hall. Once more, the final concert of the series on June 27th was conducted by Sir Henry Wood.

Like most successful ventures, this one has been largely due to the energy and enthusiasm of a few individuals. The Belfast Station Musical Director, Mr. E. Godfrey Brown, conducted most of the concerts, and organised each programme. The pioneer part played by Mr. Herbert

Ireland has already been referred to : without his foresight and courage the scheme could never have succeeded. The co-operation of the Belfast City Corporation in the spring series was welcomed by all who have ambitions for the musical reputation of Northern Ireland. Mr. R. E. Forbes, the Estates Superintendent, led the way, and the success of the venture was largely due to him.

The guest conductors have included Sir Henry Wood ; Dr. E. Norman Hay, composer and critic ; Colonel Fritz Brase, late Director of Music, Prussian Guards, and now Director of Music, Irish Free State Army ; Captain C. J. Brennan, Belfast City Organist ; and Mr. Edgar L. Bainton, the well-known composer, pianist, and conductor of the Philharmonic Society, Newcastle-upon-Tyne.

It would be impossible to mention all the famous singers and instrumentalists who have appeared before Belfast audiences in recent months. Suffice it to say that there are few artists with national reputations who have not done so.

Another recent development has been the free concerts in the Belfast Municipal Art Gallery. The largest room in the Gallery is so suitable for instrumental concerts that it might have been built for the purpose. Ever since the autumn of 1930 the Belfast Wireless Orchestra has given a concert every Wednesday afternoon in this room, and a large number of people make a regular habit of attending each week. The seating accommodation for some 400 people has been fully occupied at every concert, while the overflow has found place in the corridors and adjoining rooms in which the music can be heard. In this series the public owe much to the enthusiasm and efficiency of Mr. Arthur Deane, the curator.

The young generation are by no means neglected. The orchestra has played four times during the winter at concerts given in the Ulster Hall by the Belfast Authority. Fifteen hundred school-children have assembled on each occasion, and a keener or more attentive audience would be difficult to find. Captain T. O. Corrin, the Ministry of Education's Musical Inspector, has acted as master of ceremonies at each concert, and has explained in simple terms the composition of the orchestra and the music in the programmes. The B.B.C. hopes to give an even larger number of concerts to the school-children next winter.



Walery

CONCHITA SUPERVIA

the famous coloratura contralto, who was first introduced to the British public in a B.B.C. Symphony Concert in March 1930



H. G. WELLS

who broadcast the first of a series of talks on "What I would do with the world" in September 1931. He also spoke on Russia earlier in the year.

T A L K S

N O T E S

ONE of the most important features of the year, although it was not an innovation, has been the increase in the number of talks intended to enlighten public opinion on matters of current interest. It is a development which clearly has been appreciated by the listening public, although the controversial nature of the subjects has caused the usual protests from those holding extreme views on either side of the balanced and impartial survey which the B.B.C. tries to put before its listeners. The series of talks on India and Russia may be quoted as examples. The latter simultaneously provoked a fierce attack from a Conservative daily newspaper and an accusation from a Labour periodical in the terms of "there is about the B.B.C. a clever and cunning hypocrisy." No better tribute could be paid to the impartiality of the series.

* * *

The B.B.C. attaches great importance to its National Lectures, which are broadcast three times a year, and afterwards made available to the public both in the columns of *The Listener* and in book form. These lectures are intended to provide first-rate contributions to thought and knowledge from persons of the highest standing in the English-speaking world. Allowance is made for their lasting an hour more or less, about two or three times as long as an ordinary broadcast talk, so that the speaker may have an opportunity of developing his subject at reasonable length. The first of the National Lectures was broadcast in February 1929, when the late Poet Laureate, Robert Bridges, gave the public an advance prose version of his thoughts on beauty published later in his great poem "The Testa-

ment of Beauty." This set a standard which is difficult to maintain, but his successors, Sir A. S. Eddington, Professor G. M. Trevelyan, Sir J. J. Thomson, Lord Hewart, and Mr. Reginald McKenna have been worthy of the occasion. In the year 1931, the first lecture was by Sir Walter Morley Fletcher, President of the Medical Research Council, on "Biology and Statecraft," a plea for a more liberal provision for practical preventive medicine in the Tropics: the second, Sir William Bragg's Centenary lecture on Faraday; and the third, Sir William Rothenstein, Principal of the Royal College of Art, on art. Two lectures have been arranged for early 1932, viz. Sir Frederick Hopkins on vitamins and Prof. George Gordon, President of Magdalen, on literature.

* * *

The B.B.C. has made a practice of observing the most important centenaries and other anniversaries and has had plenty of opportunity of doing so in the past year. The most interesting were the Virgil Bi-millenary and the Faraday Centenary. The former was marked by a series of talks by Dr. T. R. Glover; the latter by a National Lecture by Sir William Bragg, talks by Professor Cramp, Sir James Crichton-Browne, and others, and a broadcast of the proceedings at the meeting in London of the British Association for the Advancement of Science, which was celebrating its own centenary as well as that of Faraday. The centenaries of William Cowper and Mrs. Siddons were celebrated by talks broadcast on the anniversary day by speakers of authority; while those of Daniel Defoe and John Dryden were made the occasion for a series of broadcasts on their life and work.

* * *

The principle of serial talks is by now well established in broadcasting and a serial story is no longer a novelty, but the two serial detective stories broadcast in the early months of 1931 deserve mention as an attempt to produce something new. In both series the idea was to produce a coherent whole based on "chapters" broadcast by different authors. In the first series, entitled "Behind the Screen," it is possible to say in retrospect that too much latitude was allowed in the hope of achieving a natural effect. The plot in consequence lost in conviction what it gained in

unexpectedness. In arranging the second serial detective story, entitled "The Scoop," greater attention was paid to the coherence of the plot, with the result that the broadcast, in which detective story-writers like Agatha Christie, Dorothy Sayers, and Anthony Berkeley took part, was one of the most successful of the year. In the autumn of 1931 the broadcast of a series of short stories by Mr. Edgar Wallace met with not unexpected popular approval.

* * *

Still more successful was the series of talks on escapes from prison during the late war. Here was something better than the serial detective story, a first-hand description, by the actual person concerned, of his attempts to escape out of prison in a foreign country. A welcome feature was the contribution by German officers, Herren Justus, Tholens and Von Mücke, who revisited this country for the purpose.

* * *

Readers of the 1930 Year-Book will remember an article by Professor A. V. Hill on "Electricity and the Body." This subject has been carried into the programmes by Mr. B. H. C. Matthews, who gave a very interesting series of talks, the novelty of which consisted in the electrical illustrations and experiments which were broadcast from the studio. For instance, the lecturer made the electric current from his heart ring a bell, nerve currents were turned into sound, and in similar ways the microphone was made an instrument of scientific demonstration. The beat of the human heart has been broadcast before by the B.B.C., and ships in mid-ocean have been known to obtain diagnosis by wireless, but this is believed to have been the first occasion on which the microphone has been used for illustrating a series of scientific lectures.

* * *

It is probable that many listeners do not realise the significance of the growth of discussion groups. They visualise groups of rather self-conscious people listening to the lecturer's voice coming through a bad loud-speaker, and afterwards to wild statements in amplification and explanation by the group-leader. If this picture was ever true, it certainly has no resemblance to the present reality. An article will be found on p. 161 surveying

group activities during the year. An idea of the present situation is best given by citing a few random facts; for instance, that there are about 200 groups in the North of England alone; that at one group the attendance on one occasion reached 123; that Sir William Beveridge found it worth while to go up to Liverpool after his series of talks on "Unemployment" were finished to discuss them with this group; that in a town like Hereford the leaders of five groups are the President of the Chamber of Commerce, one of the staff of Hereford Training College, the Headmaster of Hereford High School, the Town Clerk, and the Director of Education; and finally, that many prisons, such as Maidstone, Wakefield, and Manchester, are allowing wireless, through listening groups and otherwise, to play its part in the recreation of the prisoners.

* * *

A point of interest in connection with the work of the B.B.C.'s Advisory Committee on Spoken English is that gramophone records have been made of a great many of the words, the pronunciation of which has been laid down by that Committee. A complete set of the records has been accepted by the British Museum for preservation. The Committee's decisions are, of course, only intended for the guidance of the B.B.C. announcers, and the Committee does not set itself up as any kind of public or national authority on pronunciation. It is a matter of practical convenience for the announcer to have a definite decision to guide him in pronouncing doubtful words.

* * *

Publishers are reaping a bigger harvest each year of books derived from broadcast talks. Some of these, like Mr. Harold Nicolson's popular talks on "People and Things," take the form of bare reprints of the actual matter broadcast; in other cases the author expands a brief half-dozen talks into a small book. Some of the most successful publications have been collections of talks by various authors on a single subject; for example, the two series of "Points of View," the Escapes, and the series of talks on Russia in the summer of 1931. Sometimes a talk makes a furtive appearance in a book, as did Mr. Bernard Shaw's broadcast point of view, which had the distinction of forming part

of the preface to "The Apple-Cart." A list of books made from talks will be found in the Appendix.

* * *

There have been two recent decisions which have affected the status, professional or amateur, of broadcasters. In the first case the General Council of the Bar relaxed a ruling which forbade practising barristers to broadcast talks on law. They are now allowed to do so, but only anonymously, a proviso which nullifies the concession from the B.B.C.'s point of view. One of the Council's main motives is presumably the desire to eliminate self-advertising; but anonymity is either, as in most cases, fatal to a successful broadcast, or else acts as an intensified advertisement, if the speaker is successful in catching the public ear. There have been many examples of the latter, the most obvious being that of A. J. Alan, the mystery of whose identity has undoubtedly added to his fame as a story-teller. In parallel circumstances the General Medical Council has recognised the disadvantages of impersonal broadcasts. It is notoriously as jealous of the dignity of its profession as any other such body, but it has recognised the importance of a personal contact between the expert and the listener, and for some time past has permitted eminent members of the medical profession to broadcast under their own names. Lord Moynihan, and Sir Humphry Rolleston may be mentioned as recent examples.

* * *

The second case is that of the Amateur Athletic Association, which has ruled that amateur athletes may not broadcast and will lose their amateur status by doing so. In the decision broadcasting is coupled with writing for the Press, but it is perhaps pertinent to point out that there is a difference of principle between the two. When it suits people to do so, the B.B.C. is (erroneously) called "a government department," and the fact remains that it is an uncommercial public service charged with the duty of informing the nation in all the activities of life. There are many public men who are so conscious of this aspect of broadcasting that they regard it as their duty to come to the microphone on the appropriate occasions. It is true that they are usually Cabinet ministers, archbishops, and the like,

but there is a similar obligation on the leaders in every walk of life. It is difficult for the ordinary man to understand how a Tisdall or a Burghley becomes a professional by using a publicly controlled medium for telling the nation about the sport at which he excels. Surely, as Mr. B. G. H. Rudd has suggested, it is far worse for the amateur to be competing for valuable cups, medals, and cash vouchers.

* * *

The broadcasting of poetry has continued to be the subject of many experiments. During the autumn of 1930, partly as a sequel to the earlier "Foundations of English Poetry," a special series of weekly readings was given from September to December in collaboration with the editor of the Hogarth Living Poets, in which series the readings subsequently appeared in book form. The readings were given in the form of short anthologies on a number of themes, and were limited to the work of poets now under fifty years of age. A series of readings from English humorous poetry was also given during the autumn by Harry Graham. In the spring of 1931 readings of English Religious Poetry, with comment, were given by Mr. John Sparrow. Mr. Desmond MacCarthy and Miss Sarah Allgood broadcast readings from W. B. Yeats and J. M. Synge, and in the autumn of 1931 Mr. Yeats himself gave a notable reading of his own poetry. Experiments made in the presentation of short programmes of music and poetry, such as "Variations on an Old Theme" (a series of love poems) and "Retrospect" (based on Wordsworth's *Intimations of Immortality*) were followed in the autumn of 1931 by a number of weekly programmes entitled "Mosaic."

* * *

The B.B.C. was able to co-operate in the census of 1931. The Registrar-General, Mr. S. P. Vivian, organised a series of introductory talks which were broadcast in the weeks preceding the census. On the actual day, Sunday, April 26th, he broadcast an explanation of the filling in of the census forms, and the advice was repeated in the B.B.C.'s news bulletins.

INTELLIGENT CRITICISM

IF ANYONE cares to measure the inches in newspaper columns which are devoted to comment on affairs of general interest, and to do the same in the weeklies and monthlies, classifying the contents under such universal topics as sport, politics, finance, plays, films, books, crime, etc., he will find little comment on one interest which is shared by a large proportion of those who live in the British Isles. It is remarkable that though reference to broadcast programmes can be overheard in trams, buses, and trains, in barbers' establishments, public-houses, and dinner-parties, the space devoted to such comment, disparaging or otherwise, in the Press is disproportionately small. Space has been found for printing the items of the broadcast programmes daily; that is news. In the principal daily papers there are regular or occasional paragraphs either of chatty personalities about a revue artist, or of fairly neutral criticism of yesterday's programme; in one or two there is something definitely more ambitious. One or two weeklies contain a short article of general comment. Occasionally there are irate letters from listeners in the correspondence columns, usually balanced by expressions of appreciation from others. But there is little or no general discussion of policy, of special programmes, of presentation, of quality, of large-scale criticism and suggestion, of special inquiries.

There may be many different reasons for this. Broadcasting is new. Adequate programme criticism demands a fairly wide range of qualities. And yet when one considers that the broadcast service is a national organisation, influencing the tastes and views of large sections of the public and peculiarly sensitive to public opinion for box office as well as other reasons, the comparative absence of intelligent criticism is strange and unfortunate.

From the point of view of those responsible for initiating, arranging, and presenting talks, readings, discussions, etc., there is no question that intelligent and well-informed criticism would have a stimulating effect on programme building, and consequently a beneficial result for listeners. Regular critical notes, periodical critical articles, reviews of past and future programmes of talks, comments on new experiments, on minority interests, on technique, on the

place of controversy, and on dozens of other problems of broadcasting, would not only help the general public to show a more healthy interest in and less apathy towards the programmes they hear, but would also stimulate the inventiveness, supplement the detachment, and invigorate the imagination of a staff upon whom administrative routine and office life tend to weigh heavily in times of pressure. With the best will in the world, it is difficult to bear constantly in mind the tastes and idiosyncrasies and day-to-day environment of listeners of both sexes and all ages in all parts of the British Isles. Analysis of correspondence with speakers, which is large and on the whole intelligent, is a useful check. Special inquiries may from time to time be made. But more regular and general criticism in the Press would be of great help to the B.B.C., particularly in the arranging of talks. Nor would it be disadvantageous to the newspapers and periodicals which were enterprising enough to make it a regular feature.



W. B. YEATS

who broadcast some of his own poetry from Belfast on September 8, 1931

A SURVEY OF LISTENERS

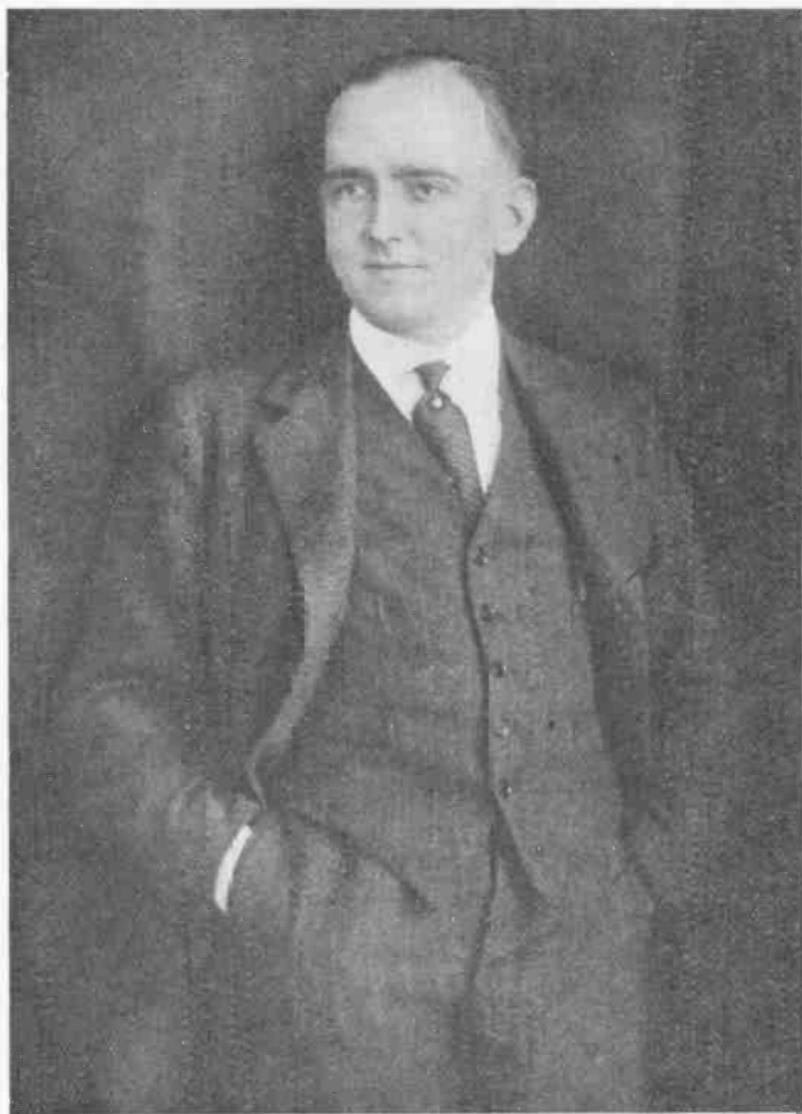
THE CENTRAL COUNCIL for Broadcast Adult Education has in mind a survey of listeners on some statistical basis which shall be a fair sample of the country as a whole and which shall take the form of an inquiry both into the tastes and habits of the ordinary listener. Why is this necessary? And how is it proposed to carry it out? These are not simple questions to answer briefly. The main reason is, in effect, that broadcasting, especially on its educational side, is a service which has been deliberately built up and based upon experience derived from the listener himself. Consider for a moment the implications of an educational service by broadcasting. Education is normally associated with discipline: it is organised subject to regulation, to the regular attendance of students of whatever age. Under such conditions the consequences in terms of educational organisation are clear enough. But what of an audience which is subject to no restraints, which is essentially voluntary in character and which comprises such a variety of types, of ages, and of experience? Here nothing arbitrary can hope for success: here education at last becomes directly and inevitably associated with life. The prejudices, the particular needs and preoccupations of a heterogeneous audience have somehow to be reconciled with that idealism and that singleness of aim without which education is meaningless and impotent. The result is that a technique and a body of principles have to be worked out afresh, without any precedent or previous example to fall back upon. It is in this spirit, at once of the pioneer looking ahead to a certain objective and looking backwards to the immediate needs and shortcomings of those who have to be led and encouraged on their way to new and unfamiliar country, that the broadcast service of adult education has been undertaken. From earliest beginnings the work has proceeded with a constant care to study the success or failure of this or that method, to make allowances without ever sacrificing a principle, to secure, in fact, the perfect adaptation of means to ends. The history of the last five years shows an increasing tendency to organise and to analyse scientifically the experience which has been derived from experiment. Local conferences,

national conferences, have each in turn been a means of associating listeners with broadcast policy in such a way as to keep the machinery of control constantly sensitive to the adjustments that become necessary in practice. But the means available are at best inadequate as a fair reflection of the difficulties and of the demands of listeners. Correspondence achieves something, but comparatively few people, and over a period a diminishing number, establish or maintain contact with the B.B.C. in this way.

Further, it is perfectly evident that, with the increasing body of licence-holders, the variety of interests to be provided for, the degrees of intelligence and capacity, tend to multiply and to burden the B.B.C. with an ever-increasing number and variety of responsibilities. It becomes important, therefore, not only to provide for sectional interests and for sections of the population, in respect of their particular preoccupations, but also to adapt the service in matters of timing to social requirements related to the hours of leisure available within this or that category. Much, of course, has been achieved and can still be achieved by a process of trial and error, but one is left in the isolation of headquarters with the uneasy sense that the service is still inadequate to the potential demand. If one's conception of broadcasting is dynamic and not static, it is probable that this sense of unease is not only healthy but inevitable, but its implications are clear in the responsibility they throw upon the B.B.C. to leave no stone unturned to perfect its service in the interests of listeners. In education the problem is the more complex because of the shyness of ordinary listeners in face of any approach under this formidable title. Education is suspect as such, and it becomes more than ever urgent to study and to understand the reasons for the diffidence and suspicion which it arouses in ordinary people. Broadly speaking, the following are the kinds of subjects within which a deal of further exploration could produce profitable results. First the problem of the appropriate timing of a service which is at once social and educational. At what hours is it possible to provide a service, not of isolated talks but of related series? Then, again, what of the psychology of the listener? What limits do the artificial conditions of listening, as it were in the void, set upon his powers of interest and concentration?

What are the important factors in the treatment of a talk and in the personality of a speaker? What lowest common denominator of the standard of ideas and of expression is possible in relation to so mixed an audience? What are the subjects that have the widest appeal, and why? That last question raises issues of far too wide a significance for discussion here: it goes to the very roots of the educational problem, for if it can be answered it must reveal in a new light the whole temper and mentality of our society.

There is nothing as yet to show that questions at once so fundamental and so personal can be answered within any statistical scheme, but that such answers would be of enormous value to the B.B.C. and to the Central Council in the development of their work, there is no question at all. It is therefore proposed to test the method by a preliminary survey on a small scale and only to proceed to the major investigation if the former brings in results that are fruitful. The plans for the preliminary survey provide for personal visits to listeners selected on an agreed plan with a view to securing a thousand effective replies to a limited questionnaire. Thus, within a compact town of about 50,000 population with, say, 4,000 licence-holders, some 250 houses would be visited. It is hoped that five districts will be selected, three representative of industrial areas and two of semi-rural districts. The distribution would provide for a survey covering samples from the North, from the Midlands, from the London area, and from the West. The survey would be undertaken under expert supervision and the returns carefully analysed: it is probable that it will be carried out during the winter of 1931-2. If the experiment is successful, a more comprehensive national survey will almost certainly be undertaken. The questionnaire for the preliminary experiment would be confined, for practical reasons, to matters directly relevant to the Central Council's work in relation to educational talks in the B.B.C.'s evening programmes. The project is of obvious importance, but it is idle at this stage to prophesy either its practicability or its results. All that can be said is that its scope and its intention are not such as to call in question the fundamental principles of the B.B.C.'s policy, but rather to adjust the service more narrowly to the convenience and for the benefit of listeners.



HERR JUSTUS

a German prisoner in England during the War, who took part in the talks on "Escapes"

CAN YOU TELL A STORY?

SCHEHEREZADE, as we know, contrived by successful story-telling to avert execution for a thousand and one nights. On the same principle the Eastern story-teller still collects his fees only on condition that his hearers desire a further instalment. Apply these rules to the microphone, and expect a sharp fall in the population of England and the fees of the B.B.C. Why? Because story-telling as an art—an art of the spoken, not the written, word—is moribund, dying of a severe attack of literary tradition. It is unfortunate for the microphone, since successful story-telling is the one criterion which applies effectively to every variety of the spoken word—plays, talks, discussions—on the wireless. If you cannot tell a story—even about the life of the ant—in such a way as to hold your listeners' attention from first to last, then give the microphone a wide berth. Yet few prospective speakers appreciate the necessity for story-telling—least of all those who daily weigh down the B.B.C.'s postbag with stories rejected by editors of papers and periodicals. Few authors, it seems, realise that broadcasting demands a special technique: it demands, in fact, a return to the art of story-telling as it was practised before the invention of printing. The story written for print, and afterwards read out before the microphone, is at best a poor substitute. Some of the best examples of true story-telling have been afforded by the stories broadcast by escaped prisoners of war. The secret of their well-merited success lay in the fact that they were told simply and in the first person. The pattern of words on a printed page has gradually imposed upon writing a convention which no longer adapts itself to the spoken word. Phrases which delight the eye do not necessarily delight the ear. Events which crowd upon one another as our eye travels swiftly over them on the pages of a magazine will seem intolerably prolonged when they come to us more slowly through the ear. The dialogue which looks natural will sound stilted: the phrase which looks smooth will sound laboured. There are, of course, many exceptions; and to say that story-tellers are required is not to say that there is no place for readings from classical literature. There is room for both, but at present the group of story-tellers is represented by



Howard Coster

EDGAR WALLACE

who broadcast a series of short stories in the autumn of 1931

A. J. Alan alone. He has perfected a technique entirely his own and wisely limits his output. Countless would-be speakers imitate him, but there are many other ways of telling a story: and originality and spontaneity are the qualities looked for by the B.B.C. Apply the dinner-table criterion: tell your story as you would tell it to the family circle. It has a frank and excellent judgment, and if it does not turn from your story to conversation about household matters, you may be fairly sure that the microphone will welcome it. But no rule will help you: grammar, style, and phrasing must all make way for spontaneity: and it is this last quality, whether "faked" or authentic, combined with a sense of the dramatic, which eventually "puts across" a story to the listening ear.

SCHOOL BROADCASTING

THE PRESENT YEAR will see the end of the initial term of office of the Central Council for School Broadcasting, which will meet in March to review its work and to formulate recommendations for the future.

The three years during which the Council have exercised supervision over the School Broadcasts have seen some considerable changes. Many of the old contacts between the B.B.C. and the schools have necessarily been curtailed, but while such intimacies lent colour to the service in early days, when only some hundreds of schools were involved, they became speedily out of place as the hundreds grew into thousands and School Broadcasting came to be regarded not as a mere novelty, but as an integral part of the daily life of the school.

The Central Council's work in the time may be divided under two main heads: (1) programme research; (2) the problem of reception.

In consultation with teachers using the broadcasts in their schools, the Council have now laid down provisionally what contribution broadcasting can make to the teaching of each separate subject of the curriculum. Experiments with new courses are still, of course, being made. For instance, during the past year a course embodying a new type of Modern History teaching has been tried out, under the title of "Tracing History Backwards," with such success as to warrant its becoming a regular feature of the school programme.

The most interesting experiment of the present year is concerned with the teaching of speech by wireless.

A recently published Board of Education report urges that "in general, pupils should be *trained* so that they may be able to lay aside dialect and impose upon their speech that other, which is known as Standard English."

It is not yet certain whether broadcasting is a practicable medium for such training. The Council, however, have decided to investigate the possibility of giving definite instruction in the pronunciation of spoken English by wireless. They have arranged with Mr. Lloyd James to give a course of weekly lessons on the King's English, which will be watched and evaluated by a special Investi-

gation Committee, on which Dr. P. B. Ballard and Dr. Cyril Burt serve as psychologists and Professor Daniel Jones as phonetician. This Committee has devised an experiment which is of interest not only to teachers, but to all those who are engaged in studying the problems of speech and speech training.

The pronunciation of one hundred and twenty children from the first year of a London Central School was recorded by the Linguaphone Language Institute in September. The children were then divided into two equal groups, graded by methods approved by Dr. Ballard and Dr. Burt. One of the groups is now following Mr. Lloyd James' lessons, while the other pursues the ordinary work of the school. In July, when the course has come to an end, the pronunciation of both groups will again be recorded and the records compared by phonetic experts, who will be able to determine whether the pronunciation of the group which has listened to the broadcasts shows any marked advance on that of the control group. If the London experiment gives sufficiently valuable results, a further investigation covering the whole country may later be arranged.

Such experiments are indicative of the care with which the Central Council seeks to establish the efficacy of the broadcast lessons it sponsors. They have recently published their second inquiry pamphlet, "The Evidence Regarding Broadcast Geography Lessons," which, while it establishes the value of the travel talk in the teaching of geography, shows also how uncertain is the guidance afforded by a random collection of teachers' opinions. "Unrelated talks have little value," says one teacher; "The talks should be unrelated," says another. Again, the teacher who holds that geography talks should be human, not physical, is flatly contradicted by his colleague who declares that they should be physical, and not human!

To turn to the other side of the Council's work, bad reception—still regrettably prevalent in the listening schools—is one of the greatest hindrances they meet with in developing School Broadcasting. The Technical Sub-Committee of the Council have established standards of performance and design, applicable to apparatus suitable for schools, and have instituted a system of Reception Tests which are broadcast three times a week. They miss

no opportunity of demonstrating at meetings and conferences the standard of reception which is considered adequate by the Council.

It may be, however, that the final solution of the problem will rest with the manufacturers and dealers. It is known that in some countries the dealers are taking an active part in the equipment of schools with suitable apparatus, recognising, possibly, that the child, accustomed to hearing perfectly clear reception in the classroom, will give his parents little peace until the home set is as effective. It must be a misfortune alike for the retailer and the consumer if the school expends its resources on a set which, although it may be perfectly adapted for use in a private drawing-room, is quite inadequate for use in a large classroom. Now, undoubtedly, the extent of the dealers' market among the schools depends upon official recognition by teachers and education authorities that the reception of broadcast lessons is a practicable proposition as well as an educational benefit. It is therefore surely in the interest of dealers to do everything possible to ensure that no teacher or education authority is misled, either by listening to the performance of unsuitable apparatus in the schools, or by hearing that large sums of money have been expended on apparatus to no purpose.



LISTENING TO SIR WALFORD DAVIES AT WEMBLEY SCHOOL

SCIENCE IN THE MAKING

IT IS OFTEN SAID that the amateur scientist has no longer a valuable part to play in the activities of twentieth-century science. He has been put out of countenance by the laboratory technique, elaborate apparatus, and cabalistic formulæ of modern science. For nowadays science is a profession, hedged about by degrees and diplomas.

Yet the result of an experiment broadcast last spring seems to show that there are plenty of people willing to lend a hand to the research worker, and able, by corporate effort, to provide him with the material he needs for his work. Five independent investigations were set afoot and some 2,500 observers took part. In each investigation an expert came to the microphone, discussed his particular problem, pointed to the gaps in his knowledge, and asked listeners to fill them by supplying him with certain clearly defined facts.

Dr. John Baker was the first in the field, asking for information about the date when blackbirds lay their first eggs. Everyone knows that birds have breeding seasons, but astonishingly little is known about what controls the onset of egg-laying. Dr. Baker was well satisfied with the response to his request: records came in from all parts of the British Isles, from the Orkneys to the Channel Isles, and from Suffolk to County Sligo. As many as fifty records were sent from single counties. Listeners could only record the date of the laying of the first egg by visiting nests every day until the first egg appeared. A surprising number of listeners did this (a result which should calm those who feared the experiment would cause the birds to desert). Sixty listeners recorded the date of the laying of the first egg and the date of hatching, and from their observations the average period of incubation was found to be sixteen days. So when listeners were only able to record the date of hatching, a deduction of sixteen days gave the date of laying. Evidence also accumulated that blackbirds generally lay one egg a day until the clutch is complete. Dr. Baker is preparing a map of the British Isles which will constitute an epitome of the whole experiment. Listeners' observations show that, contrary to expectation, there is no close correlation between latitude and the state of the

breeding season. Individual blackbirds seem to have different ideas about the time they should lay eggs. Moreover, blackbirds in the eastern counties tended to lay early: a result which was certainly not anticipated. Dr. Baker is still at work on his material, a full account of which will be published later.

The Royal Meteorological Society is in the habit of undertaking a scheme of annual observations on the times of flowering and fruiting of certain plants, and the dates of appearance and disappearance of certain migrants, etc. Mr. Margary spoke of the Society's work in this field and asked for a special investigation to be undertaken into the time of the first flowering of the blackthorn. As an immediate result of his talk, over 250 people offered their services as recorders for the Society's own scheme. The results of the blackthorn experiment were in complete agreement with the Society's own data, and showed that listeners did their work effectively.

Mr. A. D. Middleton, who is engaged in research on the numbers and distribution of certain wild animals in this country, asked for this information about red and grey squirrels, about rabbits and hares, and about field voles. Some of his most valuable information came from school-boy and schoolgirl listeners. The results of this investigation were necessarily less precise than those of Dr. Baker, and Mr. Middleton received a good deal of miscellaneous information not strictly concerned with numbers or distribution.

The fourth experiment was conceived on different lines. It demanded no hedge-searching or hiking: listeners were simply asked to record the number of taps heard during a demonstration before the microphone. Dr. Shaxby's aim was to get certain information about the masking of one sound by another—a phenomenon which is partly psychological and partly physiological. Nearly 1,000 listeners sent records, and for some time Dr. Shaxby was completely immersed in statistics. One most interesting fact emerged: there was a small well-defined group of observers who heard considerably *more* notes through the masking tone than without it. A large proportion of these said they were deaf, and it became clear that this deafness is of a type needing a general background of sound to shake up the

mechanisms of the middle ear which has lost its sensitive-ness to slight disturbances. This and other results were communicated by letter to all those taking part in the experiment.

On the last occasion, Professor Seligman asked listeners to help him in an investigation of "type dreams." Certain dreams are common to every people, no matter what their race or social culture. Dreams involving a sensation of flying or bounding through the air, for example, are found among Chinese, African, European, and Indian peoples. Such identical symbolism suggests that the unconscious mind of all these races is qualitatively much the same. Several type dreams were investigated, but the flying dream was found to be by far the most frequent in both men and women, and was universally described as pleasant. The tooth-losing dream was less frequent than was expected from its world-wide distribution. Dreams of animals, generally terrifying and often recurrent, were sent by a few men and many women: bulls, bears, lions, and tigers were the commonest animals, though some women were worried by dreams of cats and spiders. The number of dreams which were accompanied by a request for interpretation seems to show that dreams are still widely regarded as prophetic.

Encouraged by the response to this first experiment, a second series has been planned to take place in February and March 1932. On this occasion information will be sought on "Changes in Family Life." Sir William Beveridge, Director of the London School of Economics, is chairman of a representative committee which has been set up to decide on the value of the evidence to be sought from listeners, and to be responsible for its proper use.

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Readers interested in the formation of discussion groups should write to the Secretary of the Central Council for Broadcast Adult Education, Broadcasting House, London, W.1., unless they live in a county covered by one of the Area Councils, which are shown on the map opposite, where the addresses of the local Secretaries are also given.  
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AREA COUNCIL ADDRESSES

West Midland : 282 Broad Street, Birmingham.
 Western : Midland Bank Chambers, 81A Queen's Road, Bristol.
 North-Western : Broadcasting House, Piccadilly, Manchester.
 Yorkshire : Cabinet Chambers, Basinghall Street, Leeds.
 Scottish : Broadcasting House, 5 Queen Street, Edinburgh.



GENERAL JAN SMUTS
PRESIDENT OF THE BRITISH ASSOCIATION FOR ITS CENTENARY MEETING
IN LONDON
*opening the Faraday Centenary Exhibition at the Albert Hall
(September 23, 1931)*

LISTENING GROUP ACTIVITIES

RUSSIA has a Five-Year Plan; so also has the Central Council for Broadcast Adult Education. But it is a plan with a difference, for it is an attempt to foster a natural growth, and not to force the pace unduly. This is the third year of the plan, and in November the Council set out on the penultimate stage of its experiment. Already this five-year plan, within the field of adult education, has achieved results which are startling and of importance to the future. There has been nothing like it before, and the ground which has been explored is new ground in education. All of which makes the story which there is to tell the more encouraging.

The Central Council was set up in the autumn of 1928, and it is perhaps fitting that this third year of its work should have been devoted to consolidation of the many schemes it set on foot at the outset. There is much to be said, and much to be thought, about the rapid rise of these wireless discussion groups which in the winter of 1930-31, which is the year under review, topped the thousand mark by a figure which it is not possible to gauge quite accurately. But it is known, at any rate, that 1,005 listening groups were formed that winter, and were in touch with the B.B.C. through the system of Area Councils which the Central Council early set up, or by direct correspondence. Nothing new in the way of organisation has been achieved this year. The four Area Councils in the West Midlands, in the North-West, in Yorkshire and in the West Country have, with the Local Committee covering the work in two counties in Scotland, gone ahead unobtrusively with the task which they have set themselves. But the year is of importance in view of the steadiness in the growth of listening groups, and the promise which it brings of something permanent in the future. During the year the local experiment in Kent and that in the West Midlands, undertaken with the help of generous grants from the Carnegie Trustees, have been completed. Their reports have been submitted to the Trust. There remain over two experiments similarly assisted in Yorkshire and in Scotland, and when these are completed, a full report will, it is hoped, be published for the general public.



THE B.B.C. SUMMER SCHOOL
The Opening Meeting addressed by M



FOR GROUP LEADERS

4. L. Fisher in the Hall of New College

Apart from the steady rise in the number of listening groups, the important and interesting feature of the year's work is the variety of audience to which this form of education has appealed. Local authorities and public libraries, as well as voluntary bodies such as the W.E.A., have continued to associate themselves with the experiment; but in country places and clubs, and at the fireside in private homes, the same activity persists and gradually spreads over the areas within which the work is being fostered by the Central Council's officers. This variety is of supreme importance, for it is a sign that the B.B.C. preserves its elasticity and in its work realises the unique advantage of a Corporation which is not hidebound by regulations, nor finally committed to any doctrine or dogma. It is probably this catholicity of the service which accounts for the wide variety and range of its appeal. How great this is may be gauged from the variety of groups already mentioned. One group in the West last winter claims to have been composed entirely of admirals and generals! In the North the movement has taken a different turn and achieved civic significance in Liverpool, where regular meetings of over a hundred listeners were held to follow Sir William Beveridge's talks on unemployment. But it is still from the West that our surprises mostly come, for there is news of one village inn where on inquiry it was found that the wireless set had been dismantled because the discussions to which the talks gave rise had a fatally distracting influence on the amount of beer consumed!

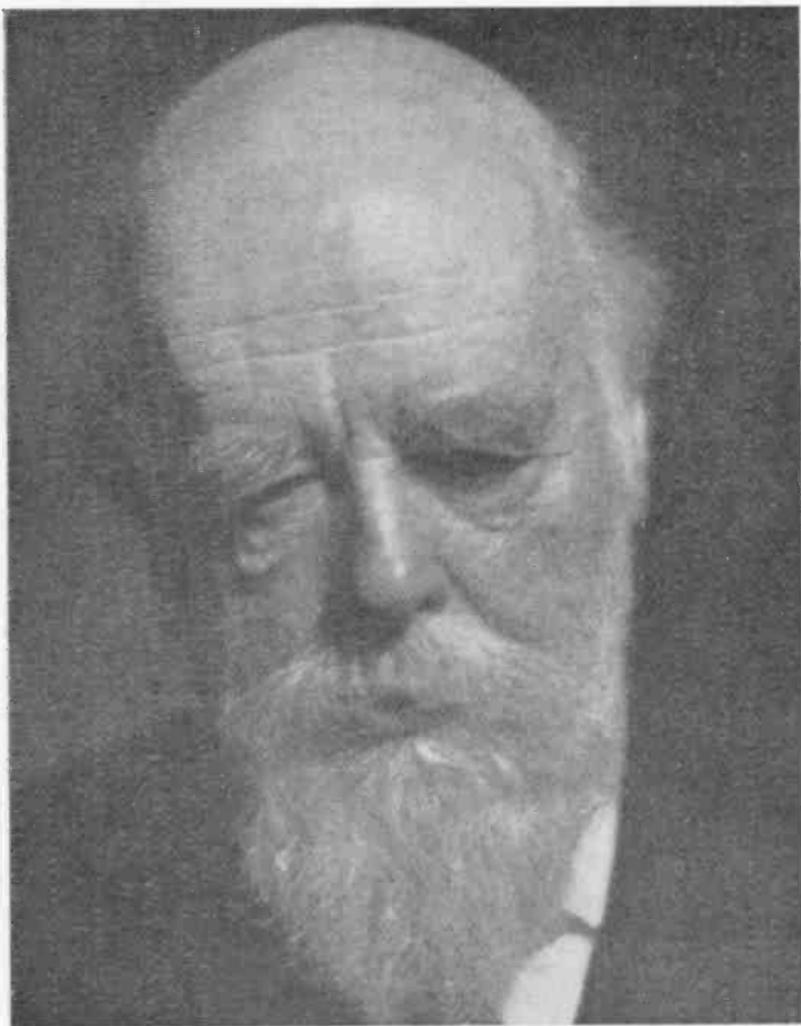
Perhaps the most distinctive characteristic of this work is the close touch which is kept with listeners of all types. If it is to succeed it must be of the earth earthy, it must be rooted in the soil, and the group movement a natural activity of ordinary life. With this in mind, everything possible has been attempted to bring listeners into close association with the B.B.C. and with the Central Council which is the guardian of their interests. In this respect the current year has been distinctive for two experiments, each of which achieved extraordinary success. In January the first National Conference of Wireless Group Leaders was held in London; to it came over two hundred representatives of groups and of student listeners to meet the Director-General of the B.B.C., the Chairman of the

Central Council's Executive Committee, and a group of speakers to whose courses they had been listening during the twelve weeks preceding Christmas. It might be supposed that little practical value would result from a gathering of this kind. But this is far from having been the case; the group meetings with the speakers made possible a personal relationship which was of obvious value to both sides; the speakers learnt at first hand the problems of the ordinary listener and of the harassed group leader. The leaders got inspiration as well as encouragement and understanding from the speakers. At a final conference a number of resolutions of great importance were unanimously carried, most of which have since been embodied in the programme arrangements and the educational policy of the Central Council. Some of the conclusions are worth mentioning, for they suggest interesting points of policy. There was unanimous approval for the continuous treatment of selected subjects on given nights of the week throughout the year. It was also felt that while authority was obviously desirable in the speaker, the first essential in a broadcast talk should be natural and simple expression. Everyone clamoured for illustrations of a homely character; everyone also stood for a provocative and controversial handling of live issues, and there was overwhelming support for the view that the subjects of most widespread interest to listeners were those concerned with the day-to-day problems of the modern world, with which the ordinary man and woman are faced in their daily lives. The Conference was unique not only in that it was the first of its kind, but also in view of the success with which it disposed of that impersonality of broadcasting which has so often been selected as a point of criticism of its work in education. Some words in one of the opening speeches are perhaps worth quoting:

“The groups which you represent are conclusive proof that there is a place—on the lowest terms there is a place—for education in the exploitation of this great medium. You realise to-day—others have not yet realised, but will in time—the immense influence of broadcasting; obviously we require your co-operation, and that you have given. We require your

support as well. The hands of all of us need strengthening at times: you are able to strengthen them and to mobilise further opinion to the same end in your own localities."

The spirit of quiet determination and enthusiasm bred of this Conference may have had a determining influence on the development of groups throughout the period under review. It is remarkable that, as reference to the last Year-Book shows, by topping the thousand mark they have almost doubled their numbers in the year. With the growth of the movement the problem of organisation, and of enlisting competent leaders and organisers of more groups, becomes more important and more difficult. Having the future clearly in mind, the Central Council, for this reason, decided, in the light of the encouragement which the first National Conference gave them, to take a further step to organise the first National Summer School for the Training of Wireless Group Leaders that has been held in any country in the world. This summer school was held in New College, Oxford, from June 27th to July 4th. Seventy students attended and were trained intensively throughout the week in the arts of a chairman and of a group leader. This school was again remarkable for the very genuine enthusiasm of those who came, an enthusiasm which was greater rather than less when the school finally disbanded on July 4th. There is not room to treat here of the new and ambitious scheme for broadcast talks for the autumn of 1931 and spring of 1932, but it is relevant to say that this programme, which is at once more ambitious and more constructive than anything that has yet been attempted, is based in large measure on the experience which has been gathered from the various conferences and contacts with listeners, and especially with listening groups, throughout the last twelve months. It is the knowledge, on the part of those who have thus become associated with the B.B.C. in all parts of the country, that they have a very real share in the moulding of the Council's policy and in influencing the future of broadcasting in this country, which gives to the listening group movement the vitality and success which it has already achieved.



Howard Coster

SIR OLIVER LODGE

*one of the oldest friends of the B.B.C. and still one of the most popular broadcasters
(September 15, 1931)*



Stage Photo

A SCENE FROM "THE PIPER" AT THE LYRIC THEATRE, HAMMERSMITH
This musical play by Edward Ferrers was first presented to the public by the B.B.C., stage production following after it had been established as a broadcast favourite

D R A M A

N O T E S

ONE of the most interesting innovations of the past year was the broadcasting of what the B.B.C. has for internal convenience called "actuality" programmes. The first of these, entitled "Crisis in Spain," was broadcast on June 11th and was intended to give an account of the events of the Spanish Revolution in the speeches of the protagonists and the actual words of the news messages by which the world was informed at the time. The story was told without comment, the facts being allowed to speak for themselves. Music was used to act as a connecting link between the scenes, the Spanish royal anthem being used as a recurring motif. This was not the first programme to contain actual speeches delivered on important public occasions, a notable earlier example being the delivery of part of Mr. Asquith's speech in the House of Commons at the declaration of war in 1914 in a commemorative programme broadcast a few years ago. It was the memory of this, perhaps, which suggested the second actuality programme, that broadcast on Armistice Day, when the events of the early days of the Great War were made to live again in the actual words of speeches and documents which have passed into history.

* * *

The past year has seen the disbanding of the B.B.C. Repertory Company, formed for acting in broadcast plays. It may be said in favour of the repertory organisation that it produced a band of players who had the great advantage of being mutually familiar with one another's work and individually trained in the technique best suited to the microphone. But in the course of time there were found to be certain disadvantages. The players tended to become familiar to the public in particular characters. Illusion

was destroyed by this familiarity, and the producer was often driven into casting a member of the company for a part which would not have been offered to him under a system of free choice. The repertory company has provided a valuable training-ground for studio players, but on the whole it has proved to be an expedient not entirely suited to the circumstances of the B.B.C.

* * *

Nearly two years ago the B.B.C. decided to introduce the principle of anonymity among its actors in broadcast plays. It was intended that the names of the players should only be given in the programme in the *Radio Times* when the production was important enough to warrant it, particularly in broadcasts of stage plays with actors well-known for their performances in the play in question. It was considered reasonable that in plays written purely for the microphone, where new material and a new technique was involved, the actors should be heard as disembodied voices, without the handicap of a stage reputation or a name other than that of the part which they were speaking. This policy proved valuable in practice and the listener's sense of fitness is no longer jarred by announcements of the names of the players before or after the broadcast.

* * *

Anyone who heard the series of "Diversions" broadcast in 1930 at short intervals will not be surprised at the B.B.C. having found it impossible to carry them on without some impairment of the quality of the component programmes. It is difficult for the public to realise the tremendous amount of organisation and work involved in a programme consisting of several short items of which three or four may be outside broadcasts from various parts of the country, many of which, in the nature of things, could not be rehearsed beforehand. Add to this the impossibility of any combined rehearsal and the consequent difficulty of estimating the timing, and there emerges a strong argument against the practice of assembling various broadcasts of an unusual kind under one programme heading, which was the basis of "Diversions." It soon became evident that better results were secured by leaving them to take their places individually in the programme at their natural times.

BROADCASTING SHAKESPEARE

OF theories and arguments as to the future and development of broadcast plays there has been and is likely to be no end; but it seems to have been reasonably well established that whatever else may or may not broadcast, from the point of view of drama the plays of Shakespeare broadcast well and are in themselves capital subjects for treatment by means of broadcast production. In the present state of the English theatre it seems not only advisable but definitely expedient that a national service such as broadcasting has become should do what it can towards keeping alive the presentation of Shakespeare's plays to the widest possible audience. And this is not merely based on the generally accepted belief that the plays of Shakespeare form a part of a good general education, but that in themselves they provide capital popular entertainment. Shakespeare did not write plays for a few intelligent highbrows, and experience has shown that he did not write plays for a limited fashionable audience. The success of the Shakespearian productions at the Old Vic, and the approval directed towards Shakespearian productions at Savoy Hill have proved this up to the hilt.

There are, however, certain definite factors in the problem of presenting broadcast versions of Shakespeare which have to be considered and overcome by a broadcast producer.

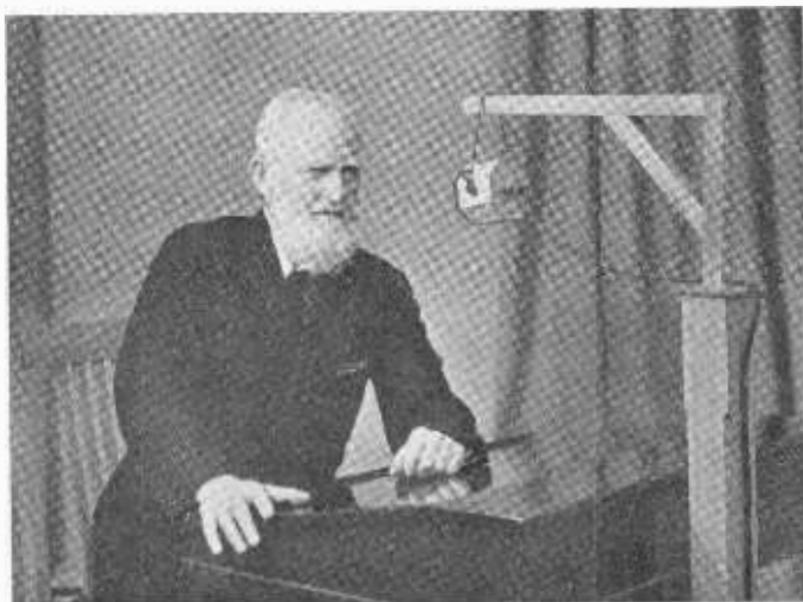
The first and most obvious difficulty is that of length. In Shakespeare's time an author was not hampered by the consideration present to every modern playwright of having to keep the "traffic of his stage" within an outside limit of $2\frac{3}{4}$ hours. Still less did he envisage the possibility that a medium would arise for presenting his plays which has an ideal outside time limit of $1\frac{1}{2}$ hours, to give a completely arbitrary figure. It has been fairly convincingly proved that more than $1\frac{1}{2}$ hours' concentrated listening to a broadcast play is probably beyond the capacity of real pleasure for the average listener. The producer has, therefore, to contemplate the necessity of reducing a play originally written to be acted within a period of from three to four hours to $1\frac{1}{2}$ hours. At first sight the thing is impossible. It may be objected that the necessary mutilation

puts the broadcast version so far from the original intention of the dramatist as to make it hardly worth doing. On the normal stage the cutting of Shakespeare's plays has been accepted as a necessary convention for years, and if only too often such cutting has been done to satisfy the whims of an actor-manager unqualified by the truest artistic consideration, there have nevertheless been plenty of fine Shakespearian productions, in which the audience has for the most part been completely unaware of the amount of the original play that it has never seen. This was convincingly demonstrated when the Old Vic last year gave "Hamlet" in its entirety, and many people who thought themselves very familiar with the play, having seen it frequently in various cut versions, found themselves watching what seemed to be an entirely new piece and were equivalently surprised.

No system of line by line cutting can hope to solve the problem. Various experiments have been made by different producers and adapters towards finding a solution, and so far two have emerged which show considerable promise of success. The first, which was applied to the recent production of "The Tempest," was the complete elimination of a sub-plot which was without very special significance in relation to the main action of the theme of the play. This method has the advantage not only of abbreviation but also of condensation and simplification. One of Shakespeare's faults as a dramatist is a tendency to allow the main theme of his plays to be obstructed by a certain amount of irrelevancy in the way of subordinate characters or comic relief which were necessary to the convention of the stage of his time, but which are from the abstract point of view comparatively unimportant. Unfortunately this method cannot invariably be applied. There are only a few of his plays from which it is possible to remove a sub-plot so neatly as it was in the case of the elimination of the conspiracy of the Lords in "The Tempest."

The second of these two methods has been used with some success in the case on the one hand of "Macbeth" and on the other of "Hamlet." This method is frankly to shift the emphasis of the dramatist on his plot and his play as a whole, to a certain aspect of that play, and even to a certain character, and accordingly to

eliminate such scenes and factors as do not have a very definite bearing upon the development of the character in question. It may be argued, perhaps, that the result is not Shakespeare. But on the whole the result is infinitely preferable to a type of dramatic presentation which only too frequently is called Shakespeare—that is to say, the presentation of unrelated scenes from a play, occasionally interlarded with linking explanation, something in the fashion of “Reading without Tears.” The latter may be a method of elementary education, but it bears no conceivable relationship to dramatic art. On the other hand, the presentation of the development of a single Shakespearian theme or character, throwing it up, as it were, into high relief, by cutting away much of the background, while it may not tally with the dramatist’s original intention, nevertheless can give both a significant and an extremely interesting aspect of the dramatist’s work while complying with the limitations of the medium. The rhythm and balance of the work are altered. But its essence remains.



BERNARD SHAW TALKING ABOUT “ST. JOAN”

(May 30, 1931)

SOME PLAYS OF THE YEAR

ADAPTED STAGE PLAYS

Shakespeare's "King John"	Cordova's "Dr. Abernethy"
"The Tempest"	Dunsany's "If"
"A Winter's Tale"	Galsworthy's "The Forest"
Clemence Dane's "Will Shakespeare"	Marlowe's "Edward the Second"
Sierra's "The Romantic Young Lady"	Masefield's "Pompey the Great"
Delafield's "To See Ourselves"	Ian Hay's "Tilly of Bloomsbury"

ADAPTED NOVELS

Stevenson's "The Wrecker"	Maughan's "Mackintosh"
"Dr. Jekyll and Mr. Hyde"	Conrad's "The Rescue"
Mason's "House of the Arrow"	Chesterton's "Napoleon of Notting Hill"

MICROPHONE PLAYS

King-Bull's "Precession"	Gielgud's "Red Tabs"
Housman's "Consider your Verdict"	Holt Marvell's "Across the Moon"
Peach's "The Path of Glory"	Bernard Walke's "The Little Ass"
"The Marie Celeste"	Rooke-Ley's "Chopin"

“ P R O L O G U E ”

THE JOURNEYMEN of the B.B.C. are as apprehensive as Bully Bottom and the other “rude mechanicals” about the success of their productions. It is nervous work discoursing at large, whether for the benefit of dukes or for the listeners who, in these days of universal entertainment, have taken their place. The Pyramus and Thisbe company thought it best to take no risks; they would have a prologue, so as to make the play easier to understand, particularly the moonshine, and “that you should think we come not to offend but with goodwill.” A prologue of this kind has been considered not out of place in a year-book of broadcasting. It takes the form of this short article, and its end is to explain the “true intent” of certain sections of the programmes which are presented with as good a will as before the Duke.

Like the “lamentable comedy,” they are for the most part original either in treatment or in matter, or at least in choice. These productions are no mere experiments; in many respects they are the high-water-mark of the present development of the art of broadcasting, and exhibit the latest application of experience. But their appeal is deemed to be limited; limited only, however, to that rapidly increasing body of listeners who regard broadcasting as something more than a form of popular entertainment. It is not, indeed, to that more private audience that this prologue is addressed, but rather to those (and they are perhaps in a majority) who, having derived from a given programme no pleasure of the kind they feel entitled to expect, are perhaps inclined to wonder why it formed part of the evening’s so-called entertainment. There are thousands, for example, who, like that excellent monarch George I, “don’t like boedry and don’t like bainting.” But such people will clearly not appreciate, for example, the delicacy of M. H. Allen’s “Chinese Moon Party.”

In any year a certain number of plays are included in the calendar which, to those who take broadcast drama as seriously as the theatre, stand out as important and satisfying. But their appreciation demands some familiarity with the medium, a certain practice in attention which

still, it may be, is possessed by no more than a minority. But a percentage have interested themselves, as with the cinema, in the craft of broadcasting, and these are entitled to demand to observe progress and novelty in what they hear. There have been many such plays, which have been so keenly appreciated as to justify revival. Tyrone Guthrie's "The Flowers are not for you to Pick" is an example, or "Yes and Back Again," by E. J. King-Bull and Walter de la Mare. For the B.B.C. is like a kind of multiple theatre, in which each stage has its own public; and it is when (a frequent occurrence) these audiences coincide in approval of any one production that it may be called popular.

At least one of these "stages" is reserved for the classics. The principle of exhibiting, for those who care to take the opportunity, a piece of acknowledged excellence, needs really little defence. The curator of a museum is, after all, not expected to think first of attracting a large attendance, but to collect and display objects of beauty and estimation to the best advantage. It is some such consideration which, to illustrate, prompts the production of Milton's "Comus." Not even listeners who clamour most loudly for the programmes to be kept popular are likely, as a matter of fact, to condemn the inclusion of such a masterpiece as this in the programmes: for candid boredom with the classics is most often tinged with tolerant respect.

Finally, there must be a category for contemporary work. This is not broadcast without due admission of the fact that its interest may lie outside established taste. But the B.B.C. considers that it is doing a service in giving opportunities, to those who care to do so, of forming their own opinions of the modern and unfamiliar. The exploitation of wireless as a medium has scarcely begun. The sources of original work in it amount to no more than a thin stream which if discouraged would seek other channels. The canons of good broadcasting will not be fixed for a long time, but those who are responsible for its development would be guilty of simple neglect of duty if they restricted the ingredients of the year's programmes to matter which had a guaranteed appeal to the multitude of wireless listeners.



Howard Coster

HENRY AINLEY

who took part in the broadcast of Lord Dunsany's "If" on August 24, 1931



Sasha

CLAUDE HULBERT AND ENID TREVOR

VAUDEVILLE

NOTES

THE VAUDEVILLE PROGRAMME on December 31st, 1930, was made notable by a relay from America of the famous "Pepsodent" comedians "Amos 'n' Andy," so popular in the United States that telephone calls show a marked decrease during their broadcasts and the times of church services and other public functions are altered so as not to clash with them. It cannot be said that at first hearing their humour appealed to the British public, but it must be remembered that even in the United States it took some time for the public to develop a taste for it.

* * *

It is surprising, therefore, that about the same time "Alexander and Mose" ("Dark Subjects") should have won instantaneous success with a similar turn of nigger cross-talk. One of the reasons may be that the circumstances of a wireless studio are particularly suited to cross-talk between two comedians. Clapham and Dwyer were the first outstanding success in this line, and subsequent successes have included Claude Hulbert and Enid Trevor, Paul England and Pat Paterson, Doris and Elsie Waters, and several others. Some of these pairs sing duets, but their popularity undoubtedly comes from the spoken humour with which their songs are interlarded. One famous pair, however, Flotsam and Jetsam, do not come into this category, their success being based on Jetsam's phenomenal bass notes and on the originality of their songs and vocal parodies.

* * *

The business of arranging variety programmes is full of contradictions. On the one hand, the B.B.C. is often led to remark on the limited supply of variety turns suited

to its purpose and yet is told by stage papers that the supply is unlimited if the B.B.C. would only tap it; on the other, well-known variety artists and music-hall managers object to broadcasting on the ground that the artist's material, which under the old conditions would last the length of a whole tour of the country, is killed by a single broadcast. Again, artists and managers sometimes say that broadcasting in general is harmful to the variety profession, while the B.B.C. can point to scores of artists who owe their success on the music-hall stage to broadcasting.

* * *

An innovation in the variety broadcasts of the past year was the weekly theatrical cartoon which was broadcast in several successive weeks in the early part of 1931. The impersonations were carried out by Elizabeth Pollock to a "book" written by Herbert Farjeon. Practically every theatrical celebrity was included in the series, the interest of which was enhanced by its topical basis.

* * *

There has always been difficulty in arranging broadcasts of good musical comedies; difficulties partly arising from the obscurity of the copyright position in regard to some of the best known musical comedies, and partly from a now slowly dying belief that the broadcast of a musical comedy somehow does harm to the owner of the copyright. The copyright difficulties were illustrated some years ago by the lawsuit over the B.B.C.'s broadcast of Messenger's "The Little Michus," and similar difficulties have made it impossible in the past for the B.B.C. to broadcast famous musical comedies such as "The Geisha" and "The Merry Widow." In fact, "The Arcadians," "The Chocolate Soldier," "Miss Hook of Holland," and "The Belle of New York" are the only really well-known musical comedies which have hitherto figured in the broadcast programme. The belief that broadcasting is harmful is best illustrated by the long-standing ban on the broadcasting of the Gilbert and Sullivan operas. At one time the ban was complete, but although the B.B.C. is now able to perform the overtures in the studio and is permitted to relay whole acts of the operas from the stage performances in London, it is not yet allowed to broadcast the operas as a whole in the studio or even to broadcast single songs. It can only

be termed an anachronism for the B.B.C. still to be forbidden to do what any country choral society is permitted to do without much cost or trouble.

* * *

The difficulty in the way of broadcasting the best known musical comedies is often merely the fact that the copyright of the component parts, such as lyrics, dialogue, songs, and orchestral music, are held by different people, some of whom are now represented by heirs and executors; and this multiplicity of interests has often made negotiations quite impossible. Theatre managers generally are now quite ready to recognise the helpfulness of broadcasting extracts from either the preliminary provincial performance of a play or from the London performance itself, and one of the features of the past year has been the increase in the broadcasts of plays, pantomimes, and revues, from the stage of provincial theatres.

* * *

The truth of the matter is that in everything broadcasting is a keen test of quality, and a musical comedy which is intrinsically second-rate is running a great risk in being broadcast at the time of its run on the London or provincial stage. A poor libretto, feeble jokes, and commonplace music soon show up as such when listened to without the infectious glamour of the theatre. But the converse is true, and anything first-rate, in any branch of artistic activity, is bound to derive benefit from national presentation by broadcasting. The microphone is particularly helpful when familiarity is an important factor in popularity, as with opera and musical comedy generally. Curiously enough, the various companies that have been responsible for operatic performances in this country have always recognised this and encouraged broadcasting.

* * *

One solution of the difficulty of providing good musical comedy for listeners is the production of original works in the studio. This is not by any means a new solution of the problem, the first broadcast of this kind dating back to 1924, when Ernest Bullock's "The Dogs of Devon" was produced in the London studio as the first complete musical comedy ever broadcast. The B.B.C.'s mailbag the next day bulged with over 5,000 ecstatic letters of

congratulation and "The Dogs of Devon" has been repeated once or twice since, the last occasion having been in the current year. Another original work was Geoffrey Toye's version of "The Red Pen," the libretto of which is by A. P. Herbert. In the category of a musical play without the comic element comes "The Fountain of Youth" and Edward Ferrers's "The Piper," a delightful little operetta founded on the story of "The Pied Piper," which has since had a successful run at the Lyric Theatre, Hammersmith. In the stage category comes the broadcast of "Rich Girl—Poor Girl," a translation of the German musical comedy success "Evelyne" which was produced as an original English musical comedy in the London studio on Saturday night, March 7th, Miss Phyllis Neilson-Terry and a brilliant cast contributing to its success. Finally, there is George Posford's "Vienna," with a libretto by Holt Marvell, the first musical comedy written directly for the microphone, which is to be broadcast early in 1932.

* * *

In March 1931 an experiment was carried out in the broadcasting of dance music alternately relayed from a London hotel and a ballroom in Budapest. Listeners were able to hear an ordinary London jazz band contrasted with tzigane music from its native home in Hungary. The arrangements for switching from one country to another worked with the speed and smoothness that are essential to a successful broadcast on these occasions.

* * *

These quick-change broadcasts carry the mind back to the early days of broadcasting, when the opening of a new B.B.C. station was often followed by successive greetings from various other stations, or a dialogue between one station and another about the new one. There have occasionally been other broadcasts of a similar kind, which have been arranged merely as an example of what can be done in synchronisation and rapid switching. A trio has broadcast as an ensemble with its three members in studios at different stations, and a singer has broadcast in one studio to an accompaniment played at another station. These experiments have no artistic value, but are now and then acceptable as novelties.



September 29, 1931

JEANNETTE MACDONALD

The Fox Film Star

[197]

A REVIEW OF REVUES

Tues. May 26.	“The Stage Revolves.”	J. W.	10.0- 1.30	D.C., L.S. 97 and Studios, H.P., Effects, 2 Pianos, Special Orchestra, Chorus. (Blatt- ner, 10.45-11.5.)	Studios No. 1 (3 Mic, Cir- cuit), 7, 2, 2 E, 2 G., Gram. in 7, Echo on 1 and 7.
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A HIGHLY MYSTERIOUS document, is it not? You, sir, would be surprised to find such a thing on your desk; you, madam, would be horrified: but the revue producer is used to it, and what is more surprising, understands it. However, the thing is not so difficult as it looks; merely the result of the steady development of production technique, of which, perhaps, “The Stage Revolves” is the latest example.

In the early days of revue at Savoy Hill only one studio was used, and the general method was far closer to that of the stage product. The very early shows in 1925, the “Radio Radiance” series which ran once a week for over a year, were simply a sequence of sketches and songs, and were produced by James Lester. Eddie Morris, Tommy Handley and many other artists who have been firm favourites ever since, first appeared in these shows. Dancing on boards in the studio as in the Ridgeway revues was used to give atmosphere.

The next development was the long series of productions entitled “Winners,” in which popular old musical comedy numbers were linked together with a plot in which several standard characters appeared, the chief of which was a heavy father in the George Graves tradition.

Then came Ernest Longstaffe, who got away from the Lester formula by building his revue around a central idea. He would take the rush hour or shop-lifting, or some topic of general interest, and the whole show would develop this particular subject. The music was original, the humour homely; the revue had a flavour of its own, and is as popular to-day as it was in those distant times. Mr. Longstaffe was followed by several other authors and producers, notably Graham John and Harold Simpson, who built up shows of a similar type.

One of the first concert parties that was produced

specially for broadcasting was that entitled "Entre Nous." "Entre Nous" was the birth of the two piano-period—a notable moment. Satire, too, started to force its thankless way into light entertainment.

Next came Charlot, trailing clouds of theatrical glory and a gong. In the Charlot shows, mostly consisting of material that had been successfully exploited in the theatre, the *compère* reigned supreme. Virtually this was a reversion to the early Lester method.

In the wake of Charlot arrived a series of story-revues, the slenderest of plots linking together comedy scenes, "pretty" numbers, and syncopation. Several of these were written by the late Clifford Seyler—the two "Djinn and Bitters" shows, "Peep-bo-hemia," "Fancy Meeting You." Gordon McConnel's "Piccadilly Dally" is also of the same type.

The next real development, however, was when the last-named produced his first "Airy Nothings." For the first time, except in the yearly Birthday programme, the B.B.C. sat back and laughed at itself. This satire on broadcasting activities strangely enough proved popular with listeners, who would hardly have been expected to enjoy such family jokes. However, apparently they did so and asked for more.

Later on John Watt's "Stop Press" continued the satirical onslaught, while Holt Marvell's "The World we Listen in" took burlesque into a wider field.

The De Courville productions were again presentation of old material, and really fell into the same reminiscent class as the various "Suitable Songs" and "Theatrescope" programmes. In the same category, too, was the Old-Time Vaudeville series and a similar series entitled "Playbills," which was originally produced in Belfast.

With the development of technical facilities, such as the Dramatic Control Panel, productions now became more elaborate. The D. C. panel was enlisted in the cause of light entertainment as early as the first "Djinn and Bitters," but as productions became more ambitious, its use increased.

In "Pantomimicry," Gordon McConnel's first radio pantomime, the full technical resources were utilised. The B.B.C., not content to burlesque itself, was now burlesquing

the theatre and the pantomime tradition. Later "Talkie Town" ridiculed Hollywood in a similar vein, while in "World for Sale" the satire was sharper and more general, the D. C. panel playing an integral part.

The vogue for two pianos was now waning. The small orchestra provided the musical accompaniment to most of the revues after "Talkie Town." The Ridgeway Parades were partially a reversion to the period of James Lester; a sequence of songs and sketches and a leavening of old numbers with a reminiscent appeal, a dancing chorus and a band, with the D. C. panel in use.

Charles Brewer's numerous shows from Birmingham also gave a mixture of the old and the new, with, in the case of the "Nine Thirty Novelties," a reversion to the *compère*, who now has a *commère* to assist him.

Further developments other than revue proper were made in the production of "Rich Girl—Poor Girl," the first musical comedy to have a first night on the ether "prior to West-End production"; and "Baghdad on the Subway," a piece of pictorial impressionism rather than a revue. The latter was based entirely on cinema technique, and owed nothing to the traditional revue methods.

In "The Stage Revolves" a further step was made. There was only the sound of the stage revolving and the strain of the theme song to assist the listener in the transition from item to item, each one self-contained, and each one self-explanatory. It is a tribute to the listener's imagination that he found no difficulty in making these mental jumps.

This production bears a closer analogy to the big theatrical revue than any previous B.B.C. show. The method has endless possibilities. It is prodigal of ideas, as each of the dozen or so items represents an idea which in the old days would have served to fill a forty-minutes "feature programme." The world moves faster to-day.

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The B.B.C. is always glad to consider plays specially written or adapted for the microphone. MSS. should be typewritten, and the time of playing should not exceed an hour and a half. Address: The Productions Dept., Broadcasting House, London, W. 1.  
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D A N C E M U S I C

THE MUSIC of dance orchestras, whether from the studio or from restaurants, night clubs, and dance halls outside, remains one of the most popular features of the programme. Admittedly many listeners do not care for the unbroken rhythm and often stereotyped melody of contemporary dance music; a small proportion of letters from these critics seasons the almost entirely enthusiastic correspondence which dance broadcasts attract from listeners, but it seems to be generally agreed that dance music is "easy to listen to" and therefore popular, particularly at the end of the day when concentration relaxes. The secret of its popularity with those who like it may be said to lie in its infectious rhythm and its revival of tunes which have become popular in the theatres and cinemas and elsewhere. It occupies, roughly, 10 per cent. of time in the National Programme, and on London Regional 20 per cent. This reckoning does not, of course, include music from such dance orchestras as may be included in vaudeville and dramatic programmes. It should be emphasised that the term "dance music" is here used to denote music of a certain kind, not necessarily played for dancing.

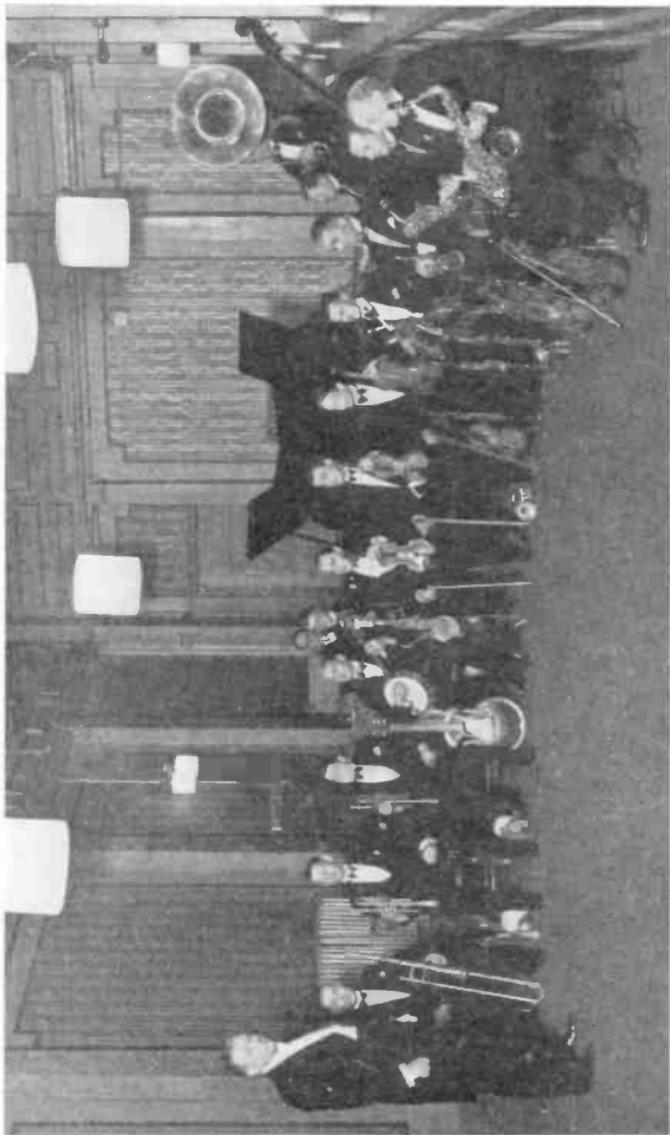
The most popular dance orchestra broadcasting is that directed by Jack Payne—understandably, since it is not only a band of the most modern and versatile kind, but is also heard far more often than any other. This B.B.C. Dance Orchestra is maintained at Savoy Hill, and is used not only for broadcasting afternoon and evening programmes of dance tunes, but also to play during the vaudeville programmes. As a result of its popularity with listeners, the band has built up a wider reputation with its gramophone records and in its periodical appearances on the music-hall stage. On account of the size of its repertoire and the originality of its orchestrations, Jack Payne's band is eagerly listened to by professional dance musicians not only in this country, but all over the Continent.

The present B.B.C. Dance Orchestra was formed and began broadcasting in February 1928, when Jack Payne, who had formerly been in charge of the orchestra that broadcast on many occasions from the Hotel Cecil, took

over the post of director of the B.B.C.'s dance band, previously held by Sidney Firman. Since the band began work in the studios it has broadcast more than 3,000 individual tunes. During the past year it has played 1,000 tunes in the course of 650 hours' broadcasting, for which 1,500 hours of rehearsal were required (its record performance was the playing of sixty-five tunes in a day's work of 4½ hours' broadcasting). The proportion of tunes broadcast is roughly 50 per cent. British, 40 per cent. American, 10 per cent. Continental. Such figures as the above show the immense amount of labour behind the regular presentation of new dance music. Each tune has to be heard, selected, orchestrated, and rehearsed, before it is brought to the microphone. A repertory of 1,000 tunes in the year absolves the B.B.C. Dance Orchestra entirely from any accusation of "plugging" that might be brought against it.

The term "song plugging" might well be explained here, for the practice provides one of the most exacting problems that the B.B.C. has to face in its work. To "plug" a dance tune means to advertise it by constant repetition. It is not every music publisher who follows the practice of paying dance bands to broadcast his publications, nor every dance-band leader who will, for the sake of a few guineas, allow the publisher to dictate what he shall broadcast. Most publishers now realise that constant repetition, far from intriguing the listening public, merely wearies it, while band leaders realise that an attractive programme, well played, is far more likely to enhance their prosperity than the inconsiderable sums of money in return for which they are bound to hand over the composition of their programmes to the publishers. There still remain, however, both publishers and band leaders who subscribe to the system of "plugging," and the B.B.C. is taking steps to put an end to a practice which not only makes it an unwilling accomplice in a form of advertisement which is quite contrary to its principles, but also militates against the listener receiving the best programmes.

Jack Payne's dance band consists of sixteen players. Each of the sixteen performs upon more than one instrument; several of them play as many as four, as well as singing. It is this versatility that makes the playing of the B.B.C. band so well varied and colourful, while the har-



JACK PAYNE AND THE B.B.C. DANCE ORCHESTRA

monised singing and clever character "patter" of its members give quite an atmosphere of vaudeville to many of the comedy songs at which this band excels.

"Outside" dance music has this year been mainly provided by nine well-known bands, all different in style, and affording an excellent contrast to each other and to Jack Payne in their treatment of current dance tunes. Their names are:—Ambrose and his Orchestra (Mayfair Hotel), Billy Mason and his Café de Paris Band, Bertini's Dance Band (Winter Gardens, Blackpool), Henry Hall's Gleneagles Hotel Band (Gleneagles Hotel and Midland Hotel, Manchester), Jack Harris's Band (Grosvenor House), Maurice Winnick and his Band (Piccadilly Hotel), Howard Jacobs and his Band (Claridge's and Savoy Hotel), Melville Gideon and the Dorchester Dance Band (Dorchester Hotel), Roy Fox and his Band (Monseigneur). The four last named are newcomers to the programme.

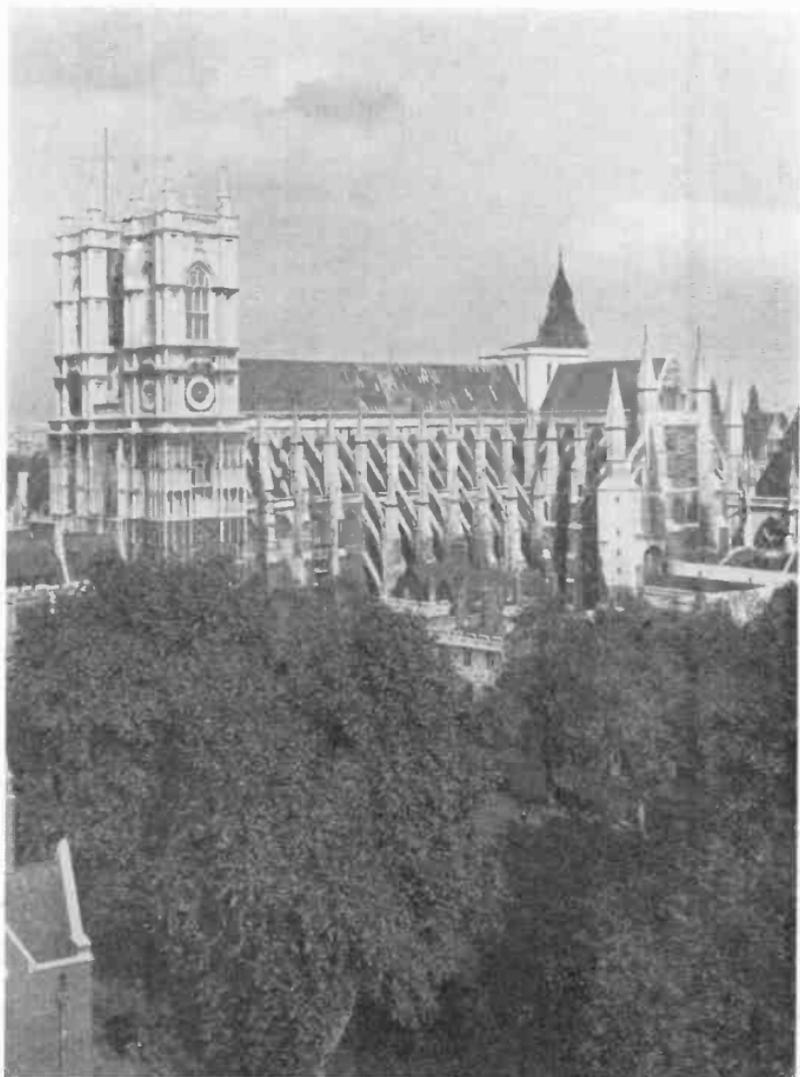
The present style of dance playing is what in the U.S.A., home of dance music, they term "sweet," that is to say, it is quiet, melodious and subtly orchestrated, as opposed to the "hot" style which held sway until recently, and which, in the strident eccentricity of its tone and rhythm, marked a step back to the native "jazz" of the jungle. Eight of the nine bands listed above play in this style, which is suited to the sophisticated dance-audience in a small and fashionable London restaurant, while Bertini's Band affects a broader, simpler, and noisier style, for it is playing in one of the world's largest ballrooms, to an audience of dancers that may number a thousand or more.

One of the most popular innovations of the year was the inclusion of several programmes by Howard Jacobs' discreet and melodious orchestra, both from Claridge's and from the Savoy Hotel. The reason for this band's disappearance from the programmes was that, soon after its first broadcasts from Claridge's, it was transferred to the Savoy, and, whereas the acoustics, etc., of the ballroom at the former hotel are excellent for broadcasting, those of the Savoy Restaurant are not satisfactory. In order that Mr. Jacobs might be able to complete the short series of relays already announced, the Savoy management kindly allowed him to broadcast from the Lincoln Room, but this practice could not be continued, and a very fine band was therefore

temporarily lost to the programmes. Considerations both of acoustics and of interference from incidental noise and chatter are important when relays of music have to be arranged from restaurants, night clubs, etc. In several places—as, for example, the Monseigneur—a special platform had to be built to prevent the dancers from approaching too close to the microphone. It is usual to use two microphones for outside dance music, one of which is placed so as to pick up the playing of the band in correct balance, while a second is used for announcements and for the vocalist.

Dance music was first broadcast from an outside dance floor on May 24th, 1923 (Carlton Hotel), six months after the B.B.C. began broadcasting. For more than eight years it has continued to be a valued and staple item in the programmes. What its future will be cannot be prophesied. New bands will come, bringing new styles of playing. There is as yet no decline in the vogue for syncopation, though Continental influences are to be detected, and the sheer “blues” rhythm is giving place to a lighter, more pronounced style of melody. The Viennese waltz, too, has returned to popularity. With regard to the “plugging” situation, it has been rumoured that the B.B.C. proposed to cope with this by installing a second band of its own at Savoy Hill and eliminating all outside music. There is as yet no truth in this, nor is there likely to be. Outside dance music serves an admirable purpose in introducing not only styles of playing that contrast well with that of the B.B.C.’s own band, but a touch of that vital “atmosphere” which a gay and crowded restaurant contributes to the playing of a popular band.

It would not be just to close this brief account of the year’s dance music without mentioning the names of several bands which have contributed to vaudeville and other Studio broadcasts—Marius Winter’s Dance Orchestra, Sid Roy’s Lyricals, Sidney Baynes’ Band, the Gershom Parkington Saxophone Orchestra, Geraldo’s Tango Band, Herman Darewski’s Orchestra, Paul England’s Speciality Octet, Len Fillis’s Hawaian Orchestra, Jack Harris’s Embassy Band, etc.



J. Dixon Scott

WESTMINSTER ABBEY

from which Evensong is broadcast every Thursday

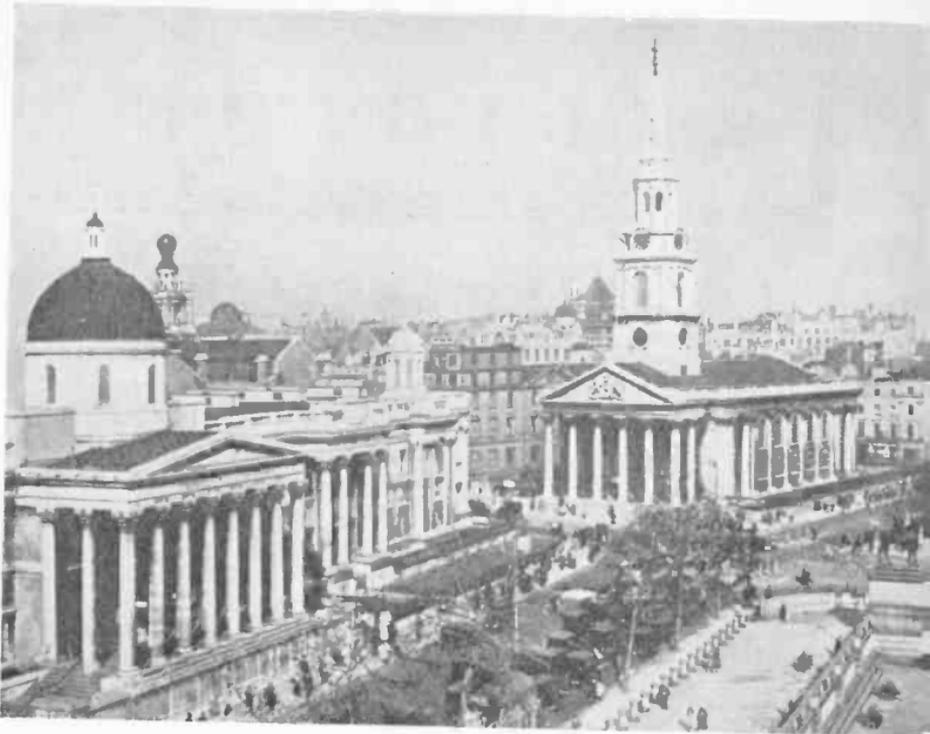
RELIGION

NOTES

THE names of the members of the B.B.C. Central Religious Advisory Committee will be found in the Appendix. This Committee was formed in 1923, a few months after broadcasting started, and has functioned regularly, and with unanimity, ever since, the original number of members being six and the Bishop of Southwark having been chairman from the very beginning. In the past year the constitution of the Committee has been revised and its membership enlarged to thirteen. This increase was felt to be desirable largely to counterbalance the very powerful Regional Advisory Committees formed in the provinces, especially those of Manchester and Birmingham, which derived their strength and numbers from the amalgamation of the local committees of the small Stations which are now absorbed in the Regions. There was also a feeling that the revised membership should include representatives of Regional Committees, not as official delegates, but, like the other members, invited directly by the B.B.C. as their advisers. The revised Central Committee now consists of the following:—Church of England 6 members, Roman Catholic Church 2 members, and Free Churches 5 members, representing the Free Church Council and the Presbyterian, Baptist, Congregational, and Methodist Churches. The above list excludes Dr. H. R. L. Sheppard, who remains an unofficial member of the Committee, whose co-operation is always welcome.

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It is a matter of gratification to the B.B.C. that the Director of one of its Regional Stations should be asked to preach as a layman in Bristol Cathedral and other churches. Mr. E. R. Appleton, who has been Director of



ST. MARTIN'S SEEN FROM

the Cardiff (now West Regional) Station since 1924, has become well known to thousands of listeners through the weekly broadcast, on Sunday evenings at the end of the programme, of the Silent Fellowship, an article on which will be found on p. 219. He has also broadcast on Sunday afternoons dramatisations of Bible stories which have proved popular with the children for whom they were intended.

* * *

There was a time when the entry of the microphone into Westminster Abbey was regarded with misgiving by some of the officials of the Abbey, and, indeed, there were other great churches where there was a feeling that the intrusion of something mechanical might prove distracting or out of place. It is perhaps also fair to record that some members of the staff of the B.B.C. felt doubtful about the acceptability of a regular broadcast of a religious service in the



SS TRAFALGAR SQUARE

middle of a week-day afternoon. Doubts on both sides were soon dispelled by the enthusiasm with which listeners accepted the weekly broadcast on Thursday afternoons of Evensong from Westminster Abbey, which has now become one of the indispensable features of the London programme. The opening of the new North Regional Station has seemed to be an auspicious moment for introducing a similar broadcast on Tuesday afternoons from York Minster, a Cathedral which has played as great a part as any in the development of religious broadcasting.

* * *

The B.B.C. has been fortunate in finding itself in the seven years of its history able to co-operate in several religious events of an unusual, if not almost unique, character. In 1924 came the dedication of Liverpool Cathedral, the first ceremony of its kind which has taken

place in this country for seven hundred years. Five years later the B.B.C. broadcast part of the 1300th anniversary celebrations of York Minster; and in the next year the enthronement of the present Archbishops of Canterbury and York, and the solemn reopening of St. Paul's Cathedral. These reflections are prompted by the broadcasting of the enthronement of Dr. Perowne, Bishop of Worcester, on March 30th, 1931. The ceremony lost little impressiveness in being broadcast, and the occasion was a particularly happy one for the B.B.C., as Dr. Perowne has always been a sympathetic friend of broadcasting.

* * *

Two of the most appreciated of the regular features in the broadcast programmes, the Epilogue and the Daily Service, have been carried on without substantial change in the past year. Each particular Epilogue stands apart on its own feet as a complete miniature programme. But it has been found that it adds greatly to its significance if it is arranged as part of a sequence carrying on over a long period a uniform train of thought. This sequential treatment is not over-emphasised, and is not allowed to act in any way detrimental to the unity of the single Epilogue. The principal sequences during the past year have been: "The Sayings of Jesus," closing towards Easter time with "The Seven Words from the Cross." The Easter Epilogue was appropriately called "He is Risen." Then, with Whit Sunday in view, began the sequence on "The Holy Spirit." During the summer there was a sequence of eleven Epilogues on the Ten Commandments and the Great Commandment (Thou shalt Love Thy Neighbour as Thyself), and finally "The Voice of Prayer," which included nearly all the well-known prayers of Scripture with appropriate accompaniment of hymns and psalms.

Except for the series of the Ten Commandments, in which the commandment itself was stated at the beginning, instead of the final closing sentence of tradition, there has been no departure from the established form of the Epilogue, but there have been fewer anthems and solos than formerly, because it is thought that listeners prefer the simplest style, which includes at least one thoroughly well-known hymn and a chanted psalm. The reading of the Epilogues is a piece of anonymous service about which

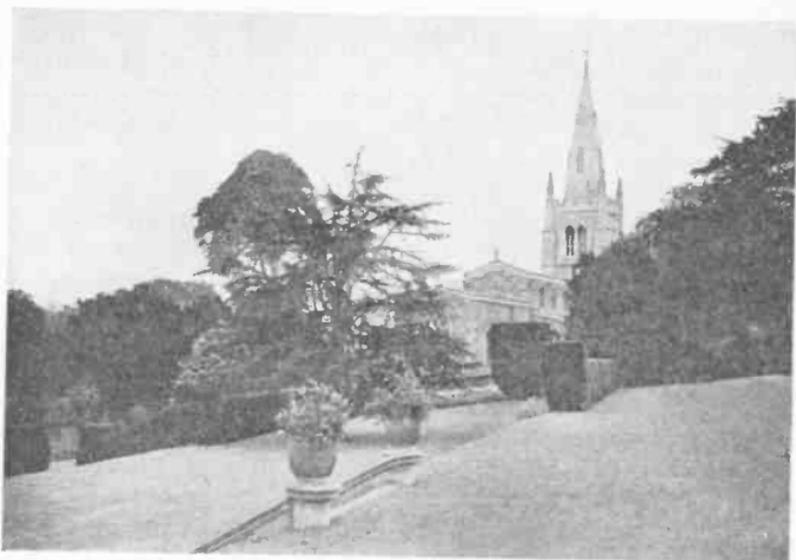
the B.B.C. does not encourage personal inquiries. Apart from members of the staff, it invites visiting readers from time to time. Some of these anonymous voices are those of quite distinguished people, who undertake the work from motives far removed from publicity.

* * *

The B.B.C. wishes also to preserve the anonymity of the daily service, although it is difficult to keep any secret over a period of four years. But this quarter of an hour is perhaps the part of the daily programme which receives more steady acknowledgment and gratitude on the part of listeners than any other. It would be impossible to estimate how many people make a regular practice of the daily quarter of an hour of worship. The Report of Convocation, printed on p. 221, affords a few glimpses of strangely gathered audiences in out-of-the-way places. Another remarkable piece of evidence lies in the fact that about one thousand letters were received at Savoy Hill on a certain occasion when the minister issued a mild reproof to those who had complained of the substitute who took his duty at a time when he was indisposed. Correspondents of the most widely different types and localities, high and low, rich and poor, strong and weak, wrote—sometimes in insufficiently Christian tones—to express their indignation with those who had been so impatient as to criticise. There has been no substantial change in the form of service. The problem whether responses should be made or not, and how far the service can be burdened with elaborate announcements of hymns, remains a standing difficulty, which is not likely to be settled to everyone's satisfaction.

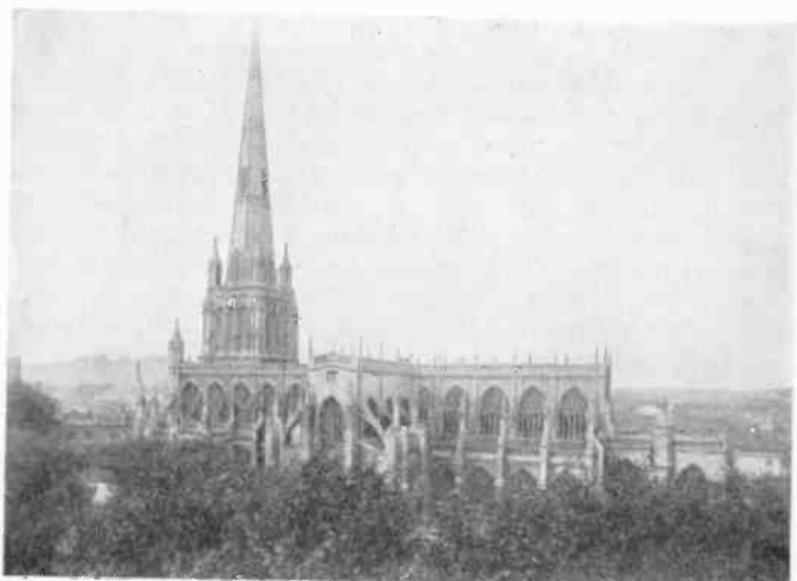
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The mid-week evening religious service was an innovation which found its origin in the national emergency of September 1931. The service is held in St. Michael's Church, Chester Square, of which the Rev. W. H. Elliott, the well-known broadcaster and former Canon of St. Paul's, is the vicar. The first broadcast was on October 1st at 10.30 p.m., lasting for about a quarter of an hour, and after that date the service took its place in the programmes as a regular weekly broadcast on Thursday evenings.



CRANSLEY CHURCH, KETTERING
(January 4, 1931)

Winterhalter



ST. MARY REDCLIFFE, BRISTOL
(March 22, 1931)

W. A. Call

ARRANGING RELIGIOUS BROADCASTS

THE merest glance at a typical week's programmes in the *Radio Times* is enough to indicate what a complicated business is this programme-building. It may be an illusion to think that the religious programme is more difficult and complicated than the rest, but it certainly has prickles and tangles of its own.

Religious Advisory Committees exist at all the principal B.B.C. stations, and in some cases they have formed sub-committees which sit with the Station Director to lay out the list of services for broadcasting. But as a rule the Advisory Committees are content to deal only with the broad principles of religious policy, and to recommend preachers. This is the case at B.B.C. headquarters. It is generally recognised that the microphone makes its own laws, and that it is not given to all successful occupants of the pulpit to achieve the effects most suited to wireless, and, moreover, that a service involves more than a good sermon. For example, if a new church is to be used for broadcasting it must obviously be submitted to a technical inspection by the B.B.C.'s engineers, who have to judge by tests of their own whether a successful broadcast can be promised. This will involve such considerations as these: are the trunk lines favourable? are the acoustics of the church good? is the organ in good condition and suitably placed? the choir well-trained? how many microphones will be required?

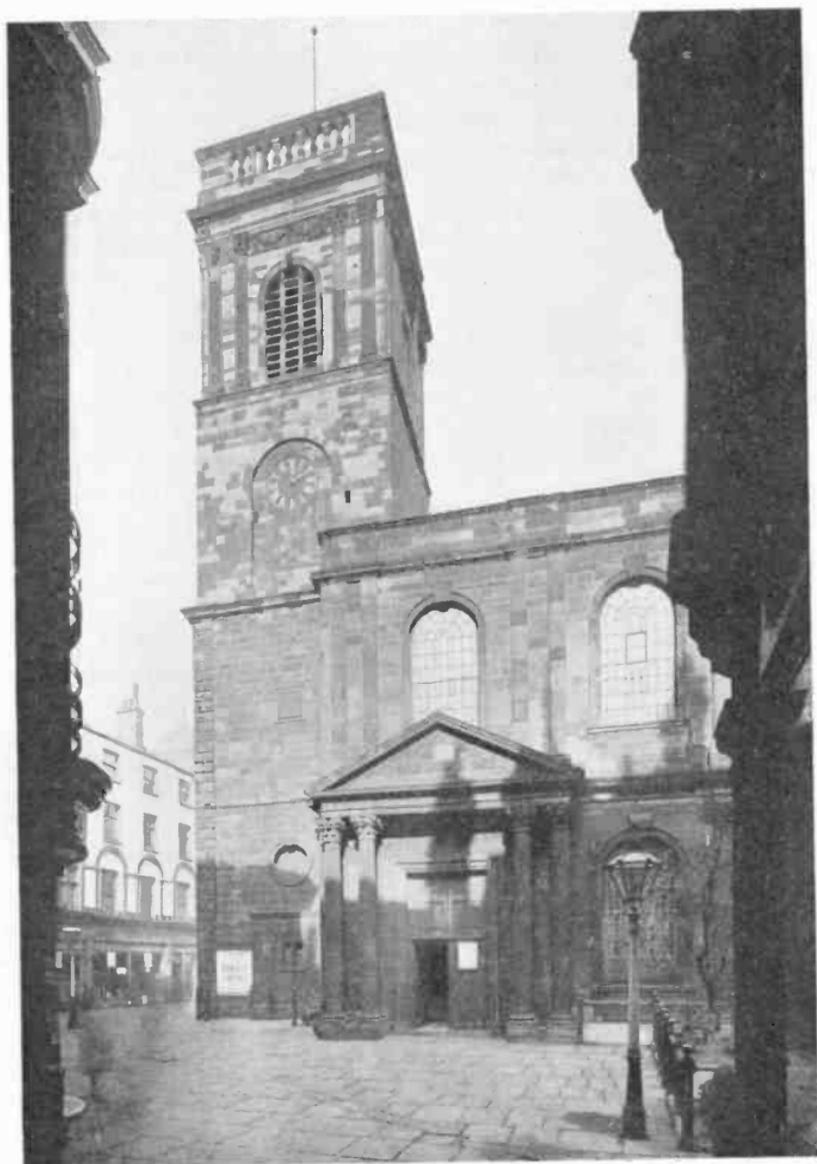
It is easy to see what risks and what expense is involved in broadcasting from a new place, and why the B.B.C. is a little reluctant to add to its existing lists of churches already equipped with inside lines. Every year fresh broadcasts are recorded for future reference. Every year the B.B.C. receive dozens of suggestions from listeners, which are as a rule placed on a list of recommended churches and preachers. When a number of recommendations converge, or when the persons recommending are known for their qualifications to recommend, then only are the technical inquiries set on foot. If each Religious Advisory Committee has a dozen members and each member recommends a dozen preachers, it is easy to see what an *embarras de richesse* may result.

The same considerations explain why the B.B.C. tends to return again to the places which have already provided highly successful broadcast services. The programme-builder, in fact, when he sets out to prepare his list for a quarter or a half-year some three months ahead, will generally begin with last year's list and ask himself in the first place which of these *must* be repeated. At the same time he ought not to be content with any such "Safety First" policy. Mere repetition is the way of stagnation. Experiments must be made and risks courted.

Certain fixed principles help or hinder the builder. For example, the second Sunday in each month has for years past been allotted to St. Martin-in-the-Fields, and the arrangements for these services go like clockwork in the safe hands of the Reverend Pat McCormick. It is likely that this arrangement will continue as regards the London wavelengths, though it is possible that the regional stations may offer local alternatives as they desire.

The fourth Sunday in each month is also a fairly simple matter, since there is only one service for all stations. This too is a very long-standing rule. The B.B.C. thinks it good to bring the whole of their vast religious congregation together at these monthly intervals. They think it makes for unity and toleration. Though the Cathedrals usually predominate on the fourth Sundays, yet a half-year's list now in preparation includes two Wesleyan Conference services, one Roman Catholic Cathedral, one English Presbyterian, one Church of England country church, one studio service at which the preacher is a very famous Scottish Presbyterian divine, and one English Cathedral. Surely this is variety enough. It must be added that, in deference to the wishes of listeners, when Roman Catholic services largely in the Latin language find their place on a fourth Sunday, the B.B.C. proposes now and in future to offer an English alternative on another wavelength. In fixing the programme for this fourth Sunday, the B.B.C. invites suggestions from all its stations and endeavours to secure that this national service shall in due course be representative of various localities as well as representative of the various denominations.

There remain the first and third Sundays. On the first there should always be a studio service in one or other of



ST. ANN'S CHURCH, MANCHESTER
(May 31, 1931)

the two London programmes, partly because many listeners like the quiet and highly-trained music provided by the Wireless Choir, and partly because that is the time and place for the use of the interdenominational book of *Services for Broadcasting*. Besides, many preachers are at their best in the studio, especially when their methods are quiet and personal. Then an alternative must be found, usually a broadcast from a church of a contrasting denomination. A balance has thus to be kept between studio and outside services as well as between the denominations.

The third Sunday is free from rules or limitations and so is the fifth when it occurs. Every wavelength in the kingdom puts up its own alternative on these Sundays. Fifth Sundays are generally assigned to the smaller religious bodies. Obviously on these Sundays of local freedom there may be clashings or coincidences. Thus there have been third Sundays when all the principal regional stations have chosen Roman Catholic preachers, and then the Protestant listener is apt to write and complain that he cannot find a service to his liking. The B.B.C. is trying to avoid this in future by arranging these programmes earlier so as to allow time for more effective co-ordination. But this is not an unmixed blessing: the earlier programmes are fixed the less flexible they become.

With regard to denominational balance, the B.B.C. has never had to regard any exact arithmetical equality as the goal. Their Religious Advisory Committees have never been pedantic, and have never made precise demands for equality. This has been all the more unnecessary because broadcast services are not the occasion for sectarian propaganda. All denominations alike welcome the opportunity of the great audience which wireless affords them and are content to preach the gospel of Christ on its universal terms of love and charity to all men, to dwell rather on that which unites than on that which divides. Moreover, at the yearly or half-yearly meetings of the Advisory Committees the B.B.C. officials are always able to produce satisfactory statistics. Their lists show as a rule figures corresponding to the distribution of churchmen among the various branches of the Christian Church. Leaving St. Martin's out of the account, generally speaking fifty per cent. of the services are given by preachers of the



MR. WALTER VALE AT THE ORGAN OF ALL SAINTS, MARGARET STREET
(October 2, 1931)

Church of England, while Methodists, Congregationalists, and Baptists share about thirty per cent. ; ten to fifteen per cent. are Roman Catholic, and the remaining five or ten are allotted to such bodies as the Friends, the Salvation Army, the Brotherhood, the Evangelical Alliance, etc.

On the whole it is felt that this elaborate planning is justified in the result. There are, as everybody knows, listeners who do not like religion in broadcasting at all; there are perhaps still more, vocal in the Press, though not conspicuous in the B.B.C.'s correspondence, who would like a secular alternative to religious programmes. But the B.B.C. believes that its policy has the support of the great majority who prefer a distinction between Sundays and weekdays, and who, while not necessarily professing to be pious or even regular church-goers, yet love the old hymns and prayers and bible-readings, and listen to sermons with an attentive, if critical, ear. Certainly under the present system there are very few failures; in fact there are very few wireless preachers who do not accumulate an embarrassingly large correspondence from all over the world. The B.B.C. knows as well as its critics, perhaps better, how far short of the ideal are its attainments. Often the microphone itself may dull or seem to dull the edge of eloquence. Much depends on good reception. Many preachers are embarrassed by the occasion, or fail to rise to the height of their powers. Many listeners listen in a wrong spirit; boredom affects some, and some are put off by a voice that strikes them as harsh or a dialect that is alien to their own experience. But if the general level was not high, the Canterbury Houses of Convocation would hardly have recommended the example of broadcast services as models to their brethren. The report of their special committee, which is reprinted in full on p. 221, is a landmark in the history of religious broadcasting. The B.B.C. is glad to think that it vindicates its policy.

THE SILENT FELLOWSHIP

PEOPLE ASK from time to time: What is the Silent Fellowship from Cardiff? The best answer is to describe the way it started.

Seven years ago, Mr. E. R. Appleton broadcast from Cardiff a good-night message after the conclusion of the Sunday evening programme. Everyone who has anything to do with sick folk knows that the night is the worst time for them. When people who have worked all day fall asleep from weariness, the battle begins for those who are in trouble of mind, body, or estate.

The good-night message originally consisted of the reading of a short poem or a psalm together with a few words of comfort. To the casual listener it probably gave the impression of a devotional service.

So many people welcomed the idea, however, that the few words developed into a ten-minutes talk, followed by the Lord's Prayer. A special meaning and intention of the work came to be perceived by many listeners, and a new and practical interpretation was given to the phrase "the coming of the Kingdom of God." So the service gave opportunity to the healthy to serve their suffering brothers, by joining in prayer and by holding them in remembrance.

But correspondence revealed a further fact: it showed that the apparently sound had their own troubles unknown to their friends, that the great need of the time is a message of courage and strength, and that this message is not heard by those who need it most.

So, although readings, music, prayer, and silent meditation all find their place in the Silent Fellowship, these items are used in one service, and as a unity they constitute a method of drawing near to God on behalf of suffering humanity.

Mr. Appleton's message has now become a weekly feature for the West Region at 10.40 p.m. each Sunday, and every month it is relayed on the Daventry National wavelength.

It is impossible to estimate the size of the unseen audience: over 50,000 letters have been received from a wide area, including the Hebrides, Ireland, Germany, France, and every county in England and Scotland.

Letters have come by the same post from people so diversely situated as a "down-and-out," a general, a medical man, and a peer.

Perhaps the most encouraging type of correspondence comes occasionally from one who has listened for a long period and who writes to record an entire change of outlook and of circumstances, dating from the time of joining.

Joining the Fellowship needs neither rules nor formal enrolment. Yet it is a personal matter, for those who have joined feel it is a duty as well as a privilege to take part in the weekly service.

The Daventry listeners only hear the service monthly, but they do not lose interest. One of them, the Rev. R. E. Vernon Hanson, then Chaplain-in-Chief, Royal Air Force, wrote as a Preface to a book of the Silent Fellowship talks:—

"From Cardiff, that cosmopolitan centre on the Bristol Channel, a veritable gate of the West, there has come a new message in the still evening hour, Sunday by Sunday. It has been heard in lonely cottages, on the high seas, on the continent of Europe, in remote islands in the Hebrides.

"It is a message of hope for humanity in terms of our modern needs. There are those who find their spiritual comfort and consolation in one or other of the recognised folds. But He who assured us that there were many mansions in our Father's House thought compassionately of those who were outside. 'Other sheep I have which are not of this fold. Them also I must bring.' This is a great work, more difficult than the cure of souls in orthodox channels. But it has to be done. It was Christ's chief mission. It may be that a new impulse is about to sweep the country from the gateway of the West."

HOW TO APPLY FOR A BROADCAST APPEAL

Write, enclosing a copy of the latest report of the charity you are interested in, to:—

THE SECRETARY,
APPEALS ADVISORY COMMITTEE,
THE BRITISH BROADCASTING CORPORATION,
BROADCASTING HOUSE, LONDON, W. 1.

THE CANTERBURY REPORT

THE Report of the Committee of Convocation, which is printed verbatim below, may be regarded as the official verdict of the Church of England, or at least of the southern half of it, on the value of religious broadcasting. The B.B.C. is happy to say that it has also received a considerable number of resolutions of support for its religious policy from Free Church bodies, such as—

Leeds Free Church Council
Plymouth and East Cornwall United Methodist Church
National Bible Society of Scotland
The Foreign Missions Board of the Presbyterian Church of England
West Carmarthen Baptist Association
Stockport Free Church Ministers Association.

CONVOCAATION OF CANTERBURY

REPORT OF THE JOINT COMMITTEE ON THE RELIGIOUS VALUE OF BROADCAST SERVICES AND THEIR BEARING ON PUBLIC WORSHIP.*

IN PRESENTING this Report the Committee desires to acknowledge the assistance which it has received from prominent members of the British Broadcasting Corporation, both by attendance at one of its meetings and through a memorandum giving the history and development of the religious side of broadcasting.

In 1923, after consultation with Archbishop Lord Davidson, an Advisory Committee was appointed under the chairmanship of the Bishop of Southwark. It included representatives of the Church of England, the Presbyterians, the Roman Catholics, and the Free Church Council. The Committee made suggestions as to suitable speakers for broadcast addresses and agreed on certain rules. Previous to this the first address had been given by the Rector of Whitechapel at Christmas, 1922, and by Dr. A. Fleming on New Year's Day, 1923.

*Bishop of Ely (*Dr. White-Thomson*) (*Convener*)
Bishop of Coventry (*Dr. Lisle Carr*)
Bishop of Portsmouth (*Mr. Lovett*)
Bishop of Buckingham (*Mr. Eliot*)
Archdeacon of Suffolk (*Mr. Darling*)
Canon Bird
Canon Guy Rogers
Canon Selwyn, D.D.
Rev. W. P. G. McCormick

It will be observed that the British Broadcasting Corporation took the initiative by approaching the various religious bodies. In the first instance the broadcast consisted of an address from the Studio at 9 p.m. with perhaps two hymns and a short Scripture reading. The possibility of broadcasting a complete service from a cathedral or suitable church was soon discussed, and St. Martin's-in-the-Fields was selected for the first experiment, which proved successful. By 1926 musical services had been given from the Cathedrals of Canterbury, York, Norwich, Carlisle, and Lincoln, the hour chosen being 8-9 on Sundays. In 1927 the British Broadcasting Corporation had 20 stations each provided with a religious advisory committee. As a result of all these experiments and partly in consequence of the unwieldy number of these various stations, the British Broadcasting Corporation decided (though, we gather, in the opinion of some of the Regional Committees somewhat abruptly) upon one regular scheme, which is as follows:—

	National.	Regional.
1st Sunday	London Studio Service with eminent preacher.	Generally no alternative in London; Regional alternative if desired.
2nd ,,	St. Martin's-in-the-Fields.	No alternative anywhere.
3rd ,,	Denominational outside broadcast.	Regional contrast.
4th ,,	All stations simultaneous broadcast (usually cathedral type).	No alternative anywhere.
5th ,,	Generally Studio Service for such bodies as the Brotherhood Movement, Salvation Army, Quakers, etc.	Regional contrast.

This general scheme remains in operation, but it ought to be added that additional religious facilities are often provided, such as the broadcasting during Lent in the National Programme) of the Thursday dinner-hour services at St. Martin's, Birmingham. We would also add that in our judgment there is much value in maintaining a reasonable number of regional alternatives in the monthly programme. Services of special interest to a locality can thus be broadcast, and the art of religious broadcasting fostered and developed in the provinces.

Besides considering, with considerable broad-mindedness, the claims put forth by those who sought facilities to broadcast, and besides suggesting names of individuals to give addresses, and of churches which might provide a service that would inspire, the Committee has been most useful in those occasional cases of friction which have naturally arisen through censorship however gently applied.

We wish to make clear that the choice of speakers and the final decision of questions of policy and of censorship rests with the Corporation and not with the Religious Advisory Committee.

We record at the same time how beneficent their policy has been towards religion, and we appreciate the harmony which has marked the deliberations of those who have composed the Committee.

We quote and make our own the words in which the Corporation has defined the scope of its activities:—

“They would claim that its obvious possibilities (bringing religion to the hearthside as a source of comfort to the sick, the isolated, the timid among religious people, and in making the voice of religion, the beauty of worship and the attractions of Scripture known to vast numbers of irreligious or semi-religious outsiders) have been explored and exploited to the utmost with results little short of marvellous; but at the same time there will be no denial of the fact that people whose only religious contact is through listening miss some of the most essential influences of religion, and their constant hope is that, as in the field of education, so in the field of religion, broadcasting may act as a stimulus and as a means of recruitment for the Churches.”

Our first unanimous finding is this: We wish to express our grateful appreciation of the debt which is owed to the British Broadcasting Corporation for its determination that religion shall be given its due and proper place in its programme as a whole. We rejoice that the policy which the Corporation has adopted has been endorsed by the volume of the correspondence which the Corporation receives from all sorts and conditions of men.

We hope that the Church will now give definite expression to its sense of gratitude by a vote of Convocation itself.

The growth of religious broadcasting has been like that of the mustard seed. From such small beginnings it has come, almost overnight, to exercise a profound and challenging influence in our life. It is true that there has been suspicion, or at least doubt, of new methods, a certain fear that the wireless services would act as rivals, an honest dread on the part of many of the popularisation of a form of godliness that lacked its power, of the substitution of an emotional appeal at the fireside for the organised fellowship which issues in labour more abundant for others. These doubts have all been factors in holding back the Church corporate from showing due appreciation of the great services to religion which the British Broadcasting Corporation has rendered.

We wish to set on record that in our considered judgment the effect of religious broadcasting has been exceedingly valuable. It has recalled to the acknowledgment of God many thousands who had, from various causes, been out of touch with sacred things. The appeal of God has found its way into homes and into hearts untouched by organised religion. We have had abundant evidence from many sources of men (the sons of Martha no less than the sons of Mary) *doing the work of life* who have paused to listen and take heed to the message. It has brought religion once again into the market-place. Discussions spring up (on points made in the preceding evening service) between men descend-

ing in the cage, in factories, under the lee side of a hedge, in bars, and places where other songs and subjects are usually heard and discussed.

All sorts of people make a point of hearing the 10.15, the Westminster Abbey Service and the Epilogue on Sunday evenings, and many listeners value highly the Fellowship of Silence. In these days of depleted staffs, when regular house-to-house visitation, the groundwork of every successful ministry, has become for the time impossible—in cases too where for any reason parishioners are kept away from church—it is surely a great cause for thankfulness that touch is maintained by other means. Further, we would stress the debt of the Church for this provision of some form of worship for her sons scattered over the seven seas in ships and lighthouses, on the Continent, in the Australian back-blocks, in Canadian clearings, in loneliness in tropical Africa, where the Church itself is unable to supply regular ministrations. These services from England, or from some Dominion or American city, provide a touch with home, and all that home at its best stands for, more potent than we can imagine. For how many lonely settlers has the broadcast from some English country church, the movement of the congregation, even the scraping of a chair, revived the sense of a fellowship well-nigh forgotten.

“He saw the little grey church across the park,
The mounds that hide the loved and honoured dead,
The Norman arch, the chancel softly dark,
The brasses black and red.”

It has been deplored that in our day the habit of family prayers has gone out of fashion. May it not be truly said that it has gone out in one way to come back in another? Nay, more, that the wireless is a potent factor in the re-creation of family life.

We note also the excellent services provided for the young on Sunday afternoons, which reach households untouched by Sunday schools.

And, finally, we would recall the inestimable boon which the broadcast services have been to the sick, to the aged, to the infirm. As they hear the bells, whose call to worship they can no longer obey, they find themselves sharing a fellowship which (partial as it must necessarily be) is made real by memories of other days and lifelong habit.

We turn now to make some suggestions which we hope may be of practical value to the British Broadcasting Corporation and the Church.

The opinion has been expressed that some of the popular services have tended to appeal largely to the emotions, and have lacked that more definite instruction as to what a Christian ought to know and believe and do for his soul's health. We are not suggesting the introduction of controversial subjects. Broadcast services must usually be of a more or less simple and general character. Yet the message may surely be distinct and definitely Christian. There is a body of theology which all who profess and call themselves Christians may be said to hold in common.

We are of opinion that preachers should be encouraged to speak more often on the character of God in the light of modern knowledge, on the lines, for instance, of the first section of the 1930 Lambeth Con-

ference Report. This has been done recently from St. Martin's-in-the-Fields, but the whole presentation of religion would be strengthened were a determined effort made to eradicate from men's minds some of the partial, sometimes actually erroneous, ideas of God that are still prevalent. We think that preachers should be encouraged to dwell more definitely on the foundations of the godly life. "Repentance," "conversion," "dedication" and "witness" may sound old-fashioned terms, but they are the essentials of all real religion, and they need more frequent restatement as against mere appeals to the emotions.

Nearly all the syllabuses of religious instruction which are being issued and revised for Church and County Council schools are based on the Creed, Lord's Prayer, and the moral teaching of the Gospels. We would urge the Corporation to advise speakers to keep this framework more in mind, so that the religious life of the nation may be built on an abiding foundation.

The thought that most of those who listen are units has rather led to the stressing of the appeal to the individual soul. In the published hints those who broadcast are asked to keep the individual listener in mind and aim at a friendly talk rather than a formal sermon. This, while necessary and valuable, has tended to give undue prominence to the individual idea of religion at the expense of the idea of fellowship which is an essential part of our Saviour's teaching.

While realising that the evening broadcast must continue on simple and popular lines, we are agreed in the wish to provide for other listeners, in the winter months, more scholarly broadcasts, say at 5 on Sundays, or in Advent and Lent, say, on a Friday afternoon. There are already groups of people who have formed study circles with the help of some recommended book, and we would assure the Corporation of the value set on such broadcasts, and strongly recommend the clergy to encourage such study and to give out in the notices in church the day and hour when such instruction is to be had.

We have given expression to our strong desire that speakers should try to lead up to the idea of fellowship, not with any idea of exploiting the British Broadcasting Corporation for the recruitment of the several religious bodies as an end in itself, but as part of the general and quite rational policy of the Corporation in all other branches of knowledge. Lectures on science and art are designed by the Corporation to whet the appetite of listeners for more serious study, and the wireless talks are intended to lead those interested to join the scientific and technical classes which are now arranged at night by many County Council and borough authorities, and are also an outstanding feature of the life of all the modern Universities.

We also suggest that as some 5000 schools are already wired, it would be a great help if once a week a good lesson or a missionary talk were broadcast. We recommend Friday mornings as appropriate. We believe that such model lessons would be as welcome to the teachers as to the children.

We are in agreement with the decision of the Corporation not to broadcast services of the Holy Communion.

The only connection between faith and works that has so far appeared has been the following of the service by the week's "Good Cause," and, here again, practically all the appeal has been for money,

and without any special call for workers. We believe an appeal for more than money would meet with a great response.

We would in conclusion address some remarks to our brethren.

We have explored an offer made to us to broadcast a complete service on Sunday evenings, on an alternative wavelength, to provide evensong in the case of the increasing number of country churches now (under schemes of amalgamation) closed on alternate Sunday nights.

The proposal is attractive, and where the conditions are favourable we should give our approval. But we foresee certain objections to any general adoption of such facilities. The hour suggested, 8 p.m., is considered too late for country parishes; there would be difficulty in providing the churches with adequate instruments for transmission, and the country congregations, accustomed as they are to slow singing, would find it difficult to keep pace with the broadcasting choir.

We have already urged upon our brethren the obligation of making wider use of the British Broadcasting Corporation's religious programme, of giving notice in church of anything which our people should hear—and this not merely in a narrow or lop-sided way. We wish that far more of the clergy would realise that broadcasting has come to stay and to be one of the most potent factors in the nation's life; that it becomes us to use its educational facilities to the full; that by leading people or helping people to select (so far as we ourselves are qualified to do so) the best thing to listen-in to, we are doing a very good work; that we should so gradually wean them from the cheap and the mean. Men need to realise that the trained mind and hand, craftsman's art and music's measure, are of God and open doors through which some souls come to worship.

There is, however, one last point we would make, with all the emphasis of which we are capable.

There is wide evidence that the British Broadcasting Corporation services have led to a renewed appreciation of the liturgical form in which they are presented. It is therefore all the more to be regretted that when listeners have been moved to attend the services in their own parish church they have too often been discouraged by indifferent preaching and inferior reading and singing. We are not so simple as to suppose that a tiny village church can rival the choir of York Minster. We would therefore advise those responsible for parochial services to abandon the attempt, and, taking pattern from some of the village broadcasts, learn that much simpler music can be quite effective.

We do not suggest that it is reasonable for the laity to expect to find in every country church the standard of preaching and reading represented by the picked men who, under God, made the success of the initial broadcast services. But they have a right to expect their clergy to read clearly and intelligently, and this is not always the case. Indistinctness, affectation and mannerism can spoil the beauty of the finest liturgy in Christendom. There are, however, indications that the special training now provided in Theological Colleges is leading to improvement in this direction.

We have asked the Corporation to give a series of talks on reading, with illustrations also of how not to do it. This should be both of interest and profit to many besides the clergy.

The truth is that broadcast services have raised the tone of public

opinion. A better type of service and better reading are demanded, and our brethren should do their utmost to meet this demand.

We recommend them to get into touch with the School of English Church Music at Chislehurst or other kindred institutions, which will advise them upon what music is within their powers, and to encourage their choirs to listen in to broadcast services from country churches. The mediæval rivalry, to which we owe so many of our priceless treasures in craftsmanship in stone and wood, might, in our day, be appealed to in singing, and the wireless be the means of bringing home even to the village that voted that the earth was flat the possibility of better things. It has been clearly demonstrated that if the necessary trouble be taken, a village choir can be made to sing in unison so clearly, so wholly together, that listeners-in can follow Psalms and hymns without a book.

We end on another note. It is said that for one letter of thanks which we receive in acknowledgment of some public service rendered, fifty, perhaps a hundred, people meant to write and got no further. This may be due to the pace at which we live and to our protective armour of sloth. So when we are told that within a month of starting the 10.15 service 8000 letters of appreciation had reached Savoy Hill, we are in a position to estimate the force of this new spiritual appeal in our life, the value of which this Committee was set up to estimate. And for this, and for a thousand other evidences of interest, which we have had brought to our notice in the course of our investigation, we thank God and take courage.

Signed, on behalf of the Committee,
LEONARD ELY,
Chairman.

1931. No. 578.

*RESOLUTIONS CARRIED IN THE LOWER
HOUSE OF CONVOCATION ON JANUARY
21, 1931.*

(1) "That this House records its grateful appreciation of the service rendered to the cause of religion by the British Broadcasting Corporation."

(2) "That this House would emphasise the fact that such religious services as are broadcast should not be regarded as a substitute for corporate public worship."

(3) "That this House welcomes the custom which the British Broadcasting Corporation has made of refraining from broadcasting during the hours of service on Sunday."

(4) "That this House thanks the British Broadcasting Corporation for its provision of occasional addresses of a more theological character, and hopes that the Corporation will develop these."

(5) "That this House recommends that clergy, lay readers, and choir trainers should take note of the high standard of preaching, reading and singing attained in broadcast services with a view to improvement of existing methods."

Note. The resolution carried in the Upper House included (1) above verbatim and (5) substantially, but with slightly different wording.



THE KING OPENS THE INDIA ROUND TABLE CONFERENCE

(November 12, 1930)

E V E N T S O F T H E Y E A R

(NOV. 1ST 1930—OCT. 31ST 1931)

NOVEMBER 1930

1. The Daily Service.
Vaudeville, inc. Teddy Brown and Ronald Frankau.
Rossini's "The Barber of Seville" by the Covent Garden Opera Company at Edinburgh. Municipal Election results.
2. Weekly broadcast of a Bach Church Cantata.
Roman Catholic Service from St. Chad's Cathedral, Birmingham. B.B.C. Sunday Orchestral Concert conducted by Leslie Howard.
4. Chamber Music by the English Ensemble.
Handel's "Acis and Galatea" by the City of Birmingham Choir.
5. Symphony Concert from the Pavilion, Bournemouth, conducted by Sir Dan Godfrey.
B.B.C. Symphony Concert at the Queen's Hall; conductor: Adrian Boult; Dorothy Silk, Roy Henderson, and the Philharmonic Choir in Vaughan Williams' "Sea Symphony," and Adolf Busch, violinist.
6. Evensong from Westminster Abbey.
7. "Pompey the Great" by John Masefield, produced by Peter Creswell.
Handel's "Solomon" performed by the Huddersfield Choral Society, conducted by Sir Henry Coward.
8. Leeds Symphony Orchestra, conducted by Julius Harrison.
10. The Prince of Wales: "Poppy Day"
"Brigade Exchange" by Ernst Johannsen, a Play based on the novel "Four Infantrymen on the Western Front."
Speech by the Prime Minister, Mr. Ramsay MacDonald, following the Lord Mayor's Banquet at the Guildhall.
Gale Warning.
Vaudeville, inc. the first broadcast by Alexander and Mose.
11. Armistice Day Service from the Cenotaph, Whitehall.
Festival of Empire and Remembrance at the Royal Albert Hall; and an Address by the Prince of Wales.
"In Memoriam 1914-1918," programme of poems compiled by E. A. Harding and Val Gielgud, and including the Last Post from the Menin Gate.
12. Speeches at the Opening of the India Round Table Conference in the Royal Gallery of the House of Lords by H.M. the King, the Maharajah of Patiala, the Aga Khan, and the Prime Minister. B.B.C. Symphony Concert at the Queen's Hall: The Brandenburg Concertos, conducted by Sir Henry Wood.
Speeches at the Opening of the first Scottish National Radio Exhibition in Edinburgh.
13. Special News Bulletin *re* Lyons Train Disaster.
R. L. Stevenson's Anniversary, "Kidnapped" adapted by Herbert Tatlock.
14. Chamber Music by the London String Quartet.
15. Provost A. M. MacEwen on "The Highlands."
16. The Rev. C. W. O'Hara, S.J., on "Science and Religion."
17. Lord Moynihan: "Surgery."
Chamber Music by the Stratton String Quartet.
18. Sir James Jeans on "The Stars in their Courses."

- Debussy's "Pelleas and Melisande" by the Wireless Chorus and B.B.C. Orchestra conducted by Percy Pitt.
- Speeches at the Ulster Parliamentary Luncheon in honour of Mr. R. B. Bennett, Prime Minister of Canada.
19. B.B.C. Symphony Concert at Queen's Hall, conducted by Sir Henry Wood: soloist, Elizabeth Schumann.
Mr. J. H. Thomas sums up "The Imperial Conference."
Recital of Schubert's Piano Music by Carola Geisler-Schubert.
 20. Extract from a concert by the Inverness Gaelic Choir.
Handel's "Solomon" performed by the Newport Choral Society.
 21. Dutch National Programme from Holland.
 22. Commentary on the Harvard v. Yale Football Match, relayed from America.
 23. Programme for St. Cecilia's Day from the Manchester Cathedral.
Religious Service from Norwich Cathedral.
B.B.C. Orchestra conducted by Nikolai Malko.
 25. "The Strange Case of Dr. Jekyll and Mr. Hyde," by R. L. Stevenson, produced by Peter Creswell.
 26. B.B.C. Symphony Concert at Queen's Hall, conducted by Sir Henry Wood: soloists, Norman Allin and Bela Bartok.
Vaudeville, inc. Flotsam and Jetsam.
 27. Lord Beaverbrook: "Trade within the Empire."
 28. National Lecture: Mr. Reginald McKenna on "Monetary Policy."
Elgar's "The Apostles" by the Belfast Philharmonic Society.
 29. "Die Fledermaus" by Johann Strauss performed by the Covent Garden Opera Company at Golders Green.
Chamber Music by the International String Quartet.
Opening of Scottish Broadcasting House by Mr. William Adamson, M.P., Under-Secretary for Scotland.
 30. Chamber Music by the Quintet Instrumental de Paris.
Prof. S. Alexander, O.M. on "Science and Religion."
Service from the City Temple.
Service from Manchester Cathedral, address by the Bishop.



AMERICAN "RUGGER"—YALE v. HARVARD

(November 22, 1930)



ALEXANDER AND MOSE

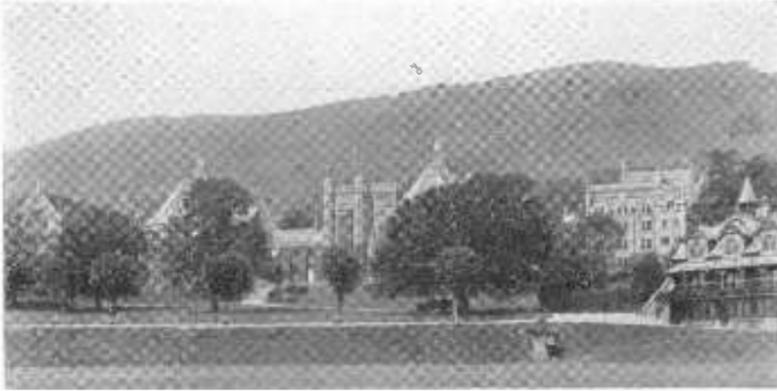
(November 10, 1930)

Sasha



JOHN MCCORMACK

(December 8, 1930)



Norman May

MALVERN COLLEGE

(December 14, 1930)

DECEMBER

1. Vaudeville, inc. Claude Hulbert and Gillie Potter.
Recital by Renée Chemet.
A. J. Alan: "The Well."
2. Peter Dawson from the London Palladium.
3. B.B.C. Symphony Concert at Queen's Hall, conducted by Sir Landon Ronald: soloist, Moiseiwitsch.
Ceremony of Welcome to Sir William Watson, relayed from the Pump Room, Bath.
4. Sir William Beveridge, "Trade within the Empire."
5. "If," by Lord Dunsany, produced by Lance Sieveking.
6. Toc H World Chain of Light ceremony at the Albert Hall.
Commentary on the Rugby Football Match between Glasgow and Edinburgh.
7. Recital by May Harrison and Arnold Bax.
Very Rev. W. R. Inge, D.D., on "Science and Religion."
Elgar's "The Kingdom" by the Cardiff Musical Society.
8. Group of Songs by John McCormack following the 70th Birthday Banquet of "The Universe" from Stationers' Hall.
Discussion on the theatre by Hugh Walpole and Osbert Sitwell: chairman C. B. Cochran.
10. Sir Francis Goodenough on "Science in Commerce."
B.B.C. Symphony Concert at Queen's Hall, conducted by Hermann Scherchen: soloist, Frederic Lamond.
11. Chamber Music by the Catterall String Quartet.
12. "A Winter's Tale" by Shakespeare, producer Howard Rose.
14. Chamber Music by the Pro Arte String Quartet.
Dr. L. P. Jacks on "Science and Religion."
Extracts from Bach's "Christmas Oratorio" from Malvern College.
15. Commemoration Service from King's College, London.
16. Speech by the Prince of Wales at the Guildhall Banquet of the Sales Managers' Association.
17. B.B.C. Symphony Concert at Queen's Hall, conducted by Hermann Scherchen. The National Chorus in Beethoven's Mass in D.

18. "The Flowers are not for you to Pick," a play by Tyrone Guthrie, produced by Val Gielgud.
19. Marquis of Lothian, C.H.: "The Question-Mark of Africa." Handel's "The Messiah" by the Philharmonic Choir.
20. Carol Service by the Royal Choral Society. "The Ship," a Play by St. John Ervine.
21. Piano Recital by Walter Frey. Roman Catholic Service conducted by the Rev. Father M.C. D'Arcy, S.J.
22. "Bethlehem," a Nativity Play from St. Hilary, Marazion.
23. Extracts from "The Love Race" from the Gaiety Theatre. Round about the North: including the Curfew Bell from York and a Pantomime Rehearsal from Manchester.
24. Carol Service from St. Mary's Church, Whitechapel.
25. Service from Canterbury Cathedral, address by the Archbishop.
26. Vaudeville, inc. Evelyn Laye.
27. Extract from the pantomime "Mother Goose" at the King's Theatre, Edinburgh.
27. "The Silver King" by H. A. Jones and Henry Herman, produced by Peter Creswell.
28. Recital by John Coates. Service from Liverpool Cathedral.
29. "A Pickwick Party," a Dickens Dream Fantasy, by C. West, and Marjorie Broughton.
30. Bach's Christmas Oratorio by the Wireless Chorus and B.B.C. Orchestra, conducted by Stanford Robinson, performed daily in the Foundations of Music.
31. Mr. Herbert Morrison, M.P., Minister of Transport: "The Road Traffic Act." "Amos 'n' Andy," relayed from America. Concert of Music by Sir Edward German. New Year Message from the Archbishop of Canterbury. "Hogmanay," arranged by Walter Barrie of Sundhope.



TOC H. CEREMONY: GENERAL DAWES, THE AMERICAN AMBASSADOR, LIGHTING A LAMP OF REMEMBRANCE

(December 6, 1930)



EVELYN LAYE
(December 26, 1930)

1. "Then and Now," a New Year's Discussion between the Older and Younger Generations, by Mr. G. Lowes Dickinson and Mr. John Maud.
Part of "Hello Folks" from the Palace Theatre, Blackpool.
New Year's Day Civic Service relayed from Wood Street Congregational Church, Cardiff.
2. Lady Diana Cooper: "Woman and Broadcasting."
"World for Sale," a revue by Harry Pepper and John Watt.
3. Baroness Ravensdale on "The Coronation of Ras Tafari."
4. World's Evangelical Alliance Universal Week of Prayer: service from the studio conducted by Mr. H. M. Gooch.
Obituary notice of the Princess Royal.
"Comus" by John Milton, music by Dr. Arne, B.B.C. Orchestra conducted by V. Hely-Hutchinson.
5. Mr. J. C. Squire on "The Enjoyment of Literary Forms."
Prof. Henry Clay on "The Problem of Unemployment."
"The Shadow of the Glen" by J. M. Synge, and "Spreading the News" by Lady Gregory, performed by the Abbey Players in the Belfast studio.
6. Programme of Strauss Waltzes conducted by Johann Strauss, from the Savoy Hotel.
7. Funeral Oration on Marshal Joffre by the Minister of War, M. Barthou, from the Invalides.
Sir Daniel Hall on "Farming."
Sir E. Hilton Young on "National Housekeeping."
Organ Recital by Quentin MacLean from All Saints', Margaret Street.
"The Key to the Situation" by Lance Sieveking, music composed by Robert Chignell.
8. Mr. Vernon Bartlett resumes "The Way of the World."
9. Prof. C. Delisle Burns on "Contact between Peoples To-day."
Contemporary Music Concert, B.B.C. Orchestra conducted by Arnold Schönberg.
"The Fire-lighters" by Laurence Housman, performed by Bristol's Little Theatre Repertory Players.
10. Commentary on the Third Round of the F. A. Cup, Arsenal v. Aston Villa, from Highbury.
"The Scoop," a serial Detective Story. First instalment by Miss Dorothy Sayers.
"At the Circus," relayed from the Mammoth Circus, Belle Vue, Manchester.
Programme by Victors at the National Eisteddfod of Wales, Llanelli, 1930.
11. Piano Music by Joaquin Nin. B.B.C. Orchestra conducted by John Barbirolli.
12. Mr. J. M. Keynes on "The Problem of Unemployment."
Musical Play "Frederica" from the Prince of Wales Theatre, Birmingham.
13. Geraldo's Gaucho Tango Orchestra, and Tom Clare.
"Macrococosmos" by James Laver, presented by K. B. Indoe.
Part of the Pantomime "Sleeping Beauty" from the Theatre Royal, Newcastle-on-Tyne.
14. Mr. A. P. L. Gordon on "Business."
B.B.C. Symphony Concert at



M. BARTHOU, FRENCH MINISTER OF WAR, DELIVERING THE FUNERAL ORATION ON MARSHAL JOFFRE

(January 7, 1931)



AT THE CIRCUS, BELLE VUE, MANCHESTER

(January 10, 1931)

- the Queen's Hall, conducted by Ernest Ansermet: soloist, Solomon.
- Swiss National Programme from Basle.
15. "Out of Patience" or "Bunthorne Avenged," a dramatic sequel to Gilbert and Sullivan's "Patience" by St. John Hankin, music by Leslie Woodgate. Ceremony of the Keys from the Tower of London. Royal Philharmonic Society's Concert at the Queen's Hall, conducted by Talich.
 17. Commentary by Capt. Wakeham on England *v.* Wales Rugby Match at Twickenham. Concert performance of "Hansel and Gretel" by the National Orchestra of Wales at Cardiff.
 18. "Makers of Miracles" by Laurence Housman, presented by University College (London) Dramatic Society. Salvation Army Service conducted by Gen. Higgins. Concert by the Hastings Municipal Orchestra directed by Julius Harrison. Pianoforte Recital by Erwin Schulhoff. Roman Catholic Service from the studio conducted by the Rev. Father Henry C. Day, S.J.
 20. Statement on the Indian Round Table Conference by the Prime Minister, Mr. Ramsay MacDonald. Chamber Music by the Philharmonic Trio. "Mackintosh," adapted from the short story by Somerset Maugham.
 21. Professor G. M. Trevelyan, O.M., "Hostels for Young Holiday Makers." B.B.C. Symphony Concert at the Queen's Hall, conducted by Ernest Ansermet; soloist, Wanda Landowska.
 23. Sir Josiah Stamp: "A Thousand Million Savings Certificates." National Lecture by Sir Walter Morley Fletcher on "Biology and Statecraft." Chamber Music by the Unity Quartet.
 24. Celebration of the 172nd Anniversary of Robert Burns from Edinburgh—a Burns Nicht arranged by Dr. James Devon. Part of the Pantomime "Dick Whittington" from the Palace Theatre, Manchester. "The Good Companions" Concert Party and the Pump Room Orchestra from Bath.
 25. Religious Service from Wakefield Cathedral. "Comfortable Words," an Oratorio programme conducted by Joseph Lewis. B.B.C. Orchestra conducted by Frank Bridge.
 26. "The Conquering Hero" or "The Jorrockses arrive at Handley Cross," adapted from the Novel by R. S. Surtees.
 27. Piano Recital by Ernst Wolff. Programme from Ilkley, Yorkshire.
 28. B.B.C. Symphony Concert at the Queen's Hall, conducted by Ernest Ansermet: soloist, Stravinsky.
 29. Hallé Concert from the Free Trade Hall, Manchester, inc. Delius' "Appalachia."
 30. "Edward the Second" by Christopher Marlowe, produced by Peter Creswell. Mr. Roger Fry: "Persian Art." Gracie Fields from the Hippodrome, Rochdale.
 31. Extract from "Little Tommy Tucker" from Daly's Theatre. St. Cecilia Singing Festival from Queen's Hall. "Sister Angelica" by Puccini, by Students of the Royal Manchester College of Music.



Pacific and Atlantic photos

THE POPE OPENING THE VATICAN STATION

(February 12, 1931)

FEBRUARY

1. Jubilee Service of the Christian Endeavour Union.
2. "The Problem of Unemployment"—by Mr. B. Seebom Rowntree (for the Liberal Party).
Commentary by Lionel Secombe on the Boxing Contest, Bert Kirby v. Jackie Brown, from Belle Vue, Manchester.
4. B.B.C. Symphony Concert at Queen's Hall; conductor, Adrian Boult; soloist, Szigeti.
5. Broadcast by Sir Harry Lauder. "Dr. Abernethy—His Book," a Comedy of 1815, produced by Howard Rose.
Recital by Elena Gerhardt. The Gloucester Orpheus Society's Concert.
7. Speech by Sir Arthur Quiller-Couch at the Dickens Fellowship Dinner.
Extracts from the Pantomime "Jack and the Beanstalk" from the Theatre Royal, Leeds.
9. "The Problem of Unemployment" by Mr. Herbert Morrison, M.P., Minister of Transport (for the Labour Party).
10. Liverpool Philharmonic Concert, conducted by Dr. Malcolm Sargent.
11. Symphony Concert at Queen's Hall; conductor, Adrian Boult; soloist, Backhaus.
Hungarian National Programme from Budapest.
12. Ceremony of the Opening of the Vatican Broadcasting Station by His Holiness Pope Pius XI, relayed from the Vatican.
Brahms' "Requiem" performed by the Hallé Orchestra.
An Ulster Play, "Apollo in Mourne," by Richard Rowley.
13. Music by Eugene Goossens and Vaughan Williams.
14. "The Pursuit of Pleasure" by Lance Sieveking, in co-operation with Harold Scott.
Commentary by Mr. G. F. Allison on the Fifth Round of the



SIR HARRY LAUDER

(February 5, 1931)

- F. A. Cup Tie—Chelsea v. Blackburn Rovers.
15. Service from the Friends' House, Euston Road.
Service from Bradford Cathedral.
Mendelssohn's "The Hymn of Praise" by Cardiff Musical Society.
 16. "A Happy Man," by Chekov, produced by Howard Rose.
"The Problem of Unemployment"—VII. Mr. Stanley Baldwin, M.P. (representing the Conservative Party).
Speech by the Duke of Gloucester following the Banquet at the Guildhall in celebration of the Opening of the British Industries Fair.
"Young Imeson," a play by James R. Gregson.
Part of the Pantomime "Goldilocks and the Three Bears" from the Theatre Royal, Glasgow.
The Herefordshire Orchestral Society's Concert from Hereford.
 17. Lady Frances Balfour: "Scotland—Things New and Old."
 18. Symphony Concert at the Queen's Hall; conductor, Adrian Boult; soloist, Dohnanyi.
 19. Talk by Sir Malcolm Campbell on landing at Southampton.
Reid Orchestral Concert, first performance of "The Prison" by Dame Ethel Smyth, conducted by the Composer.
 20. Professor Arnold Toynbee on "British Mandates."
Vaudeville, inc. Elsa Lancaster.
Harpichord Recital by Rudolph Dolmetsch.
First of a series of talks on "New Friends in Music": Mr. Constant Lambert on Debussy.
 21. Puccini's "Madame Butterfly," Act II, performed by the Covent Garden Opera Co. at Liverpool.
Will Hay from the London Palladium.
Tzigane Dance Music from Budapest.
 22. Shakespeare's "The Tempest" produced by Val Gielgud and E. A. Harding.
Service from St. George's Chapel, Windsor Castle.
Special Service relayed from the Carver Street Chapel, Sheffield, in connection with the Methodist Congress.
 23. Memorial Concert of the works of Peter Warlock from Wigmore Hall.
Speech by the Prime Minister at the Annual Banquet of the Birmingham Chamber of Commerce.
 24. Sir Landon Ronald's memorial talk on "Dame Nellie Melba."
 25. Symphony Concert at the Queen's Hall; conductor, Adrian Boult; soloist, Albert Sammons.
Mrs. Victor Bruce: "My World Flight."
"The Younger Generation," a Play by Stanley Houghton.
 26. Mr. Maurice L. Dobbs: "Russia in the Melting-Pot."
"Pagliacci" (Leoncavallo) performed by the Covent Garden Opera Co. at Halifax.
 27. First performance of a "Requiem Mass" by Frederic D'Erlanger by the National Chorus and B.B.C. Orchestra, conducted by Stanford Robinson.
Fay Compton, Edmund Willard, and Michael Redgrave in "Variations on an Old Theme" from poems by various poets.
 28. Speeches at the St. David's Day Banquet of the Cardiff Cymrodorion Society.
Commentary by W. P. Collopy on the Rugby Match, Ireland v. Scotland relayed from Dublin.



Elliott and Fry

THE LATE DAME NELLIE MELBA AS "JULIET"
(February 24, 1931)



Ian Smith

MR. WINSTON CHURCHILL AS RECTOR OF EDINBURGH UNIVERSITY

(March 5, 1931)

MARCH

1. Roman Catholic Service from the Church of the Holy Name, Manchester, with an Address by the Bishop of Salford.
St. David's Day Service from the studio arranged by the University College of South Wales.
2. Recital by the English Singers and Violet Gordon Woodhouse.
3. B.B.C. Orchestra conducted by Sir George Henschel.
"Rutherford & Son," performed by the Newcastle Repertory Players.
Elgar's "King Olaf," performed by the Swansea Orpheus Choral Society.
4. National Lecture by Sir William H. Bragg, O.M., on "Michael Faraday."
5. London County Council Election results.
6. Piano Recital by Franz Osborn.
7. Eye-witness Account of the Oxford *v.* Cambridge Sports by H. M. Abrahams.
"Rich Girl—Poor Girl," a new musical comedy founded on the story by E. Phillips Oppenheim. Short Variety Programme composed of extracts from some recent Talking Films.
10. Speeches by the Lord Mayor of Newcastle and Viscount Grey of Fallodon on the occasion of the celebration of the Jubilee of Newcastle-on-Tyne Public Library.
11. B.B.C. Symphony Concert at



R. M. N. TISDALL PUTTING THE WEIGHT IN THE 'VARSITY SPORTS
(March 7, 1931)

- Queen's Hall, conducted by Oskar Fried; soloist, Giesecking.
12. Concert by the Worcestershire Association of Musical Societies.
 13. "The Rescue" by Joseph Conrad, adapted and produced by Cecil Lewis.
 14. The Prince of Wales opening the British Empire Exhibition, Buenos Aires, relayed from South America.
"La Bohème" (Puccini) performed by the Covent Garden Opera Co. in Birmingham.
Commentary by Mr. G. F. Allison on the F. A. Cup Semi-Final between Birmingham and Sunderland, from Leeds.
Holst's "Savitri" performed by the National Orchestra of Wales.
 15. Service from St. Decuman's Church, Watchet.
 17. St. Patrick's Day Programme from Belfast.
 18. B.B.C. Symphony Concert at the Queen's Hall, conducted by Oskar Fried; the National Chorus in Beethoven's Choral Symphony.
 19. Hallé Pension Fund Concert from the Free Trade Hall, Manchester.
St. George's Westminster By-Election Result.
Concert by the New English Music Society.
Vaudeville by the Clifton Arts Club Players, Bristol.
 20. "Red Tabs," a radio play by Val Gielgud.
Symphony Concert from the Palais Lucerne, Prague, under the patronage of Dr. Masaryk, President of the Republic, conducted by Nikolai Malko.
 21. Commentary by J. D. M. Snagge and Holt Marvell on the Oxford and Cambridge Boat Race.
Commentary by Capt. H. T. B. Wakelam on the Rugby International Match, Scotland *v.* England at Edinburgh.
The Glasgow Orpheus Choir conducted by Sir Hugh S. Robertson from the Queen's Hall.
 22. St. Matthew Passion, Part II, by the London Bach Choir, conducted by Adrian Boult.
Service from St. Mary Redcliffe, Bristol.
 25. B.B.C. Symphony Concert from Queen's Hall; conductor, Adrian Boult; soloist, Suggia; first performance in London of "Morning Heroes" by Arthur Bliss.
 26. Royal Philharmonic Society Concert at Queen's Hall: soloist, Lionel Tertis.
 27. Commentary on The Grand National Steeplechase at Aintree.
Viscount Cecil: "British Mandates."
'Cello Recital by Lauri Kennedy.
Elgar's "The Dream of Gerontius" performed by the Belfast Philharmonic Society.
 28. Commentary on Scotland *v.* England Association Football International at Glasgow.
 29. The Albert Hall Diamond Jubilee Celebration Concert: the B.B.C. London and New Symphony Orchestra; conductors, Sir Henry Wood, Adrian Boult, and Malcolm Sargent.
 30. Concert in Memory of Anna Pavlova conducted by Walford Hyden.
Ceremony of enthronement of Dr. Perowne as Bishop of Worcester from Cathedral.
Piano Recital by Eduard Steuermann.
 31. Wee Georgie Wood in his sketch "Half a Clown" from the London Palladium.



Buenos Aires Herald

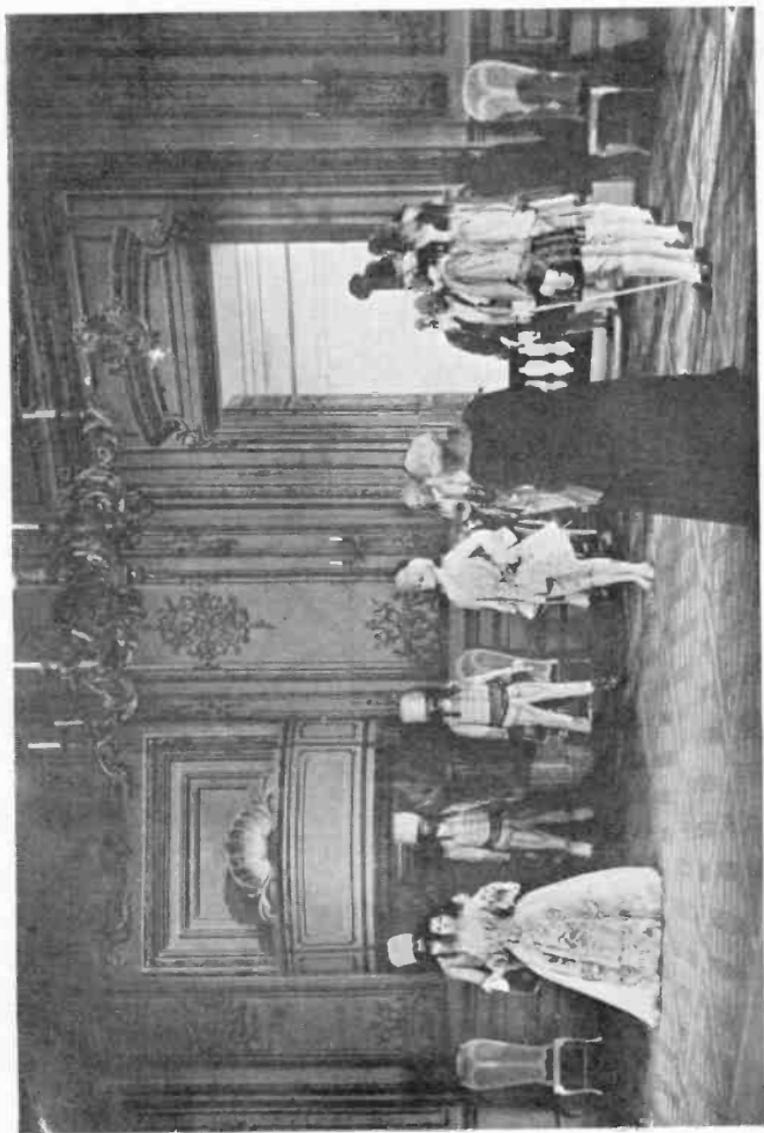
THE PRINCE OF WALES OPENS THE BRITISH EMPIRE EXHIBITION AT
BUENOS AIRES

(March 14, 1931)

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APRIL

1. "A Woman of Compassion," a Play by Florence Howell, performed by the Trecynon Dramatic Society.
2. "Little Flower of the Wood" by Leonard Merrick, produced by Lance Sieveking.
"The Pace Egg" or "St. George's Annual Play" as performed at Midgley, Halifax, on Good Friday.
3. Devotional Service from St. Martin-in-the-Fields.
B.B.C. "Parsifal" Concert conducted by Sir Henry Wood.
Religious Service relayed from St. Nicholas Church, Bristol, with an address by the Bishop of Bristol.
5. Easter Morning Service from Manchester Cathedral.
Easter Service from the Studio, address and Benediction by the Archbishop of York.
7. Holiday Entertainment from Blackpool, including part of the "Radio Stars" Revue from the Palace Variety Theatre.
8. "The House of the Arrow" by A. E. W. Mason, produced by Howard Rose.
Holles Madrigal Society of Stuttgart in the London studio.
10. Sir Walter Lawrence on "India."
Rimsky-Korsakov's "Kitesh" performed by the B.B.C. Orchestra and Chorus, conducted by Albert Coates.
Address by Sir Halford Mackinder at the Geographical Association's Spring Meeting.
11. Commentary on the F. A. Match, Grimsby Town v. Arsenal, from Grimsby.
Speeches by Dr. Chaim Weizmann, Sir Herbert Samuel, and Mr. D. Lloyd George, O.M., M.P., at a Dinner given to Mr. Lloyd George in recognition of his services to the Jewish people.
12. Violin Recital by Isolde Menges.
Mr. T. S. Eliot on "John Dryden."
13. "Riders to the Sea" by J. M. Synge, and "The Coiner" by Bernard Duffy, performed by the Abbey Players in the Belfast studio.
15. B.B.C. Symphony Concert at the Queen's Hall conducted by Albert Coates.
Symposium on Progressive Architecture in Scotland: Mrs. T. B. Whitson, Lady Provost of Edinburgh, "The Changing Face of the Capital."
16. Result of the Division of Parliament on the Debate on Unemployment.
17. The Marquess of Zetland: "The Races and Religions of India."
"Twelve Thousand," a play by Bruno Frank, produced by Peter Creswell.
19. Service from Govan Parish Church, Glasgow.
Service from the Chapel of the Royal Military School of Music, Kneller Hall, Twickenham.
20. Vaudeville, inc. Jeanne de Casalis and Colin Clive.
21. "Riverside Lights," written, composed, and produced by Ernest Longstaffe.
Discussion between Prof. T. H. Pear and Mr. L. Du Garde Peach on "The Future of Dialect."
22. B.B.C. Symphony Concert at Queen's Hall: The National Chorus in "Israel in Egypt" (Handel), conducted by Sir Henry Wood.
"Sea Shanties," sung by Sir James Sexton, assisted by Mr. Ben Tillett and others.
23. Speeches at the Shakespeare Birthday Celebrations, Stratford-on-Avon, by John Drinkwater, Sir Nigel Playfair, Miss Lilian Braithwaite, and others.



Armand. Console

THE OPENING OF THE COVENT GARDEN SEASON WITH STRAUSS' "DER ROSENKAVALIER"

(April 27, 1931)

- "Will Shakespeare" by Clemence Dane, produced by Val Gielgud.
- Mr. Kaye Don: on the Buenos Aires Speed Record.
- Speeches by the Lord Mayor of Manchester and Lord Barnby celebrating the 21st Anniversary of the Textile Institute.
- Shakespeare's "King Henry V" produced by E. A. Harding.
24. Sir Harcourt Butler on "India." Interview on board M. V. "Britannic" with the Lord Mayor of Liverpool and the Secretary of the Manchester Chamber of Commerce prior to their departure for America.
- The Master of Sempill on "Aviation" at the Luncheon of the Bradford Rotary Club.
25. Commentary by G. F. Allison on the F. A. Cup Final, Birmingham *v.* West Bromwich Albion, from Wembley.
- Discussion between General Sir Ian Hamilton and Mr. Compton Mackenzie on "Gallipoli."
26. Service from the Cathedral, Birmingham.
- Mr. S. P. Vivian, the Registrar-General: "The Census."
27. Opening of the Covent Garden Opera Season: "Der Rosenkavalier" (Strauss) conducted by Bruno Walter.
- Mr. Wickham Steed: "How the House received the Budget." "Yes and Back Again," a Paraphrase by E. J. King Bull, founded on "The Story of this Book" by Walter de la Mare.
28. Mr. Philip Snowden, the Chancellor of the Exchequer: "The Budget."
29. B.B.C. Symphony Concert at the Queen's Hall, conducted by Sir Henry Wood: soloists, Gota Ljungberg and Myra Hess.
- Mr. E. H. Keeling, M.C.: "The Fall of Kut, April 29, 1916."
30. The Marquis of Aberdeen: "Some Stories." Organ Recital by Berkeley Mason.
- "Die Walkure" (Wagner) from Covent Garden.



Marsden

THE PACE EGG
(April 2, 1931)

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Stage Photo

LA CHAUVE-SOURIS

(May 6, 1931)

M A T

1. "May Day," libretto by David Garrick, music by Arne. Darius Milhaud's music by the B.B.C. Orchestra conducted by the composer.
2. **Commentary** by W. E. Dickman on the Rugby League Final, York *v.* Halifax, at Wembley. **Speeches following the Annual Dinner of the Royal Academy** by the President, Sir W. Llewellyn, Sir Roger Keyes, Mr. J. R. Clynes, Sir Arthur Quiller-Couch, Viscount Hailsham, and Lord Treowen.
3. Military Service from York Minster. Recital by Elisabeth Schumann. "For the Children." Bible Stories dramatised by Mr. E. R. Appleton.
4. Mr. David Lloyd George, O.M., M.P. (for the Liberal Party), on "The Effects of Tariffs on Employment."
5. "Baghdad-on-the-Subway," a Phantasmagoria of New York by John Watt. Speeches by the Lord Mayor of Hull and Mr. John Drinkwater at the Banquet celebrating the 600th Anniversary of the Granting of a Charter to Kingston-upon-Hull by King Edward III.
6. B.B.C. Symphony Concert from Queen's Hall: conductor, Adrian Boult, Maria Olszewska (Contralto) and Cortot (Piano). "La Chauve-Souris" introduced by Nikita Balieff in extracts from the production at the Cambridge Theatre. Speeches at the Opening of the Exhibition of the Linen Industry Research Association at Belfast.
7. Recital by Maggie Teyte and Cortot.

8. "The Marie Celeste," a Mystery of the Sea, adapted by L. du Garde Peach.
B.B.C. Concert of Contemporary Music conducted by Anton Webern.
9. Concert by the Belfast Wireless Symphony Orchestra by Colonel Fritz Brase, Director of Music to the Irish Free State Army.
11. Recital of his own piano music by Roy Agnew.
Royal Command Performance in aid of the Variety Artists' Benevolent Fund from the London Palladium.
William Graham, M.P. (for the Labour Party), on "The Effects of Tariffs on Employment."
"Chinese Moon Party," a Landscape in Lacquer compiled by M. H. Allen.
12. Speech by the Prince of Wales to the members of the Manchester Chamber of Commerce.
13. Centenary Service of the Congregational Union of England and Wales from the City Temple. Speeches at the Annual Dinner of the National Safety First Association at Leeds.
Mozart's "The Magic Flute" from Covent Garden.
14. Sir Frederick Cowen conducting his own music played by the B.B.C. Orchestra.
Organ Recital by Reginald Goss Custard.
15. "The Forest" by John Galsworthy, producer Howard Rose.
16. Commentary on the Kentucky Derby relayed from America.
Three Valleys Festival at Mountain Ash. Mendelssohn's "Elijah" by Choir of 1120 voices.



CORTOT
(May 6, 1931)



CICELY COURTNEIDGE

(May 23 and 30, 1931)

17. Recital by Olszewska.
Roman Catholic Service from the studio conducted by the Rev. Father M. C. D'Arcy, S.J. Sunday Orchestral Concert conducted by Basil Cameron.
18. Elgar's "The Dream of Gerontius" performed in the Queen's Hall, the National Chorus and the B.B.C. Orchestra conducted by Stanford Robinson. Broadcast of the Song of the Nightingale.
19. Speeches at the Annual Meeting of the National Federation of Women's Institutes in the Albert Hall.
Sir William Beveridge on "Unemployment."
A. J. Alan: "Mr. Pappas."
Concert by the Birmingham Bach Club.
The General Assembly of the Church of Scotland: Devotional Service in St. Giles' Cathedral and Opening Ceremony in the Hall of Assembly.
20. Mr. Neville Chamberlain, M.P. (for the Conservative Party), on "The Effects of Tariffs on Employment."
Cardiganshire Musical Festival, Aberystwyth, Concert by the National Orchestra of Wales and the Festival Choir.
21. Speech by the Prince of Wales at the Banquet given by the London Executive Committee of the British Empire Trade Exhibition, Buenos Aires.
Wagner's "Lohengrin," Act I, from Covent Garden.
"The Gypsy Princess," a Musical Comedy produced by Gordon McConnell.
22. Professor Alfred Zimmern: "Europe at Geneva."
West-Country Variety Programme, including a performance by a Male Voice Choir from Wookey Hole Caves, Somerset.
23. Empire Day Festival from Hyde Park.
The Prime Minister, Mr. Ramsay MacDonald: "Empire Day." Part of "Folly to be Wise" from the Piccadilly Theatre.
24. Cello Recital by Maurice Eisenberg.
B.B.C. Orchestra conducted by Eugene Goossens.
25. "The Jockey," presented by Freddie Kaufmann with Ernest Engel (Pianist).
26. Concert by the Scottish Orchestra conducted by Ian Whyte.
27. Speech by the Prince of Wales following the Dinner given by the Clothworkers' Company in aid of the Wireless for the Blind Fund. Organ Recital by Dr. Alan Gray from York Minster.
28. Earl of Derby, K.G., President of the Travel Association: "Great Britain's Visitors."
Telephone Conversation between Commander Stephen King-Hall in the London Studio and Captain Latta, of the Canadian Pacific Railway, on board the *Empress of Britain*.
29. Opening of the London Group of the Douglas Haig Memorial Homes by the Prince of Wales.
"Assault on Professor Weltmann" from the German of Felix Mendelssohn, adapted by Lance Sieveking.
30. Vaudeville, inc. Cicely Courtneidge.
Mr. G. Bernard Shaw: "Saint Joan."
31. Service from Farnham Parish Church.
Recital by Miriam Licette.
Last of the series of Sunday Orchestral Concerts, conducted by Adrian Boult.
Blind People's Service from St. Ann's Church, Manchester. Concert by the National Orchestra of Wales in aid of the Musicians Benevolent Fund.



Photopress

H.M. THE KING ON HIS WAY TO THE HORSE-GUARDS PARADE
(June 6, 1931)



Gale and Polden

TANKS AT THE ALDERSHOT TATTOO

(June 13, 1931)

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THE PTERODACTYL—R.A.F. DISPLAY

(June 27, 1931)

JUNE

1. Verdi's "La Forza del Destino" from Covent Garden.
2. String Orchestral Concert conducted by Kemlo Stephen in Glasgow Civic Week.
3. Commentary on "The Derby" by R. C. Lyle.
Verdi's "Falstaff" from Covent Garden.
4. Eye-Witness Account by Bernard Darwin of the Open Golf Championship from Carnoustie. Concert by Bristol Royal Orpheus Glee Society, from the Fête at Clifton Zoo.
6. Commentary by Major J. B. S. Bourne-May on "Trooping the Colour" on the Horse Guards' Parade.
J. R. Ackerley gives the first of a series of talks on "Escape." German's "A Princess of Kensington" performed by the Wireless Chorus and Orchestra conducted by Joseph Lewis. Commentary on the Third Irish International Grand Prix Motor Race at Phoenix Park, Dublin. Relayed from Dublin.
7. Service from St. David's College, Lampeter.
8. Sir Bernard Pares on "Russia." Broadcast from the training ship H.M.S. *Helicon* at Newcastle.
9. "The Dogs of Devon," a Comic Opera by W. H. Bullock.
10. Mr. James Agate: "Mrs. Sidons."
11. Shakespeare's "King John" produced by Peter Creswell. Recital by Dr. Alcock (organist of Salisbury Cathedral) from York Minster.
11. "Crisis in Spain," programme of contemporary events composed and produced by E. A. Harding and John Watt. Lord David Cecil: "William Cowper."
Verdi's "Rigoletto" from Covent Garden. Part of a revue "Pleasure on Parade" from the Floral Pavilion, New Brighton.
12. Speeches at the National Allotments Society's Dinner at Bridgwater.
13. Mr. C. W. A. Scott: "Australia and back in Record Times." The Aldershot Command Searchlight Tattoo. Scenes from "A Midsummer Night's Dream" in the Belfast Studio.
16. A. J. Alan: "My Adventure in Norfolk."
Mr. W. S. Paley, President of the Columbia Broadcasting System, U.S.A.: "Your Broadcasting and Ours."
18. Dr. Lorand Horvath: "Broadcasting in Hungary." Romani's "Fedra" from Covent Garden.
19. Commentary on the Senior T.T. Race from the Isle of Man.
21. Orchestral Concert with Yvonne Arnaud (Pianoforte). Primitive Methodist Annual Conference Service from Derby.



A SCENE FROM ROMANI'S "FEDRA"
(June 18, 1931)



YVONNE ARNAUD

(June 21, 1931)

22. "The Defence of Cardiff Castle in the Civil War," written by Principal J. F. Rees and Cardiff University Staff.
Puccini's "La Bohème" from Covent Garden.
Purcell's "The Fairy Queen," presented by E. J. King-Bull.
23. "Helen with the High Hand," a Play by Richard Pryce adapted from Arnold Bennett's Novel. Address by Sir Arthur Balfour to Sheffield Chamber of Commerce on "Business Conditions in the U.S.A."
24. Address by the Archbishop of Canterbury at the Annual Commemoration Service of the Order of St. John of Jerusalem from Westminster Abbey.
Recital by Dr. Stanley Marchant (organist of St. Paul's Cathedral) from York Minster.
25. Commentary on the Northumberland Plate by Mr. R. C. Lyle, from Gosforth Park.
26. Sir Francis Younghusband summing up the talks on India.
"Tilly of Bloomsbury" by Ian Hay, produced by Howard Rose.
27. Commentary by Squadron-Leader Helmore on the Royal Air Force Display at Hendon. Belfast Wireless Orchestra conducted by Sir Henry Wood.
28. Unveiling of the Statue of Late Field-Marshal Earl Haig, at Montreuil-sur-Mer.
29. "Frae a' the Airts," a new series of programmes from all parts of Scotland: (1) The Borders.
30. "Midsummer Madness," a play by Clifford Bax, music by Armstrong Gibbs, produced by John Watt.



THE HAIG MEMORIAL AT MONTREUIL

(June 28, 1931)



E.N.A.

IDA RUBINSTEIN AS "DAVID"
(July 16, 1931)



H.M. THE QUEEN NAMING THE KING GEORGE DOCK

Ian Smith

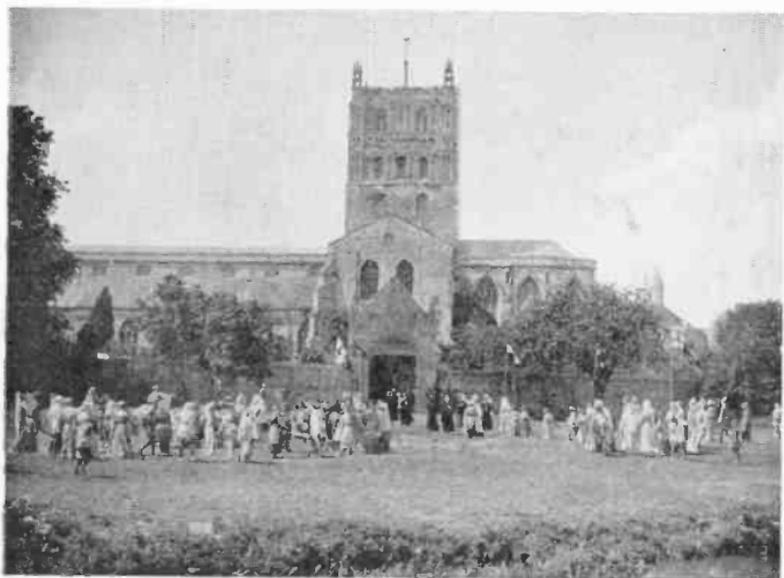
(July 10, 1931)

JULY

1. "Ellen Vannin," a Manx National Programme. Annual Ceremony from the National War Memorial, Edinburgh Castle.
2. "Chinese White," a Play by Val Gielgud. Alfred Rode and his Tzigane Orchestra. Concert in co-operation with the Ulster Summer School of Music.
3. "A Masque of Wimbledon" by Herbert and Eleanor Farjeon. Last night of the Covent Garden Opera Season—Puccini's "Tosca."
4. Commentary by Colonel R. H. Brand and Capt. H. T. B. Wakelam on the Finals of the All-England Lawn Tennis Championships. Roman Catholic Service from the Cathedral, Plymouth.
5. Part of the Jubilee Festival Service of the Girls' Friendly Society in Southwark Cathedral. The Celtic Congress Concert

- from the Coliseum, Douglas, I.O.M.
- Service from Londonderry Cathedral: Address by the Bishop.
- Nave Service from Bristol Cathedral.
6. Mr. Howard Marshall on the Oxford *v.* Cambridge Cricket Match. Mr. Bertram Thomas: "Crossing the South Arabian Desert." "Phyllida and Corydon," a Pastoral Opera, music by Handel, written and arranged by J. Michael Diack. Annual Tynwald Ceremony from the Isle of Man. Concert by the Band of Royal Corps of Signals from Royal Victoria Park, Bath.
 8. "Bumpkin Pie," a Revue by Ernest Longstaffe. Recital by Dr. Henry Ley (Organist of Eton College) from York Minster.
 9. "The Napoleon of Notting Hill," from the Novel by G. K. Chesterton, produced by Howard Rose.

- Excerpts from the Revue "Say it with Laughter," at the Palace Theatre, Manchester.
10. The Opening of the New Dock at Shieldhall, Glasgow Harbour, by H.M. the King.
"The Rebel Maid," a Musical Comedy by Montague Phillips.
 11. Speeches by Mr. Ramsay MacDonald, Mr. Stanley Baldwin, and Mr. David Lloyd George at a National Demonstration in the Albert Hall on behalf of World Disarmament.
 13. Mr. H. G. Wells summing up the series of talks on "Russia."
 15. Sir Basil Blackett: "The Situation in Germany."
Commentary on the Tewkesbury Pageant.
Bath Rotary Carnival, relayed from the Institution Gardens, Bath.
 16. The Ida Rubinstein Ballet Season; "David" from Covent Garden Opera House.
 17. Speeches at the Opening of the Historical Pageant of Bradford by the Lord Mayors of Bradford and of London.
Scenes and Songs from Shakespeare's "As You Like It."
Concert by the Buxton Municipal Gardens Orchestra conducted by Horace Fellowes.
 18. The Opening of the King George Hospital, Ilford, by H.M. the King.
Mr. H. M. Abrahams on the Athletic Match, Oxford and Cambridge *v.* Harvard and Yale.
Oberleutnant Heinz H. E. Justus on his "Escape."
Frank Terry's "Super Optimists" from the Floral Pavilion, New Brighton.
 19. Gardener's Service from St. Philip's, Alderley Edge.
Evensong from St. James's Parish Church, Belfast.
 20. Edgar Wallace: "The Sooper Speaking."
Recital by Richard Tauber.
Speech by the Lord Mayor at the Opening of the Historical Pageant of Newcastle-on-Tyne.
 21. Sir James Crichton-Browne, F.R.S.: "Faraday once more."
 22. Commemoration Week at Canterbury Cathedral: the B.B.C. Chamber Orchestra conducted by Adrian Boult in the Cloisters.
 23. "The Rumour," a play by C. K. Munro, produced by Howard Rose.
Piano Recital by Herbert Fryer.
 24. "The Stage Revolves" (second edition), by Henrik Ege and Peter Wyse.
West-Country Variety Programme.
 25. Commentary by Squadron-Leader Helmore on the King's Cup Air Race from Heston Air Park, Hounslow.
Major R. W. G. Hingston on "Dodds of the Future."
 26. Religious Service at the Annual Wesleyan Conference, from the Central Hall, Birmingham.
 27. Recital by Paul Robeson.
International Society for Contemporary Music Festival Concert from Queen's Hall: B.B.C. Orchestra conducted by Gregor Fitelberg, Constant Lambert, and Alfredo Casella.
 28. Recital by Marguerite de Pachmann.
 29. Revival of "The Wrecker," a Mystery of the Sea, by R. L. Stevenson and Lloyd Osbourne, produced by Peter Creswell.
 30. "The Secret Marriage" (Cimarra), from the Municipal Theatre of Salzburg by the Vienna Philharmonic Orchestra on the occasion of the Salzburg Festival.
 31. "The King can do no Wrong," a Ruritanian Romance written and produced by C. Denis Freeman.



TEWÆSBURY (JULY 15, 1931)



Yorkshire Observer

TWO PAGEANTS. NEWCASTLE-ON-TYNE (JULY 20, 1931)



Sport and General

H.M. THE KING OPENING THE KING GEORGE HOSPITAL AT ILFORD
(July 18, 1934)



THE DUNMOW FLITCH TRIAL

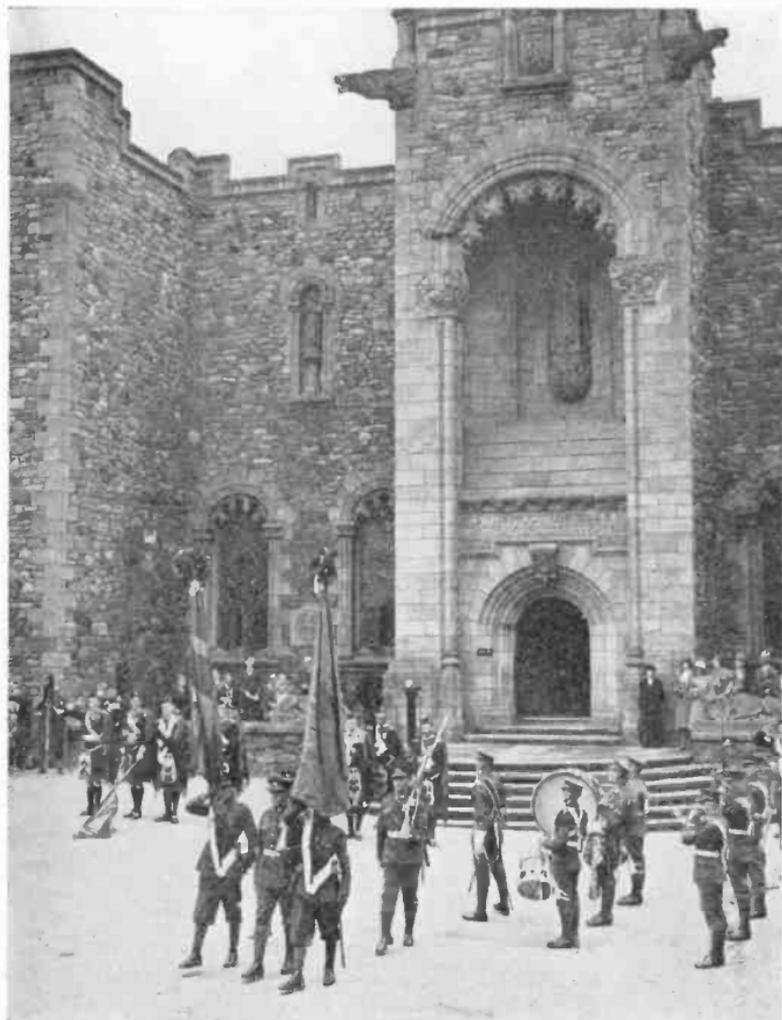
(August 3, 1931)

AUGUST

1. The Laying up in the War Museum of the Colours carried at the Battle of Culloden by the Appin Stewarts and Barrell's Regiment, relayed from Edinburgh Castle.
"Rolling the Planet," a Comedy by George Shields.
2. Service arranged by the Old Contemptibles Association from St. Martin-in-the-Fields.
3. The Dunmow Flitch Trial proceedings from the Causeway Meadows, Dunmow.
4. The Southern Command Tattoo from Tidworth.
5. Vaudeville including Isobel Elsom.
Viola Recital by William Primrose.
6. Ceremony of Chairing the Bard, and speech by Miss Megan Lloyd George, M.P., from the Welsh National Eisteddfod at Bangor.
"The Bunker at the Fifth," a
7. Programme of Arnold Bax' Songs and Piano music.
Mr. J. T. Mollison on his record-breaking flight from Australia.
8. Korvettenkapitan a.D. Hermann Tholens on his Escape during the War.
First Night of the Promenade* Concerts at the Queen's Hall.
Melville Gideon and the Dorchester Hotel Dance Band.
10. Eric Coates' Music played by the B.B.C. Light Orchestra, conducted by the composer.
"Listeners' Inn," a revue by Archie de Bear and Reginald Arkell.
Concert by the Band of the 1st Battalion Welsh Regiment.
12. Vaudeville from the Carnival in aid of the Queen Alexandra Memorial Hospital, Weston-super-Mare.
First of Mr. George Grossmith's talks on "My Apprenticeship at Hollywood."

* The season lasted from August 8 to October 3 and every concert was broadcast in one or other of the London programmes.

13. Mr. E. M. Forster reviewing new books.
"Fireside," a sketch by L. du G. Peach, produced by Peter Creswell.
15. Mrs. Caroline Wilson: "Stage Memories."
16. A Piano Recital by Emma Lubbecke Job.
Religious Service from the studio conducted by the Rev. H. R. L. Sheppard.
Welsh Religious Service from Penmount Calvinistic Methodist Chapel, Pwllheli.
17. Beethoven String Quartets played during the week by the Stratton String Quartet.
"A Seat in Hyde Park," a revue by C. Denis Freeman.
"The Society Six" and their Jester, from the Orange Hall, Portrush.
18. Wagner's "Tristan and Isolde," relayed from the Festspielhaus, Bayreuth.
20. Commentary by Mr. George Aitchison on the Rydal Sheep Dog Trials from the Vale of Rydal, Westmorland.
Programme of the Music of Norman O'Neill played by the Leslie Bridgewater Quintet.
Paul Robeson in "God's Trombones," presented by E. J. King-Bull.
21. "The House Fairy," a play by Laurence Housman, produced by Howard Rose.
Naval and Military Tattoo, organised by the 6th Battalion, the Gloucestershire Regiment, relayed from the Bristol Memorial Rugby Ground.
22. Commentary by Major Vernon Brook and H. C. Lafone on the R.A.C. International Tourist Trophy Motor Race over the Ards Circuit, near Belfast.
Eye-Witness Account by H. M. Abrahams of the England v. Italy Athletics at Stamford Bridge.
Modern English Music played by the B.B.C. Light Orchestra, conducted by Cyril Delmaine.
The Music of Villa Lobos played by Michael Mullinar.
23. The Bishop of Winchester on "The Stockholm Conference."
Organ Recital by Solomon.
Roman Catholic Service from Plymouth Cathedral.
24. "If," adapted and produced by Lance Sieveking from the play by Lord Dunsany.
25. The Prime Minister, Mr. Ramsay MacDonald, on "The Political Situation."
Chamber Music by Eduard Steuermann and the Amar String Quartet.
The Travels of Tiadatha (Owen Rutter) spoken by Gordon Bailey.
27. "The Fun Factory," a revue by Paul England and Claude Hulbert, produced by John Watt.
Speech by General Dawes at the Ceremony of the gifting of a Gymnasium to Kirkcudbright Academy.
28. A Galloway Gathering from the Selkirk Arms Hotel, Kirkcudbright.
29. Boy Scouts Camp Fire Concert relayed from Yorkswood Park, Castle Bromwich.
30. Recital by Maggie Teyte.
Concert from Knocke, Belgium, by the Kursaal Orchestra, conducted by M. Charles Candael.
31. A Discussion between S. P. B. Mais and Holt Marvell on "Living Dangerously."
"The Romantic Young Lady," a play by Martinez Sierra; English Version by Helen and Harley Granville-Barker, produced by Peter Creswell.
Vaudeville including Nellie Wallace.



Ian Smith

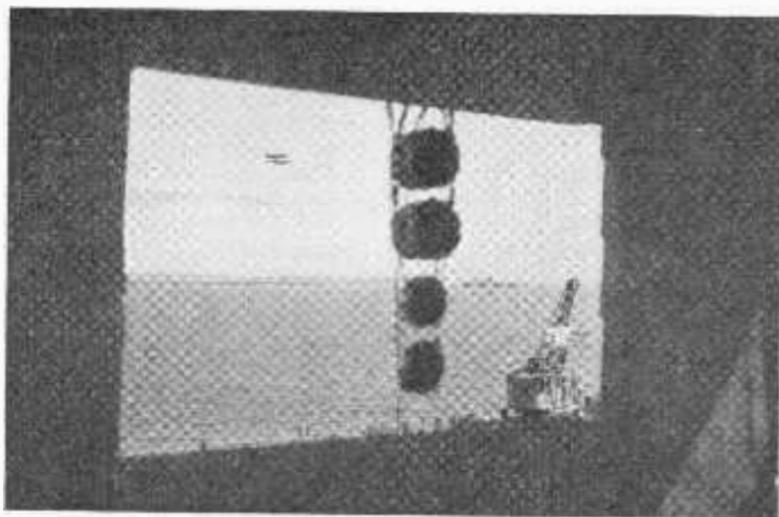
THE LAYING-UP OF THE CULLODEN COLOURS

(August 1, 1931)



PAUL ROBESON
(September 1, 1931)

Shaw Wildman



THE SCHNEIDER RACE FROM THE B.B.C.'S HUT

(September 13, 1931)

SEPTEMBER

1. Song Recital by Paul Robeson. "The Philosopher in the Apple Orchard" by Harcourt Williams.
5. Commentary by Major Vernon Brook and H. C. Lafone on the International Ulster Grand Prix Motor-Cycle Race from County Antrim.
Lady Tree in "House Party" by C. Denis Freeman with music by Francis Poulenc, arranged for small orchestra by Hyam Greenbaum.
Concert by Victors at the 1931 Royal National Eisteddfod of Wales, Bangor.
6. An International Religious Service from Leeds Parish Church with an Address by Bishop of Ripon.
7. Eye-Witness Account by Mr. Vernon Bartlett of the Opening of the League of Nations Assembly, relayed from Geneva.

8. Programme by Street Pavement Entertainers.
An Irish Programme, with W. B. Yeats reading his own poetry, Sara Allgood in Irish Ballads and the Belfast Wireless Symphony Orchestra conducted by E. Godfrey Brown.
9. Commentary by R. C. Lyle on the St. Leger Race at Doncaster.
"Consider your Verdict," a Play by Laurence Housman, produced by Lance Sieveking.
Mr. O. J. R. Howarth: "Centenary of the British Association."
Three Choirs Festival Concert from Shire Hall, Gloucester.
10. Discussion between Dr. G. J. Renier and Dr. Karl Silex on "As Others See Us."
11. "Depression over Fairyland," a Fantasy by Henrik Ege with music by Robert Chignell.

- Mr. Philip Snowden speaking from Downing Street on "The Budget."
13. Commentary by Squadron-Leader W. Helmore on the Schneider Trophy Race from Ryde.
Recital by Margot Hinnenberg-Lefèvre.
 14. "To See Ourselves," a Domestic Comedy by E. M. Delafield, produced by Peter Creswell.
Opening of the English Season of Opera at Covent Garden with Smetana's "The Bartered Bride."
Recital by Jan Smeterlin.
The Abbey Players in a prose version by W. B. Yeats of Sophocles' "King Œdipus."
 15. Sir Oliver Lodge: "What Science has done in a Hundred Years."
 16. "Are Americans Thin-Skinned?" discussion between Kingsley Martin and Hubert Agar.
"The Cousin from Nowhere," a Musical Comedy by Fred Thompson, revised by Gordon McConnel.
 18. "The Road to the West," a Dramatic Monologue written and spoken by Filson Young.
 19. "Are School Holidays too Long?" discussion between Mr. W. W. Vaughan, late Headmaster of Rugby, and Mr. Harold Nicolson.
Senatore Marchese G. Marconi: "The Beginnings of Wireless."
Wagner's "The Mastersingers" from Covent Garden.
"At the Tower Circus," Blackpool.
 20. Religious Service in connection with the Students' Missionary Campaign, conducted by the Bishop of Croydon from the Parish Church.
Bristol Concert by the National Orchestra of Wales.
 21. Introductory talk to the series "Industry and Trade" by Sir Edward Hilton Young.
Faraday Commemorative Meeting from the Queen's Hall, including speeches by Mr. Ramsay MacDonald, the Marchese Marconi, Lord Rutherford, a Commemorative Address by Sir William Bragg, and a concluding Address by Lord Eustace Percy.
 22. Mr. Desmond MacCarthy introducing the talks on "The Spirit of Modern Literature."
"Mosaic," a programme of poetry read by Robert Loraine, Mr. Michael Redgrave, and Mr. Alan Howland.
West Regional Children's Hour relayed from the Zoological Gardens, Clifton, Bristol.
"The Farmer's Wife," a Comic Opera by Charles Dibdin, music by Henry Bishop.
 23. Opening of the Faraday Centenary Exhibition at the Royal Albert Hall by General Smuts.
Message of Greeting from Dr. Jewitt, Past President of the American Institute of Electrical Engineers, relayed from America.
Sir Thomas Holland introducing the series of talks on "Science."
Presidential Address by General Smuts from the Centenary Meeting of the British Association in Central Hall, Westminster.
 24. Commentary on the Launching of H.M.S. "Leander" at H.M. Dockyard, Devonport.
Prof. Ernest Barker introducing the series of talks on "The Modern State."
Sir Arthur Steel-Maitland: "The Crisis: How you can Help."
Dame Ethel Smyth's "The Wreckers" from Covent Garden.

"The Torch of Time," a Study in Revolution by Laurence Housman, from Bristol's Little Theatre.

Birmingham Philharmonic Mid-day Concert.

25. Mr. H. B. Lees Smith introducing the series of talks on "Education and Leisure."

Vaudeville from the Bristol Radio Exhibition, including Gillie Potter, Winnie Melville, and Derek Oldham.

The National Festival of the Gael. Part of a Concert by the leading prizewinners from Dingwall.

26. Rossini's "The Barber of Seville" from Covent Garden.

Kapitanleutnant a D. Hellmuth von Mücke on his "Escape."

27. Organ Recital by Marcel Dupré from St. Margaret's, Westminster.

Dean Inge introducing the

series "The Modern Dilemma." Nave Service from Bristol Cathedral with an Address by the Dean of Bristol.

Recital of Schubert Songs by Robert Maitland.

28. Quintets for Strings and Piano-forte played by the International String Quartet and Yvonne Arnaud.

Mr. H. G. Wells introducing the series of talks on "What I would do with the World."

Antrim Dialect play "The Wheat and the Chaff" by J. H. McIlveen.

"Midland Towns and Cities" programme—No. 1, Leamington.

29. Vaudeville, including Jeanette Macdonald.

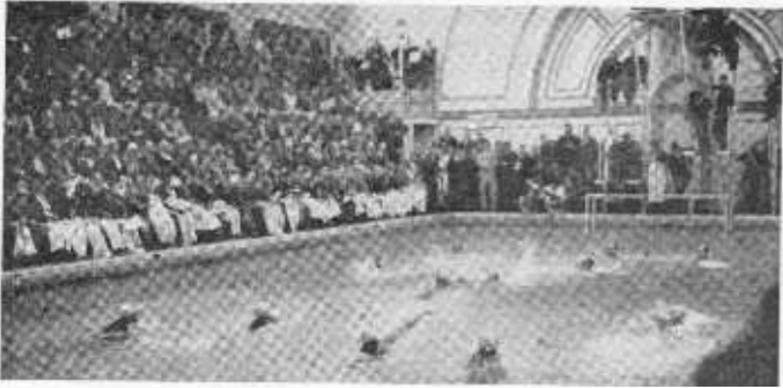
30. "Down for the Day," a Revue by Ernest Longstaffe.

Verdi's "Aida," from Covent Garden.



THE FARADAY COMMEMORATIVE MEETING

(September 21, 1931)



ENGLAND *v.* FRANCE AT WATER POLO

(October 17, 1931)

Central News

OCTOBER

1. First of a series of weekly Evening Services from St. Michael's, Chester Square, conducted by Rev. W. H. Elliott.
Mr. Leonard Woolf introducing the series on "Can Democracy Survive?"
Coleridge-Taylor's "The Song of Hiawatha" by the National Orchestra of Wales, and Neath and District Choral Union.
Military Tattoo at Belle Vue, Manchester.
2. "The Lost Cause," by Compton Mackenzie, produced by T. P. Maley.
Organ Recital by Walter Vale, from All Saints, Margaret Street.
3. Last Night of the Promenade Concerts at the Queen's Hall.
Bizet's "Carmen" from Covent Garden.
4. Religious Service from Chichester Cathedral.
Service and Address by the Primate of All Ireland from St. Patrick's Protestant Cathedral, Armagh.
5. Franz Lehar's Music by the

- B.B.C. Theatre Orchestra, conducted by Ernest Irving.
Sir Richard Glazebrook: "The Clerk Maxwell Centenary."
Puccini's "Tosca" from Covent Garden.
Piano Recital by Edgar Bainton.
6. Vaudeville with Harry Tate and Estelle Brody.
Puccini's "La Bohème" from Covent Garden.
Concert by the Bach Cantata Club from St. Margaret's, Westminster.
Liverpool Philharmonic Society's Concert, conducted by Adrian Boult.
7. "The Little Ass," a Cornish Comedy by Bernard Walke, produced by the author and Filson Young, relayed from Marazion, Cornwall.
First of the new series of "The Ridgeway Parade."
Mr. Ramsay MacDonald on the General Election.
8. Recital by Marian Anderson.
"Traitor," by L. Beeston and G. Kostlin, produced by Lance Sieveking.
Wagner's "Lohengrin" from Covent Garden.

- F. E. Weatherly Memorial Concert, including his Songs by West-Country artists, and an appreciation by H. A. Vachell.
9. Shakespeare's "The Merchant of Venice."
Idle Thoughts by Dr. Ota Vocadlo.
 10. First of a series of broadcasts by Mr. Edgar Wallace on "The World of Crime."
 12. Wagner's "The Valkyrie" from Covent Garden.
"The Northerners," a Drama by Harold Brighthouse.
 13. "Peep-Bo-Hemia," a Revue, produced by Gordon McConnel. Mr. Stanley Baldwin on the General Election.
The Huddersfield Glee Society's Concert of Music by Gustav Holst.
"Prunella," by Laurence Hous-

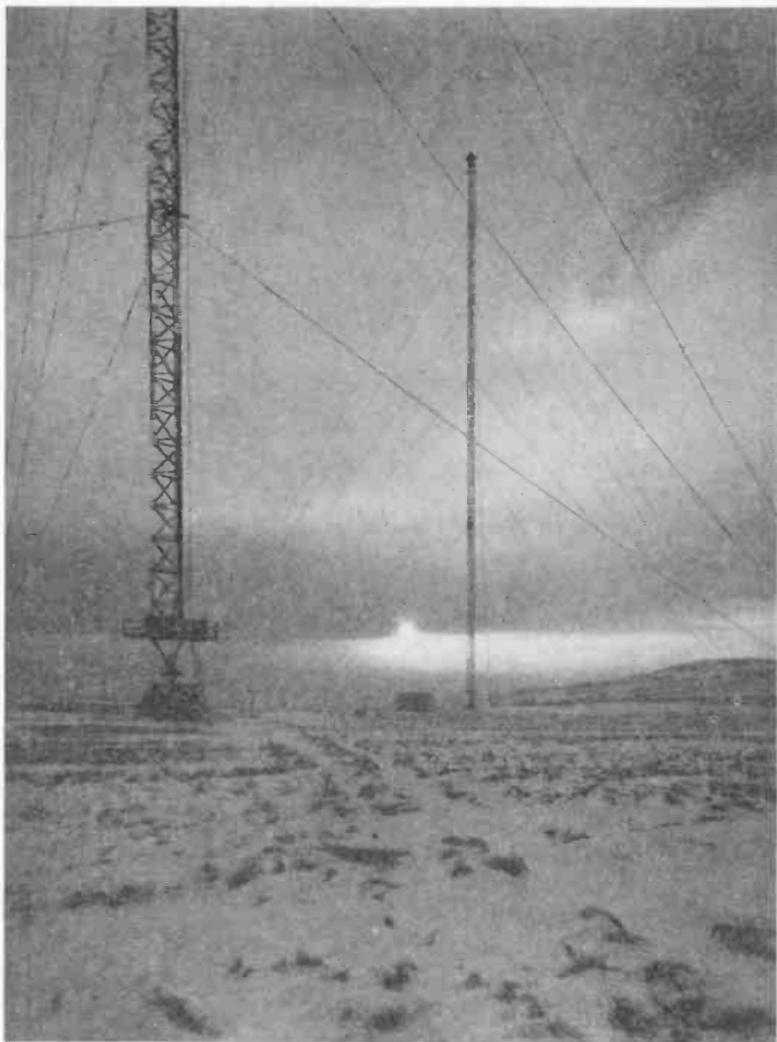


ESTELLE BRODY

(October 6, 1931)

- man and H. Granville-Barker, music by Joseph Moorat.
14. Miss Clemence Dane reviewing New Novels.
First B.B.C. Symphony Concert of the Season 1931-2 from the Queen's Hall. B.B.C. Symphony Orchestra, conductor Adrian Boult; soloists: Florence Austral and Backhaus.
Mr. J. R. Clynes on the General Election.
 15. Commentary by J. S. Hoskins on the Wembley Open Speedway Championship.
Mr. Lloyd George on the General Election.
 16. "Chopin," a Romantic Play by Wilfrid Rooke-Ley and Christopher Martin, produced by Val Gielgud.
Chamber Music by the New London Trio.
"Baa, Baa, Moo Cow, have you any Eggs?" a Revue by Graham Squiers.
Sir John Simon on the General Election.
 17. Commentary by George F. Allison on the International Association Football Match, Ireland *v.* England at Belfast.
Commentary by W. J. Howcroft on the Water Polo International, England *v.* France, from the Westminster Baths.
Mr. Philip Snowden on the General Election.
First Recital on the newly-restored Organ of St. George's Hall, Liverpool, by Mr. H. F. Ellingford.
 18. Roman Catholic Service from the Church of the Holy Name, Manchester.
First of the Winter Season of Sunday Orchestral Concerts by the B.B.C. Studio Symphony Orchestra, conducted by Richard Strauss in a programme of his own music.
 19. Sibelius' Chamber Music by the Kutcher String Quartet.
 20. Puccini's "Madame Butterfly" from Covent Garden.
Mr. William Graham on the General Election.
 21. B.B.C. Symphony Concert from the Queen's Hall, conducted by Richard Strauss; soloist, Margarete Teschemacher.
Sir Herbert Samuel on the General Election.
 22. Recital by Keith Falkner and William Murdoch.
Mr. Stanley Baldwin on the General Election.
 23. Paul Robeson in "God's Trombones" and "Negro Odyssey," presented by E. J. King-Bull.
Mr. Arthur Henderson on the General Election.
First Concert of the Season by the Belfast Philharmonic Society, conducted by E. Godfrey Brown.
 24. Mr. Ramsay MacDonald on the General Election.
 25. Evensong from the Church of St. Hilary, Marazion, Cornwall.
Sunday Orchestral Concert, conducted by Basil Cameron.
 26. "The Testament of François Villon," a Melodrama by Ezra Pound, produced by E. A. Harding.
 27. General Election Results.
Strauss's "Die Fledermaus," performed by the Covent Garden Opera Company at the Theatre Royal, Glasgow.
 28. B.B.C. Symphony Concert from the Queen's Hall, conducted by Sir Henry Wood; soloists: Herbert Janssen and Harold Bauer.
 29. Reid Orchestral Concert, conducted by Professor D. F. Tovey, from Edinburgh.
 30. Operatic Programme by the B. B. C. Studio Symphony Orchestra, conducted by Percy Pitt; soloist: Herbert Janssen.

N O R T H
R E G I O N A L
S T A T I O N



MOORSIDE EDGE. THE AERIAL MASTS IN A WINTRY LANDSCAPE

THE NORTH REGIONAL STATION

THE YEAR 1931 HAS SEEN the establishment of the North of England twin-wave Station. This has been an event of great importance to Northern listeners, and also to listeners further afield. But it may be that an event of this kind is liable to throw into the shade the past history of the early pioneer Stations in the North of England, and the period of intensive subsequent development, as the result of which those Stations were grouped together for a common object, their programme resources were pooled, and a general survey of Northern activities and talent undertaken by the Northern officials of the B.B.C. Some brief review, therefore, of all those activities which have paved the way to the new scheme of broadcasting in the North, may serve as an interesting record in this current Year-Book.

It was decided in 1927 that some grouping of the interests represented by the respective B.B.C. Stations in the North was necessary as a preliminary preparation for the introduction of the alternative programme system. The first move was to bring into more frequent contact the two Lancashire Stations of Manchester and Liverpool. Some months later other Stations in the North began to take their place in an occasional interchange of broadcast programmes, the first result of which was the arrangement of broadcasts, during the summer months, from some of the principal resorts and spas in the North, including such places as Blackpool, Buxton, Harrogate, Morecambe, and Grange-over-Sands. At this time, too, endeavours were made to break other new ground in the Region, and Manchester began to undertake broadcasts from the Lake District and elsewhere.

The Stations incorporated in this early grouping were the Main Station of Manchester, and the Relay Stations of Sheffield, Liverpool, Leeds-Bradford, and Stoke-on-Trent. The Manchester Station's origin dated back to September 1922. It was originally established by the Radio Communication Company Limited and Metropolitan Vickers Limited, and its first studio was located in the premises of the latter firm in Trafford Park. It was officially opened as a B.B.C. Station on November 15th, 1922. Of the other B.B.C. Stations and transmitters incorporated in the

grouping, Sheffield—a city where broadcasting amenities had already been enjoyed for some period as the result of the initiative of a Sheffield citizen, Mr. Frederick Lloyd—had been opened on November 14th, 1923, Liverpool on June 11th, 1924, Leeds-Bradford on July 8th, 1924, Hull on August 15th, 1924, and Stoke-on-Trent on October 21st of that year.

By the summer of 1928 these various transmitters, despite the fact that the Relay Stations were committed to taking a considerable number of the national programmes, were radiating programmes reflecting many important current activities in the North, with the result that listeners were enabled to hear such events as the Laying of the Foundation Stone of Hull University College, the Opening of the New Tunnel under the Mersey, the Lancashire and Yorkshire Cricket Matches at Sheffield and Old Trafford, and a series of talks by well-known Northern personalities, including the Dean of York, Mr. E. D. Simon, M.P., Professor G. W. Daniels, Alderman J. R. Nuttall, and Miss Margaret Law, on "Cities of the Industrial North." These talks gave not only a comprehensive survey of Northern characteristics and the evolution of industry, but also an idea of the importance of each city as an individual entity and also as a member of a great commonwealth. During the summer of 1928 a further extension was made to the relaying of music from Northern resorts, and the large orchestral concerts at Scarborough and Llandudno, and band concerts from the Southport Promenade, were heard by Northern listeners, in addition to relays from other Northern resorts, some of which have already been mentioned as figuring in the summer programmes of 1927.

In general, the autumn of 1928 may be regarded as a period of intensive transition from the old individual Stations to the collective grouping. The orchestra at Manchester, which had hitherto been engaged on weekly contracts, was put on a more definite annual basis and became known as the Northern Wireless Orchestra. A highly important Education Conference was organised by the North Region at York in October, among the principal speakers being the then Archbishop of York (now Archbishop of Canterbury), and Sir Henry Hadow, Vice-

Chancellor of Sheffield University. This conference led eventually to the formation of two B.B.C. Adult Education Councils in the North. These were the North-Western Area Council, under the Chairmanship of Dr. W. H. Moberly, Vice-Chancellor of Manchester University, and the Yorkshire Area Council, under the Chairmanship of Sir Percy Jackson, Chairman of the West Riding Education Committee. The aim of these Councils was to promote the formation of groups of persons listening to and discussing the B.B.C.'s Adult Education talks, an aspect of broadcasting which is dealt with more fully in pp. 175-180 of this book.

Several conferences between the Station Directors in the Region took place, and agreement was reached on the best methods of co-ordinating future programmes, and also of effecting the administrative changes entailed by the future establishment of the alternative programme system in the North.

But it was not until 1929 that the real and definite characteristics of the North Regional organisation and its programmes began to take shape. While, on the one hand, economies were effected by the transference of Station Directors and programme staff from some of the outlying centres, a rational concentration of activities on the Manchester and Leeds offices and studios was carried through in such a way as to ensure the maximum continued maintenance of local programme activities consonant with the improvement of studio programmes and the considerable development of outside broadcast activities in various districts which had hitherto remained untapped. The Children's Hours were centralised at Manchester and Leeds, each of which supplied this feature on alternate days of the week. The Manchester Station Director was appointed North Regional Director, and in April the Manchester staff moved into the North Regional Offices at Broadcasting House, Piccadilly. From that time onwards these offices definitely assumed the position of the Northern Headquarters of the B.B.C., and have played a vital part in the building up of Northern broadcasting under the new regime.

Meanwhile, exhaustive investigations of the country on and around the Pennine Range had been undertaken by

the B.B.C.'s engineers, and before the end of 1929 a site for the Northern transmitters had been selected on the high ground above Slaithwaite, to the west of Huddersfield.

During the summer months the experiment of relaying music from the various Northern resorts was again repeated and crystallised into a definite programme institution, while in the winter a considerable number of the concerts by the Halle Society, the Liverpool Philharmonic Society, and the Leeds Symphony Orchestra, were offered to listeners through the medium of the chain of transmitters. Certain definite new developments occurred during this year, which have ever since characterised the Northern programmes. One of these was the initiation of a policy for mirroring the distinctive life and problems of the Region. Important events in Northern industry, such as the 35th Anniversary of the Manchester Ship Canal on January 1st, the Port of Hull Banquet on March 18th, and the Inauguration of the Five Counties Coal Scheme, were duly reflected in the programme service. In addition, the whole field of Northern industrial problems was tackled by leading experts in the textile, steel, coal, and other industries, among the speakers being Professor A. M. Carr Saunders, Professor of Social Science at Liverpool University, Sir Ernest Thompson, then President of the Manchester Chamber of Commerce, Professor Aldred F. Barker of Leeds University, Sir Robert Hadfield, Bt., Mr. Herbert Shaw, Secretary of the Newcastle Chamber of Commerce, and Professor Henry Clay of Manchester University. Among the many important civic and musical events which took place in the North during that year, and which were rendered available to listeners in one way or another, either by eye-witness accounts or outside broadcasts, were the Bolton Civic Week, the Leeds Triennial Musical Festival, the Enthronement of Dr. Temple as Archbishop of York, the annual meeting of the British Medical Association at Manchester, the World-wide Boy Scouts' Jamboree at Birkenhead, the Opening of the Dutch Exhibition by the Prime Minister in the Art Gallery at Bradford, and of the Autumn Exhibition in the Liverpool Art Gallery by Sir Archibald Salvidge, the Royal Agricultural Show at Harrogate, the Northern Command Tattoo, the National Eisteddfod of Wales at Liverpool, the



THE AERIAL OF THE OLD MANCHESTER STATION (2ZY)

Brass and Military Band Contests at Belle Vue, Manchester, and the Catholic Emancipation Centenary Celebrations of the Liverpool Arch-Diocese.

Under the old regime each Station had been assisted in the arrangement of its religious services by its own advisory committee, consisting of members of the various denominations. In view, however, of the need for establishing a joint Religious Advisory Council to cover the whole area, these various committees were wound up during 1929, and a Regional Religious Advisory Committee, meeting twice a year at the North Regional Offices, was established under the Chairmanship of the Bishop of Wakefield.

Another interesting development during this year was an increased co-operation, for the purpose of producing broadcast plays, with various bodies of repertory players in the North, the B.B.C.'s studios being put at the disposal of organisations such as the Leeds Art Theatre, the Leeds Civic Players, the Liverpool Playhouse, the Sheffield Repertory Players, and the Little Theatre at Hull. Moreover, plays of Northern life, and dramas written by

Northern playwrights, began to figure more prominently among the performances given by the Manchester Studio Repertory Players.

The necessity for placing the various Relay Stations on the common wavelength involved certain restrictions on group broadcasting during the winter of 1929-30, but despite these restrictions a considerable number of joint programmes were radiated by all Stations during the day-time, and many of the concerts by the Halle and Liverpool Philharmonic Societies and the Leeds Symphony Orchestra were again made available to listeners. New ground was also broken in the relaying of certain concerts organised by some of the well-known choral societies of the West Riding of Yorkshire. In the summer of 1930 the North Region launched out on the most ambitious orchestral project which has ever been undertaken in the Provinces. This was nothing less than the arrangement of four weeks' continuous Promenade Concerts, in conjunction with Sir Hamilton Harty and the Halle Orchestra, in three Northern cities. This experiment was launched in the Free Trade Hall, Manchester, on May 26th, where two weeks of concerts were given, and was continued for a week in the Liverpool Philharmonic Hall, starting on June 9th, and concluded by a week in the Victoria Hall, Leeds, starting on June 16th. The idea of the concerts was two-fold—to offer to Northern and National listeners first-class orchestral music during the early weeks of the summer, and to enable members of the general public to attend orchestral concerts at the cheapest possible prices. Such a large-scale project had never been attempted before, and although it was realised at the outset that the concerts could not pay their way at the prices offered, they were a success, having regard also to their programme value from a broadcasting point of view. But it was felt by the B.B.C. that an attempt of this kind to put Northern orchestral music on its feet at a period of the year when such concerts were not normally given, might conceivably give a lead to various organisations and municipalities in the direction of forming and maintaining a touring orchestra in the North, whose members would be able to receive permanent employment all the year round. Why this attempt was not followed up, and why, therefore, the Promenade

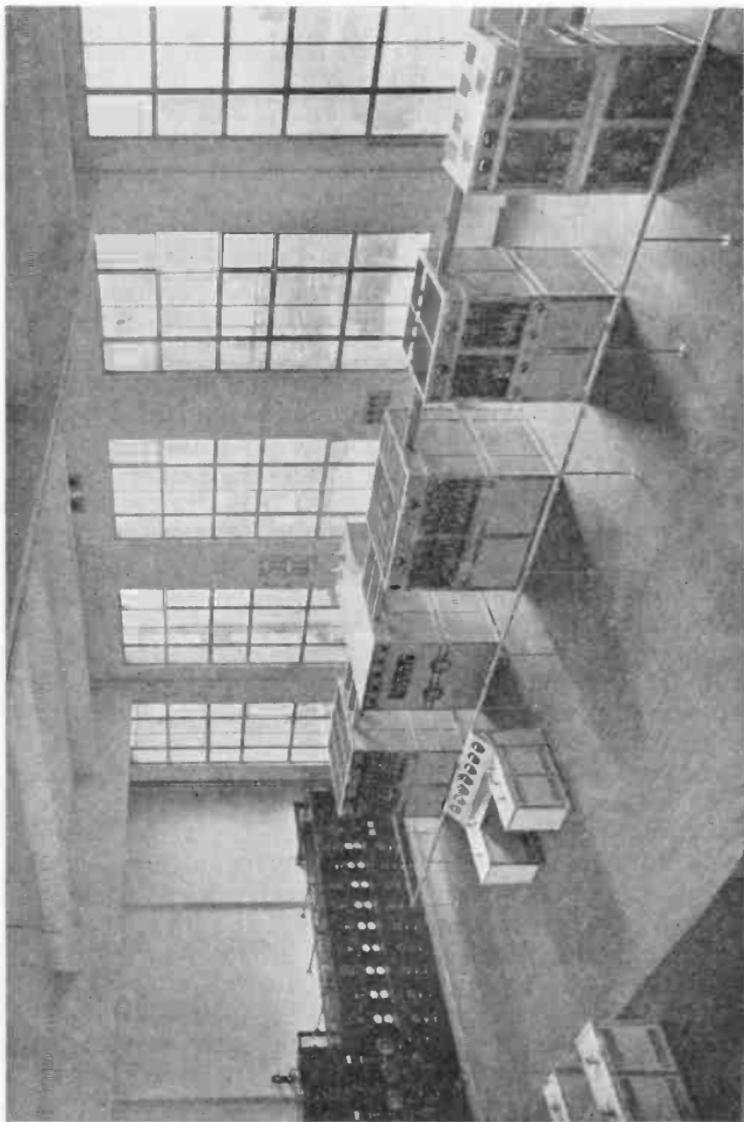


FEEDER LINES AND THE INSULATED BASE OF AN AERIAL MAST

Concerts were not repeated in 1931, is explained in a separate article in this Year-Book.

Throughout 1930 the policy of reflecting industrial and civic interests in the Northern programmes was continued, and many important events and programmes, including the North of England Education Conference on January 2nd, the Welsh Singing Festival at Corwen on March 27th, the Archbishop of York's Presidential Address to the Classical Association at its annual meeting in Hull on April 9th, the 50th Anniversary of the Bradford Art Gallery on April 11th, the Josiah Wedgwood Bi-Centenary Celebrations and the Manchester University Jubilee Celebrations in May, the Secretary of State's speech at the Forfeit Feast in the Cutlers' Hall, Sheffield, on June 27th, the Departure of the White Star Liner "Britannic" on her Maiden Voyage on June 28th, the Jubilee Service of the Diocese of Liverpool on July 13th, and the Manchester and Liverpool Railway Centenary Celebrations on September 13th, enabled the B.B.C. to offer a comprehensive kaleidoscope of the shifting currents of Northern life. Advantage was also taken of the newly laid cable between the mainland and the Isle of Man. For the first time the Tynwald Ceremony, one of the oldest Parliamentary Institutions in the world, in which the promulgation in Manx and English of the new laws of the Isle of Man has been made annually for the last thousand years, was broadcast on July 5th. Listeners were also able to hear a running commentary, from various places on the course itself, on the Senior T.T. Cycle Races in the Isle of Man on June 20th.

Early in the year Newcastle, which had hitherto continued as a Main Station, took its place as a component part of Northern broadcasting. This Station was one of the oldest of the B.B.C.'s Main Stations, its inauguration dating back to the winter of 1922. During subsequent developments it has continued to retain its local transmitter. Though this transmitter now works on the common wavelength and relays the National programme, the Newcastle offices and studios act as a channel for furnishing North-Eastern material to the North Regional programme. In fact, incidentally, it should be pointed out that the accession of Newcastle to the North Region



PART OF THE TRANSMITTER HALL

has brought a wealth of interesting programme resources into the general pool of material available for Northern broadcasting.

Among the many studio re-arrangements which took place in 1930, was the centralisation of the Children's Hour at Manchester, and it is interesting to record that the membership of the Radio Circle, run in connection with the North Regional Children's Hour, stood approximately at 20,000 in July 1931.

During the first half of 1931 a vast extension of outside broadcasts was undertaken. For this purpose a "flying squad" of engineers, freed as the result of the closing down of some of the old local transmitters, was formed at Manchester. There is insufficient space to comment on the great variety of new material thus brought into the programmes, but mention should be made of the microphone's entry into many of the best theatres and music halls of the North, for relays of revues and variety performances therefrom. The policy of giving expression to the more serious side of Northern activities was also continued. Studio debates and discussions on problems in Northern life began to take a more frequent place in the programmes. Among the outstanding events which were rendered available to listeners were a talk by the Secretary of State for War on "The British Cotton Textile Exhibition," on February 10th, speeches by the Lord Mayor of Newcastle and Lord Grey of Fallodon on the occasion of the jubilee of the Newcastle-on-Tyne Public Library on March 10th, Mr. A. K. Wilson's address to the Sheffield Chamber of Commerce on March 18th on his return from the Sheffield Trade Mission to South America, the address by Sir Halford Mackinder at the Geographical Association's Spring Meeting in Manchester on April 10th, the address by Sir Malcolm Campbell on "British Enterprise," at the Luncheon of the Bradford Rotary Club on April 28th, and speeches by the President of the Board of Trade and others on the occasion of the Opening of the new Bromborough Dock at Port Sunlight on the same day, speeches by the Lord Mayor of Manchester and Lord Barnby at the Banquet celebrating the 21st anniversary of the Textile Institute on April 23rd, and a specially arranged interview on board the M.V. *Britannic* with the Lord Mayor of Liverpool

and the Secretary of the Manchester Chamber of Commerce on the occasion of their departure to America in connection with trade matters on April 24th. The emergency relay of the Prince of Wales' speech to members of the Manchester Chamber of Commerce in the Free Trade Hall on his return from South America was probably the most rapidly organised "outside broadcast" undertaken by the B.B.C. It was arranged at an hour's notice.

Meanwhile, the finishing touches had been put to the masts and to the transmitter building at Moorside Edge, and the new Station had begun to take the air in gradual stages. On March 23rd test transmissions outside the normal programme hours were started on the North Regional wavelength (479 metres). On April 20th the North Regional transmitter took over part of the North Regional programme service. A full single programme service, consisting partly of national and partly of regional items, began to be radiated by the North Regional transmitter on May 17th. Then on June 8th the North National transmitter began to radiate test transmissions.

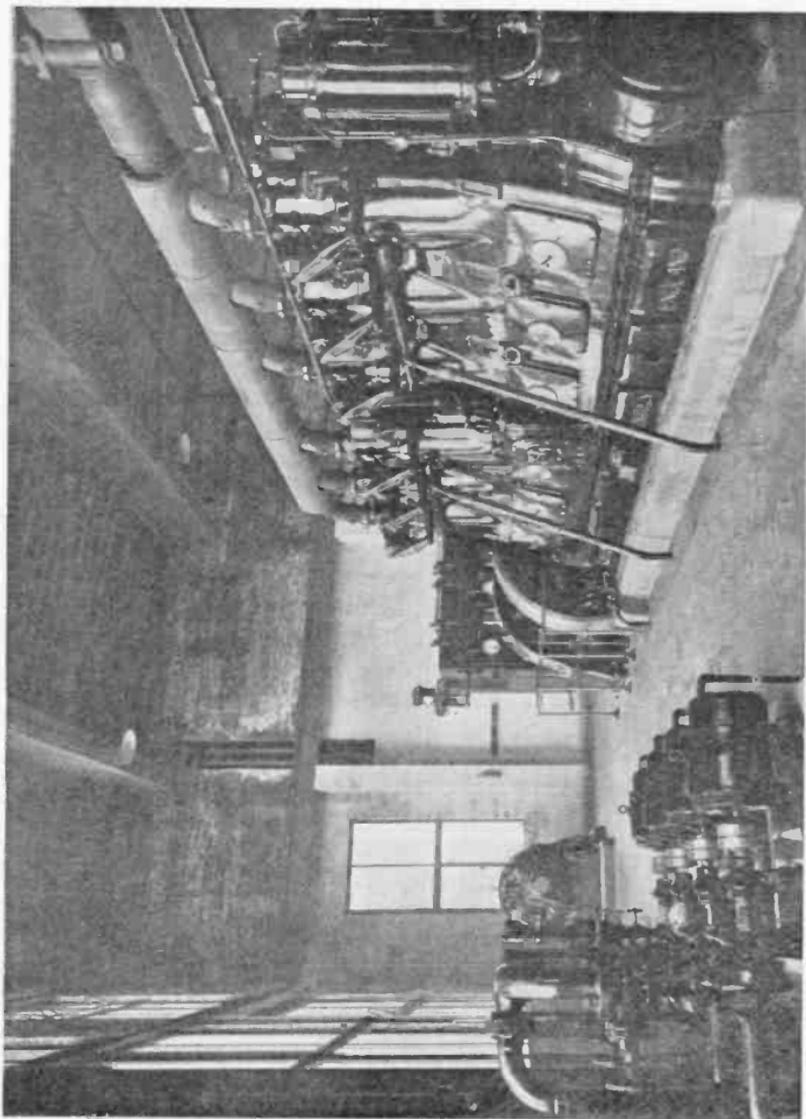
At length, on Sunday, July 12th, when simultaneous programmes on a regular scheme were sent out from both of the Pennine aeriels the engineering, programme, and administrative activities, which had been directed to this end for the past several years, were completed. By the time that this Year-Book is published Northern listeners will have been able to gauge during several months the effect of this revolutionary change in Northern broadcasting. As listeners, they have been offered a free choice between the National programmes on the one hand and a programme service which very largely mirrors Northern interests and activities on the other. In addition, it may perhaps be claimed that the introduction of a regional programme service, based on a region containing a population of approximately fifteen millions, is not without its interest, both within and without the North of England, as a social experiment on a large scale.

THE TWIN TRANSMITTERS

IN THE YEAR-BOOK FOR 1931 there was a short article describing the progress that had been made with the construction of the B.B.C.'s North Regional Station at Moorside Edge, near Huddersfield. Since that time the erection has been finished and the introduction of a dual programme service in the North has been completed. The Station is now regularly transmitting two programmes, the Regional on 479 metres (626 kc/s) and the National on 301 metres (995 kc/s).

This is the second twin-wave Regional Station to be built by the B.B.C., the first at Brookmans Park to serve the London area having been in operation now for almost two years. In the North, a more difficult problem had to be faced; the area to be covered, from Liverpool in the west to Hull in the east, is greater, and the population exceeds ten millions. The difficulties from a wireless point of view are increased by the ridge of high land running north and south which divides the region geographically into two parts, and the site of the station was necessarily chosen on the wild moorland over 1,100 feet above sea-level. The construction work was delayed somewhat by bad weather which made mast building and outside work difficult, and on many occasions impossible. However, the difficulties were overcome and the first public test transmission of the Regional transmitter took place on March 23rd, 1931.

The design of the Station closely follows that adopted for the London Regional Station. In fact it is only in detail that the building and its equipment differs from that of the earlier Station. In the mast and aerial arrangement, however, the design is quite distinct. At Brookmans Park the B.B.C. was limited by Government regulations to a mast height of 200 feet, but at Moorside Edge no limitation was imposed, and three stayed lattice masts, each 500 feet high, have been erected in triangular formation. The design of the two aerials, each supported by two masts, one mast being common to both, has been the subject of considerable experimental work, in order to determine the best type to use having regard to the area to be covered and the wavelengths to be used. The design finally adopted for the Regional transmitter is a T-type aerial with



THE POWER HOUSE—SHOWING ONE OF THE DIESEL ENGINES

a top hamper of 200 feet and a down lead of 450 feet, and for the National an approximate half-wave aerial consisting of a vertical wire approximately 440 feet long.

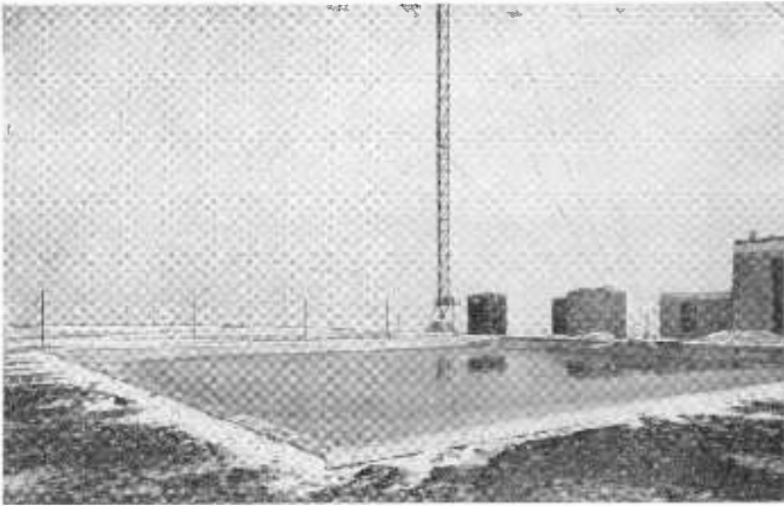
A series of field strength measurements of both transmitters was taken in the principal centres in the region to determine the actual signal strengths given by different aerial arrangements, the one which gave the most satisfactory signal strengths to the main centres of population being adopted in each case.

Energy for the Station is generated by Diesel plant, three months' supply of fuel oil being stored in two tanks each of 75 tons capacity at the rear of the building. The whole building is heated by waste heat from the Diesel exhaust gases, an auxiliary oil-fired heater being installed for use when the Diesels are not running. Direct-current generation at 230 volts has been adopted in order to allow for the installation of an accumulator battery to take care of off-load periods and to provide an emergency source of supply in the event of temporary engine breakdown.

The four Diesel engines, each of which is rated at 345 B.H.P. at 335 R.P.M., are slightly larger than those at Brookmans Park, and similarly the high-tension generating sets are each capable of supplying 230 kW. at 12,000 volts, as compared with the 160 kW. output of the Brookmans Park sets. The rest of the machine-room equipment, including the filament heating and grid bias machines, is a copy of that at Brookmans Park.

In the transmitter hall, the satisfactory layout of Brookmans Park has again been adopted. The design of the two transmitters follows closely the arrangement of the London sets, but detail improvements have been made. Both transmitters are now working on full power, 70 kW. (Hague rating) in each case. A crypt running under each transmitter and under the main transmitter hall switchboard provides accommodation for auxiliary apparatus and wiring between machine-room and transmitters.

Some alterations have been made in the Control Room arrangements following the experience gained at Brookmans Park. The batteries for the speech input and line-testing equipment are housed in a room on the first floor where the battery control switchboard is also installed. Circuit switching is relay operated, an arrangement which



THE COOLING POND

ensures the shortest runs of "programme" wiring. The five private cable circuits connecting the Station to the Regional offices in Manchester are suitably equalised to obtain a substantially flat characteristic between 50 and 8,000 cycles per second.

To provide against failure of these circuits and the failure of reserves that can be brought into service at short notice, the Station is equipped with a rebroadcasting receiver for relaying the programme from Daventry 5XX in the event of emergency. An acoustically treated room in which careful checking of the transmission is carried out, as well as a local studio for test or emergency programmes, are provided in the office block in the front of the building.

An interesting feature of the plant is the 200,000 gallon reservoir which ensures a constant supply of water for the Diesel plant and other purposes, the water being passed through a treating plant to remove acidity and excessive softness, which would have a serious effect on pipework. The reservoir also serves as a cooling pond for the water circulating through the jackets of the water-cooled valves.

The procedure adopted for introducing the service was similar to that adopted in the case of Brookmans Park. As far as possible the B.B.C. tried to anticipate listeners'

difficulties in changing over from the reception of one of the several small transmitters to the reception of two programmes from the new high-power Station, by the issue of two booklets; the first, entitled "Receiving the North Regional Station," deals mainly with problems of sensitivity and the choice and installation of suitable sets, while the second tackles the question of "Selectivity" and how to separate one programme from the other. Possibly as a result of this careful preparation work, the introduction of the new service has caused little dislocation or inconvenience to listeners in the region.

Public reception tests of the Regional transmitter on 479 metres began on March 23rd, 1931, and the Station took over the service from the low-power Manchester transmitter it has replaced on May 17th, 1931. Simultaneously the relay transmitters at Leeds and Bradford were closed while the service from the other Northern relay transmitters at Stoke, Liverpool, Sheffield, and Hull was suspended to enable their listeners to receive the new Station without having to eliminate a strong local signal.

The National transmitter radiated its first test on June 8th, 1931, and the full dual programme service began on July 12th, 1931. The new Station will enable the B.B.C. to tap programme resources which could not be exploited under a single programme system, and Northern listeners may therefore be assured that their programmes will reflect the improvements in transmission.



THE MACHINE ROOM—FILAMENT CURRENT GENERATORS (LEFT) AND
312,000 VOLT H.T. GENERATORS AT THE BACK

TECHNICAL
SECTION



Keystone

ONE OF THE AERIALS ON BROADCASTING HOUSE

(These aerials are used for reception of the B.B.C.'s own transmissions for checking purposes)

NOTES OF THE YEAR

THE EASE OF HANDLING a modern broadcasting receiver may lead some listeners to forget the care they had to exercise five years ago. At one time the fact that a receiver contained a large number of knobs and dials was considered rather an asset. To-day receiving equipment has been so simplified that its working requires no more skill than switching on an electric light. Listeners to whom the working of their receiver still causes difficulty are reminded that instruments are to-day obtainable which take all their power from the electric light mains, and which can be changed from one programme to the other as easily as turning on a tap. The present-day receiver is an inexpensive article and really good reproduction can be obtained for a modest expenditure. Those who experience trouble in maintaining batteries in good condition can now obviate it completely provided an electric power supply is laid on in their homes. Furthermore, listeners who require only to receive, say, the National and the local Regional programmes can obtain all-mains receivers which will reproduce either programme merely by turning a switch.

* * *

The congestion in the ether, due to the rapid growth of broadcasting and the limited wave band allotted to it, has lately become a very serious problem. London Regional listeners had practical evidence of this during last winter (1930-31), immediately after the high-power German transmitter, Mühlacker, near Stuttgart, commenced operations on the ether channel next to the London Regional transmitter. The interference sometimes took the form of a more or less continuous whistle; or in certain circumstances it produced a background of the German programme during soft or silent passages in that of the London Regional transmitter.

* * *

From the above it will be realised that the shortage of ether channels is placing severe limitations on the development of broadcasting. Quite apart from the welfare of the actual national broadcasting organisations, it must be borne in mind that the manufacture of receiving equipment has become a large industry and will suffer some

limitation if the expansion of broadcasting is hindered by the wavelength dilemma.

Possibly at the Madrid Conference in 1932 the band of wavelengths at present allotted to broadcasting may be extended, but even if other users of the ether agree to such an extension it will prove a future rather than an immediate solution to the congestion which has now developed.

* * *

The shortage of wavelengths has enforced broadcasting authorities to explore the possibility of working more than one transmitter on one wavelength. The B.B.C. has developed a system of synchronisation on which it has worked eleven relay transmitters successfully for some years. The degree of wavelength stability which has to be maintained by a transmitter employing a shared wavelength is very high, namely, of the order of three parts in one million. Even with this standard of stability it is usually necessary for each station sharing a wavelength to radiate the same programme, and to provide approximately three times the signal strength to a listener than he obtains in composite from the other transmitters working on the same wavelength. The widely differing programme requirements of the various areas in the British Isles limit the extent to which synchronised working can be employed.

* * *

In November 1927, the B.B.C. commenced transmissions from an experimental short-wave Station G5SW situated at the Marconi works at Chelmsford. This transmitter works on a wavelength of 25.53 metres, with approximately 16 kilowatts in its aerial system. The object of the experiments was to ascertain whether there was a demand for the reception in the British Dominions and Colonies of a regular programme service from England, and if so, the best means technically of meeting it.

The experiments have provided the information sought. They have proved that a short-wave transmitter situated in England and working on a single wavelength can provide intelligible reception at some time of the year to almost every British Dominion and Colony, although reception is much better in some parts of the world than in others. It has also been shown that if two transmitters were used working on different wavelengths so that one can be re-

ceived when the other could not, the value of the service would be at least doubled. Definite schemes for an Empire broadcasting service were drawn up in 1929 on the basis of the experience and data thus gained, and discussed at both the Colonial Conference and the Imperial Conference in 1930. They were then submitted to the Governments and broadcasting authorities of the overseas countries concerned. The response, however, was small and the home Government has declined to proceed with the scheme. Matters, therefore, seem at a standstill.

* * *

The B.B.C. is frequently asked questions about the output capacity of power stages and the requirements for filling rooms of various sizes with comfortable loud-speaker volume. This is a problem which depends very much, *inter alia*, upon the sound-absorbing properties of the room or hall which it is desired to fill, but the following may serve as a rough indication.

It has been found by experiment that an average sitting-room, furnished in the usual way with easy-chairs, carpet, curtains, and of dimensions approximately 20' long \times 15' wide and 10' high, can be filled to a level which is comfortable for listening if the input power to the loud-speaker is approximately $\frac{3}{4}$ of a watt, assuming that this input can be obtained from the receiver without admitting audible distortion. Various authorities have expressed figures which show the ratio of undistorted speech output to the D.C. input to the anode of the final stage, and these vary between 10 and 25 per cent. It is thought, therefore, that a figure in the neighbourhood of 15 per cent. can be taken as reliable under normal conditions. Assuming an efficiency figure, *i.e.* power output to the loud-speaker to power input to the anode, of 15 per cent., an "undistorted speech output" of $\cdot 75$ of a watt could be obtained if the power to the anode of the final stage was of the order of 5 watts. These figures, of course, are based upon the use of a modern sensitive loud-speaker and upon a correct impedance match between the last stage and the loud-speaker.

* * *

Between September 23rd and October 3rd, 1931, an Exhibition was held in the Albert Hall to commemorate the centenary of Michael Faraday, to whose pioneer work the

many branches of the electrical industry owe their development. Various organisations and manufacturing associations showed exhibits at this Exhibition which also contained some of Michael Faraday's original apparatus and notes. The B.B.C. undertook the somewhat ambitious task of erecting in the Albert Hall a complete high-power transmitter. Actually the transmitter which was exhibited was one of the two transmitters which are now being erected at the Scottish Regional Station near Falkirk. The transmitter was, of course, shown only in still life, as space did not permit the inclusion of any of its power supply, speech input gear, or aerial equipment. Time did not permit more than about half the internal wiring in the various units to be finished, but sufficient was installed to give the various units a completed appearance. Visitors at the Exhibition showed considerable surprise at such elaborate apparatus being necessary for transmitting one programme, but, of course, the actual transmitter represents only a small part of the total equipment which is necessary at a Regional Station.

* * *

The limitations affecting the use of wavelengths under 500 metres for broadcasting purposes, *i.e.* the presence of distortion and fading outside a radius of approximately 70-80 miles after nightfall, has stressed the importance of the Daventry National transmitter, 5XX. Without doubt this transmitter serves a far larger audience than any other in the British Isles, and it is received regularly by listeners on the Continent. The value which the transmitter has been to British listeners during the past six years of its working, particularly to outlying districts, has been enormous. The Daventry transmitter was built in 1925 and began regular transmissions in July of that year. Experiments with a long-wave high-power transmitter had previously been carried out at the Marconi works at Chelmsford, on the results of which the design of the Daventry transmitter was based. At present Daventry 5XX is capable of putting 35 kilowatts into its aerial system and of giving a reasonably straight response to all frequencies between approximately 80 and 5,000 cycles.

During the years that Daventry has been in regular service great strides have been made in the design of trans-

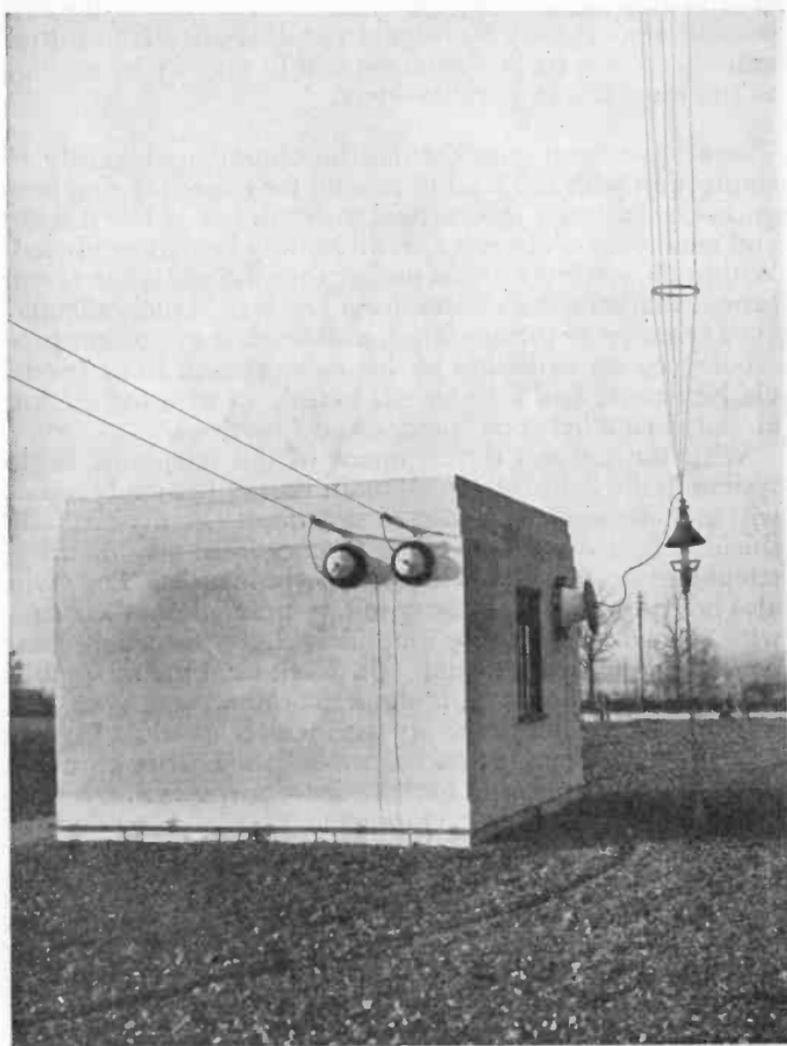
mitters, and there is no doubt that the design and performance of the present Daventry transmitter could now be greatly improved. The B.B.C. therefore intends at the first possible opportunity to rebuild the Daventry transmitter entirely so that its performance will in no way be inferior to the most modern transmitters.

* * *

There have been considerable developments recently in connection with the land lines used for interchanging programmes between the various transmitters of the B.B.C., and new types of circuits are still rapidly being introduced. Within the last few months underground circuits have been brought into use from London via Leeds to Manchester and via Daventry to Birmingham, and work is at present proceeding on an extension of this cable system from Leeds, via Newcastle and Edinburgh, to link up with the section already in use between Dundee and Aberdeen.

With the normal development of the telephone cable system in the British Isles, all main Post Office cable routes will include specially designed broadcast circuits carefully shielded against inductive interference from neighbouring telephone circuits and other outside influences. They will also be equipped, every forty to fifty miles along their run, with special high-quality amplifiers and "distortion-compensating" networks to maintain good strength and quality of the programme currents along the route.

The extraordinary rapidity with which broadcasting has developed in recent years has made it necessary to bring into use a cable network for broadcast purposes in advance of ordinary telephone development. This has been done in the case of the London-Leeds-Manchester link by special modification of the existing circuits and telephone amplifier equipments. These modifications of the cable circuits are of a very costly and elaborate nature, but the service which has resulted has undoubtedly been a great improvement over the best that could have been expected with the old overhead telephone lines. In a comparatively short time a further step will have been achieved when the modified telephone apparatus at present in use is replaced by the specially designed broadcast amplifiers at all intermediate stations along the routes.



AN AERIAL TRANSFORMER HOUSE AT BROOKMANS PARK

THE NEW HIGH-POWER STATIONS

EXCELLENT PROGRESS has been made during the past year with the construction of the new high-power stations, which are designed to give to the majority of listeners a choice of two programmes. Each of the two transmitters at these stations uses about fifty times greater power than the old ones, and is planned to serve whole regions rather than single towns or cities.

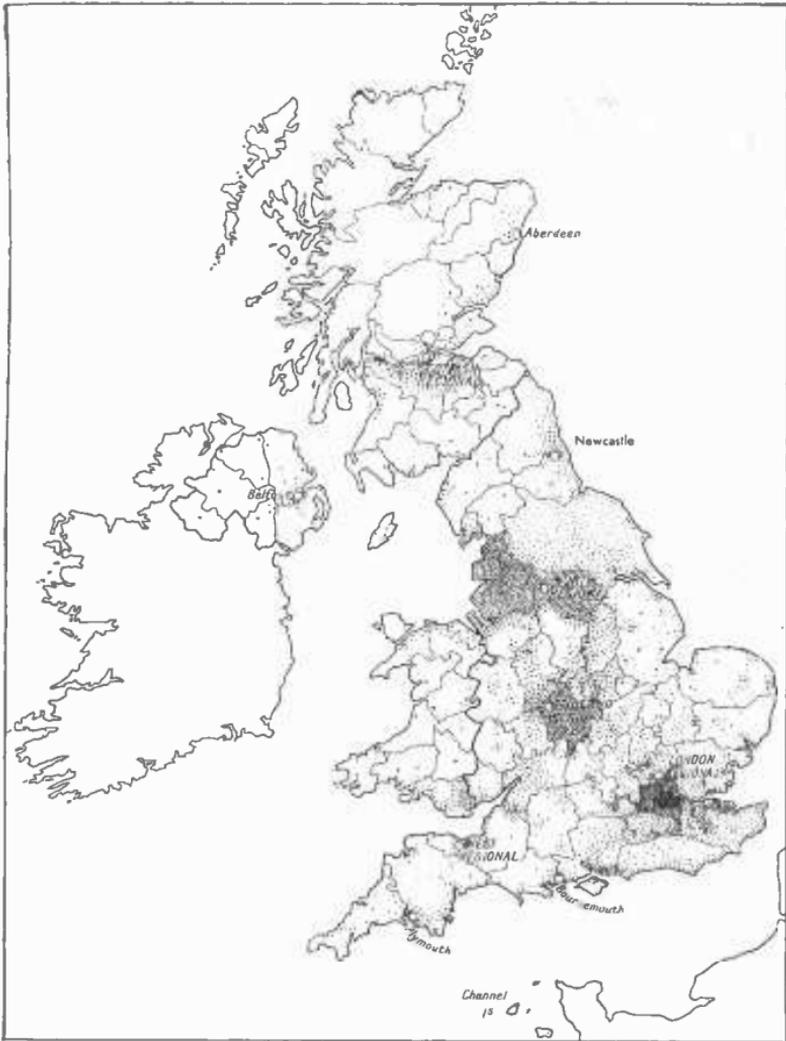
The first station of this type was Brookmans Park, which has now provided a dual programme service to London and district since March 1930. The second station, often known as Moorside Edge, but officially called the North Regional Station, started work under full service conditions on July 12th, 1931. This station is of particular importance, since it serves the densely populated industrial areas of the North. It is in a way unfortunate that such an area should be very hilly, in fact almost mountainous in character, because the flatter the country the more easy it becomes to provide a good service from the technical point of view. However, in an endeavour to give the best service in spite of this difficulty it was decided to allot to this station the longest wavelength which is available for use in this country, with the exception, of course, of 1554 metres, which is used by Daventry 5XX, to give a service to those districts all over the country which are not served by other stations. Thus 479·2 metres became the wavelength for the Regional programme in the North. The other wavelength of 301 metres, which is used at Moorside Edge for the National programme, is, of course, much shorter, and therefore bound to cover a smaller area. This cannot be helped, as the considerable difference between the two wavelengths is obviously essential to allow the two programmes to be separated easily, and since the Regional wavelength is the longest available, the second wavelength must be appreciably shorter. However, it must be remembered that 5XX also transmits the same programme and is therefore available when reception on the 301 metre wave is not satisfactory. It seems to be universally agreed that the Regional transmitter on 479 metres gives a highly satisfactory service, both as regards quality and range. In

fact it is the most widely received transmitter in this country, with the exception of 5XX.

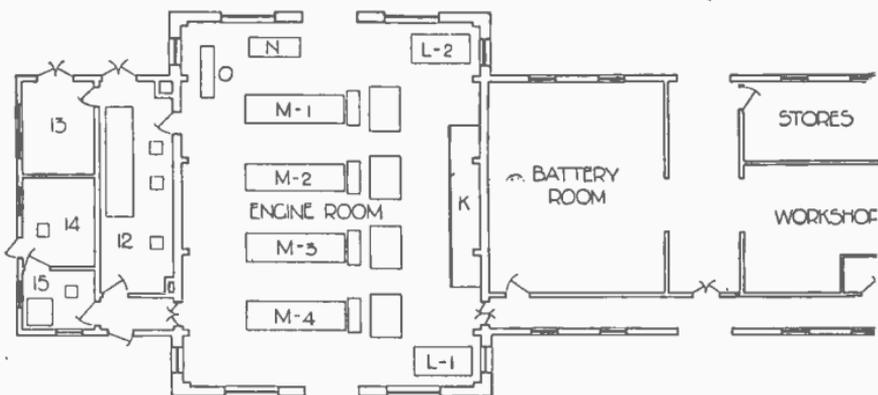
While the North Regional Station was approaching completion, work was started on a similar station to serve Scotland. Since it is necessary to give the best service to the greatest number of people in any particular region, the new Scottish station has been placed at Westerglen, near Falkirk. This site being almost midway between Edinburgh and Glasgow, the best possible service will be given to these densely populated districts. By the time this Year-Book appears the building will be complete, and some of the machinery installed. Every effort has been made to have the building sufficiently advanced before the winter to prevent delays due to bad weather, and there is now no doubt that this will materialise. In the case of Moorside Edge it was not possible, and the work was carried on under great difficulties during a large part of last winter.

The site for the next and last station to be built to complete the scheme has been chosen in Somerset, at Washford Cross, near Watchet. It will provide a good service to the populous districts of South Wales and the West of England, within a radius of about eighty miles. Many people have wondered why a station largely intended to serve Wales should be placed fifteen miles or so away from the nearest point in Wales. The reason is that by this means it is possible to give a service to more people in Wales itself than by locating the station actually in Wales. This is because the radiation reaches a large part of the coast-line of South Wales, including many important cities and towns, by travelling directly over water. Were the station in Wales itself, a comparatively small district would get overpoweringly strong reception, but many of the districts which will now be reached over water would get a much weaker service, because the radiation would have to pass over land of a very hilly character. As is well known, wireless waves will pass over water with very little loss, although when passing over broken country the loss, or attenuation as it is called, is very high. Preliminary work on this station is well in hand, and every effort will be made to complete the station in the shortest possible time.

With Daventry 5XX, and the Midland Regional transmitter 5GB, forming part of the scheme, a point has been



MAP SHOWING THE B.B.C. TRANSMITTERS IN RELATION TO DENSITY OF LICENCES AT AUGUST 31, 1931

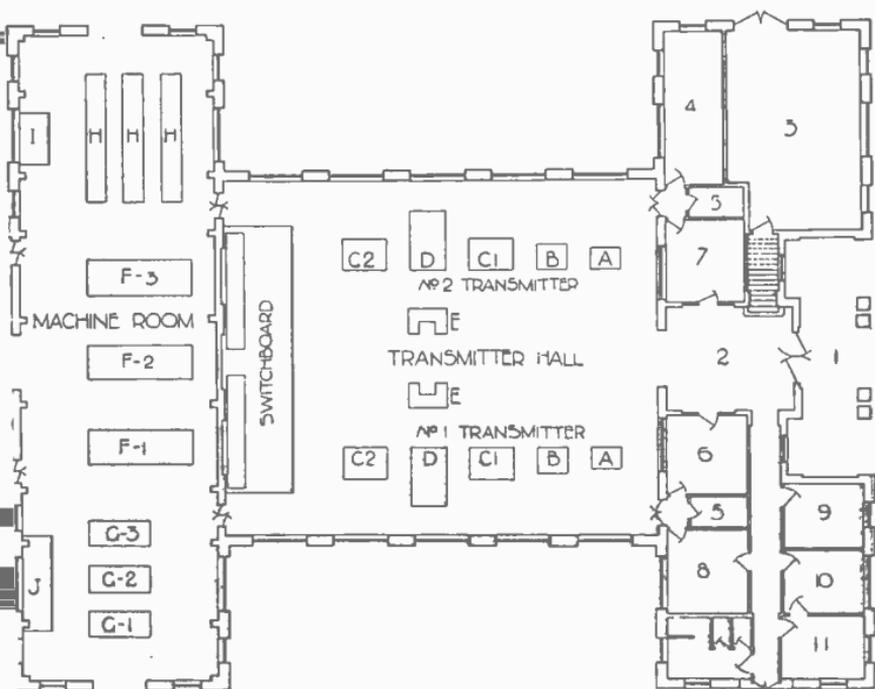


GROUND PLAN OF THE MAIN BUILDING OF THE NORTH REGIONAL STATION AT MOORSIDE EDGE

1, Loggia; 2, Entrance and Waiting Hall; 3, Garage; 4, Transmitter Store; 5, Store; 6, No. 1 Control Room; 7, No. 2 Control Room; 8, Test Room; 9, General Office; 10, Engineer-in-Charge Office; 11, Maintenance Engineer; 12, Exhaust Heater Room; 13, Engine Room Store; 14, Water Treating Room; 15, Oil Filter Room. F1-2-3, H.T. Motor Generator Sets;

reached where over half of the stations are in full operation, while of the remaining two stations, one is half finished and work on the other has just begun.

The new transmitters employ approximately the same power, namely, 50 kW. carrier power in the aerial; thus the range which they are capable of reaching depends only on the wavelength which they are using and the nature of the country which they are serving. Some people are confused because this does not apply to long-distance reception during the hours of darkness; but in this case the attenuation of the waves over the surface of the earth has comparatively small effect, and the strength of reception depends largely on the particular atmospheric conditions



F1-2-3 Filament Current Motor Generator Sets; H, Small Motor Generator Sets; I and J, Motor Control Switchboards; K, Engine Room Switchboard; L1-2, Booster Sets; M1-2-3-4, Engine-Generator Sets; N, Water Pumps, O, Air Compressors.

obtaining at the time, and the particular distance at which the observation is being made. Thus it may well be found that at a distance of, say, 200 miles from the North Regional Station, on a particular occasion, the National transmitter may be stronger than the Regional.

Although with the completion of the new station near Watchet the scheme will be essentially complete, it will not mean that the end of the building programme has been reached. Both 5XX and 5GB are due for reconstruction, 5XX because the time is approaching for it to be brought up-to-date, and 5GB because it was originally built on an experimental basis.

Finally, the Belfast transmitter, although it must of

necessity remain a single station, will be rebuilt on modern lines, with some increase of power.

All specifying, supervision, and testing of these new stations is carried out by the B.B.C. engineering staff, as it is considered that in this way the greatest amount of specialised experience can be incorporated in the new stations, although this does not mean, of course, that the B.B.C. does not make the fullest use of outside experience.

It is hoped that much of the work still remaining to be done can be carried out concurrently, but it would be unwise in these days of continual change in technical conditions, particularly those of an international character, to attempt to lay down a definite time-table.



M. RAYMOND BRAILLARD

President of the Technical Commission of the U.I.R.

THE WAVELENGTH PROBLEM

EXCLUSIVE of the Russian stations and those stations working outside the medium waveband (200 to 550 metres) there are, at present, about 160 broadcasting stations now working in Europe. The majority of these stations are working according to what is known as the "Prague Wavelength Plan," which is the name given to the allocation of broadcasting wavelengths agreed between representatives of the European postal and telegraph administrations assembled at Prague in April 1929.

The International Radio Telegraphic Convention, signed at Washington in 1927, had allotted bands of wavelengths to the various services. The International Broadcasting Union had, by private agreement among its members, achieved considerable success in Europe by its Geneva plan of 1926 and the Brussels plan of 1928. These two plans made detailed allocations to European countries of wavelengths within the broadcasting band allotted by the Washington Convention. They suffered somewhat from incomplete application, but were nevertheless of great benefit to European broadcasting, and undoubtedly prevented chaos which would have resulted in the absence of international co-operation. The work of the Union, therefore, formed the basis of the Prague plan, and indeed it was officially recognised in the Prague Protocol as the expert consultant of the European administrations in broadcasting matters. A simple calculation will show that the medium waveband of 200 to 550 metres is equivalent to 1,500 to 545 kc/s. In the Prague plan this band was divided into 106 channels to accommodate the claimant stations. Of these 106 channels, ten were International Common Waves to be used by any nation for small stations, one was a free channel (not allotted), and ninety-five were exclusive waves. It was necessary to reduce the separation between these waves to 9 kc/s—a figure which, at the time, was regarded as a minimum and only acceptable as the basis of an agreed plan. In the Geneva plan 10 kc/s had been regarded as the minimum separation, and this is still in use in the United States of America and in Canada.

The success or failure of any wave plan must first be judged in terms of listening to the local station. If all

European broadcast stations became assured of uninterrupted reception within their service area, as defined solely in terms of their power and wavelength employed, the wave plan employed could be considered a success. If in addition distant listening by means of properly designed receivers can also be assured, so much the better, but this must not be the first criterion of judgment.

The Prague plan was undoubtedly successful, where it was applied, for the first year of its existence, but the winter of 1930-31 showed up weaknesses which can, unfortunately, only be expected to multiply in the coming winter. The reason is not far to seek. The change in conditions in Europe in the past five years is shown thus:—

	Spring 1926, Plan de Genève.	Spring 1929, Plan de Prague.	Spring 1931.
Total number of stations (U.S.S.R. ex- cepted)	119	189	213
Number of stations of the U.S.S.R. . .	?	11	48
Total number	?	200	261
Total power in kW. (C.C.I.R.) . . .	150	600	2,860
Number of stations of 20 kW. and more	1	5	44
Number of stations of 50 kW. and more	0	1	27
Maximum power in kW.	22	54	158
Mean power per station in kW.. . . .	1.1	3	11
Separation in kc/s	10	9	9

The figures for the increase in power of stations are indeed remarkable and, taken in conjunction with the increase in the actual number of stations, constitute the reason for the present shortcomings of the Prague plan. The practical result of this great increase in power of stations is now well known, viz. mutual interference. This interference extends at times into areas where the signal strength of the local stations is as much as 20 millivolts per metre (mV/m) in some cases, while listeners who have 10 mV/m—a signal hitherto considered as well in the service area—may get serious interference after sunset on receivers which in the past have been considered as sufficiently selective.

The outstanding example of this has been the interfer-

ence caused to listeners in the service area of the London Regional transmitter by the German transmitter at Mühlacker near Stuttgart. It is to be emphasised that both these transmitters are modern in design and that both are operated under conditions which are considered as correct by those competent to judge. This particular case of mutual interference is not unique, and unfortunately new cases must almost certainly be expected in the coming winter with the opening of more and more high-power stations. Indeed within the next year or so it is to be expected that the majority of stations between 550 and about 260 metres will be using powers in excess of 25 kilowatts, while at the present time four transmitters of over 100 kilowatts are either projected or working in this waveband (Budapest, Vienna, Prague, and Leipzig). What is the remedy and what is being done to meet the situation?

The interference is caused by the high value of signal strength produced at a considerable distance from a transmitter by the indirect ray, a ray which has not travelled to the receiver over the surface of the intervening earth, but has been reflected down again to the earth after reaching a layer of atmosphere known as the Heaviside-Kennelly layer. Space does not here permit detailed discussion of this subject, and it must suffice to say that transmitters of the power of those at the British Regional stations, Mühlacker, Beromünster, Rome, Stockholm, etc., may, under favourable conditions, produce indirect rays having values sometimes of over 5 mV/m at distances up to 600 miles or more. One solution to the problem would be to suppress, or at any rate materially to reduce the indirect ray. Unfortunately no means of doing this has yet been achieved, although much research has been carried out. The British high-power transmitters, where other conditions permit, use aerials designed to give the least possible amount of indirect ray. However, the gain is at present questionable, the present justification for such aerials being that they give a better efficiency for the wanted direct ray. Should the complete suppression of the indirect ray ever be achieved, and at the present time it seems very doubtful if it will, it might well be hailed by the listener as a mixed blessing, for while it would mean no interference at night on the local station, it would at the same time mean no

distant listening at night to stations which could not also be heard in the day-time.

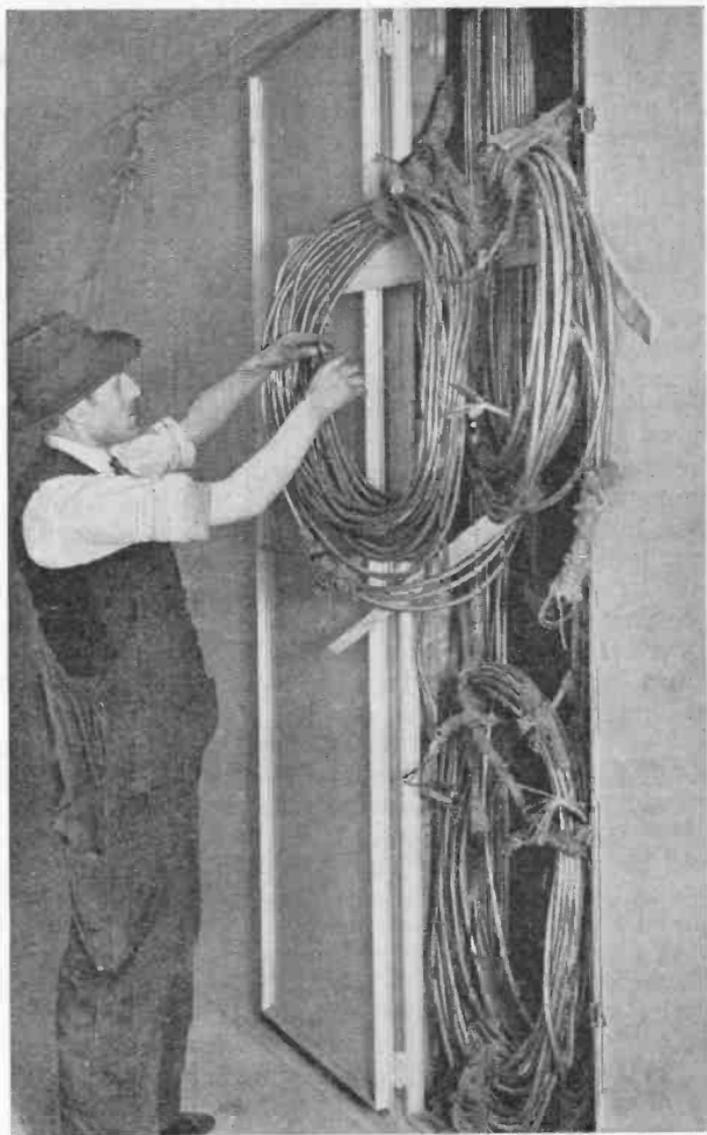
To turn to more immediate remedies and the steps which are being taken to apply them. A considerable amount of experimental work has been carried out to ascertain firstly the performance a receiver must have to cut out interference, and secondly the necessary separation in kilocycles per second between adjacent high-power stations in terms of the performance of existing commercial receivers. These experiments have been carried out in Germany by the central broadcasting authority (the Reichs Rundfunk Gesellschaft), in Holland by Dr. Van der Pol, and in this country by the B.B.C. They have been carried out partly in collaboration and partly independently, and it is pleasing to note that the results obtained all agree very well. The first experiment carried out jointly by engineers of the R.R.G. and the B.B.C., at the B.B.C.'s receiving station at Tatsfield, showed that, there, the interference from Mühlacker could not be cured in terms of improvement of receiver selectivity without such loss of acoustic quality of reproduction as seriously to compromise the artistic side of broadcasting. In this experiment the most unfavourable field strength ratio was of the order of 2 to 1. The only solution is, therefore, a greater separation in kilocycles per second between the stations. Laboratory experiments carried out independently in England and in Holland agree that a separation of 11 kc/s is necessary if a considerable improvement is to be effected. It should here be observed that unless the receiver has adequate selectivity, interference will still be experienced, but that it is possible to secure freedom from interference while preserving reasonable acoustical quality of reproduction.

THE LONG WAVELENGTHS

The practical step of increasing the separation between stations from 9 to 11 kc/s seems simple enough at first sight; but when it is remembered that the width of the band allotted to broadcasting is fixed, it becomes obvious that the increased separation between channels can only be achieved if the total number of channels is reduced. Practical experience of the working of the stations using the so-called "long" waves in Europe indicates that the

present separations are adequate, taking into account the extreme value of these waves and the impossibility of reducing their number. As an instance of the different conditions of propagation of these waves from those obtaining in the medium waveband, it is interesting to compare the interference caused by Zeesen to Daventry 5XX with that caused by Mühlacker to London Regional. Both Zeesen and Mühlacker have 75 kW. (Hague rating), and while the latter interference is very serious, the former is not so serious and can be overcome largely by increased receiver selectivity. This is due to the low values of indirect ray produced as the wavelength is increased. The International Union recently undertook a series of fading measurements, and these indicated that, if a station of given power uses a wave in the medium band—say 300 metres—and one in the long waveband—say 1,600 metres—the maximum signal strength produced at night, at a distance of 300 to 500 miles, would be some five times greater in the case of the shorter wave. The ratio of maximum night value to steady day value at the same distance would be some hundreds to one in the case of the 300 metre wave, whereas for the 1,600 metre wave it would be of the order of only three or four to one. These figures account for the relative lack of interference observed on the “long” wave broadcast band.

Taking all the above into consideration, it would appear that any new wave plan which might be evolved to succeed the Prague plan, would increase the separation between the medium waves probably to 11 kc/s. This, of course, would involve a general sacrifice in the total number of channels available. A little calculation will show that it should be possible to serve Europe as a whole better by having fewer channels spaced more widely apart. International opinion on this subject is not yet altogether unanimous. It remains to be seen what the general opinion of broadcasters will be after another winter season with a steadily increasing number of high-power stations in operation. The B.B.C. thinks it is inevitable that a new wave plan will ultimately be necessary to deal adequately with the situation, and it believes that the service it could give to its listeners would be considerably extended by the freedom from interference thereby to be obtained.



Kitching and Clayton

INSTALLING MICROPHONE CABLES IN BROADCASTING HOUSE

“ULTRA-SHORT” WAVES

IT HAS FREQUENTLY BEEN STATED in this book that the number of wavelength channels available for broadcasting in Europe is inadequate for the needs of all countries. In these circumstances it is natural that technicians should be constantly on the look-out for some means of improving the situation. The obvious cure is to obtain international agreement to the use of a wider band of the so-called long wavelengths, by which is meant those between approximately 500 and 2,000 metres, since this is the band most useful for broadcasting, particularly in hilly countries. However, there are many claimants to these useful wavelengths among other wireless services, and the number of channels is very limited, even assuming that the use of up-to-date apparatus made it possible to allow a very small interval between them, which unfortunately is not so. For this reason attention has lately been directed to the possibility of using wavelengths not hitherto in much demand for any other purpose.

The only *vacant* space in the whole wavelength band which would seem to hold out any prospect of being useful for broadcasting is in the neighbourhood of from 6 to 9 metres. It should be pointed out, however, that such a band cannot possibly obviate the necessity of utilising the normal broadcasting band or do away with the urgent need for more “long” waves.

With very short wavelengths the radiation dies away rapidly when it travels *over the surface of the ground*, and the reason why short waves of the order of 15–50 metres are of great value for very long distance transmissions is because the ground wave is not used at all. In fact, transmission is only possible over long distances by means of the “sky” wave, which travels upwards at an angle to the surface of the ground until it is reflected by an ionised stratum of gas which exists at a height of roughly 100 kilometres from the surface of the earth and is known as the Heaviside–Kennelly layer. After being reflected the wave travels through space back towards the earth, which is reached at a distance from the transmitter that depends on the wavelength and various other factors. However, for local broadcasting the B.B.C. is only concerned with the ground

wave, since the object is to serve areas at comparatively short distances from the transmitter with reception which shall not be subject to the fading always associated with the "sky" wave.

At first sight, therefore, it would appear that a wavelength as short as, say, 8 metres would be useless for this purpose. However, recent investigations have shown that the absorption, although practically complete at considerable distances, is not so rapid during the first few miles as might be expected on such short waves. Moreover, it would appear that there is no reflection by the Heaviside layer, which means that there is no "sky" wave radiation which will descend in other countries. Thus if these waves were used, the night time interference which is so often experienced in this country on the ordinary broadcasting band would be obviated. It is true that the loss as the waves travel over the surface of the ground is sufficiently rapid to preclude the use of high power, with the object of reaching distances of the order of, say, 50 miles. However, there seems to be a hope that with the use of reasonable power a strictly localised service, with a radius of, say, 6-8 miles, might be practicable. The most attractive feature of this proposal is that such a service might be given without any danger of interference with any other service, broadcasting or otherwise, which is operating appreciably outside this range. This property is not possessed by any other wavelength at present used for broadcasting, or any other regular service; in fact in every wireless service there is almost constant trouble through interference from other stations.

It appears, therefore, that there is a chance of breaking new ground, and the B.B.C. has decided to carry out extensive experiments to find out what the possibilities are from the point of view of broadcasting. From work already done by other organisations, both in this country and abroad, it is known that reception at, say, 8 miles is usually good, but it remains to find out if it is consistently good, to what extent there are blind spots, and so on. It is also known that there are difficulties, but it will be time enough to speak of these after they have been investigated. In order to carry out this experiment as quickly and thoroughly as possible and to give it the best possible

chance of success, the B.B.C. is pooling its resources with those of the Marconi Company, who are at present building the transmitter.

The tests will be carried out in London, and will last for some months in any case, but for a considerably longer time if some measure of success is forthcoming. Certainly no attempt will be made to use these waves for a service until very complete data has been obtained, and in any case they would be used only as an auxiliary to the service on the normal wavelengths. It has to be realised that however successful the experiment might be, some time must elapse before suitable adapters could be designed and put on the market, which would make existing receivers suitable for these "outsize" wavelengths. On the other hand, it may be found that it is impracticable to use these waves for general reception by the public.



Kitching and Clayton

THROUGH THE CLOCK APERTURE

A view of All Souls' Church and Upper Regent Street from the Seventh Floor of Broadcasting House

EMPIRE BROADCASTING

THE TECHNICAL PROBLEMS which are involved in the provision of a service of direct broadcasting to the Empire are extremely complex, although it is fortunate that a very large amount of research has been carried out during the past few years on the only possible medium for this purpose, namely, transmission by "short" waves. By the term "direct broadcasting" is meant direct reception of a station situated in this country by the various Dominions or Colonies which may wish to avail themselves of such a service. However, this would include both reception by private individuals and by local broadcasters intending to rebroadcast the programme through their own stations.

So far as present knowledge goes, the band of wavelengths which is suitable for this purpose extends from, say, 15 to about 60 metres, but this band is liable to be extended as technical knowledge progresses. The wavelength which gives the best communication between two far-distant countries depends on the season of the year, and on the time of day, but in most cases two wavelengths are a minimum to obtain 24-hour communication. However, there may be in any case two periods of about one hour at a time when reception is impracticable on any wavelength. Unfortunately the best wavelength under a certain set of conditions does not remain constant from year to year. There is, in fact, a tendency for the optimum waves to drift together, either upwards or downwards. Lately the tendency has been upwards. There is little doubt, however, that the optimum wavelengths will eventually return to those obtaining two or three years ago. There are many theories, although the precise reason for this phenomenon is not known, but it would seem to occur in cycles of several years.

In the consideration of a broadcasting station to give a service of this kind it becomes clear that the transmitter must be capable of working over a very considerable band of wavelengths. Moreover, one transmitter by itself will not cover all requirements which are likely to arise in practice. For instance, it may be desirable to transmit at a certain time an item which cannot for some reason be repeated, to two or more countries, which owing to their

geographical position require different wavelengths. Thus it would appear at first sight that a large number of transmitters, all possibly sending out the same programme simultaneously, might be essential. Fortunately some compromise in the matter of wavelengths is possible, and two, or perhaps three, transmitters, each capable of fairly quick wavelength changes, should satisfy most of the practical requirements.

It is well known that it is possible to make short wave transmitters directional, that is to say, the aerial system can be arranged to send out a beam of radiation. By the time a distance of about 2,000 miles has been reached, the beam covers a fairly wide area, but even so it will be clear that if it is desired to cover the whole Empire, several beams would be necessary. Thus if the undoubted advantages of directional transmission are to be gained, the station would be somewhat more elaborate, and the problem becomes involved with economic considerations, more particularly in connection with the prime cost of the station.

All long-distance transmission by short waves is by what is known as the indirect ray. The direct ray travelling along the ground becomes attenuated very rapidly indeed, in fact for all practical purposes it is dead after a few miles. This is due to the fact that short waves suffer great loss when travelling over the surface of the ground; on the other hand, propagation in space can take place without this excessive loss, and therefore the rays travelling upwards at an angle to the ground continue until they meet an ionised layer of gas, known as the Heaviside-Kennelly Layer. Here they are reflected, and although there is appreciable loss in the process, they travel downwards until they again reach earth a considerable distance from the transmitter.

There are several factors which determine the distance at which they eventually return to earth, such as, for instance, the changing height of the reflecting layer, which varies with the light conditions, *i.e.* the time of day.

Since it is necessary to rely on indirect ray transmissions, the quality of reproduction given by a service of this kind cannot possibly equal that given by a direct ray service at good strength, such as is available in almost every part of this country.

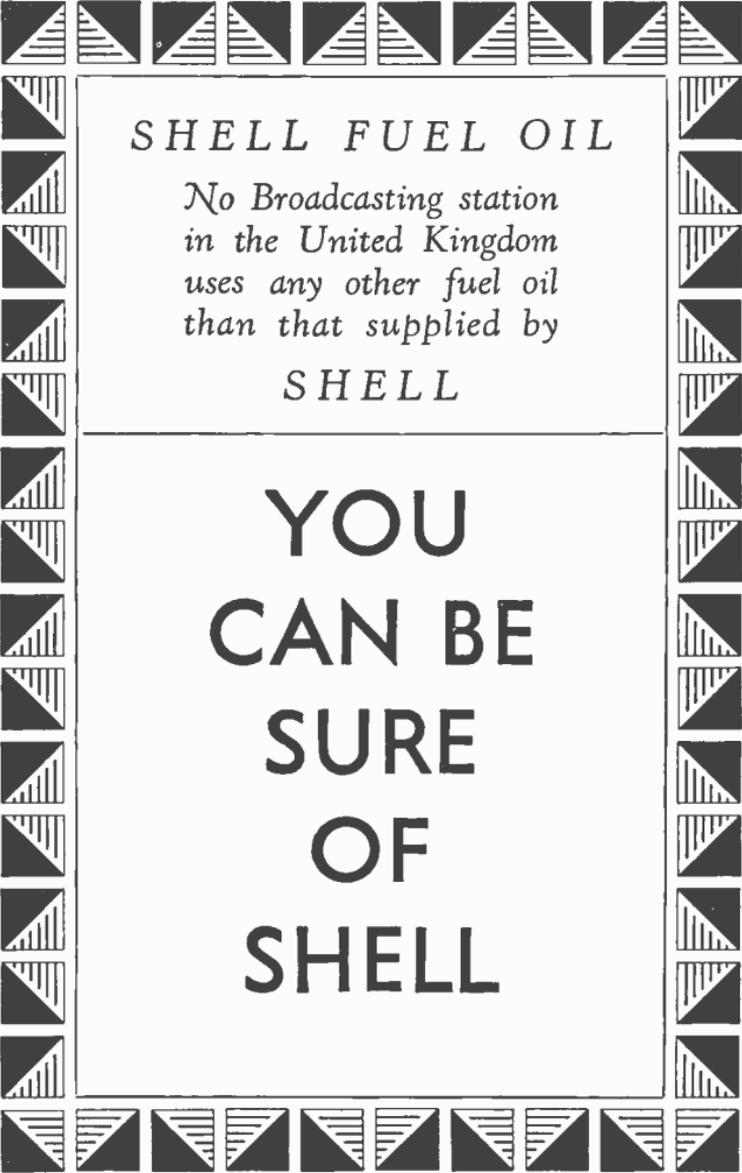
The causes of bad quality in these circumstances are as follows :—

- (1) Atmospheric disturbances which become obtrusive owing to the low level of strength which is available.
- (2) Frequent changes in strength due to general fading.
- (3) Distortion due to differential fading.

With regard to (1), it is obvious that the strength of reception cannot be so great with this type of service as with the direct ray, or local broadcasting service. Apart from any other consideration, the fact that enormous areas are covered makes it obvious that the strength must be comparatively minute. However, this is counterbalanced to an extent by the fact that atmospherics on the short waves are much less than on the long waves. Nevertheless, the weak signal available is bound to make such a service subject to interference of various kinds.

With regard to (2), general fading is inevitable owing to the fact that reflection by the ionised layer is never even sensibly constant for more than a few minutes at a time at the best. There are in existence special methods of reception which minimise this effect, but they are rather too elaborate to be suitable for individual reception, although they are practicable for organisations wishing to relay the programme through a local station.

A few words of explanation as to the meaning of differential fading may be necessary in connection with (3). A telephony transmitter sends out simultaneously what amounts to a group of many waves each of slightly different frequency. Although all these waves are contained in a narrow band of frequencies not more than about 15,000 cycles per second wide, which is small compared with the carrier wave frequency, which may be of the order of 10,000,000 cycles per second, the reflection by the ionised layer may not be equal at any given receiving point, for all the waves making up the complete telephony transmission. The result is that the side-band frequencies and carrier frequency are not always reproduced in their correct proportions. For instance, at one time the carrier wave and one side-band might be very weak, there being apparently only one side-band receivable. The result in



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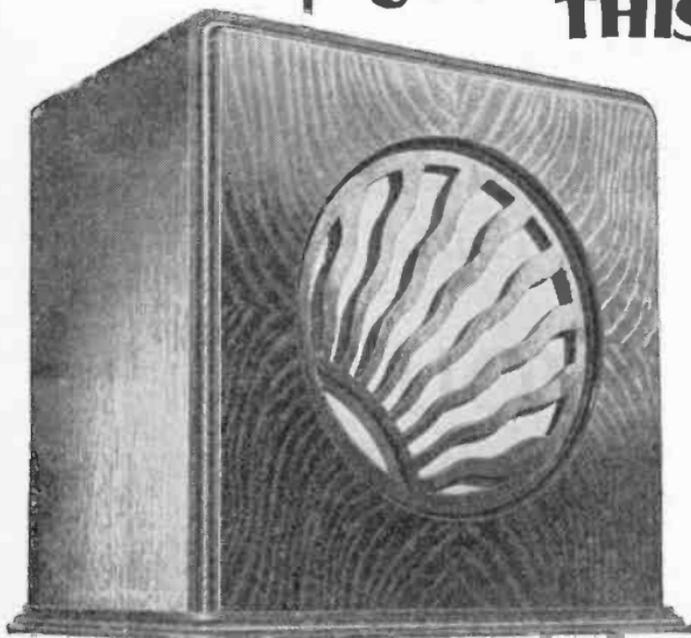
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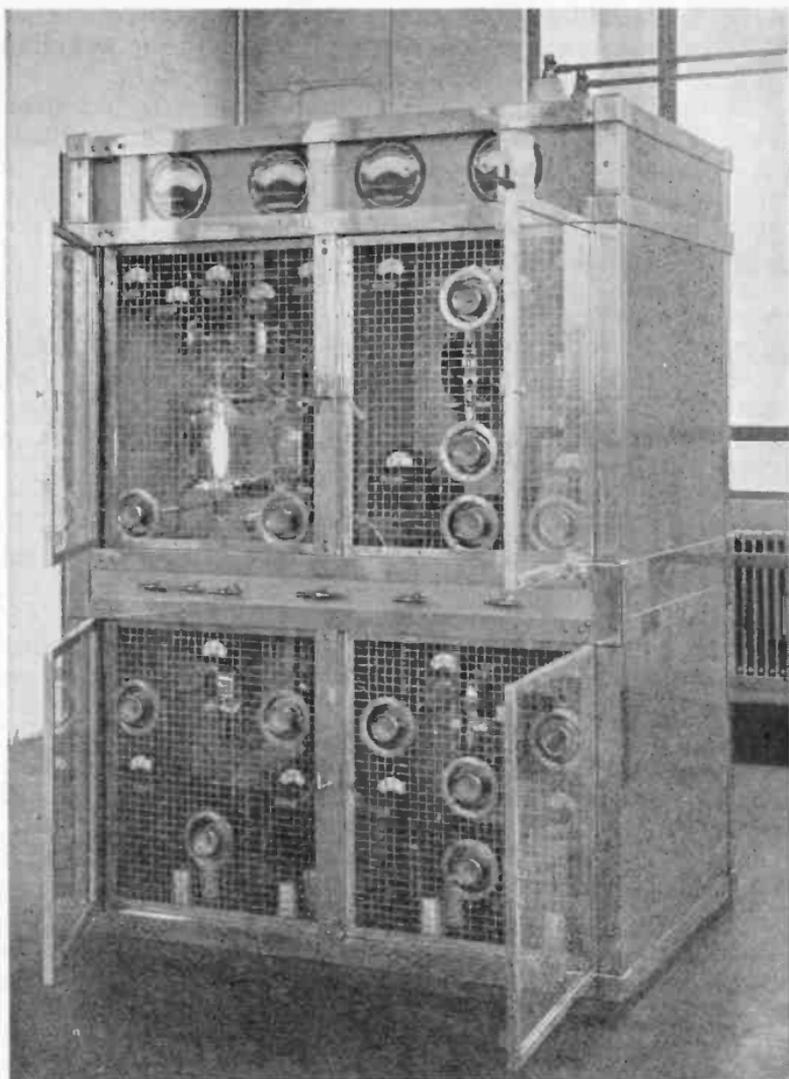


the loud-speaker would be merely a scratching noise which is entirely unintelligible. However, this phenomenon is not always present to a serious degree, although general fading practically always exists to an appreciable extent.

A method of overcoming differential fading has been suggested which consists of suppressing one side-band and the carrier wave at the transmitter, the object being to reduce as much as possible the width of the band actually transmitted. Obviously the narrower the band width the less differential effect there would be, but here again this method is not suitable for individual reception, since it is necessary to replace the carrier at the receiving point with exactly the right frequency and phase, which naturally includes costly and complicated apparatus. The method, however, is being exploited for commercial work, where this disadvantage is not so serious, and where much is gained by reducing the band width.

For short wave transmitters it is usual to employ comparatively low power, usually not more than 15 to 20 kW. in the aerial. The reason why much higher power would not produce correspondingly better results is due to the fact that if atmospheric conditions are not favourable it is practically impossible to receive anything at all, whatever power may be used. On the other hand, if conditions are favourable it is necessary in any case to use a fairly sensitive receiver, and the gain arising from the use of much higher power would not be felt greatly. Apart from this there are certain technical difficulties in the design of a very high power transmitter for these "short" waves.

In spite of the technical difficulties a service of this kind can be of great benefit in districts where programmes of local talent and interest are particularly hard to find. In fact the technical imperfections are easily overlooked if the interest in the programme is keen, and when programmes of equal interest cannot be obtained with what we have called local station quality. There is little doubt also that if a service were established on a more comprehensive basis than is possible with the existing experimental plant at Chelmsford, great advances in the design of suitable receivers for individual listeners would follow automatically.



AN "A" UNIT AT BROOKMANS PARK
which contains the master oscillator, separator, modulator, and modulated amplifier, stages

BROADCASTING TRANSMITTERS

FUNDAMENTAL PRINCIPLES OF DESIGN

THE FUNCTION of the broadcast transmitter is to generate the high-frequency oscillations which, when applied to a suitable aerial system, are radiated in the form of ether waves. These waves have to be modulated by the speech or music which it is desired to broadcast, and are merely the means whereby the speech or music is conveyed or carried to the receiver in the listener's home. A plain unmodulated ether wave is called the carrier wave.

In modulation, low-frequency currents which have been generated by the microphone and passed to the transmitter through lines and amplifiers are caused to vary the amplitude or strength of the high-frequency oscillations, so that in the end the carrier wave is also modulated.

The variations in amplitude of the carrier wave must be a faithful copy of the low-frequency currents, which in turn must be a faithful copy of the sound waves it is desired to reproduce.

The process of modulation may be carried out at any point in the transmitter between the generation of oscillations and the aerial. It is usual for various reasons to generate the oscillations at a fairly low power level and to amplify them to the desired power level for energising the aerial. Modulation can, therefore, take place at the point where the power level is correct for energising the aerial, or at some lower power level when the subsequent modulated oscillations are amplified and supplied to the aerial. The former is called high-power modulation, and the latter low-power modulation. In the former case the high-frequency amplifying circuits and valves are merely concerned with the amplification of the carrier wave, and any distortion only results in the production of harmonics of the carrier which can easily be removed by suitable filters. It is necessary, however, to amplify the low-frequency currents to a high-power level in order that they can modulate the power carrier oscillations sufficiently. The high-power L.F. amplifiers must be able to deal with the powerful L.F. currents without distortion.

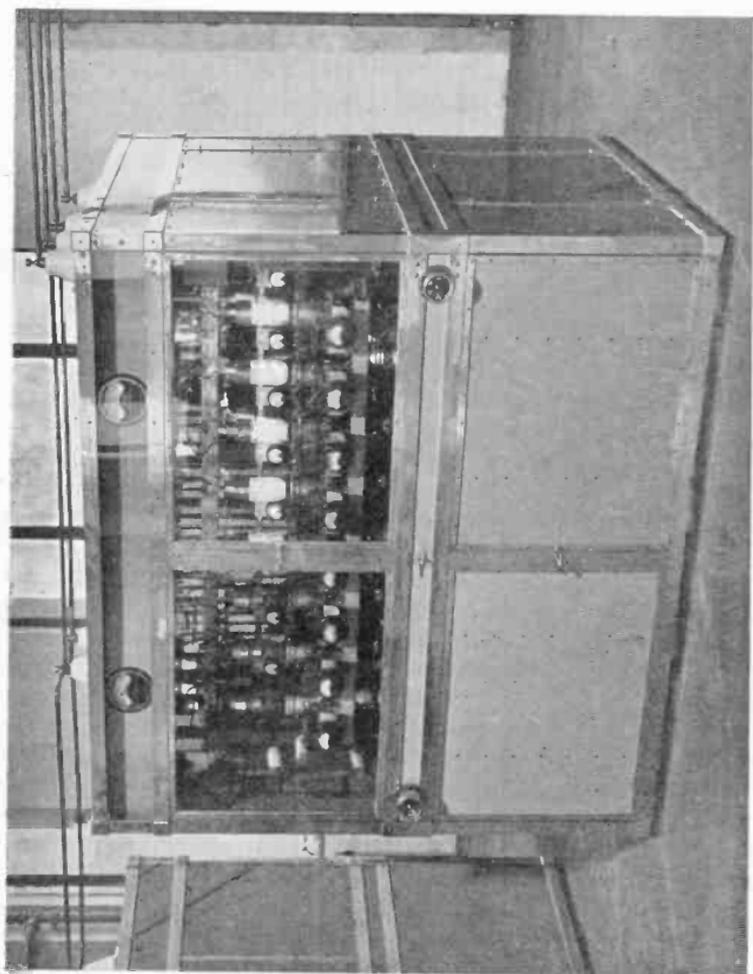
In low-power modulation the modulated high-frequency oscillation has to be amplified without distortion, and while

the distortionless high-power low-frequency amplifier is dispensed with, it is necessary to take great care in the design of high-power high-frequency amplifiers in order to prevent distortion of the modulated carrier oscillations. Either system would be simple to design were it not for the necessity to keep within practical limits of expense.

The power efficiency of a broadcast transmitter is the ratio of the modulated high-frequency power supplied to the aerial to the power which has to be supplied to the apparatus in the form of high-tension current to the anodes of the valves and the power supplied to heat the filaments. This power is expensive. Further, any wasted power is dissipated in the form of heat, so that expensive apparatus has to be supplied to absorb and take away such heat. This is the same in a motor-car engine where the petrol consumption is the power input to the engine. Some of this power is usefully employed in driving the motor and some is wasted in heating up the engine, necessitating water cooling. In broadcasting transmitters, the difference in overall efficiency of the two systems is not great, but it is generally accepted that the low-power system is the most convenient, largely because it obviates the necessity of having special high-power low-frequency amplifying valves and the use of iron for transformers operating at high power. With the exception of Daventry 5XX all the B.B.C. high-power transmitters now use the low-power system.

There are two main forms of distortion in a broadcast transmitter, amplitude distortion and frequency distortion, and in this respect a broadcast transmitter is no different from a low-frequency amplifier or a receiver. Amplitude distortion is where the modulation of the carrier wave is not in proportion to the amplitude of the low-frequency currents, irrespective of the frequency of the currents. Frequency distortion is where amplitude of the modulation varies with frequency. Of the two, amplitude distortion is the more difficult to prevent, but on the longer wavelengths frequency distortion may also be a difficulty.

The system of modulation used exclusively in this country is anode modulation by choke or transformer. High-frequency oscillations are supplied to the grid of the modulated valve, while the low-frequency modulating currents are applied to the anode of this valve from a low-



A "C" UNIT AT BROOKMANS PARK
forming half of the final stage of amplification

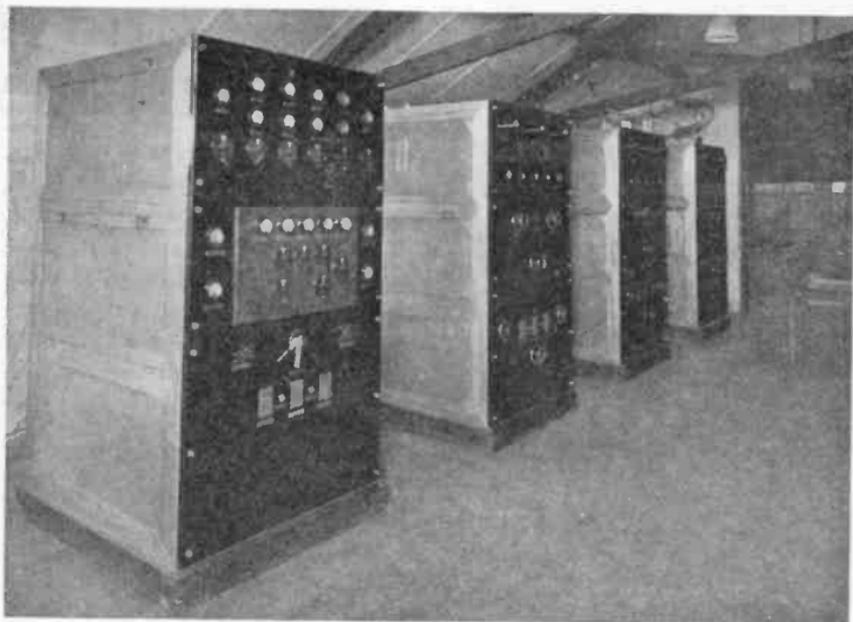
frequency amplifier of sufficient power together with the high-tension direct-current voltage. The action of the modulated valve is somewhat peculiar technically, as for full modulation the voltage at the anode varies from nearly zero to nearly twice the voltage required for the carrier only. The amplitude of the modulated H.F. output must be made to vary in exact relation to the anode voltage.

The following main conditions are desirable for good modulation: (1) the H.F. output shall be only that supplied by the valve action, and not supplied by capacity coupling from the grid; (2) the H.F. oscillations applied to the grid shall be ample to control the valve fully at the highest anode voltage; (3) the potential of the grid shall be made highly negative—usually by a grid leak and condenser.

In order to prevent interference with other stations it is necessary to prevent the frequency of the carrier wave from varying seriously. For reasons of economy in ether channels, European broadcasting transmitters are at present separated in frequency by 9,000 cycles per second, and a high-pitched whistle is heard in the loud-speaker if an interfering station 9,000 cycles away in frequency is of appreciable strength. If either station changes its frequency the note will vary; if the frequency difference were only 7,000 cycles, say, the whistle heard would be lower pitched and more annoying; moreover, interference from the modulation of the neighbouring transmitter would be more pronounced. The carrier frequency must therefore be kept within a hundred cycles or so of its correct frequency in order to reduce interference.

It is also possible that while the average frequency of the transmitter remains constant it may change momentarily during modulation. This is called frequency modulation and may cause distortion. It is not to be confused with the changing of frequency independent of modulation.

A valve oscillator is provided in order to supply a source of oscillations sufficiently constant in frequency. This may be a valve in conjunction with electrical circuits, quartz crystal, tuning-fork, or magneto-striction oscillator. For ordinary purposes on broadcast wavelengths an electrical circuit oscillator of suitable design is sufficiently constant in frequency, but it is usual to provide some accurate means of checking the frequency.



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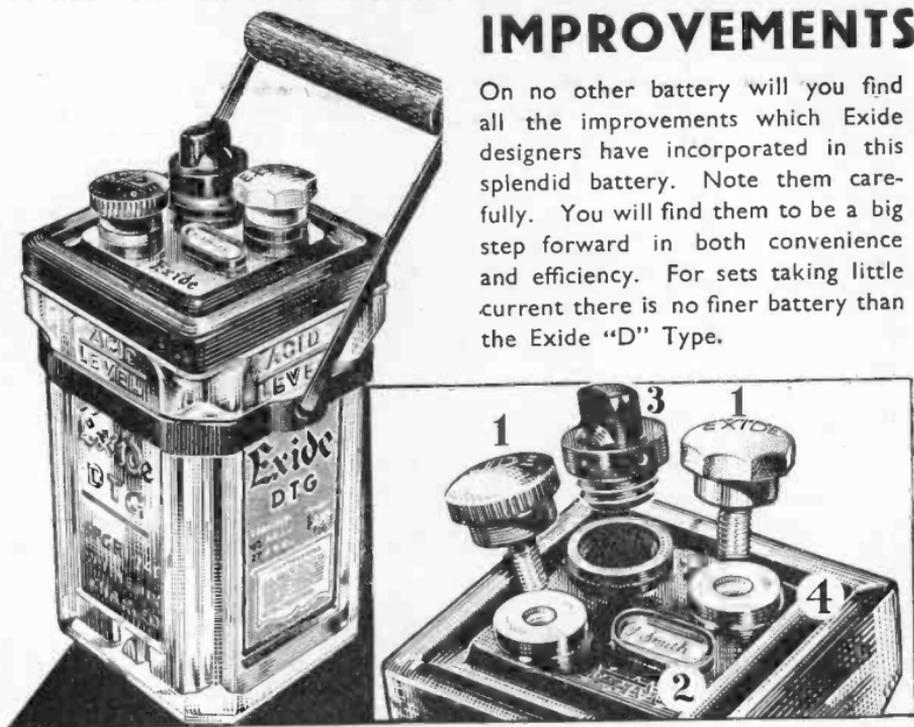
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In order to prevent frequency modulation it is necessary to prevent any of the modulation circuits from affecting the master oscillator. For this purpose a separator valve is usually provided which is carefully neutralised so that there is a minimum coupling between the master oscillator and the modulated amplifier. It is also necessary to prevent any grid current in the separator, as this is a potential source of frequency variation of the master oscillator. The modulated amplifier is also neutralised to prevent coupling between the grid of the valve and the output circuit, and reduce still further the possibility of frequency modulation.

The power output of the modulated amplifier is insufficient to operate the main power amplifier, and an intermediate power amplifier consisting of two water-cooled valves is provided. This intermediate stage operates the grids of the final power amplifier, which consists of up to 14 water-cooled valves in two banks of seven. The two banks are connected in push-pull, and each valve has a separate feeder circuit. With this arrangement certain tendencies to instability which occur when a large number of valves are operated in parallel are consequently lessened.

The output of the final high-frequency amplifier is then taken to the aerial via filter circuits. The aerial for convenience is situated several hundred feet from the transmitter, and power is supplied to it by overhead feeders or transmission lines. These lines have almost negligible loss and afford a considerable flexibility in the layout of the transmitter building and aerial system.

The aerial consists essentially of a vertical portion composed of one or more wires. It is this portion which radiates. It may with advantage be as high as half the wavelength of the transmitter. For instance, the vertical portion of the North National Transmitter is about 440 feet (135 metres) long, *i.e.* nearly half the wavelength (300 m).

Of the power in the aerial, some is lost in the earth and other places and the remainder is radiated, mostly along the ground, but some at various angles from the horizontal. This latter radiation is undesirable, and as a high aerial radiates less at such angles and more along the ground, it is consequently more efficient.

A LIST OF THE NEW STUDIOS

1 CONCERT HALL No. 1

BASEMENT GROUP

- | | | |
|---|-------------|------|
| 2 | Vaudeville | B.A. |
| 3 | Dance Bands | B.B. |

THIRD-FLOOR GROUP

- | | | |
|-----|--------------------|-------------|
| 4 | Children's Hour | 3A. |
| 5-7 | Talks | 3B, 3C, 3D. |
| 8 | Religious Services | 3E. |

FOURTH-FLOOR GROUP

- | | | |
|------|------|-----------|
| 9-10 | News | 4A and B. |
|------|------|-----------|

PRODUCTIONS GROUP

SIXTH FLOOR

- | | | |
|-------|----------------|-----------|
| 11 | Musical Comedy | 6A. |
| 12-13 | Speech | 6B and C. |
| 14 | Effects | 6D. |
| 15 | Gramophone | 6E. |

SEVENTH FLOOR

- | | | |
|-------|------------|-------------|
| 16-18 | Speech | 7A, 7B, 7C. |
| 19 | Gramophone | 7E. |
| 20 | Effects | 7D. |

EIGHTH-FLOOR GROUP

- | | | |
|----|---------------|-----|
| 21 | Military Band | 8A. |
| 22 | Debates | 8B. |

STUDIOS AND CONTROL ROOMS

DESIGNING THE NEW STUDIOS

THE GENERAL QUESTION of the design of studios for broadcasting, and the nature of the technical problems involved, were fully discussed in the issue of the Year-Book for 1931, whilst some account of the same problem was also given in the 1930 edition. It is unnecessary, therefore, to deal again with the whole of the theoretical side of the question, and it is proposed to confine the present article to a discussion of the application of the general principles to the particular problem of the design of studios for Broadcasting House.

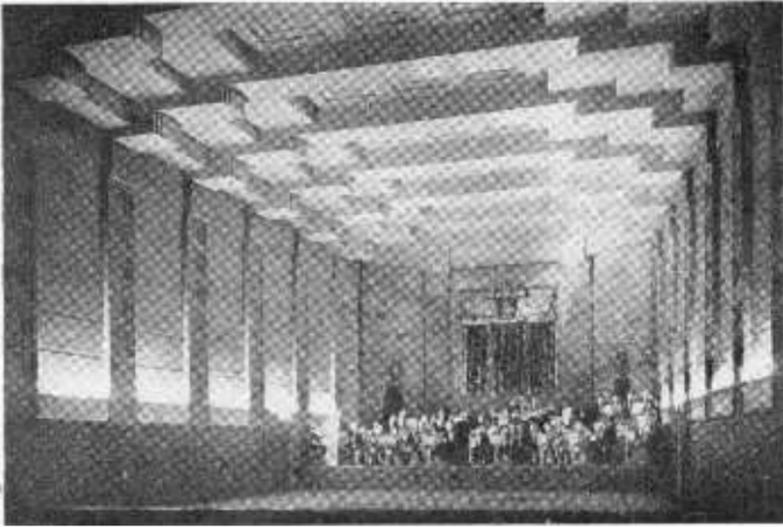
Readers may remember the statement made in the articles referred to above, that the most fundamental property of a studio, which largely determines its suitability or otherwise for broadcasting, or even for direct listening, is its "reverberation time," and the dependence of that property on frequency or pitch. The reverberation time is the time, expressed in seconds, taken for a fairly loud sound of the frequency concerned to die away to inaudibility after the source has ceased to operate. Defined in scientific terms, it is the time taken for the mean sound intensity in the room to decay by 60 decibels, that is to say, to one millionth of its original value. It is quite definitely related to the volume of the room and the amount of sound-absorbing material which the latter contains, and simple mathematical expressions have been derived whereby it may be calculated, with reasonable certainty, in advance of construction.

Experience has shown that so far as studios to be used for musical performances or for general purposes are concerned, the desirable reverberation time does not differ greatly from that which would give the best conditions in a room of the same size intended to be used as a music-room or small concert hall with no reference whatever to

broadcasting. It must be understood that if the reverberation time of a given room is too high, the result sounds "echoey," all definition is lost in music, and speech becomes very difficult to understand. If, on the other hand, it is too low, music is clear and distinct, but the effect is dull and lifeless, and reminiscent of that obtained in the open air. The determination of the actual value of reverberation time which will give the desired mean between these two extremes can only be made by making measurements of the reverberation time in halls and rooms which critical musicians consider to be acoustically good. It is necessary to realise that whilst scientific methods may be employed in the design of a room so that it may have certain characteristics, the decision as to what those characteristics should be must remain largely a matter of experience and musical opinion. Such measurements have been made by various authorities, and the optimum reverberation time of a given room is found to depend on its volume. The larger the room is, the longer must its reverberation time be for the best conditions.

In designing the studios for Broadcasting House the optimum reverberation time has been taken to be slightly less than would be the case if the studios were to be used for direct listening, without the medium of the microphone. There are two reasons why the accepted time for direct listening has been somewhat decreased. The first is, that in listening by means of a loud-speaker, the reverberation time of the listener's room has to be taken into consideration, being virtually added, so far as the final effect is concerned, to that of the studio. The second is that broadcast listening is effected with the aid of a single microphone, and is therefore the equivalent of monaural listening. For some psychological reason, not fully explained, the effect of reverberation is more noticeable in monaural than in binaural listening, on the basis of which the accepted values of optimum reverberation time were determined.

As concrete examples of the reverberation time for which various studios are being designed, the large studio or Concert Hall, which has a volume of very nearly 150,000 cu. ft., is to have a reverberation time of 2 seconds; the Vaudeville Studio, 30,000 cu. ft. in volume, is to be of 1.3



THE MODEL OF THE CONCERT HALL IN BROADCASTING HOUSE

seconds period, whilst a small Debates Studio is being constructed to have 0.6 second reverberation, corresponding with a volume of 2,200 cu. ft.

As has been already indicated, the variation in reverberation time which takes place with frequency or pitch is of the utmost importance, and the Broadcasting House Studios are being constructed, as far as possible, to possess reverberation independent of pitch. This means that the rate at which the sound energy in the studio dies away is the same for all notes within the musical scale. Where it is not possible to fulfil this condition exactly, the reverberation time is allowed to decrease somewhat towards the higher or treble frequencies, the maximum reverberation time being that which is determined from accepted data as described above. No marked increase in reverberation time for any part of the frequency scale is, however, to be tolerated.

A certain school of thought in acoustical work considers, on theoretical grounds, that the reverberation time of a good auditorium should be very definitely greater for the lower frequencies than for the remainder of the scale. There is room for considerable difference of opinion in this respect, but even if the suggestion is true under certain

circumstances, such conditions may be dangerous for broadcasting on account of the difficulties of "bass blasting" which occur as the result of excessive reverberation at the lower frequencies. Still less can any increase in reverberation towards the higher frequencies be allowed. Should this occur, reproduction is characterised by a marked "edge" and excessive brilliance, which is most unacceptable to musical taste.

In a concert hall of the ordinary type, a very large part of the sound absorption which limits the reverberation time is due to the audience itself, and this constitutes a very serious difficulty in the design of such buildings to satisfy acoustical requirements, since an audience represents a variable quantity, and consequently the best the designer can do is to compromise in the matter of reverberation time, making his conditions right when only a part of the full audience is present. In broadcasting studios this difficulty does not arise to so great an extent, but it now becomes necessary to discover materials with which to treat the greater part of the wall surface to provide the necessary absorption. Clearly if the reverberation time of the completed studio is to be practically independent of frequency, the same must apply to the absorptive properties of the sound-absorbing materials. At the same time these materials must be susceptible to a certain amount of decorative treatment without losing their acoustic properties. Two types of material are being specified for the majority of studios in Broadcasting House. Of these, one is ordinary "building board" or "insulation board," composed of wood pulp, cane fibre or similar material, and the other is a treatment which has found a certain amount of use in B.B.C. studio construction in the past, namely, "felt and wall-paper treatment" consisting of a layer of 1 in. hair felt applied to the wall surface and covered with one or more thicknesses of lining paper and a soft porous type of wall-paper for decorative purposes. Both of these materials, if certain precautions are taken, possess absorptive properties sensibly independent of frequency. Both must be stuck firmly in contact with a rigid wall surface, and not supported on battens out of contact with the wall. Neither must be subjected to decoration involving any form of paint or distemper which will alter the character-



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istics of the surface of the material. Colouring by means of stains or water-colours is, however, permitted, whilst an alternative method is to stretch very thin decorative fabrics over the surface of the sound-absorbing material.

Whilst the majority of the studios in Broadcasting House are being acoustically treated in accordance with the principles outlined above, several, to be used for talks and dramatic effects, are being made acoustically "dead." This means that their reverberation time is to be made as small as possible by covering the walls and ceiling with a material which absorbs a very large proportion of the sound energy reaching it. The material which is employed is known as "Rock Wool." It is composed of a mass of vitreous fibres and is applied between battens to the wall surface to a thickness of several inches.

The reason for the adoption of this treatment in the case of talks studios is that it is plainly desirable for the listener using a loud-speaker to get the impression that the speaker is addressing him in his own room, whether the latter happens to be large or small. If this is to be the case, the sound of the voice must be modified only by the acoustics of the listener's room and not by any effect emanating from the studio. Hence the studio is so treated that as little reflected sound as possible reaches the microphone. In the case of the dramatic effects, varying degrees of reverberation are necessary for different purposes, and these are obtained by adding "artificial reverberation" by the use of a so-called "echo room" to any desired extent, as described in the B.B.C. Year-Book on previous occasions. Here again, therefore, the studio itself must possess the property of reverberation to as small a degree as possible.

R E L I A B I L I T Y F I G U R E S	
October 1st, 1930 to September 26th, 1931	
Total length of transmission . . .	67,686 hrs. 47 mins.
Percentage of breakdowns . . .	·03 %



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M I C R O P H O N E S

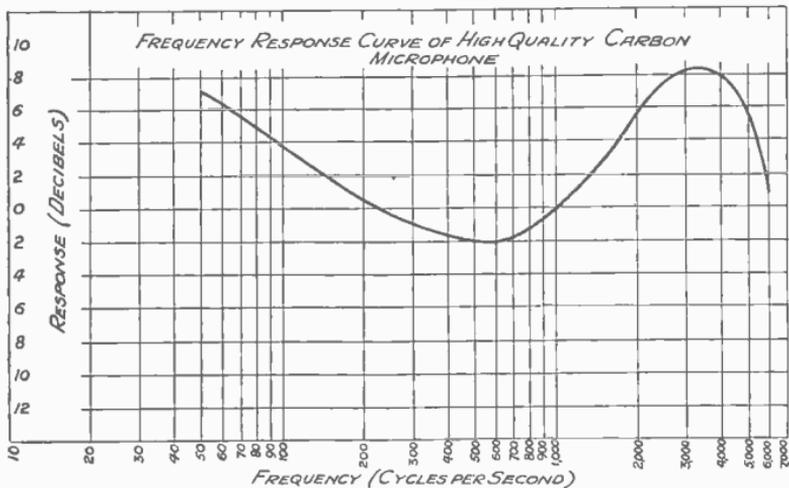
IN PREVIOUS YEAR-BOOKS consideration has been given to the various properties which a good microphone should possess. Of these, one of the most important is that summarised under the heading of "good frequency characteristic."

A microphone is a device for the conversion of sound wave energy into electrical energy. In other words, the fluctuations of atmospheric pressure which are experienced by the microphone, and which, when they act upon our ears, give rise to the sensation of sound, are able by reason of the special properties of the device to set up corresponding fluctuations of electric current in the electrical circuit of which it forms a part. The magnitude of these currents is increased by the aid of suitable amplifiers, and they may then be used to operate a loud-speaker, to modulate a broadcasting transmitter, or, if the microphone is being employed in connection with some system of sound recording, to make the necessary variations in the impression on a gramophone disc, celluloid film or other recording medium.

If the reproduction of the original sound is to be faithful, which is the final end to be attained in all the cases just mentioned, it is necessary that the electric currents generated by the microphone should be the exact counterpart of the sound waves falling on it. One important condition which has to be satisfied if the latter is to be the case is that stated at the commencement of this article.

As has been explained on numerous occasions, the meaning of this condition is that the piece of apparatus under consideration must respond equally, so far as is practicable, to notes of all the important frequencies in the audible range. So far as broadcasting is concerned this range is usually considered as being from about 30 to 10,000 cycles per second, in order that the natural quality of music and speech may be adequately reproduced, although some curtailment at the high-frequency end of the range is sometimes inevitable in receiver design on account of the international wavelength situation.

The microphone is one of the links in the broadcasting chain which are least satisfactory so far as fulfilment of this requirement is concerned. Now in order that improvement



may be attained, it is necessary to be able to make reasonably accurate measurements of the frequency response of any individual piece of apparatus, so that the effect of any modification can be exactly observed. The results of such measurements are plotted in the form of a "frequency characteristic," and the technique of the necessary observations is comparatively simple in the case of the purely electrical parts of the chain. If, for example, it is desired to know the frequency characteristic of a given amplifier it is merely necessary to apply a simple tone of the required frequency and of known amplitude to the input of the apparatus and measure the magnitude of the current produced at the output. This measurement is repeated at a number of frequencies throughout the desired range, and instruments well known to electrical engineers are used to measure the alternating currents or voltages concerned. The observation is frequently simplified by employing a tone generator which itself gives constant output over the whole range of frequencies, to supply the apparatus under test, so that it is necessary only to measure the output energy from the latter, whilst it is even possible to devise semi-automatic methods whereby the apparatus is caused to draw its own response characteristic with the aid of a recording meter.

When, however, we attempt to apply such methods to

the measurement of the performance of a microphone we find that we have first to obtain a measure of the sound wave pressure at the required frequency, incident upon the microphone, and to compare it with the electrical output of the microphone or that of its associated amplifier. The production of the necessary sound wave, with the aid of a tone generator and a loud-speaker, is comparatively simple; but the measurement of its magnitude, even in relative terms, is a matter of some difficulty.

Several different methods of making this measurement have been proposed from time to time. Most of them, however, suffer from the defect that they measure the pressure which is actually exerted on the sensitive surface of the microphone by the sound waves. This appears at first sight to be satisfactory until it is realised that the microphone itself, being an object of definite physical dimensions, is capable of reflecting sound waves and therefore modifying them, and that, moreover, this effect will vary, in general, with the frequency of the waves. The factor we are trying to determine is the performance of the microphone relative to the sound wave pressures in the air itself, and to include in that performance any increase of pressure over part of the frequency range which may occur as the result of reflection from its surface, and may be materially modified by alterations to its shape or size.

Fortunately there is a method, though a difficult one, whereby sound-wave pressures can be measured. If a very small light disc is suspended in a sound field it tends to turn so as to lie at right angles to the direction of motion of the sound waves, and the force tending to turn it is dependent on the pressure of the waves. By silvering the disc, directing a beam of light upon it and observing the deflection of the beam, it is possible to measure the force tending to turn the disc and hence to calculate the sound-wave pressure.

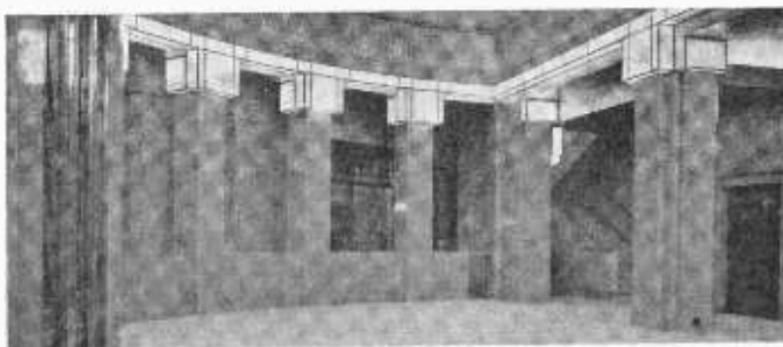
This method, however, is not one to be employed in general research work on microphones on account of its great practical difficulty and the many precautions which have to be observed. It is customary, therefore, to take a suitable microphone, usually of the electrostatic type, of unvarying characteristics, and calibrate it by the Rayleigh

Disc method, as the procedure just outlined is termed, after which it may be used for the determination of the response of other microphones by direct comparison.

The latter method is used by the B.B.C. in work on the characteristics of microphones, and a typical response characteristic so obtained, and referring to the high quality type of carbon microphone which is largely used at the present time, is shown in the accompanying diagram. The microphone is still the weakest link in the chain of broadcast transmission, and the curve serves to indicate the order of the departure from ideal response which has still to be tolerated in a reasonably good microphone.

Even in comparing the response of two microphones, one of which is of known performance, very many precautions have to be taken. For example, in order to minimise the very marked interference effects due to partial or complete cancellation or to mutual reinforcement of waves reflected from the walls, floor, and ceiling of an ordinary room, the walls of a sound measurement room have to be treated with material which will render them almost completely non-reflecting.

Here again, as in the case of measurements on amplifiers, it has been possible to devise methods whereby a semi-automatic record can be obtained of the comparison curve between two microphones, and it is hoped that by making use of the facilities for research thus provided, information will be gained in the near future which will materially improve microphone technique in broadcasting.



THE ENTRANCE HALL IN BROADCASTING HOUSE

the Drum behind the Band



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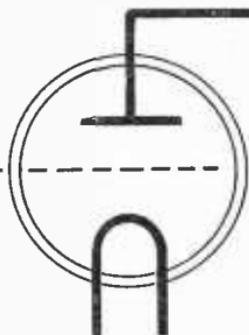
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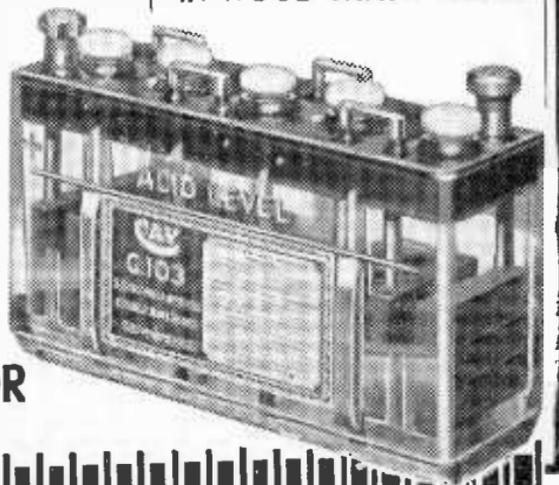


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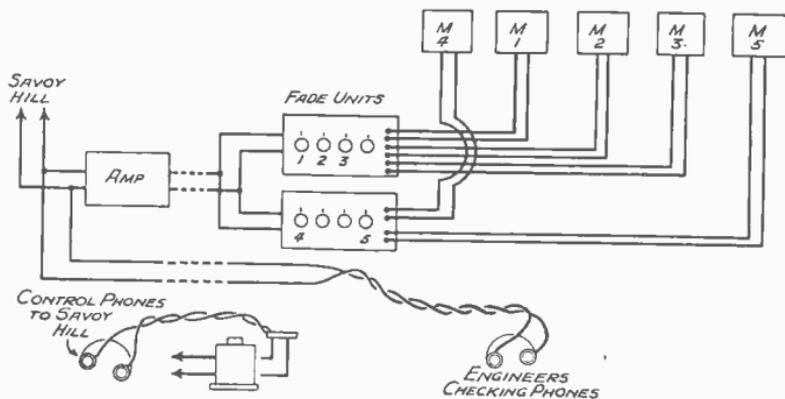
THE DAY of placing the full responsibility of an Outside Broadcast on one microphone has long disappeared and has been succeeded by the use of multiple microphones—each one having its own specific part to play.

Many difficulties had to be overcome before it was possible to use more than one microphone at a time with success, but the switching from one microphone to another, in order to conform, for instance, to movements on a stage, can now be carried out without it being noticeable to the listener. This could hardly be said of the single microphone placed in the centre of the footlights, with the movements of the artists passing to and fro causing a continual fading effect. Elaborate precautions are now taken in the placing of the various microphones, and every conceivable position likely to be used by the artists in a theatre, or other place of broadcast, is now catered for.

Many hours of preliminary testing take place before the proposed broadcast, and no effort is spared to find the most suitable positions for the microphones. These are found mostly by trial and error, and are governed to a large extent by local restrictions, the acoustic properties of the building, the placing of the players in the case of an orchestra, or the type of ensemble in a theatre broadcast.

Theatre broadcasts usually present in themselves innumerable difficulties, and these are generally caused by electrical interference from the multitude of lighting circuits installed for illuminating the stage or for effects. This unwanted energy is often picked up on the microphone circuits or on the microphone amplifiers, and these, besides having to be adequately screened, have to be moved from place to place in an endeavour to find a neutral zone free from interference. It is interesting to note that this type of interference invariably has directional properties in relation to the apparatus in use, and this is especially noticeable in the instrument used for controlling the microphones.

The four-channel unit, or "fade unit" as it is more commonly called by the people who use it, is the instrument used for controlling the number or combination of microphones in circuit at one time. Each four-channel unit, as



LAYOUT OF APPARATUS FOR A TYPICAL OUTSIDE BROADCAST

the name implies, can handle four microphones in their respective positions, so that if more than four microphones are installed, more than one fade unit has to be used. These units form a junction point between the microphones and the microphone amplifiers, and where possible are placed in such a position that the engineer in control can see what is taking place and so fade up in turn each microphone, or combination of microphones, as required.

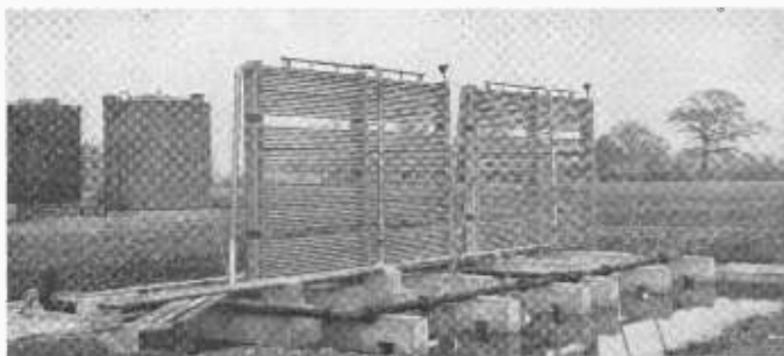
The usual number of microphones in use would be, as a general average, six for a theatre broadcast (three in the footlights and three for any setting that might be employed with advantage) and seven for the Covent Garden Opera (one orchestral rail, one centre footlights, four wings, and one for any up-stage settings that might prove useful). Large symphony orchestras, as used in the B.B.C.'s Queen's Hall Concerts, require five microphones suspended in various parts of the hall and controlled by a musician from a score in a remote part of the building, each microphone being used according to the type of music being played. Dance orchestras and others are limited to two microphones except in exceptional circumstances. For example, if the orchestra is spread out, the number is increased to three microphones in order to obtain a satisfactory degree of balance between one section and the other. In placing microphones in ballrooms, consideration must also be given to the elimination of floor noise. If the microphones are placed too far away from the band in an attempt to

obtain a good balance between the various instruments, floor noise and other background interference can become objectionable; while if the microphones are too near the band, "microphone blasting" may occur.

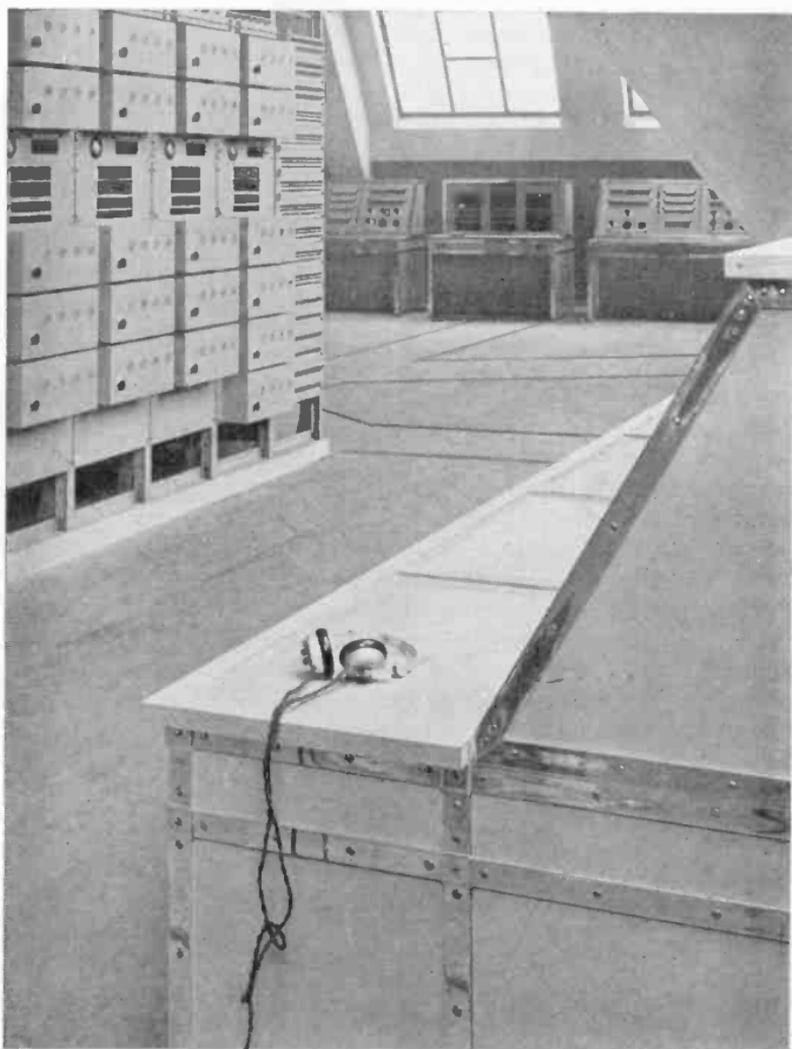
The diagram opposite will give readers an idea of the apparatus in use at any average outside broadcast.

It will be noticed that the positions of the various microphones are arranged on the fade unit to correspond with the position of the control handles. This small item in arrangement of apparatus enables the engineer to follow movement from left to right or vice versa automatically, without looking at his controls, as quickness in operation is naturally very necessary to avoid any chance of a break in the continuity of a broadcast.

Breakdowns likely to happen to any mechanical or electrical equipment are things to be avoided, and all outside broadcasts, however small in importance or however short in duration, are protected against this by having all the apparatus duplicated. Thus there are at least two microphones each with their separate circuits, two microphone amplifiers, two sets of H.T. and L.T. batteries, etc. Each or any of these can be changed over by suitable switching arrangements at a moment's notice without the slightest chance of the listener hearing that the change had taken place. Tests of each separate set of equipment are carried out prior to the broadcast in order that the sensitivity of the various microphones may be matched and the magnification of each amplifier balanced.



RADIATORS AT BROOKMANS PARK FOR COOLING WATER FROM THE VALVES



A CORNER OF THE CONTROL ROOM AT BROADCASTING HOUSE

T H E C O N T R O L R O O M

THE production of a number of broadcasting programmes, and the necessary rehearsals, in one building and their distribution to a number of transmitting stations in different areas, involves a large number of switching and controlling operations which it is desirable to centralise in one place. It has been customary to set aside one room, termed the Control Room, for this purpose.

In this Control Room terminate circuits from all studios, echo rooms, etc., and all land lines from outside broadcast points, from other stations linked by the Simultaneous Broadcast system, and from the transmitting stations themselves. This room serves as a central exchange where programmes are received, controlled, and passed to their particular destinations.

In a building of the magnitude of Broadcasting House, which contains twenty-two studios, and from which at least two programmes, the National and the London Regional, will be distributed almost continuously from morning until midnight, it will be realised that the Control Room will be the centre of ceaseless activity. In addition to the two or more programmes actually being broadcast there are a number of rehearsals always in progress, which, when a microphone is used, pass through the Control Room and cause as much activity as the actual broadcast programmes, and frequently more. For this reason the Control Room accommodation at Broadcasting House comprises two rooms side by side, one used solely for broadcast transmissions and the other for rehearsals. In this way those engaged on the switching and controlling of the actual programmes will be free from the hustle and telephoning always associated with rehearsals.

Each broadcast programme has to be continuously controlled by an engineer seated at a desk. Such a desk, with its associated equipment, is known technically as a "Control Position." There are six such Control Positions in the Transmission Control Room and four double positions in the Rehearsal Control Room.

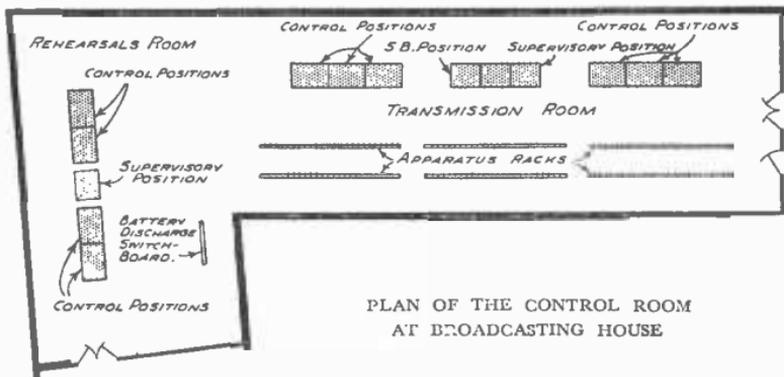
The speech amplifiers through which the programmes pass are all located on two rows of apparatus racks running the length of the Transmission Control Room. The six

Control Positions are arranged in two rows of three, and between these two rows are situated the Simultaneous Broadcast Position and the Transmission Supervisory Position. The functions of these latter positions will be explained later.

The engineer seated at a Control Position has before him a controlling handle, with which he can regulate the volume of the transmission, one or more handles with which he can fade from one programme source to another, a row of keys controlling the signal lamps in all the studios in the building, and a set of special keys by which he is able to set up the particular circuits that he wishes to use.

The engineer has a schedule of the day's programme before him, and his first duty is to set up the circuits for the first two or three studios that will be in use for this programme, by means of the keys on his position. The operation of these keys will switch on the amplifiers required, energise the microphones in the appropriate studios, and bring the outputs of the amplifiers associated with these studios to the fade unit on this Control Position. All this is effected by means of relay switching, the relays being located on the apparatus racks. These relays also cause "engaged" lamps to light on all the Control Positions in both Control Rooms so that the engineer at this position knows that his circuits are set up correctly, and the engineers at other positions know that these particular studios are engaged.

When the programme is due to begin, the announcer in the studio presses a button which operates a buzzer in the Control Room and lights a green light on all Control Positions. The engineer on the particular Control Position which is controlling this transmission depresses a key which puts out these green lights, then throws the key in the opposite direction, which lights a red light in this studio, and also lights a red light associated with this studio on every Control Position. The red lights in the studio give the announcer the signal that all is ready and the programme begins. The engineers seated at other Control Positions take no notice of these lights, since they are not concerned with those particular studios at this time, and on seeing the red lights they know which studios are actually in use for a transmission.



PLAN OF THE CONTROL ROOM
AT BROADCASTING HOUSE

The engineer at the Control Position keeps a continuous check on the programme by means of headphones and maintains the volume within specified limits, the volume being recorded on a "Programme Meter" on the position. When it is necessary to change from one studio to another or from a studio to an Outside Broadcast, the engineer will set up the second circuit in advance and at the appropriate time will fade from one to the other by means of the fade-unit on his Position.

The transmission of such a programme to Brookmans Park, or to a distant Regional Centre such as Manchester or Birmingham, is the duty of the engineer at the Simultaneous Broadcast Position. At this Position he has a set of keys similar to those on the Control Positions whereby he can connect any of the programmes passing through the Control Positions to any land-line outgoing from Broadcasting House. Such connections are made by means of relays on the apparatus racks.

The important musical items of the programme require very careful controlling (in order that the interpretation of the conductor is not impaired), and for this reason arrangements are made to transfer the controlling facilities when required from the Control Position to a Cubicle Position situated in a sound-proof cubicle on a separate floor. There are six such cubicles, three reserved for transmissions and three for rehearsals. The control of highly important musical items is carried out by musicians specially trained for this work who have the score of the

music before them. Meters are provided in these cubicles and loud-speakers are installed as an aural cross-check.

The Supervisory Position, as its name implies, is the place at which an engineer can supervise all the activity of the Control Room. This position acts as a central exchange for the Control Room Telephone System, which comprises telephones in all studio silence rooms, listening rooms, cubicles, and other rooms used in connection with transmissions. At this position the engineer can listen at will to any programme passing through the Control Room. There is one such Supervisory Position in the Transmission Control Room and one in the Rehearsal Control Room.

Associated with the Control Room are two Dramatic Control Rooms, each containing a fade-unit whereby ten sources, such as Studios, Outside Broadcasts, etc., may be mixed as desired for dramatic purposes.

All the speech amplifiers in the Control Room are supplied from central batteries, the batteries and their necessary charging equipment being on a separate floor.

The Control Room equipment also provides for echo circuits, Greenwich Time Signal and Big Ben, quality checking by wireless, line testing, and the operation of headphones and loud-speakers in various parts of the building.



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CONTROL OF THE VOLUME OF TRANSMISSIONS

THE INTENSITY OF SOUND experienced by the ear in speech, music, and noises varies over wide limits. A very loud sound may be as much as one million times as great as a very weak sound. It might be a very desirable feature of a perfect reproducing system to reproduce at the listener's ear the same range of intensities that he would experience if he was listening to the original sound. There are many reasons in practice to-day, however, which make it impracticable to do so.

It is an expensive matter to make apparatus which will reproduce faithfully a sound as loud as the loudest sound normally experienced by the ear, and even if it was not, many listeners might not desire it. Generally speaking, apparatus, whether it is the listener's receiver or a broadcast transmitter, is, or should be, designed to deal with a certain maximum sound intensity without appreciable distortion, and, consequently, sound intensities greater than this value will suffer distortion.

Thus an arbitrary upper limit is set to the sound intensity that can be dealt with faithfully. The lower limit of sound intensity is determined by two factors; firstly, the minimum sound the ear can hear, and secondly the degree of extraneous noise present, whether such noise be incoming to the receiver or in the listener's room. For example, a gas jet or a clock ticking are sources of noise of appreciable intensity, which would interfere with the reception of very weak sounds, quite apart from the background of interference always associated with wireless reception.

To take account of these limits it is necessary at present to modify the range of intensities in broadcasting so that the maximum sound intensity is about one thousand times as great as the minimum.

In considering such wide variations of intensity it is convenient to use a unit known as the decibel, which is a logarithmic unit, and represents a ratio of two intensities or two powers. A decibel is equal to a transmission unit or to $10 \log_{10} \frac{P_1}{P_2}$ where P_1 and P_2 are the two powers. It is convenient here, however, to give examples. For instance,

10 decibels means a power or intensity ratio of 10 to 1, while 20 decibels means a ratio of 100 to 1, 30 decibels 1000 to 1, etc., so that a range of intensities of a million to one, which is met with in a concert hall, can be represented as a difference in power level of 60 decibels; and this has to be condensed for broadcasting purposes into a range of 30 decibels approximately.

There are two essential methods of accomplishing this condensation, viz. automatic and manual. Any automatic apparatus should be capable of anticipation, otherwise the first portion of a sound would not be at the correct intensity in relation to the remainder. Such an apparatus, to be really effective, would probably be so expensive as to prohibit its use, and up to the present no such apparatus has been used.

At present manual control is almost universal. Manual control, to be effective, should attempt to preserve an illusion of reality, as opposed to maintaining a high general level of intensity and consequently reducing the amount of light and shade.

For many years the difficulty has been to provide instruments which indicate to the controller the level of intensity from moment to moment, and enable him on the one hand to prevent exceeding the agreed upper limit of intensity and so causing distortion due to overloading, and on the other hand to ensure that the level of intensity is never too low for satisfactory reception.

The ear is not a good instrument by which to judge intensity, as it accommodates itself too readily to variations of volume.

Most early forms of indicating device attempted to indicate in terms of the percentage modulation at the transmitter, irrespective of the sound-producing value of the particular item. Percentage modulation is determined by the peak value of the modulation voltage at the transmitter, while the sound intensity is more a function of mean or R.M.S. value.

An early form of peak-indicating instrument was the "slide-back," which consisted of a valve or similar device so biased that no indication occurred until there was present and superimposed upon the bias a voltage greater than, and opposing in phase, the biasing voltage. In any

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such method excess of peak voltage is indicated by the movement of a meter needle. Such a movement is ballistic, and the extent of the movement will depend not only upon the extent of the excess voltage, but also upon the time such an excess has lasted. The simple slide-back does not, therefore, give an accurate indication of the state of affairs.

The only early volume meter other than the slide-back was one at the transmitter intended to indicate the degree of modulation. This meter was of the square-law type; that is to say, the scale reading was proportional to the square of the voltage. Consequently the volume range of the instrument was small. Later, a meter with a linear law scale was developed which was a considerable improvement and lasted several years, but all the time there was a tendency towards the development of instruments which indicated in the control room the absolute degree of modulation of the transmitter in instantaneous peak voltage. Apart from the difficulty of making an instrument which really indicates instantaneous peak voltages, recent work has shown that it is not really necessary or desirable for the volume controller to know anything about the transmitter. In any case it was found that when lined up or adjusted on a pure tone, peak voltmeters (so-called) situated at different parts of the circuit did not read the same on programmes, and were therefore of very little value.

Telephone engineers have for some time past made use of an instrument known as a volume indicator, which is a square-law device with a calibrated attenuator preceding it. The indicating instrument and associated circuits are arranged to have a time period of about one-fifth of a second so that the reading tends towards the mean or average power during a period of one-fifth of a second. This power is referred to as the mean syllabic power, because the average syllable is said to last one-fifth of a second. Such an instrument may be satisfactory on telephone speech, particularly as the telephone engineer has to contend with quite a different problem as regards ratios of useful intensities. The term "mean syllabic power," however, has practically no meaning in broadcasting, at any rate as regards music; in fact an equally useless term would be the "mean acoustic energy per semiquaver." In Germany use

has been made of a double instrument, one reading up to, say, $\frac{1}{5}$ or $\frac{1}{10}$ of the maximum volume and the other reading up to the maximum volume.

A device known as the "programme meter" has recently been developed by the B.B.C., the scale reading of which is proportional to the logarithm of voltage or power; *i.e.*, equal ratios of intensity give equal *differences* of scale reading, irrespective of the part of the scale on which the reading occurs. In fact the meter can be calibrated in decibels and have a linear scale. This means a more useful scale, because a greater range of intensities is indicated.

The instrument has a $2\frac{1}{2}$ " dial, and is divided into seven scale divisions. Each scale division represents a power ratio of just over 3 to 1, or 5 decibels, so that the instrument has a range of 30 decibels, or 1000 to 1 in power between scale readings of 1 and 7. Below 1 on the scale the reading has no meaning. Various types of instrument (with regard to damping and time period) have been tried. The lighter the moving parts the more quickly the needle responds, but it has been found that with very light moving parts the movements of the needle are so rapid that they are tiring to the eye; and although it might appear that a light movement would give a more accurate indication by following the variations of intensity more closely, this was not found to be any advantage in practice. A dead-beat instrument responding fairly closely to fluctuations of current occurring with a periodicity not greater than about 2 per second was found to give the most satisfactory results.

It must be realised, however, that the law of the instrument is different from that of other types, and the time of operation of the needle will not have the same meaning. In practice this instrument is the only one so far which gives any reasonable indication to the eye of the true sensation of loudness experienced by the ear.

This type of instrument is being standardised for use throughout the B.B.C., both studio control rooms and transmitters being equipped with them.

Various types of peak voltage indicators for use in determining degree of modulation at the transmitter have been developed since the original slide-back. The most satisfactory seems to be one in which a condenser is

charged to the peak voltage through a diode, the charging time being sufficiently low for the condenser to become fully charged very quickly and thus respond to rapid transients. The voltage to which the condenser is charged may be indicated by a valve-voltmeter or by an electrostatic voltmeter connected across the condenser. Provided that the total leakage is sufficiently small and the time period of the meter sufficiently low, the needle will have time to reach the true reading before the condenser has discharged to any appreciable extent. In practice a condenser of 2000 $\mu\mu\text{F}$. ($\cdot 002 \mu\text{F}$.) capacity is found to be satisfactory, and the insulation resistance of the apparatus is such that the discharge time constant CR is about 5 or 10. This is used chiefly for lining up or calibrating the programme meter, but can be used reasonably accurately to determine the percentage modulation of the transmitter at any moment during a programme. This form of instrument when using an electrostatic voltmeter is direct reading, which is an advantage, and, what is equally important, is more convincing to the maintenance engineer than any other instrument.

As has been stated above, it is the present object to relieve the controller of any thought of the actual transmitter, and merely to make him responsible for condensing the range of intensities to within certain limits, so that the maximum intensity never exceeds a certain limit and the minimum intensity is always audible; that the average intensity has a reasonable value, and at the same time to preserve as much as possible of the light and shade of the original. At the same time it is necessary, in order that the transmitter and other apparatus shall be used most efficiently, to adjust the amplification at various points, and in order to eliminate as far as possible the human element a system of lining-up has been arranged. It is proposed to describe this in order to complete the description of the present form of volume control in use in this country.

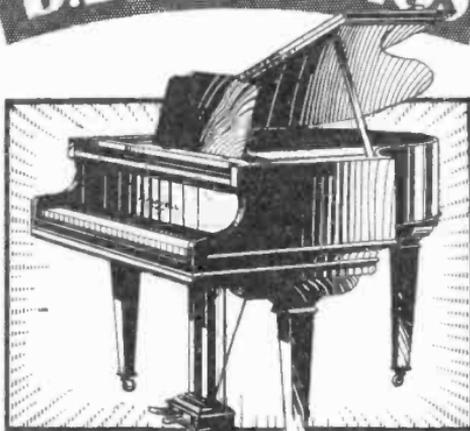
In the first place it is necessary that the programme meter at the transmitter shall be adjusted so that a maximum reading on the programme meter corresponds with the maximum modulation during a programme which the transmitter can handle without overloading. A series of tests has indicated a simple method of making this

adjustment on a steady testing tone as follows:—the transmitter is modulated with steady tone, so that the depth of modulation (peak value) is approximately 30 per cent. of the maximum, and the programme meter then adjusted so that it reads its maximum value. This, of course, is done with a “pure” tone, but as most musical and other items broadcast are very far from “pure” tones, the peak values developed on music and other items will be much greater than that developed by a “pure” tone. If the adjustments have been carried out as indicated above, it has been found that when the programme meter reads 7 the peak value of modulation will be about the maximum on most programme items.

It is now necessary to line up or calibrate all programme meters in the chain between the originating station and the transmitter. This is also done with a steady tone, and so arranged that the programme meters all read the same value on steady tone, while the level of tone outgoing to each particular line is adjusted to suit the requirements of that particular line. Thus, when the controller at the originating station arranges his volume so that his programme meter is reading 6 at some instant, then all the other programme meters in the chain will be reading 6 also, and the transmitter will be modulated to a depth of about 5 decibels below the maximum. Ideally the volume of different items should be adjusted to reasonable levels relative to each other. On the other hand the general level of all items must not be kept down for one peaky soprano.

As the programme meter indicates to the eye the sensation of loudness experienced by the ear, it is quite easy for a controller to arrange his volumes (which he does by adjusting the amount of amplification, or conversely the amount of loss in a circuit) to whatever he requires, and, generally speaking, speech should be put out at about 5 to 6 on the programme meter; ordinary music will read an average of 4 to 6; and heavy passages up to 7, while very weak passages will be adjusted to read not less than 1 or 2. The practical operation of the actual controlling is, of course, largely a matter of skill on the part of the controller, and in order to anticipate in his controlling or condensing of the volume range he must have a knowledge of what is going to be broadcast. In

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the case of music this knowledge can be obtained from a score unless the controller, who nowadays is usually a musician, is so intimate with the music that he can dispense with a score. The controller also attends rehearsals—either in person at the concert hall or by listening in a rehearsal room—so that he can ascertain the particular expressions which the conductor wishes to emphasise.

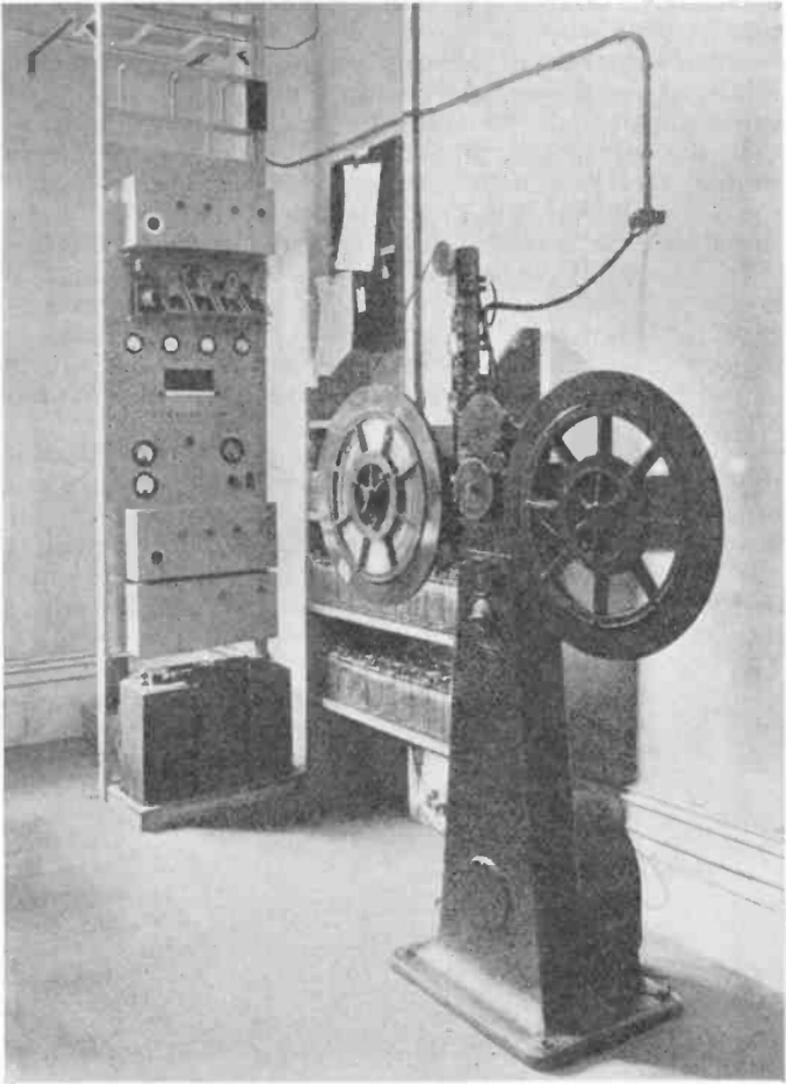
In the case of speech, such as talks, the matter is very simple, and in general, unless a very erratic person is speaking, all that is necessary is to set the control handle so that the meter reads between 5 and 6 most of the time.

In nearly all cases controlling volume is a matter of skill and knowledge which can only be gained by experience. It is not the function of the programme meter to make the operation of controlling fool-proof, but rather to assist the controller by giving him more information about what is happening.

One of the great advantages of the programme meter is that it gives the controller confidence, which most of the other forms of meter do not. A square-law meter, for instance, on moderately weak passages hardly moves at all, while on heavy passages it flicks right across the scale, thus tending to frighten the controller, making him reduce his volume far more than is really necessary.



AT THE LOCAL CONTROL POSITION IN QUEEN'S HALL



THE BLATTNERPHONE USED BY THE B.B.C.

R E C O R D I N G A P P A R A T U S

A VERY little consideration will show the reader how useful, to an organisation like the B.B.C., are facilities for readily obtaining permanent or semi-permanent records of speech and music, capable of being reproduced at will. The obvious use, which occurs to one immediately, is that of re-broadcasting. If, for example, an important speech, by some distinguished personage, occurs at a time when the majority of interested listeners are away from home, the difficulty can be met by a re-broadcast, at a convenient time during the evening programme, of an actual record of the speech itself, every tone and inflection of the voice and every point of emphasis being reproduced almost as in the case of the original utterance. Such re-broadcasting has already been undertaken on one or two occasions, notably, for example, on the occasion of the opening of the India Round Table Conference by H.M. the King.

Excerpts from the running commentaries of certain sporting events, again, may justify the use of some system of recording in this way, as may interesting relays of trans-oceanic telephony occurring at an inconvenient hour.

But there are other, perhaps less obvious uses, to which such apparatus as is now under consideration can be put. One of the difficulties continually confronting those who are responsible for the organisation of broadcasting is that a person who is to deliver a talk or lecture or take part in a play has, in general, very little idea of the exact effect which his utterance has upon his hearers, whether via the medium of the microphone or by direct speech. It is a well-known fact, to those concerned with any system of recording, that a person who hears a record of his own voice, however accurate and realistic, for the first time, is almost unable to believe in the truth of the record, so different is it from his own impression of the sound and intonation of his voice. It is usually only by comparison of records of the speech of others with their actual voices that he eventually becomes convinced. It will thus be seen what an advantage it is to a dramatic producer, for example, to be able to demonstrate to an actor the exact effect of his performance as transmitted by the microphone, and so to be able to obtain the exact impression which he requires.

Yet another use, applicable only in special cases, is to enable an artist, unable to broadcast at a given hour, to record his performance at a time convenient to himself; whilst the value of a system for making permanent records of interesting events for future broadcasting will be obvious to everyone.

There are three methods, each possessing its particular advantages, which might be applicable to use in broadcasting. They are :

- (1) Gramophone disc recording.
- (2) Sound-film recording.
- (3) Steel strip recording.

All three of these are capable, under the best conditions, of giving good quality reproduction. The first two, however, possess the disadvantage from the broadcasting point of view that they require complicated apparatus and a considerable interval of time between the taking of the record and its reproduction. Moreover, the cost of raw material, if much use is made of the process, is liable to be very high, particularly when it is considered that only a very small percentage of the recorded matter is likely to be retained in permanent form.

The B.B.C., therefore, has recently made use of the third process, under the name of the British Blattnerphone (Stille system), though in the past several re-broadcasts have been made from gramophone records specially recorded by the Gramophone Co., Ltd., including that of the speech by H.M. the King referred to above.

In the Blattnerphone process a thin strip of steel tape runs at a speed of rather over three feet per second between a pair of thin pole-pieces, around which coils are wound very much as in a telephone receiver. The electric currents corresponding with the matter to be recorded, and provided at the output of a suitable amplifier, are passed through these coils and cause changes in the state of magnetisation of the particles of the tape. These changes persist, and if the tape is again run between similar pole-pieces and coils, connected to the input of an amplifier, speech currents are generated in them, which suitably amplified can be used to reproduce the original matter.

The magnetic records thus obtained are permanent, and



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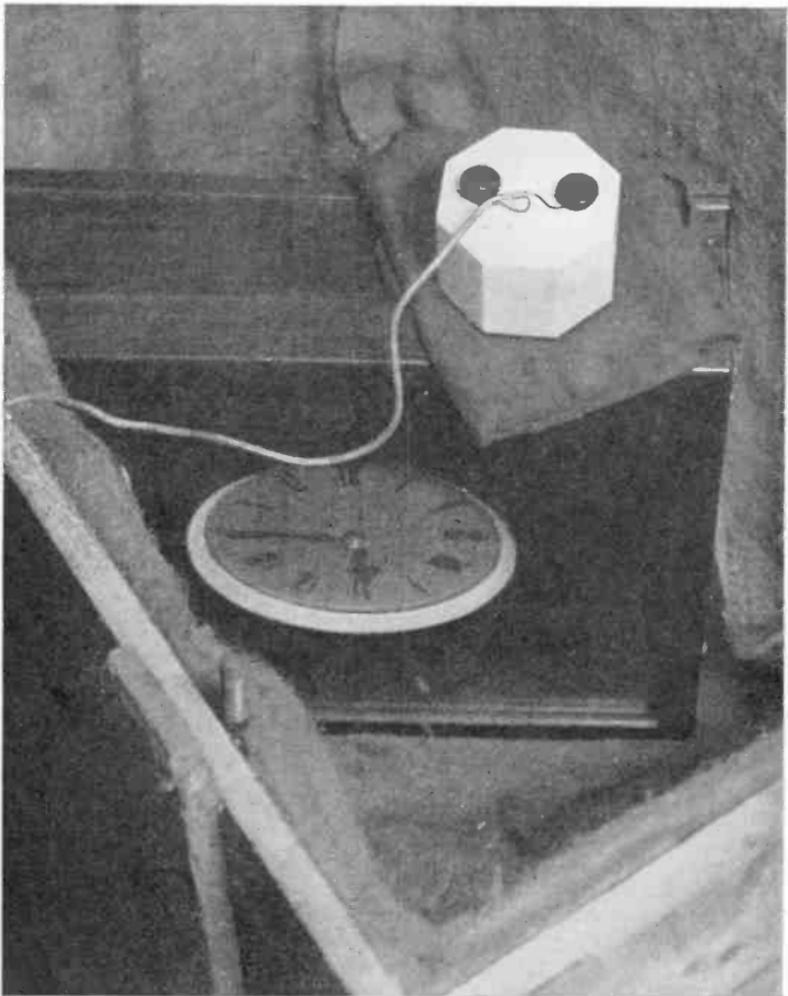
can be reproduced an indefinite number of times without deterioration. They possess the great advantage that if desired they can be instantly and completely obliterated on re-magnetising the tape by running it between the poles of a direct current electromagnet. The tape can thus be used as many times as desired, if not required for some permanent record, with consequent economy of material. The other great advantage of the steel strip system is that the records are instantly re-playable, only the time taken for rewinding elapsing between recording and reproduction.



Price Studios

THE GRAMOPHONE METHOD

Apparatus used in America for providing an hour's continuous transmission of an electrically-recorded programme



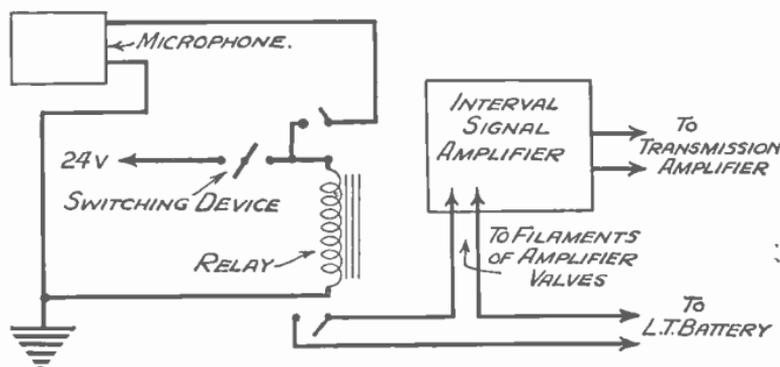
THE CLOCK AND MICROPHONE IN A FELT-LINED BOX

THE INTERVAL SIGNAL

THE present Interval Signal was brought into use by the B.B.C. in December 1930. It is radiated at all times in the programme when an unexpected interval arises, *i.e.* one which does not appear in the *Radio Times* or in the programmes as printed in the Press. In the event of unforeseen delays which might develop in a studio, or at an outside broadcast, the sudden failure of the programme from such causes is likely to lead the listener to think his set has become faulty. The radiation of the interval signal relieves all anxieties on this account and eliminates the possibility of listeners adjusting their receivers if nothing can be heard at the moment of switching on.

Many suggestions have reached the B.B.C. from time to time as to the type of interval signal to be used. The majority of them are impracticable owing to the difficulty of combining mechanical and electrical considerations. Many other suggestions such as the metronome, the tick of a grandfather-clock, a musical chord, or jingling bells, were tried, but for various reasons none of them were considered satisfactory.

What are the requirements of an interval signal? Primarily it must be flexible in use and available at a moment's notice: obviously also it should not require additional staff for operating it. Another requirement is that it should be as unobtrusive as possible so as not to irritate listeners. There are many types of signal which



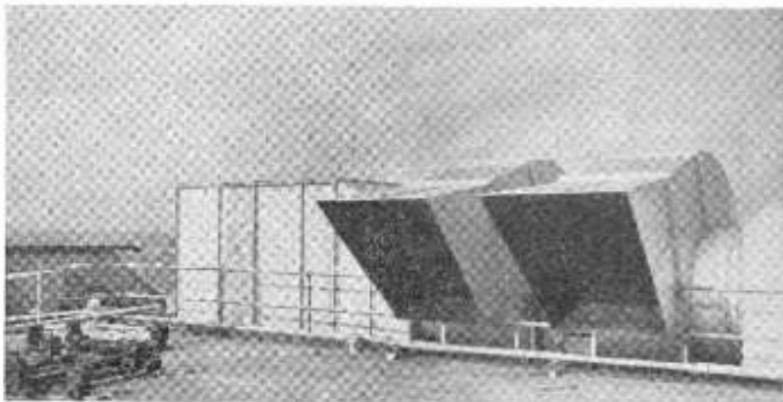
would perhaps in the first instance be more pleasing than the present one. It is doubtful, however, whether one could listen to them seven or eight times a day, week after week, with the same equanimity that one listens to what has been called "*The Ghost in Goloshes.*"

The apparatus used is extremely simple and easy to operate, and has the undoubted advantage that very little of it is mechanical. A microphone is installed in an electric clock fitted with a second hand. A relay, operated by a switching device fitted quite close to the control engineer, is responsible for the following actions :—

1. Polarising the microphone.
2. Heating the filaments of the amplifier.
3. Connecting the output of the Interval Signal amplifier to the other amplifiers in the chain of transmission.

The cabinet of the clock is lined with felt to cut out unnecessary echo effect, and the clock with its microphone is installed in a large felt-lined box which renders it sound-proof. Unofficially this box is known as "Studio 10a," and is perhaps the only studio that has never been visited by a member of the public.

A simplified circuit arrangement is shown in the accompanying diagram. It has no doubt already been realised that each tick of the clock indicates the passing of one second, and it can therefore be used for timing purposes.



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RECENT DEVELOPMENTS

THERE HAVE BEEN NO outstanding or radical developments in the design of broadcasting receivers during the year. Steady progress has been made in many directions, but this progress has been more in the nature of applying well-known principles more carefully, rather than in the discovery and adoption of new principles. Closer investigation into various details has cleared up a number of points which were previously rather obscure, and the requirements to be fulfilled in the design of high-quality receivers are becoming more clearly defined and more generally understood.

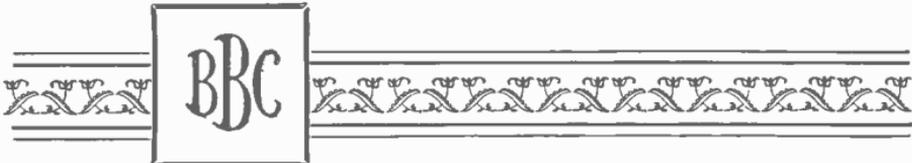
The rapid growth of high-power stations in Europe has made the fulfilment of the conflicting requirements of selectivity and reproduction of the upper audio frequencies more and more of a compromise. The need for avoiding rectification in high-frequency stages, and provision of ample selectivity before the first high-frequency stage in order to avoid this, are now generally appreciated, but the influence of the detector on the amount of audible interference produced does not appear to be as well recognised as it might be. This effect has been known for some years, but there was not the present need for it to be given so much attention. The shape of the detector characteristic affects the amount of interference produced when an interfering modulated carrier of a given amplitude is applied to the detector together with the required carrier of a given value. The presence of the required carrier may increase, decrease, or leave unaffected the strength of signal heard from the interfering station when the required carrier is absent, depending on the shape of the detector

characteristic. Thus selectivity is not merely a function of the sharpness of tuning of the tuned circuits. A linear detector reduces the amount of audible signal produced by an interfering station by a factor which is proportional to the ratio of the interfering and required inputs to the detector. Rectification of an interfering signal by a detector which has a characteristic which follows a square law is not affected by the presence of the required signal. Hence a linear detector is desirable from the point of view of selectivity as well as quality.

When the difference in frequency between the interfering and wanted carriers lies within the audible range, the "wipe-out" effect described above applies to the amount of intelligible interference produced. There is another type of interference, however, due to heterodyning of the sidebands and carriers and of the two modulated carriers. This interference may be audible even when the "wipe-out" effect of the detector is sufficient to make the amount of intelligible interference inaudible. In order to eliminate this sideband heterodyning it is necessary to reduce the strength of the interfering modulated carrier until the ratio of the required input to the interfering input at the grid of the detector is several hundreds to one. If, however, rectification occurs in stages preceding the detector, audible interference may be experienced, even if this ratio is obtained by further tuning after such stages. Hence it is important to ensure that no rectification occurs in H.F. stages, and it is desirable to provide sufficiently selective circuits prior to H.F. valves to avoid overloading (even the 1st H.F. valve) when a strong interfering signal is present. The overall selectivity of the tuned circuits should be sufficient to obtain the required reduction of the interfering input at the grid of the detector to something like 0.5 per cent. of the input from the required signal.

In order to preserve as much as possible the upper audio frequencies of the required signal, the frequency response of the tuned circuits should be flat-topped over as wide a band as possible, and should then cut off sharply at a frequency three or four kilocycles short of that of the interfering carrier.

The use of diodes, and three-electrode valves employed as diodes, for detectors has received further attention.



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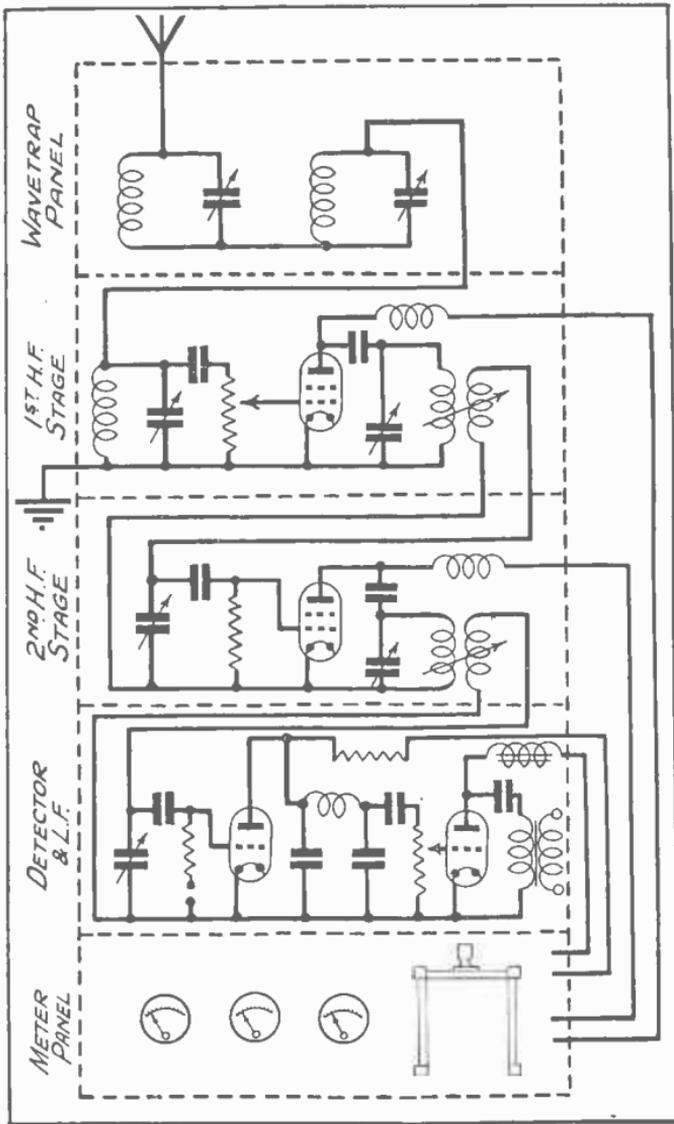
ALL - ELECTRIC RADIO

Woburn

Modern diodes normally used to rectify alternating current for supplying H.T. current to receivers, and also three-electrode valves with anode and grid connected together, have been found to give excellent rectification characteristics when used as detectors with an output load resistance of the order of a quarter or half a megohm. By using this type of detector, which does not amplify as well as rectify, the rectification characteristic is not limited by the amplification characteristic as in the ordinary grid rectifier. Consequently the curved position at the lower end of the rectification characteristic can be made negligible by working over an extended characteristic which is not limited by curvature of the amplification characteristic at large amplitudes. The high-frequency components remaining after rectification can be removed before amplification takes place in a separate valve, thereby avoiding the limitations imposed by their presence. In addition this type of detector, with its leak of a quarter or half a megohm, gives considerably less damping on the tuned input circuit than does the ordinary grid detector, since in the former case the anti-reaction effect due to capacity coupling between the grid and the amplified H.F. voltage in the anode circuit does not exist. Like the push-pull method, however, it has the disadvantage of requiring an additional valve, since no amplification occurs in a diode. A new type of screened grid valve has recently been developed in America called a "variable mu" valve. This has a characteristic composed of two fairly straight portions, one of steep slope for low inputs and a long portion of small slope for large inputs. It is claimed for this valve that the amplification of a strong signal is reduced without distortion by increasing the grid bias, but whether its advantages are sufficient to warrant its general adoption remains to be seen.

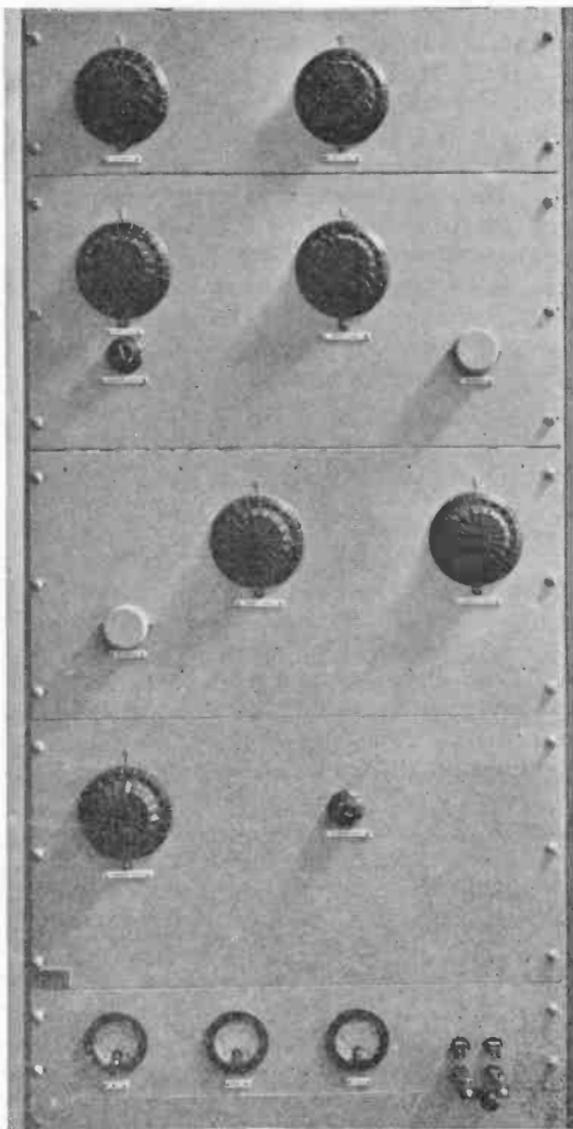
OUTPUT STAGES

Considerable confusion still appears to exist as to the optimum load for output valves. Much has been said and written about maximum efficiency being obtained, on certain assumptions, when the load impedance is equal to the valve impedance, and when it is equal to twice the valve impedance on other assumptions.



(a) Diagram of Circuits

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(b) Exterior of Panel

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It would appear, however, that the optimum load in practice is that which will give the maximum output when the harmonic content is limited to an amount which is not audible. If the latter is taken to be 2 per cent., recent investigation has shown that with some modern output valves the value of a resistance load required to give the maximum output is eight or ten times the valve impedance. Worked under these conditions the output is fairly small, and difficulty is

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Maker	Type	Field Ohms	Field Volts	Field Amps	Rectifier Type	Remarks
Amplion	EM 644	2,500 + Series Res.	240	0.048	H.T.8	Voltage Doubler. Two 2 mfd. Condensers 200 v. A.C.
Baker's Selhurst	All Battery Models	6	6	1.0	A.3	9 v. Transformer Secondary
B.T.H. R.K.	Senior	4,000	200	0.05	H.T.8	Voltage Doubler. Two 2 mfd. Condensers 200 v. A.C.
	Senior	6	6	1.0	A.3	9 v. Transformer Secondary
	Minor	6,700	200	0.03	H.T.7	$\frac{1}{2}$ -wave. 4 mfd. Condenser 250 v. A.C.
Ferranti		10,000	200	0.02	H.T.6	$\frac{1}{2}$ -wave. 4 mfd. Condenser 200 v. A.C.
		9	6	0.67	A.3	9 v. Transformer Secondary
Magnavox	140/142 & 143	7,500	210	0.028	H.T.6	$\frac{1}{2}$ -wave. 4 mfd. Condenser 210 v. A.C.
Rola	"F" series	6,500	220	0.034	H.T.8	Voltage Doubler. Two 1 mfd. Condensers 210 v. A.C.
		4,700	190	0.040	H.T.8	do.
		8	6	0.75	A.3	9 v. Transformer Secondary

Transformers are not required except where stated, provided that the magnet is adequately insulated, and the mains voltage corresponds to the A.C. voltages given.

The Westinghouse Brake & Saxby Signal Co. Ltd.,
82, York Rd., King's Cross, London, N.1. Phone: North 2415.

L O U D S P E A K E R S

ONE OF THE MOST important pieces of apparatus in the listener's equipment is the loudspeaker. It is the means whereby the electric currents which are produced at the output of his receiving set, and which are, or should be, precisely similar, except in magnitude, to those which are produced by the microphone itself, are reconverted into sound energy. It is unfortunate that so important a link in the broadcasting chain should be technically the least able to fulfil its ideal requirements. Such is nevertheless the case, and throughout the period during which broadcasting has been carried on much research has been done to improve the characteristics of loudspeakers.

The result of all this work to date is that, so far as the ordinary listener who desires as good reproduction as possible is concerned, his loudspeaker must consist of a suitably designed light diaphragm, usually in the form of a cone, moving in an aperture in some kind of baffle. It is not fundamentally important whether the means of setting the cone in vibration is a coil of wire carrying the speech currents and moving in a constant magnetic field, or a steel armature acted upon by a magnetic field which varies in intensity in accordance with the speech currents.

The function of the baffle has been explained on numerous occasions. To recapitulate briefly, however, its purpose is to increase the sound wave output of the loudspeaker at the lower audible frequencies, corresponding with the bass of the musical scale. If a baffle is not used, instead of the diaphragm exerting pressure on the air when it is being actuated at a low frequency, circulating currents of air are set up between the back and front of the diaphragm, and these allow the energy of the loudspeaker to be dissipated with very little radiation of sound waves. This difficulty could be obviated by making a much larger diaphragm, but, if this were done, the response at the higher audible frequencies would be very much reduced, for reasons which are outside the scope of the present article. A comparatively small diaphragm is therefore used in practice, and its effective size is increased by the use of a sufficiently large baffle.

Whilst it is comparatively well known that the ordinary

flat baffle must be of considerable size, in order that the lowest frequencies, of the order of 50 cycles per second, shall be adequately reproduced, it is not so often realised that the material of which it is composed has a very considerable effect on the result.

Recently some experiments were made to determine to what extent a compromise could be reached between the technical requirements of a baffle to be used with a good modern coil-driven loudspeaker, and æsthetic considerations, bearing in mind that the loudspeaker was to be used in an artistically furnished room. One object of the experiments was to determine the minimum size of the baffle for the best quality reproduction. Two results became apparent: one that by increasing the size of the baffle up to a diameter of about five feet, improvement in bass response was still obtained. The second result, perhaps even more important, was that the baffle, to be effective, must be made of a fairly hard wood, at least seven-eighths of an inch in thickness. So marked is this effect that a large baffle, four or five feet in diameter, but constructed of plywood three-eighths of an inch thick, is hardly more effective than one about two feet in diameter, made of thick material.

The essential characteristic is that the baffle should be sufficiently rigid not to be set in vibration at the lower frequencies to any appreciable extent. If vibration does occur, the baffle does not, as might be supposed, help to radiate sound energy at the frequency concerned, but allows communication to take place between the front and the back of the diaphragm, hence diminishing the sound output of the loudspeaker, as well as introducing other undesirable features.

It will be seen that a thoroughly satisfactory flat baffle is a large and massive object which is not easily adapted to the scheme of decoration of any ordinary room.

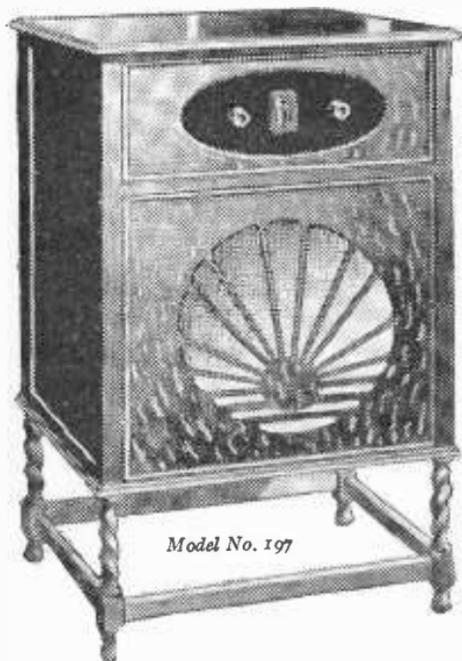
Fortunately, a solution of the difficulty is possible in terms of the box baffle. It will be observed that if a baffle is made up in the form of a box, the front surface, containing the aperture, being, say, two feet square, the two sides, the top and the bottom being each eighteen inches deep, and the back remaining open, the distance which a sound wave has to travel from the back of the diaphragm to the front is about the same as in the case of

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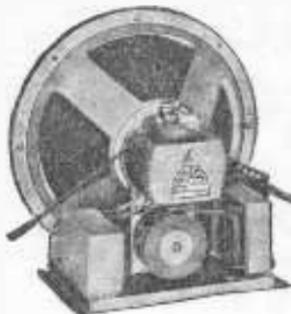
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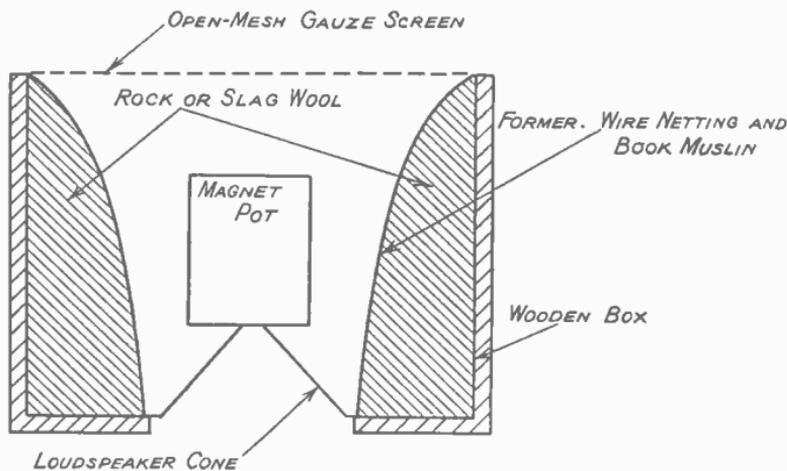
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a flat baffle four or five feet square. Such a box baffle is very much easier to adapt as an article of furniture than its equivalent flat baffle.

An untreated box baffle, however, possesses the very great disadvantage that, owing to the natural resonance of the air in the box, which thus acts very much like an organ pipe, the output of the loudspeaker is considerably increased over a limited band of fairly low frequencies, probably round about 150 cycles per second. The result is a pronounced "boom," giving a most unpleasant effect, particularly on speech. Recent experiment has, however, shown that the undesirable effect of this resonance can be avoided by treatment of the inside of the box baffle with sound-absorbing material. The most suitable material is known as "Rock Wool" or "Slag Wool," and is a commercial product, originally placed on the market for use in heat insulation.

The best method of arranging the wool, which is composed of a mass of vitreous fibres, is shown in section in the accompanying diagram. The wool is packed fairly tightly behind a former composed of wire netting of about half-inch mesh combined with book-muslin to retain the fine particles, and the tunnel so formed is flared out rather like a short, wide exponential horn. Early experiments were made using a tunnel with parallel walls and a diameter slightly greater than that of the loudspeaker diaphragm.



Results, though good, were inferior to those obtained with the arrangement just described, as the effect of the resonance was still not sufficiently reduced.

Actually the result obtained with a loudspeaker thus treated is considered to be superior to that obtained using an efficient flat baffle in conjunction with a good coil-driven cone. The superiority appears to lie in the improved response of the loudspeaker to intermediate frequencies of the order of 250 to 500 cycles per second. It is just this band of frequencies which has always tended to be lacking in the moving-coil loudspeaker arranged with a flat baffle in the conventional way.

The theory of the improvement may be regarded as follows. It is now generally realised that a loudspeaker only operates efficiently by reason of its resonances. If a cone loudspeaker really behaved as the light rigid non-resonant piston it was once supposed to be, its efficiency would be very small indeed. Instead, its sound output over the frequency range is due to a series of resonances merging one into the other, and it is the duty of the designer of a loudspeaker so to arrange matters that the series covers the whole range as far as possible. In the coil-driven cone loudspeaker the high-frequency range is covered by the various modes of resonance of the cone and even the coil itself, whilst the very low frequencies are adequately reproduced owing to the resonance between the mass of the cone moving as a whole and the restoring force due to the suspension. Mounting the cone in a suitably designed box baffle provides additional restoring force, due to the elasticity of the air column, which becomes operative at the intermediate frequencies, and extends the range of efficient operation of the loudspeaker by resonating with the effective mass of the cone itself.

The improvement resulting from this method of treatment, from the point of view of both quality of reproduction and appearance, is such that it has been decided to equip Broadcasting House almost completely with loudspeakers of the type under consideration.

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VALVES AND VALVE TESTING

IT IS NOT MANY YEARS since the R valve, which lit up brightly when in normal working condition, was the only type available for receiving purposes. So rapid, however, has been the development of the thermionic valve, that anyone unacquainted with the appearance and performance of valves of ten years ago would have difficulty in believing that such improvements could have occurred in so short a period. In those days, when "bright emitters" were the only type generally available, the listener considered that his valve was in perfect order if it lit up brightly when connected to an accumulator. This was, in fact, about the only test necessary with these early valves. To-day, however, there are large numbers of different types and makes of valves, many of which show only a feeble glow from the filament, and even that is often obscured by deposits on the inside of the glass of magnesium and other substances evolved during the evacuating processes. Such formations are known as "getters," an American word used to denote the process whereby the final vacuum is obtained. Moreover, even if the feeble glow from the filament is observable, this only means that the filament is intact, and not necessarily that it is emitting as it should do.

It does not seem to be realised generally that one valve which is faulty, owing to poor emission of the filament, may ruin the reproduction from a receiver. To all outward appearances the valve is perfect, and the only way to detect the fault is to test the valve by some method such as that described below.

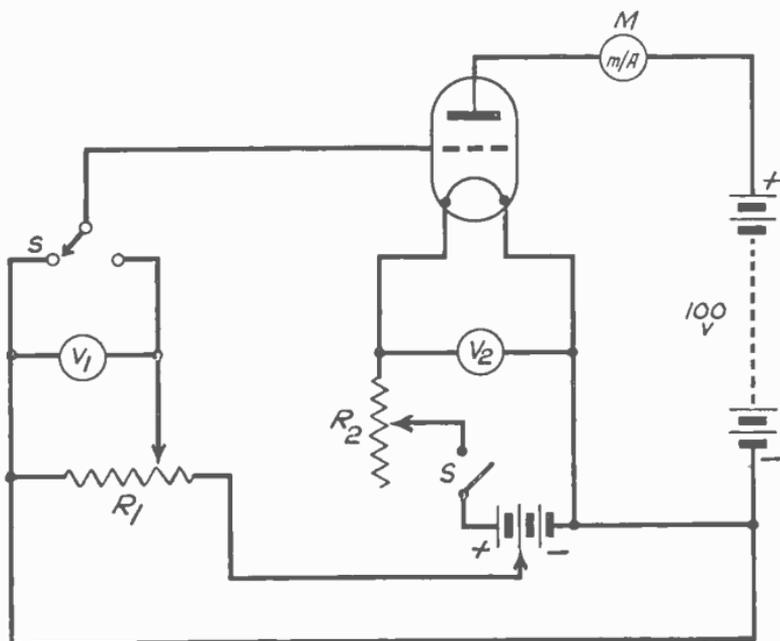
It is the standard practice of all British valve manufacturers to test their products thoroughly before they are sold to the public. The following remarks, therefore, are not primarily intended to apply to new valves, but rather to valves which have given service in a receiver for some length of time. At the same time, the test described below can be applied easily to all valves whether old or new, and it will do no harm to test new valves, as it will satisfy the purchaser that his purchase has not been damaged in transit between manufacturer and retailer.

It is now the common practice of valve manufacturers to give a figure for the mutual conductance (or slope) of

each of their products. Actually this may be considered to be a measure of efficiency, as it shows what change of anode current will take place due to a certain change of grid voltage. Mutual conductance, in fact, applies only to very small changes and varies all along the length of the valve characteristic. It is the practice of manufacturers to give a figure of mutual conductance at zero grid volts and with 100 volts on the anode. Then a small potential applied to the grid will cause a change of anode current as measured by a milliammeter in the anode circuit. The mutual conductance is then given by

$$\text{Mutual conductance (milliamps per volt)} = \frac{\text{Change of anode current}}{\text{Change of grid voltage}}$$

If the change of grid voltage be made unity, then the change of anode current will show the mutual conductance directly. It will only be a true value about a very small change of grid voltage, but sufficiently accurate results can be obtained by changing from zero to plus one volt.



CIRCUIT OF VALVE-TESTING APPARATUS

A small valve-testing apparatus can be made up quite simply on the lines indicated in the diagram opposite.

It will be noted that a positive potential is applied to the grid by connecting a potentiometer R_1 across a part or the whole of the battery. The voltage is adjusted until 1 volt is shown on voltmeter V_1 , which must be an accurate instrument. By means of the switch S , the grid potential can be adjusted either to zero or plus one volt. A change of anode current thereby produced will be observed in the anode circuit milliammeter M . This also should be an accurate instrument of a reliable make. The change of anode current in milliamperes will be the mutual conductance in milliamperes per volt change on the grid. The rheostat R_2 and voltmeter V_2 are not essential to the action of the testing panel, but will prove valuable in adjusting correctly the filament voltage to the particular valve under test. The above test is suitable for all types of valves. Valves fitted with indirectly heated cathodes should have the cathode connected to the negative terminal of the accumulator. Pentode valves should have the fifth electrode connected to the positive H.T., on the battery side of the milliammeter. Screened grid valves require a lower voltage on the screen than on the anode, therefore either a separate H.T. battery must be used for the screen, or tappings arranged on the anode battery. In all cases the milliammeter M must indicate the actual anode current only, any other H.T. connection being taken off on the battery side of the milliammeter.

The manufacturers' lists must be referred to for the published figure of mutual conductance. Within reason, the higher the value of mutual conductance, the more efficient the valve. The listener will require to know what departures may be allowed from the published figures. In the case of new valves, the measured mutual conductance usually will be higher than the published figure, and there is, of course, no upper limit. A new three-electrode valve may be considered up to standard provided its mutual conductance is not more than 33 per cent. below the published figure. For screened grid valves and pentodes this figure may be 40 per cent. below the published figure. Old valves may be considered serviceable provided the mutual conductance has not dropped more than 50 per

cent. below the published figure for three electrode valves and 60 per cent. for screened grid valves and pentodes. Below this figure the valve has lost so much of its emission as to be liable to produce bad quality reception, and should be replaced. It should be noted that with screened grid valves, manufacturers are not all in agreement as to the values of anode voltage and screen voltage to be used for their published figure of mutual conductance. Care must be taken that the correct voltage, as published for each type, is applied.

CHOICE OF VALVES

The different makes and types of valves available on the market to-day are so numerous as to render choice difficult. In the case of manufactured receivers, the designer has designed his receiver round a particular type and make of valve. In the case of replacement, it is desirable that the replacement be made with a valve of the same make and type, otherwise trouble will nearly always ensue. In the case of the home constructor who has designed his own receiver, he will almost certainly want to take any advantage he can of improvements in valves, and it is to him that these latter remarks are addressed.

As indicated in the remarks about testing, the higher the mutual conductance, the more efficient the valve, but a very high mutual conductance means that the electrodes are very close together, and this must be borne in mind. In all reputable makes of valves, proper anchoring of the electrodes ensures that they will not come in contact during life. A high mutual conductance means either that the magnification factor of the valve is increased and the impedance remains unchanged, or else that while the magnification factor remains the same, the impedance is decreased. The listener, wishing to take advantage of the higher efficiency of new valves, usually will choose a new valve having an impedance similar to the old valve, but with a high magnification factor. Increase of magnification in any stage means that the overall magnification of the receiver will be increased, and care must be exercised to see that any subsequent stages are capable of dealing with a stronger signal. This applies particularly to the detector and the output stage. Some remarkable developments have taken



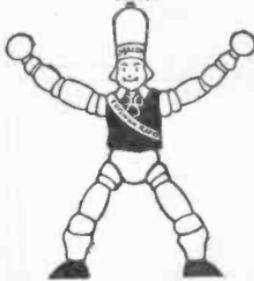
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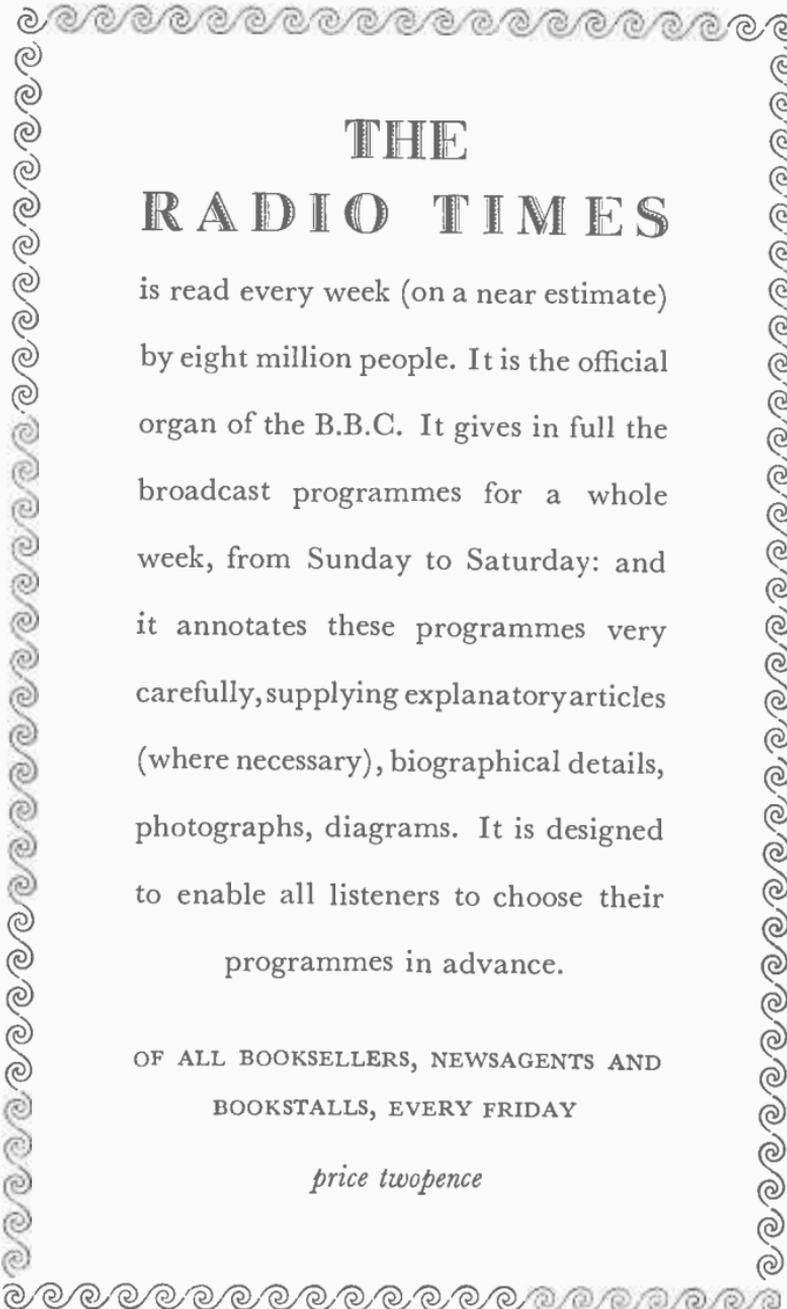


DECCA FOR DANCING

place in output valves, and the increase of efficiency is so great that, in many cases, the detector will feed the output stage directly without any intermediate stage of L.F. These high-efficiency output valves require carefully designed circuits. The grid leak must be kept low—50,000 ohms to 100,000 ohms being of the right order—and a resistance of about 5,000 ohms should be placed directly in series with the grid to prevent short-wave oscillation. This latter is essential when using two or more valves in parallel or push-pull. Finally, all stages (except, of course, the output stage) should be properly decoupled, and any common impedance in the earth return leads must be avoided by returning each grid-leak and decoupling condenser to the cathode or filament of the valve it is associated with, and by the shortest path. The practice of merely connecting over to the screen nearly always causes trouble, as a common impedance is introduced. A direct and separate earth lead to each cathode is greatly to be preferred.



AERIAL VIEW OF DAVENTRY STATION



THE RADIO TIMES

is read every week (on a near estimate) by eight million people. It is the official organ of the B.B.C. It gives in full the broadcast programmes for a whole week, from Sunday to Saturday: and it annotates these programmes very carefully, supplying explanatory articles (where necessary), biographical details, photographs, diagrams. It is designed to enable all listeners to choose their programmes in advance.

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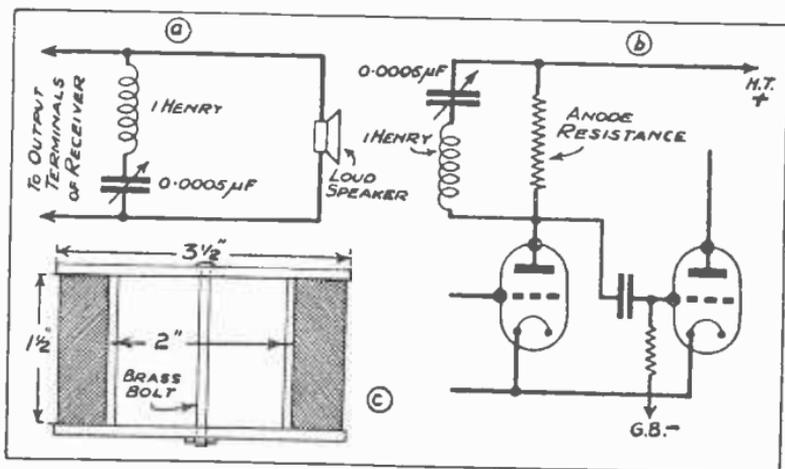
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HETERODYNE FILTERS

ALTHOUGH a receiver may be sufficiently selective to prevent the programme transmitted by another station, to which the receiver is not tuned, being audible, it very often happens that an annoying very high-pitched whistle is heard, either at irregular intervals or continuously. Sometimes this may be due to a listener in the neighbourhood allowing his set to oscillate at a high audible note, but it is usually due to the carrier-wave of the station working on the wavelength adjacent to that of the station to which the receiver is tuned. With the present arrangement of wavelengths in force in Europe the difference in frequency between stations on adjacent wavelengths is 9,000 cycles per second, and a note of this frequency is heard if either of the stations on wavelengths adjacent to the one to which the set is tuned gives sufficient field strength in the neighbourhood of the receiver.

It is very difficult to prevent this type of interference by using very sharply tuned high-frequency circuits without spoiling the quality of reception from the local station. If the circuits are sufficiently sharply tuned to do this, they will probably remove most of the high audio-frequencies from the programme being received from the local station, unless they are very carefully designed to have a flat-topped response-curve for all frequencies up to about 7,000 cycles per second each side of the carrier-frequency, with a very sharp cut-off beyond. An arrangement of this kind is probably the best for avoiding interference, but it cannot be embodied in the simpler types of receivers.

A fairly simple method of removing a 9,000-cycle heterodyne note, which can be applied to existing receivers, consists of a filter circuit connected across some part of the low-frequency portion of the receiver. This filter circuit consists of an inductance and condenser in series tuned to 9,000 cycles, and in most cases an inductance of 0.5 to 1 henry with a variable condenser of a suitable value is satisfactory. Actually a capacity of 0.0003 μ F. is required to tune an inductance of 1 henry to 9,000 cycles, so that a variable condenser with a maximum capacity of 0.0005 μ F. will be suitable. If the inductance is as low as 0.5 of a henry a capacity of 0.0006 μ F. will be required. This



ALTERNATIVE METHODS OF CONNECTING THE FILTER, AND DETAILS OF THE INDUCTANCE COIL

can be obtained by connecting a small fixed condenser of, say, $0.0003 \mu\text{F.}$ across a $0.0005 \mu\text{F.}$ variable condenser or by using a $0.001 \mu\text{F.}$ variable condenser.

An inductance which has been found to give satisfactory results in a number of cases consists of about 4,000 turns of No. 32 or No. 30 gauge double silk- or double cotton-covered copper wire wound on a former made up as indicated at (c) in the diagram. The overall diameter of the completed coil is about $3\frac{1}{2}$ inches, and about $1\frac{1}{4}$ lbs. of wire are required. The inductance is about 0.8 henry, and therefore a $0.0005 \mu\text{F.}$ variable condenser is suitable.

The filter should be connected across some part of the low-frequency circuits which has a high impedance at a frequency of 9,000 cycles compared with the impedance of the filter at this frequency, so that the filter will by-pass all audible signals of this frequency. At the same time, however, since it is not desired that signals of other frequencies should be by-passed, the impedance of the filter at other frequencies should be sufficiently high compared with the impedance of the alternative path to have negligible effect on it. Hence the resistance of the filter should be kept as low as possible, so that it will have very low impedance at the frequency to which it is tuned, and very high impedance at other frequencies.

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.)

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THE WAIFS AND STRAYS SOCIETY

Usually the filter is quite effective when connected across the terminals of a normal high-resistance loud-speaker (shown at *(a)* in the diagram), as the impedance of the latter is quite high at a frequency of 9,000 cycles. If a low-resistance loud-speaker, such as the moving-coil type, is used with a step-down transformer, the filter can be connected across the primary of the step-down transformer.

If it is found that the filter is not sufficiently effective when connected in either of the above ways, it will be necessary to connect it across a higher impedance such as an anode resistance (see *(b)* in diagram) or one of the windings of an intervalve low frequency transformer. It should not be connected across an impedance greater than about 25,000 ohms if it is not to affect frequencies below 9,000 cycles. In some cases, however, it may be found an advantage to do so, as it may remove a certain amount of interference due to sideband heterodynes as well as carrier-wave heterodynes, with the result that, although some of the upper audio-frequencies from the local programme have been removed, the quality is on the whole improved due to the elimination of annoying distorted interference due to sideband heterodyning.

The tuning of the filter will be sharp if it is effective, and a condenser with a vernier dial is an advantage, although it is not essential.

In practice it will be found advisable to mount the filter circuit so that the variable condenser can be conveniently adjusted; as stated above, the tuning point is sharply defined, and very slight readjustments of the filter condenser (for the elimination of the heterodyne note) may have to be made from night to night or when a change is made for the reception of a different transmitter.

WORLD-RADIO

WORLD-RADIO is published every Friday at the same time as *The Radio Times*. It contains important information concerning the technique of both transmission and reception which is often not available in any other wireless journal. Most important of all, it prints the programmes for a whole week of practically every European station, with details of wavelengths and power. It also provides a unique IDENTIFICATION SERVICE for its readers. It is the official foreign and technical journal of the B.B.C.

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SPECIAL SUPPLEMENTS PUBLISHED IN

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THE LISTENER



ELECTRICAL INTERFERENCE

COMPLAINTS of interference with broadcast reception by electrical machinery appear in the B.B.C.'s post-bag every day of the week. Many listeners, on the other hand, have become so accustomed to this type of interference that they seldom complain, because they assume that nothing can be done to reduce it. The object of these few remarks is to give listeners information firstly as to the type of electrical equipment which is liable to cause interference, and secondly the way in which complaints are handled.

Most types of electrical equipment, such as all apparatus which is driven by any form of electric motor, can in certain circumstances cause a disturbance to broadcasting. In this class are included trams, trolley buses, lifts, domestic appliances, etc. In addition to this there are many other types of electrical apparatus, as, for example, electric signs, and most types of electro-medical equipment, such as violet rays. The extent to which different types of electrical apparatus cause interference depends mainly upon their proximity to the broadcast receiver, and to some extent upon the strength of the required broadcast transmission. If electrical interference is present in any district it will be more pronounced when receiving a distant or weak broadcast transmitter than if reception is restricted to strong local transmissions. During the past few years engineers of the General Post Office have carried out a considerable amount of work on the problem of electrical interference. Unfortunately, time must elapse before the full benefits of this work can appear, as the suppression of interference at its sources, apart from the difficulties of localisation, usually involves the acquiescence of third parties in the application of remedies.

If a listener finds that his reception is marred by some unknown disturbance he is advised to write to the B.B.C. In reply he will receive a questionnaire form, which is the outcome of experience in the handling of the many varied electrical interference complaints which have been received during the past five years. The B.B.C. requires certain definite information from complainants, and it is far easier both for the complainant and the B.B.C. if this is supplied as answers to a questionnaire. When the questionnaire is

received by the B.B.C., and it is found that a very large percentage of them *are* returned, it is examined carefully. This examination often supplies evidence that the difficulty is not electrical interference at all, but due to some unsuspected fault having developed in the listener's receiving equipment, as, for example, a run-down high-tension battery, or possibly a faulty valve or anode resistance. If it is obvious from the questionnaire that the trouble really is electrical interference, the particulars of the complaint are forwarded to the General Post Office for investigation. The B.B.C. does not itself send out engineers to investigate electrical interference complaints, as these come from all over the country, and an excessive amount of travelling would have to be undertaken even if a very large staff of qualified engineers was maintained solely for that purpose. On the other hand, engineers of the Post Office, who can equally well carry out investigations on site, are permanently stationed all over the country.

The activities of the Post Office, however, do not consist solely of investigations by their local engineers. Many types of electrical interference can be silenced by quite simple and, therefore, inexpensive means, while others require detailed examination before any remedy can be suggested. Obstinate sources of interference are investigated by the Research Department of the General Post Office, and in certain instances by the B.B.C. as well. The most practical cure that is forthcoming is then made known to the local Post Office engineers for application when they have to deal with those particular types of complaint. The General Post Office organisation provides for the interchange of information between headquarters and district staffs, and all members of the staff are, therefore, kept in touch with the latest developments.

In practice general methods of curing different types of electrical interference can only be adopted for a limited number of types of disturbance, as it is often found that a cure which is effective in one case is quite ineffective in another, although the two types of interference would seem to be exactly similar. It is only by the additional circulation of information amongst the various Post Office engineers that individual problems can be solved satisfactorily. There are some types of interference which

cannot be handled by any simple steps, of which by far the most serious is that caused by the trackless tram, or trolley bus. There is not space in these few remarks for a full description of the elaborate methods adopted to suppress the growth of this, but at the first opportunity the B.B.C. will make known to its listeners the various courses which have been adopted. It is sufficient to say, so far as interference by trackless trams is concerned, that those concerned fully appreciate its gravity, and the large percentage of listeners which may become affected by it. The matter is at present under full consideration by all parties concerned, and representations on behalf of listeners are being sympathetically received. It is, of course, a better policy for new vehicles or sources of disturbance to be silenced at the time of their construction than it is to allow the interference to reach extreme proportions, and then to endeavour to find a make-shift remedy. On the other hand, it is not always possible to find a remedy which can be applied at the time of construction of the interfering apparatus without seriously increasing costs.

In pointing out the gravity of electrical interference, the B.B.C. asks listeners for their co-operation in suppressing it. There are many manufacturers who are fully prepared to adopt remedial measures for the silencing of their products if there is any demand by their customers for such steps to be taken. For example, a keen listener who intends to move into a new block of flats could make sure beforehand that there is no local electrical machinery on or near the premises which will seriously interfere with his reception. Again, listeners who are buying household apparatus are quite entitled before purchase to ask the manufacturers or their agents to demonstrate to them that it does not cause a disturbance to their broadcast receiver. The public can do far more towards the silencing of electrical interference in this way than can be achieved by the B.B.C. or the Post Office making representations after the apparatus has been purchased.

Finally, the B.B.C. believes that some of its listeners would like to join it in expressing their appreciation to the engineers of the General Post Office for the large amount of work which they are carrying out on behalf of listeners.

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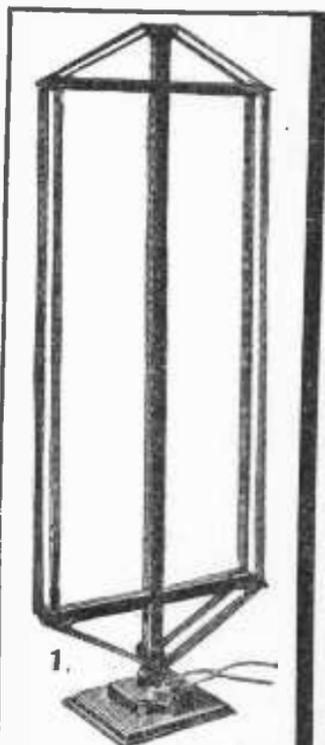
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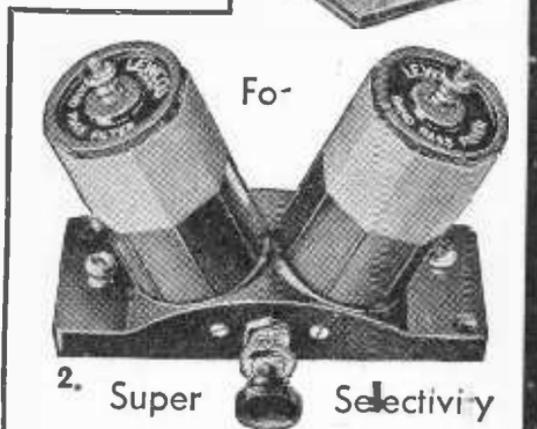
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THE USE OF FRAME AERIALS

IN THE YEAR-BOOK for 1931 an article appeared entitled "The Properties of Frame Aerials" which described the principles on which they worked. This article is written as an indication of the design and application of simple types of frame aerials and the part they play in the reception of broadcasting.

The most practical application of frame aerials in broadcast reception is their use in portable sets. This type of receiver has become extremely popular and contains a simple type of frame aerial wound round the inside of the cabinet, or, in a suitcase type of portable set, round the lid.

WORKING PRINCIPLES OF FRAME AERIALS

Waves vary in amplitude in accordance with the sine law, and their instantaneous amplitude at one point will not be exactly the same as their amplitude at a point, say, 2 feet further away from a broadcasting station. If the side or plane of a frame aerial is turned to the direction of a broadcasting transmitter, there will be a slight difference in the amplitude of the wave when it cuts or passes through one side of the frame as compared with its amplitude when it cuts the other side of the frame. This means that it will induce a slightly different voltage or electromotive force in one side of the frame than it will induce in the other, due purely to the fact that the amplitude of the wave has altered in that very small interval of time. In consequence, there will be an "out of balance" effect in the frame, as the voltage induced in the one side slightly exceeds that induced in the other, and current consequently flows round the frame. If now the frame is turned so that it is "flatways," or "broadside on," to the direction from which the waves are coming, both sides of the frame will be struck by the wireless wave at precisely the same instant, and, as the amplitude of the wave striking each side of the frame is equal, the electromotive force induced in each side of the frame will also be equal. The two voltages will, in these conditions, exactly cancel each other out, with the result that no current will pass round the frame. When a frame, therefore, is "broad-

side on," or "flatways," to the direction of a transmitting station it will pick up nothing from it.

APPLICATIONS OF FRAME AERIALS

Frame aerials, therefore, have two definite uses in broadcast reception; firstly, they are self-contained and portable, and secondly, they have directional properties. It is these directional properties which can be exploited with advantage when interference is being experienced between two broadcasting stations or between a required broadcasting station and some other source of interference. It should be pointed out, however, that a frame aerial is a very inefficient aerial from the point of view of the amount of energy which it will pick up as compared with even a small "open" or "vertical" aerial of the more common type. If a frame aerial is being used as a means of reducing interference from some unwanted source, it is important to note that *it should be turned round or orientated, so that it picks up the minimum amount of energy from the unwanted station rather than the maximum amount from the required station.*

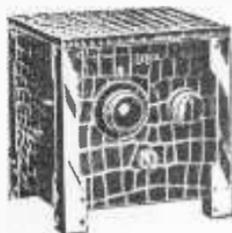
A frame aerial, well designed and efficiently coupled to a receiver, should show a very sharp minimum line of reception on the direct ray from a distant transmitter. By this it is meant that if it is turned round through a complete circle (360°), the two points at which no signals are picked up from any one transmitter should be sharply defined. Thus moving the frame by only one or two degrees on either side of the line of minimum reception should bring in the transmitter again fairly strongly but in the line of minimum reception no signals at all should be received. Furthermore, if the frame is turned through the whole circle of 360° , it should show two minima which are in a straight line, or 180° from each other. Actually it is not an easy matter to obtain a very sharp minimum when a frame is used inside a house (probably no minimum at all will be obtained inside a steel-frame building), owing to the fact that metal-work in the structure of the building, such as metal pipes, fire-places, or even electric-light wiring, tend to distort the minima. This is because they are themselves aerials re-radiating a little of the energy from the distant station, and the frame consequently tends to pick up energy from directions other than that of the

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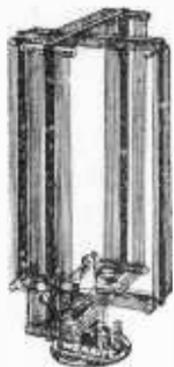
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broadcasting transmitter. Again, unless strict precautions are taken, energy will be picked up directly on the tuning circuits of the receiver rather than entirely on the frame. This again will tend to spoil the minima and give no position of absolute silence when the frame is turned into the minimum line of reception of a strong signal.

A simple, though not technically correct, way to apply a frame aerial to a receiver which was designed primarily for use with an open or vertical aerial is to disconnect the existing aerial circuit inductance and to use the frame aerial in its stead. It is insufficient, of course, merely to connect the frame aerial across the aerial and earth terminals of the receiver, as this may result in the frame being directly in parallel with the inductance inside the set and will probably result in an entirely unwanted band of wavelengths being covered. However, in cases where there is fairly loose aperiodic coupling a frame will sometimes be found effective.

It is an easy matter to apply a frame aerial to a receiver with plug-in type coils, as it is only necessary to remove the aerial circuit coil and to connect the two leads from the frame to the pin and socket or terminals on the coil-holder.

DESIGNS OF FRAME AERIALS

The amount of energy which a frame aerial will pick up depends principally upon its size and the number of turns. Large frames, of course, pick up appreciably more than do small frames, as there is a greater "out of balance" effect in the amplitude of the wave being received when it strikes the two sides of the frame. Large frames, however, are cumbersome to mount in a way which enables them to be turned round conveniently, and in consequence no mention will be made of frame aerials which are greater in size than 4 feet square.

The average type of frame aerial which is used in a portable set is, of course, much smaller, as the limitations of portability have to be considered. If the reader wishes to experiment with different sizes of frame aerials, it is a comparatively simple matter to obtain two stout and square pieces of wood about 6 feet long, to mortice them at the centres and to bolt them together at right angles to each other. Wooden pegs can then be driven in so that a

wire wound round the pegs takes the shape of a square with sides of different lengths. An experimental former for winding frame aerials of different sizes is shown in Fig. 1. For a thoroughly efficient frame aerial it is advisable that the turns of wire on the frame should be slightly spaced from each other, and preferably stranded wire should be used, as this reduces the high-frequency resistance of the frame aerial circuit. It is not thought, however, that any appreciable difference will be noticed aurally if fairly stout solid, instead of stranded, wire is used and the turns are wound fairly close to each other.

As an indication to any reader who may be thinking of using a frame aerial, Table No. 1 shows the effect upon the wave range when turns are wound adjacent to each other as compared with being spaced. Double cotton-covered wire was used purposely, as this gives an automatic spacing between conductors even when wound so that each turn touches its neighbour.

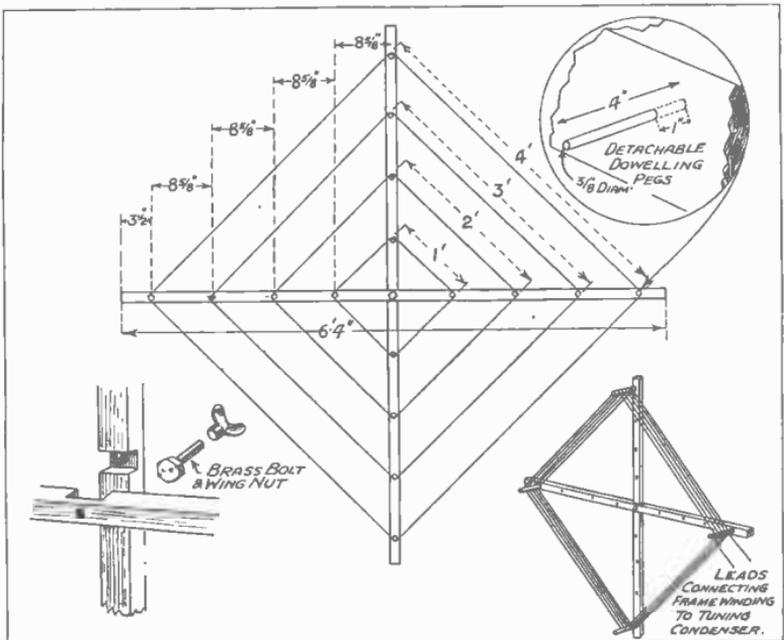


FIG. 1

TABLE A

Effect of spacing turns on a 4-foot frame.

Winding consisting of 6 turns No. 22 D.C.C.

Frame winding tuned with 0.0005 μ F. variable condenser.

No. of Turns.	Spacing between Turns.	Minimum Wave-length in metres.	Maximum Wave-length in metres.
6	No spacing, except insulation.	260	600
6	$\frac{1}{8}$ " between turns.	230	560
6	$\frac{1}{4}$ " " "	215	525
6	$\frac{1}{2}$ " " "	200	500

The approximate wave ranges for different frame windings are given as a further indication. These wave ranges were obtained when the frame was tuned with a 0.0005 μ F. variable condenser and with the leads between the frame and the receiver well spaced and only approximately 3 feet in length. The wave range covered, and in particular the minimum wavelength which can be reached, depends very largely upon the amount of stray capacity due to wiring in the receiver, valve-holder, valve, etc., which is across the frame and in parallel with the tuning condenser when it is in its minimum position.

In practice it will probably be found better to wind at least one extra turn on to the frame, as it is far easier to

TABLE B

Size of Frame in feet.	No. of Turns (no spacing), No. 22 D.C.C. wire.	Minimum Wave-length in metres.	Maximum Wave-length in metres.
4'	5	225	520
4'	7	325	700
3'	6	212	510
3'	7	255	575
3'	33	1100	2400
2'	8	220	525
1'	12	190	490
1'	14	220	555

N.B. The above figures are given as an indication of the wave range which is covered with different frame windings when tuned with a 0.0005 μ F. variable condenser. Stray capacity in parallel with the tuning condenser may alter the above wave ranges appreciably.

take off turns, if it is found that the frame does not tune down to any particular wavelength, than it is to make joints and add on extra turns. Again, great care should be taken to ensure that the insulation of the wire is thoroughly sound, as if two adjacent turns on the frame come into metallic contact the wave range which the frame will cover and the way in which it will work will be greatly impaired.

Careful attention should be paid to the wire connecting the frame to the receiver, on the one hand to guard against stray capacity if the maximum wave range is desired with a given tuning condenser, and on the other hand to avoid the accidental or spurious pick-up of more energy on the leads between the frame and the receiver than the frame is picking up itself. This will result in the frame showing hardly any minima when it is turned to the line of minimum reception. It is manifest that these leads should be kept as short as is possible, consistent with ability to turn the frame round, and if possible wire with metal braiding should be used. Twin lead-covered cable is a compromise, but one at the expense of stray capacity and a reduction in wave range. Pick-up on the leads between the frame and the receiver is the first thing to suspect if a frame is being used well away from any metal objects and only poor minima are obtained.

IMPROVING MINIMA AND DIRECTIONAL PROPERTIES

If a frame aerial is connected to a receiver by merely being substituted for its aerial tuning inductance, as indicated in the above remarks, it should show definite directional properties, but probably it will be found that its minima are not very sharply defined or exactly in a straight line with each other. Such an arrangement, for example, would probably show discrepancies of at least 10° if used as a purely directional receiver for finding the bearings of distant stations.

The circuit diagram of an arrangement which would show a far greater accuracy and which actually has been used as a portable direction-finding receiver for military work is shown in Fig. 2. It will be seen that the frame winding is interrupted at its centre (C_1 and C_2) and brought

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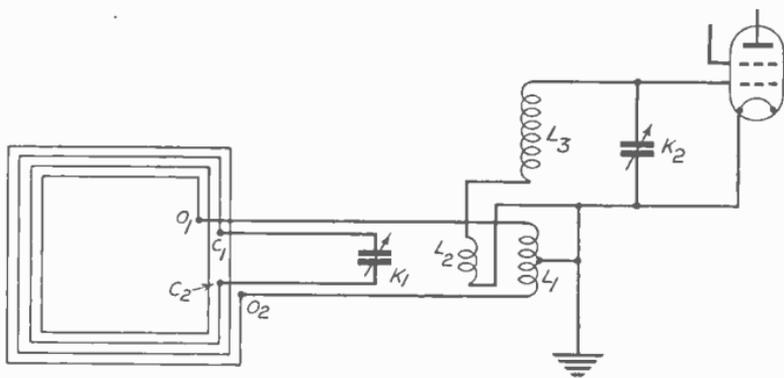


FIG. 2

out to the variable tuning condenser, K_1 . The two extremities of the frame, *i.e.* the beginning and end of the winding O_1 , O_2 , are also brought out to a coupling coil, L_1 , the exact centre point of which is earthed. This circuit, therefore, has two halves, both of which are electrically symmetrical about the earth. If, now, a variable coupling coil, L_2 , is inserted at the centre of the frame coil, L_1 , and led out to a secondary circuit, as shown in Fig. 2, accurate bearings should be obtained. It will, of course, be advisable to screen the coils L_1 , L_2 , the tuning condenser K_1 , and the secondary circuit, L_3 , K_2 . Any other tuning circuits which occur subsequently in the receiver, such as tuned high frequency, should also be screened to prevent the equipment picking up signals at any points other than on its frame. An equipment such as this, well built and used clear of metallic objects, will be found to give accurate bearings on strong signals within plus or minus one or two degrees in hours of daylight.

EXTENDING THE WAVE RANGE

The wave range which is covered by any particular frame winding when tuned with, say, a variable condenser of a definite maximum capacity can be increased by adding additional capacity in steps in parallel with the variable frame tuning condenser, but each step should add less capacity than the maximum capacity of the variable con-

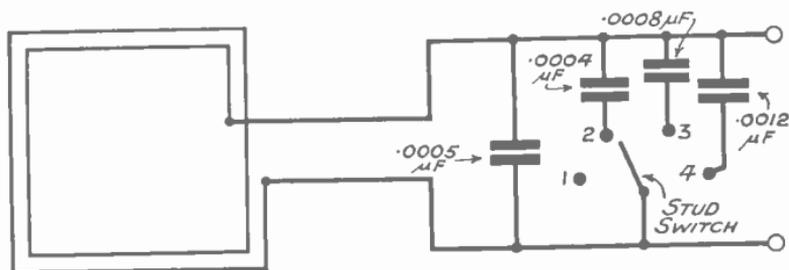


FIG. 3

WAVE-RANGE EXTENSION OF FRAME CIRCUIT BY ADDING PARALLEL CAPACITY

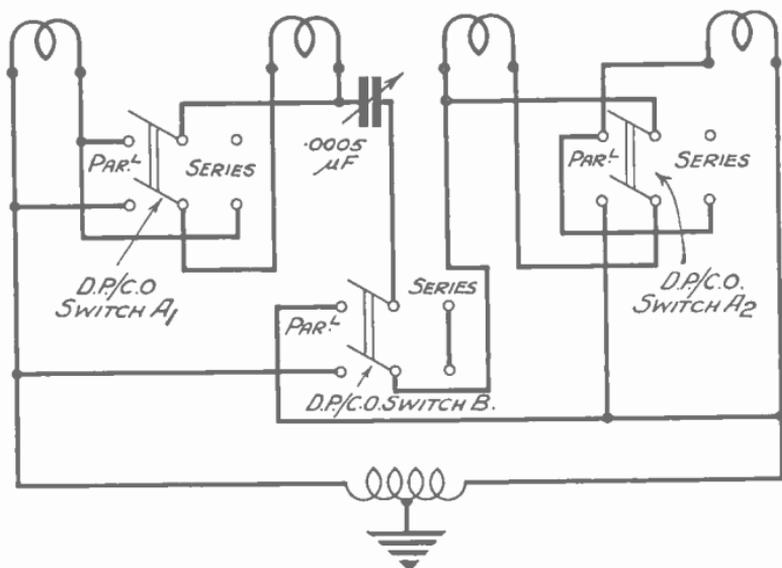


FIG. 4

WAVE-RANGE EXTENSION OF FRAME CIRCUIT BY SERIES-PARALLELING TURNS

N.B. Switches A_1 and A_2 can be strapped together.
 For Low Waves A_1 and A_2 and B in parallel.
 For Medium Waves A_1 and A_2 in parallel, B in series.
 For Long Waves A_1 and A_2 and B in series.

denser so as to maintain an overlap in the tuning range of the circuit. For example, Fig. 3 shows a simple way in which this can be done, and it will be noticed that each step or increase of extra capacity which is placed in parallel is $0.0004 \mu\text{F.}$ and less than the maximum capacity of the variable tuning condenser. This enables the maximum wavelength which can be reached on one setting to be reached again before the variable condenser is turned down to its minimum on the next setting. It is inadvisable, however, to load up a frame circuit severely by the addition of too much parallel capacity, as it will lead to inefficiency. This can be avoided by using a frame with more turns.

Another method is to use a frame with a large number of turns even for very short wavelengths and to "series-parallel" sections of the frame with a range switch. To do this efficiently with a frame which is centre tapped, it will be found convenient for the frame winding to contain a number of turns which is a multiple of four. When a low band of wavelengths is required, the sections of the frame can be placed in parallel, and when longer wavelengths are required, in series. It is efficient to place the sections of the frame in parallel on low wavelengths, as this tends to reduce the resistance of the frame circuit at the high frequencies which are then encountered. Fig. 4 shows a switching arrangement which enables this to be done.

METHODS OF OBTAINING REACTION

If a frame aerial is being used in a receiver containing plug-in coils and no high-frequency stages, some attention should be given to the method of obtaining reaction. For example, reaction may previously have been produced by magnetic coupling from a reaction coil to the old aerial tuning inductance, and as this is substituted for a frame, no reaction will now be obtained. There is a number of ways in which reaction can be obtained when using a frame aerial inductance, either by magnetic or capacity methods. Receivers with high-frequency stages, however, are far more likely to prove satisfactory when used with frame aerials, and in these, particularly if a screened grid valve is used, no reaction control should be necessary.

BATTERY CHARGING AT HOME

COMPLETE MAINS-DRIVEN RECEIVERS are coming more and more into general use, but there must obviously be a very large number of listeners who still use accumulators for supplying low-tension and high-tension current, rather than taking it direct from the mains through a smoothing unit, and, in the case of alternating-current mains, a rectifier.

Methods of charging low-tension accumulators are almost too well known to need further mention: many satisfactory types of chargers are on the market at prices which are little, if anything, more than the cost of assembling a charger at home. These, however, are practically all for operation on alternating-current mains.

In view of the large proportion of the power consumed which has to be dissipated in a voltage dropping resistance when charging an accumulator of 6 volts or under from direct-current mains, this is not an economical proposition. It is, however, possible to avoid this waste of energy by arranging to connect the accumulator across the mains in series with a lamp normally used for lighting purposes. This can be done in a number of ways, such as by wiring a non-reversible plug and socket in series with the lighting switch, and using a short-circuiting plug when charging is not required. Precautions to be taken are, of course, to see that adequate insulation is provided, and that the amount of current passed by the lamp in use is not excessive for the size of cells which are being charged. The slight reduction in the voltage applied to the lamp is usually immaterial.

CHARGING HIGH-TENSION ACCUMULATORS

If alternating-current mains are available, high-tension accumulators can be charged at comparatively small cost by means of a half-wave rectifying valve connected in series with the mains and the battery, provided that the battery voltage is not more than about two-thirds of the mains voltage. A current limiting resistance may be required, in which case it is connected in series with the valve and battery. The filament of the valve can conveniently be heated from the secondary winding of a small transformer.

If sufficient voltage cannot be obtained with a half-wave rectifier, a full-wave rectifier in conjunction with a transformer having a low-tension and high-tension secondary winding can be used. The advantage of this is that any desired high-tension voltage may be obtained, thus avoiding the necessity of charging the battery in sections if the voltage of the whole battery approaches that of the mains. An additional advantage is that, as a smoother output is obtained, and there is no direct connection with the supply mains, the charger can often be left on while a receiver is being worked from the batteries, without introducing appreciable hum.

Charging high-tension accumulators from direct-current mains merely necessitates connecting a suitable number of high-tension cells in series with a limiting resistance across the mains, as in the case of low-tension cells. As, however, only a comparatively small amount of power need be dissipated in the limiting resistance, there is no undue waste of power. The arrangement mentioned earlier can be used by substituting a larger lamp, or a suitable resistance, for the lamp which is used when charging a low-tension battery.

It is, of course, essential, when using any method of charging in which there is a direct connection between the battery and the mains, that the battery should first of all be disconnected from the receiver, or arrangements made that the mains cannot possibly be earthed through the receiver earth lead, or that no parts of the wireless receiver or aerial circuit with which other people may come into contact can become "live."

Listeners are strongly advised not to attempt themselves to connect-up charging apparatus, unless they are accustomed to handling power mains. The Institution of Electrical Engineers has laid down necessary regulations governing the design of apparatus which is connected to electric mains. Apparatus which does not comply with these regulations is liable to cause its owner some inconvenience in the future, as, for example, at times when a change in the nature of the supply is being effected by the Supply Authorities. Possibly the Fire Insurance Company may also object to it.

“ HOW IT WORKS ”

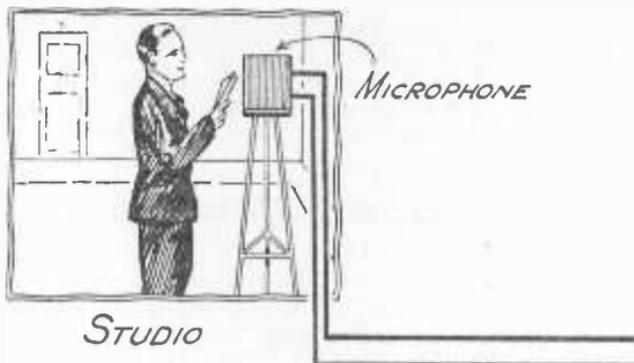
THIS is an attempt to give an easily understood description of the various stages of broadcast transmission and reception. It is primarily intended to help listeners who have no technical knowledge and, for this reason, technical terms will be avoided as far as possible. Where their use is unavoidable they will be explained. The whole process from the studio to the listener's loud-speaker will be followed, in order that the reader may obtain a better grasp of the process than he would if the transmitting side were taken for granted.

To enable a reasonably clear idea to be obtained, it is essential that one should have an elementary idea of what electricity is, and of the different forms of electric currents which are used. Although most people make use of electricity in some way or another, it is extremely difficult clearly to define what it really is. We do know, however, that it can be used in innumerable ways and that it can be “made” in many different forms.

The most easily understood form of electric current is what is known as a “direct” current, that is, a flow of electrons, which are particles of electricity, along a wire or a piece of metal. In order that such a flow may occur, there must be an excess of electrons at one end of the wire or circuit; the effect is then analogous to that when water flows from a high level to a

lower one. This excess of electrons can be caused in many ways, the most simple being by means of a battery. Due to chemical action one plate or electrode of the battery is rich in electrons and is known as the “negative” plate, and the other, known as the “positive” plate, is deficient in electrons; therefore, when a path is provided, by connecting a wire from one plate to the other, a “current” of electrons will flow from the negative to the positive plate. If any apparatus capable of utilising the energy exerted by the flow of current is connected in the circuit formed by the wire, it can be made to do work in a way somewhat similar to a water-wheel placed in a flow of water.

There is also another type of electric current, which is known as alternating current. It is really made up of pulses of direct current which flow through a circuit, first in one direction and then in the opposite direction. The number of times it does this in a second is known as the “frequency” of the current; thus in ordinary household alternating current of a frequency of 50 cycles per second, the current changes from one direction to the other and back again fifty times in a second. There are many ways in which alternating current can be used where direct current could not and vice-versa, but for the present purpose let it suffice to say that in broadcasting



we are concerned with (a) Direct current, (b) Alternating current of from about 30 to 10,000 cycles, known as *low* frequency current, (c) Alternating current of from 150,000 cycles (150 kc/s) upwards, known as *high* frequency current.

The word current is used to denote the rate of flow of electricity in a circuit and is analogous to gallons of water per minute in a water circuit. The pressure which causes the flow of current may be compared to pressure of water in pounds per square inch. Current is expressed in "Amperes," while pressure is expressed in "Volts."

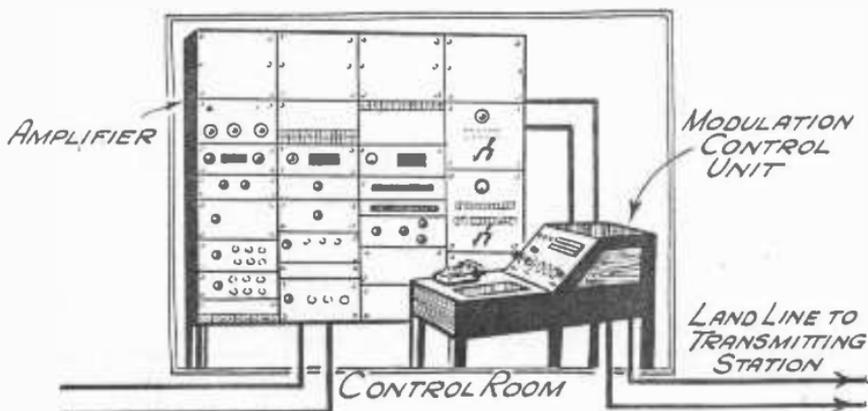
The term "Watts," which has, at least, been heard by most people who have electric light, is used to denote "power." It is the product of the pressure, in volts, multiplied by the current, in amperes, which is used in a circuit, such as, for instance, a lamp. Thus a lamp which consumes 0.25 ampere at 240 volts is known as a "60-watt" lamp. The words "milli" or "micro" placed in front of any of these terms has its usual meaning, as in the decimal system, and indicates thousandths or millionths of an ampere, volt or other unit.

TRANSMISSION

The first link in the broadcasting

chain is, naturally, the microphone; whether this is in a studio, or a hall, or even in the open, is immaterial. The essential fact is that when the sound vibrations which are caused by a person speaking, or any other sound, near the microphone, impinge on the sensitive interior of that instrument they cause impulses of electric current to flow in a circuit formed by two wires which lead from the microphone to an amplifier. Actually, a steady direct current from a battery is fed into the microphone circuit; the current remains constant until sound waves enter the microphone; then it is broken up into varying pulses by the action of the sound waves. The pulses of current are very feeble, but are exact electrical copies of the sound waves themselves and are, therefore, of an extremely complex form when many different sounds are being dealt with, such as in an orchestral broadcast.

The feeble electrical impulses are passed through several valves in the amplifier already referred to, thereby being increased to many times their former strength. They are then taken through a "modulation control point" by means of which the control engin-

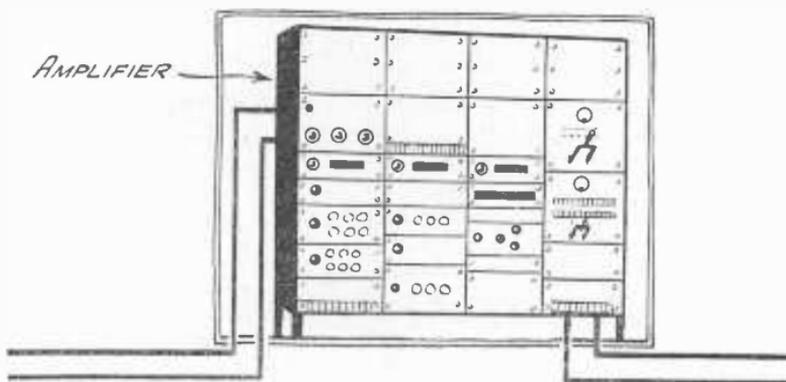


eer can adjust the general level of the strength of the impulses. The amplifiers and control units are contained in the "control room" near the studios, together with other apparatus, which need not be described here. The signals, for that is what the impulses really are, are then fed into a land-line (a pair of wires carried underground), which connects the control room with the transmitting station. Here the land-line terminates in another amplifier which magnifies them still further, so that they are of about the right strength to give good results on a loud-speaker, were they to be used in that way. The signals still consist of impulses of current, just as they did when leaving the microphone; they have been magnified in the amplifiers, but not changed in character. The next link in the chain is the transmitter itself, and for the present purpose it will be taken as consisting of three main stages—the Modulator, the Master Oscillator, and the Power Amplifiers. There are, of course, many complications in transmitter design, which here can conveniently be forgotten.

The master oscillator valve

in the transmitter generates an alternating current of an extremely high frequency, the actual frequency being that on which the particular transmitter radiates. Thus, the master oscillator in the London Regional transmitter produces alternating current of the very high frequency of 842,000 cycles per second. This high-frequency current forms the foundation of the "carrier wave" of the transmitter; it could be radiated direct from the oscillator, but its power would be small. It is, therefore, taken through several stages of amplification and finally to the transmitting aerial, from which, owing to the properties of currents of very high frequencies, it is radiated into the ether in the form of electrical waves.

So far, however, we have only considered the high-frequency current itself as being radiated. It can, of course, be received, but produces no sound in a receiver, except possibly a very faint "hiss." It is, in fact, a "silent" carrier wave. We have left out the modulator stage; this is the stage into which the signals from the land-line are fed, after being amplified. The function of the modulator is to



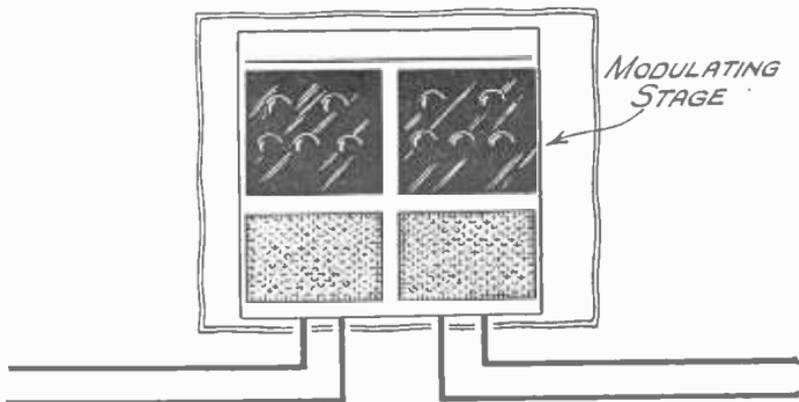
superimpose the microphone signals on to the high-frequency "carrier" wave generated by the oscillator. This has the effect of varying the strength of the high-frequency oscillations to correspond in form to the variations of the microphone currents. The carrier wave is then said to be "modulated," and is radiated from the transmitting aerial in this condition so long as a programme is being broadcast. During intervals the carrier wave reverts to the "silent" or unmodulated condition as described above. It may be interesting to note that the power supplied to the aerial of a "Regional" transmitter is about 50,000 watts, whereas the power of the signals received from the land-line is about one-hundredth of a milliwatt.

So far, we have seen that when power is transmitted from one point to another, two wires are used so that a complete circuit is formed. A somewhat similar condition exists when power is radiated from a transmitting aerial, as one side of the transmitter output circuit is connected to the aerial and the other side to earth. The result is that what is known technically as an electromagnetic field

is set up by the waves radiated from the transmitting aerial. This extends in all directions from it.

RECEPTION

It is one of the fundamental laws of electricity that if an electrical conductor is placed in a changing electromagnetic field a varying current will be caused to flow in the conductor. (Faraday, Aug. 29th, 1831.) Obviously, then, a current will be induced in any metal which is within the "field" caused by a broadcasting transmitter. This is actually the case, but the currents are so minute as to be quite inappreciable unless steps are taken to utilise them, as in a receiving set. This introduces a very important point in the reception of wireless signals. It has already been explained that a transmitter is made to radiate power of a certain definite frequency, this frequency being different for each transmitter. Although currents are induced in any conductor which is within the range of the transmitter, it is only if the conductor is in resonance with the transmitter, that is, tuned to the same frequency, that a current of any value is induced in it.



Taking the standard type of receiving aerial as shown (on p. 435), it will be seen that there is a complete path from the aerial, through the coil of wire "L.1" to earth. The circuit is actually the same as that of the transmitting aerial except in physical dimensions. It will be seen that a complete circuit is formed by the transmitting aerial system, the ether, the receiving aerial system and the earth.

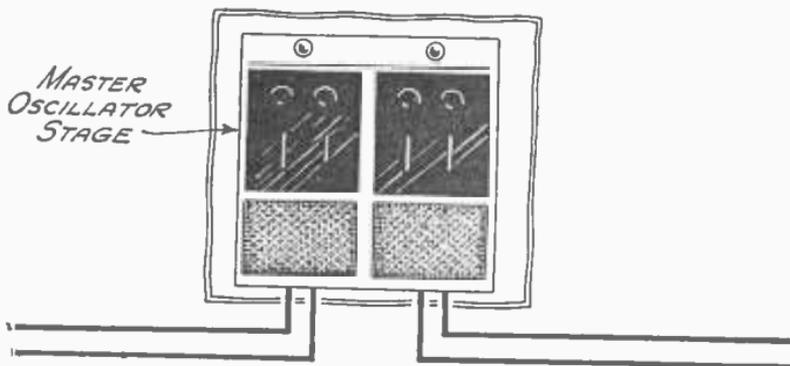
A receiving aerial, unless specially designed, would have a natural frequency different from that of the transmitter. Even if specially designed, it would only be in resonance with one particular transmitter. An aerial system can, however, be "tuned" to different frequencies by connecting between the end of the aerial and the earth a coil of wire "L.1" (Fig. 2*), the actual size and number of turns in the coil depending on the frequency required. It would, however, be extremely difficult to have different coils for every frequency which may be required. The usual way of tuning a circuit, therefore, is to connect a variable condenser "C₁" across the coil as shown; this has the effect of altering the

resonant frequency of the circuit and, as the condenser can be varied, the circuit can be "tuned" to any frequency within certain limits. The effect produced by the variable condenser is, so far as this article is concerned, similar to that which would be produced by a coil in which the number of turns could be varied at will.

It has already been explained that there must be a pressure, or voltage, to make a current flow. Tiny pressures of only a few millivolts, which are induced in the aerial system, naturally cause minute currents to flow through the coil "L₁"; therefore it follows that there must be a difference of voltage between the two ends of the coil, A and B (Fig. 3). This voltage is, therefore, present across the grid "G" and filament "F" of the first valve, to which the tuning circuit is connected. It is necessary at this point to digress a little in order to explain broadly the function of a valve.

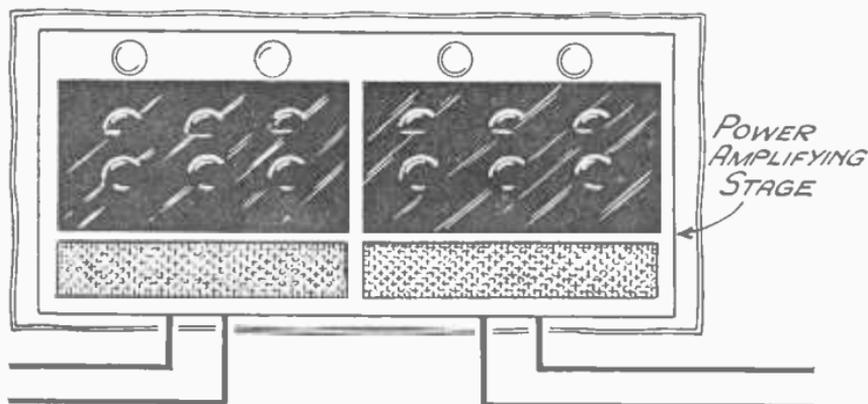
The parts of the diagrams which represent valves do not, of course, bear a very close resemblance to the physical appearance of a valve,* but they convey an excellent idea

* See also the actual photographs on pages 438-9.



of the disposition of the parts, known as electrodes, in the valve. These electrodes in an ordinary valve are three in number, the filament "F," the grid "G" and the anode "A." The filament consists of a piece of specially treated tungsten wire arranged in a straight line, or a loop. The grid is usually a spiral of wire arranged around the filament, but not touching it. The anode is a small sheath of sheet metal which surrounds the grid and filament. The interior of the glass bulb of the valve is a vacuum, the air having been exhausted in the same way as it is from a vacuum electric lamp. In the working condition the filament is raised to a certain heat by passing through it a current, which, in the case of battery-heated valves, is usually obtained from a low-tension accumulator (Fig. 4). A positive voltage is applied to the anode of the valve by connecting the negative end of a high-tension battery, which may be from about 50 volts upwards, to one side of the filament, and the positive end of the battery to the anode. In this condition a small current, in the form of a shower of electrons, will be given off from the filament of the valve and will be attracted to the anode, thus

completing an electrical circuit. There is, of course, no actual metallic connection between the filament and the anode, but the emission of the electrons by the heated filament is due to the peculiar properties possessed by the metal of which the filament is made when raised to a certain heat and enclosed in a vacuum. As the anode is positive and, therefore, deficient in electrons, they are naturally attracted to it. Although a current can be passed through the valve from filament to anode, no current will pass in the opposite direction, so that the device is actually an electrical valve, in the same way as a mechanical device, which will pass water in one direction and not in the other, is a water valve. The actual amount of current which flows across the valve will depend upon the type of valve and the high-tension voltage which is applied between the filament and the anode, but so long as this voltage remains unchanged the amount of current will be constant, that is, of course, assuming an uninterrupted path between the filament and anode. There is, however, the third electrode, the grid, to be considered. As this is situated between the filament and anode, the electrons pass through

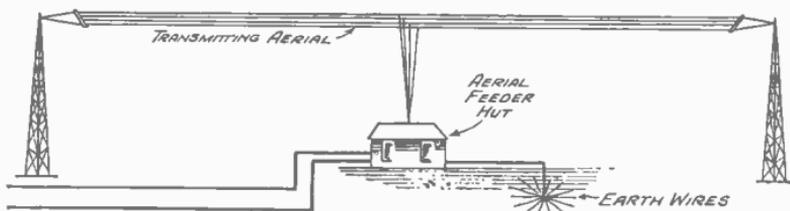


it in their passage to the anode. If the grid is made electrically positive in respect to the filament, its influence on the electrons will be similar to that of the anode and it will tend to help the flow of electrons from the filament to anode. Conversely, if made negative it will impede the flow of electrons.

It has already been explained that the varying impulses caused in the aerial circuit by the carrier wave of a broadcasting station are applied to the filament and grid of the first valve in the receiver. It follows, therefore, that the voltage on the grid of the valve will vary in sympathy with the changes in the carrier wave. These variations will produce precisely similar, but larger, variations in the current flow from the filament to the anode in the valve, and, therefore, in the whole of the anode circuit. It will be seen (Fig. 5) that a tuned circuit, consisting of a coil and a condenser similar to that already explained, is included in the anode circuit of the valve. The varying current will set up a variation of voltage across the two ends of this circuit in the same way as did the minute

currents from the aerial in the first tuned circuit, but as the currents are much larger so will the voltages be much larger. Thus amplification is obtained.

It will be obvious that, if a second stage of amplification were required, it would only be necessary to repeat the connections already described with a second valve. For the present purpose, however, a three-valve set is being considered. The valve already described functions as a high-frequency amplifier; the second valve functions in a rather different manner, and is known as the detector. We have already seen that the modulated carrier wave which has been received and amplified consists of high-frequency oscillations varying in strength and corresponding in form to the original pulsations in the microphone circuit. As explained earlier, the microphone impulses when amplified would produce audible results if applied to a loud-speaker. The carrier wave, however, consists of complete cycles of high-frequency alternating current, and would produce no audible result from a loud-speaker owing to the fact that the loud-speaker dia-



phragm, having weight, cannot follow these extremely rapid variations. In order to produce signals capable of reproducing the original sounds, it is necessary to subject the signals to what is really a process of separating the high-frequency from the low music frequencies; this is commonly referred to as "rectification" or "detection." The effect really is that half of every cycle of the modulated carrier wave is suppressed, the other half being allowed to pass on from the detector valve to the low-frequency amplifier.

The actual process of rectification which takes place in the valve is somewhat involved, but briefly, in the most usual form of detector, the grid is given a slight positive voltage, with the result that a small percentage of the emission of the filament is attracted to the grid itself instead of passing to the anode. This is known as "grid current." It has already been shown that only a negative current can flow from the filament. Therefore, it follows that one set of half-cycles of the impulses which are impressed on the grid and filament from the previous circuit can cause an increase in the current flowing from filament to grid, but the other half-cycles are unable to do so, and are, therefore, suppressed. The flow of current between filament and grid of the valve must obviously be allowed to return. Therefore, a high re-

sistance, known as a "grid leak," is connected between the grid and the positive side of the filament circuit. It is from the latter that the slight positive voltage already referred to is obtained. It will be seen that a complete circuit is formed from the filament to the grid and back to the filament through the grid leak "GL." The impulses are, of course, applied from the ends of the tuned circuit C_2-L_2 , and being high-frequency impulses they are able, in effect, to pass through the condenser " C_2 ." After rectification, however, they become direct-current impulses, and are unable to pass the condenser, and must, therefore, return through the grid leak. Incidentally, the condenser " C_2 " also serves the purpose of preventing the direct-current high-tension voltage which exists in the anode circuit of the first valve from getting on to the grid of the second.

So far we have only considered the grid and filament of the valve, which is really all that matters so far as the process of rectification is concerned, but there is still the current which is flowing from the filament to the anode. As a varying current is flowing through the grid leak, there must naturally be a varying voltage across the ends of the grid leak, and therefore between grid and filament. This obviously will cause variations in the anode current in the same way as that in the first valve which has

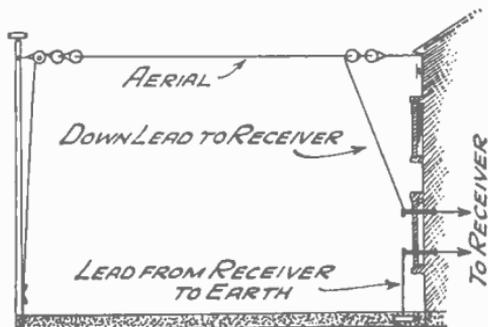


FIG. 1

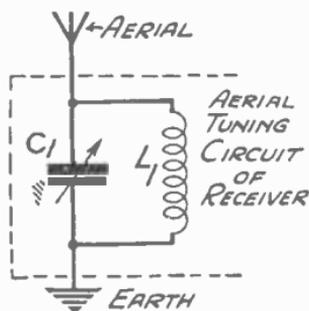


FIG. 2

already been described, with the difference that the impulses on the grid of the detector correspond exactly to the original microphone signals, the high-frequency carrier wave having, in effect, been removed. It will be observed from the diagram that the arrangement which is connected in the anode circuit of the detector valve differs from that in the anode circuit of the high-frequency valve. It represents a low-frequency transformer,* which consists of two separate coils, each containing several thousand turns of very fine wire wound round a core made of sections of soft iron. When a varying direct current is passed through one winding of such a transformer an alternating current is induced in the second winding, owing to electromagnetic action. The voltage variations in the second winding bear the same relationship to the voltage variations in the first winding as do the number of turns in the second winding to the number of turns in the first winding. It is usual, with inter-valve transformers used in wireless receivers and amplifiers, to make this ratio something between two to one and five to one, depending upon the design of the particular apparatus,

in order to obtain further voltage amplification. It will be noted that the second winding of the transformer is connected to the grid and filament of a third valve. The battery (GB) which is shown between the filament and one end of the winding serves to impress a negative voltage on the grid of this valve, but does not affect the continuity of the circuit, so far as the impression of the signal voltage across the grid and filament is concerned. For the sake of simplicity they can be regarded as passing straight through this battery, which is actually a grid bias battery. There is no need to explain the working of this third valve as it functions in the way already described for the first valve, with the exception that it is known as a *low-frequency amplifier*, the signals which it handles having already been rectified. It may be wondered why, apparently, there is no tuned circuit in the anode of the second and third valves, but actually the transformers are designed to respond to audible frequencies between, say, 30 and 10,000 cycles. It should be added that, after the process of rectification, it is these frequencies which have to be dealt with in-

* See practical illustration, p. 439.

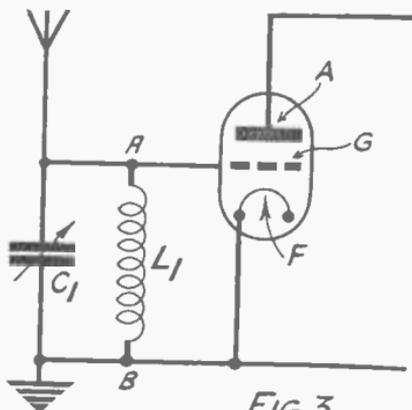


FIG. 3.

stead of the higher frequency of the carrier wave, to which the circuits preceding the detector valve have to be tuned. It will be noticed that the frequencies are now the same as those which were originally applied to the modulating stage of the transmitter.

The transformer connected in the anode circuit of the third valve works on the same principle as that connected to the second valve, but instead of being designed to give a step-up of voltage, its first or primary winding is made to suit the particular valve with which it is to be used, while its secondary winding is made to suit the loud-speaker. The last valve differs from earlier stages in that instead of being required to give a magnification of voltage, without appreciable current, it is designed to give also a relatively heavy output of current which is used to work the loud-speaker. The transformer, therefore, is often so designed that the voltage induced in the secondary winding is lower than that in the primary, but, on the other hand, the current will be considerably greater. The actual power (in watts) is,

nearly the same, as the product of a high current and a low voltage is the same as if the figures for volts and current were reversed. The power needed to give good reproduction on a loud-speaker is usually from about half a watt upwards. This should not be confused with the power supplied to the anode of the valve; actually, it is usually equal to about 15 per cent. of the latter.

THE LOUD-SPEAKER

The output of the secondary winding of the output transformer is taken by two wires to the loud-speaker, where it passes through a winding of fine wire wound round a magnet, or, in a "moving coil" speaker, round a ring of fibre or similar material. The principle of the first type of speaker is that the pulses of current produce variations in the "pull" of the magnet on a small piece of iron, known as the "armature," which is pivoted in front of the magnet. This causes the armature to vibrate, thus producing the same vibrations in a diaphragm, consisting usually of a cone of paper, which is attached to the armature. The "moving coil" speaker really functions in a similar manner, except that the winding is wound on a ring as described above. This ring is attached to the cone and the assembly is mounted in such a way that the coil is suspended freely over the end of a circular magnet. The result is that the signal currents flowing in the coil winding cause the coil to be attracted to the magnet to a varying degree, thereby producing vibrations in the cone in a similar way to the armature already described. These vibrations of the cone set up varying pressures in the air surrounding it and so sound waves reach

the listener's ear. Thus, depending on the fidelity with which the many transformations already described have been carried out, the listener hears a sound resembling in a greater or less degree the original sound made in front of the microphone.

The foregoing explanation has, of necessity, dealt only with the broad principles of transmission and reception, but, if it has been followed, it may possibly encourage readers to obtain elementary text-books on the subject and to follow up in detail interesting points in theory and practical design which could not possibly be dealt with in an article such as this. For example, an ordinary valve has been assumed in the first stage, whereas most modern receivers use a "screen-grid" valve; the fundamental principle is the same, but space does not permit a detailed explanation of the particular reasons for the use of special valves such as this. In other ways,

also, liberties have been taken with strict scientific facts, which could not be tolerated in a purely technical article. Any technically-minded readers will realise that it would be quite impracticable, without reference to well-known fundamental principles and apparatus, to describe adequately even a small part of the apparatus involved in the transmission and reception of broadcast programmes.

The illustrations Figs. 6-12 are actual photographs of typical examples of some of the component parts of a wireless receiver referred to in the foregoing article.

Figs. 6 and 7 show two types of tuning coils or inductances, as they are called technically; the first, known as a cylindrical "solenoid" type of coil, consists of a single layer of wire wound on a fibre tube. The number of turns on a tuning coil depends upon the frequency to which it is desired to tune the coil. The higher the fre-

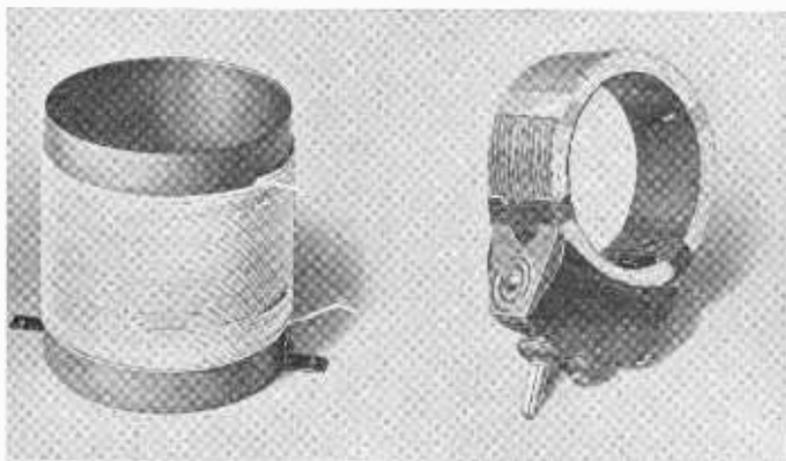


FIG. 6.—SOLENOID COIL

FIG. 7.—PLUG-IN COIL

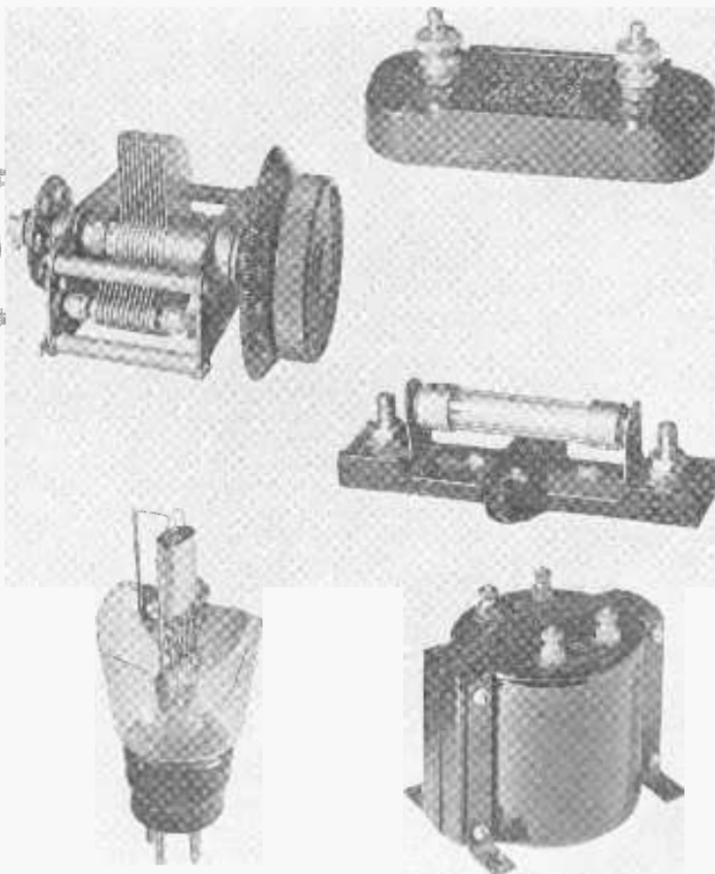


FIG. 8.—VARIABLE CONDENSER
 FIG. 9.—VALVE
 FIG. 10.—FIXED CONDENSER

FIG. 11.—GRID LEAK HOLDER
 FIG. 12.—LOW-FREQUENCY
 TRANSFORMER

quency, the fewer will be the number of turns.

The second coil shown is of the plug-in type. The two ends of the wire terminate in the plug and socket which can be seen in the illustration, and which are designed to engage in a similar plug and socket provided in the receiver, thus making coil changing a simple matter.

Fig. 8. This shows a typical variable tuning condenser. It consists essentially of two sets of metal plates, one of which can be rotated so that each plate moves between two of the plates in the fixed set, without actually touching them. The fixed set of plates is insulated from the moving set, in the instrument illustrated, by four small discs of ebonite, one of which can be seen on the left side of the condenser. Some form of reduction gear is usually employed, in order to facilitate fine adjustments to the plates, or, in other words, "fine tuning."

Fig. 9 shows a receiving valve, the glass bulb of which has been broken off just below its centre; the anode and grid can easily be seen. The filament consists of an inverted V-shaped wire suspended from the small spring arm, which can be seen overhanging the grid, the two lower ends of this filament being welded to two of the upright supports which are fixed to the glass "pinch" near the base. The two ends of the filament, the grid

and the anode, are connected to the four pins which project through the base of the valve, and which make contact with the appropriate sockets in the valve-holder.

Fig. 10 shows a small fixed condenser. It is fundamentally similar to the variable condenser already described, except that, as its name implies, its capacity is fixed. Mechanically it differs in that its two sets of plates, although interleaved, are separated by extremely thin sheets of insulating material such as mica. By this means a similar electrical capacity can be obtained in a very greatly reduced space.

Fig. 11. This is an illustration of a grid leak, which for convenience is shown mounted in a holder ready for wiring up. It consists, in the example shown, of a resistance element mounted in a glass tube, but may be obtained in several other forms. In some types the ends of the grid leak are extended to form connections, thereby dispensing with a holder. The grid leak is, of course, actually an electrical conductor, having a very high resistance.

Fig. 12 is an illustration of a low frequency transformer and has already been described in the article. The letters P and S indicate the primary and secondary windings respectively, while the letters I and O near the terminals indicate that they are connected to the inner and outer ends of the respective windings.

A P P E N D I X

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.
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Regional Centres

		<i>Telegrams and Telephone</i>
BELFAST	31, Linenhall Street.	Belfast 5870.
BIRMINGHAM (MIDLAND REGION)	282, Broad Street.	3761 Midland Birmingham.
CARDIFF (WEST REGION)	39, Park Place.	2514 Cardiff.
MANCHESTER (NORTH REGION)	Broadcasting House, Piccadilly.	City 8396 Manchester.
EDINBURGH (SCOT- TISH REGION)	5, Queen Street.	30111 Edinburgh.

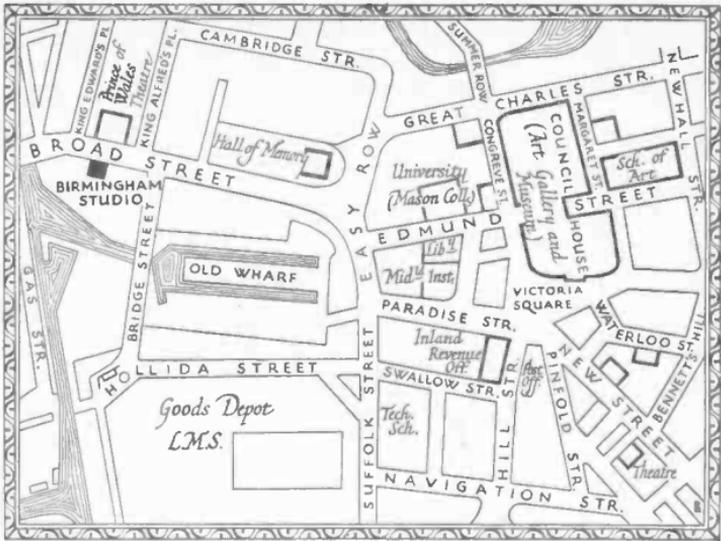
Other B.B.C. Offices

ABERDEEN	15, Belmont Street.	2296 Aberdeen.
BOURNEMOUTH	72, Holdenhurst Road.	3460 Bournemouth.
DUNDEE	22, St. Salvador Street.	5209 Dundee.
GLASGOW	21, Blythswood Square.	5230 Douglas, Glasgow.
HULL	26 & 27, Bishop Lane.	Central 36138 Hull.
LEEDS	Broadcasting House, Albrecht Buildings, Woodhouse Lane.	Leeds 28131.
(until March 1932.)	Cabinet Chambers, Basinghall Street.	
LIVERPOOL	Cobbs Quarry, St. Domingo Rd., Everton.	Bank 5018 Liverpool.
NEWCASTLE	54, New Bridge St.	Newcastle 20961.
PLYMOUTH	Athenæum Chambers.	2283 Plymouth.
SHEFFIELD	47, Corporation St.	24227 Sheffield.
STOKE-ON-TRENT	Majestic Buildings.	Hanley 48170.
SWANSEA	Oxford Buildings.	3107 Swansea.

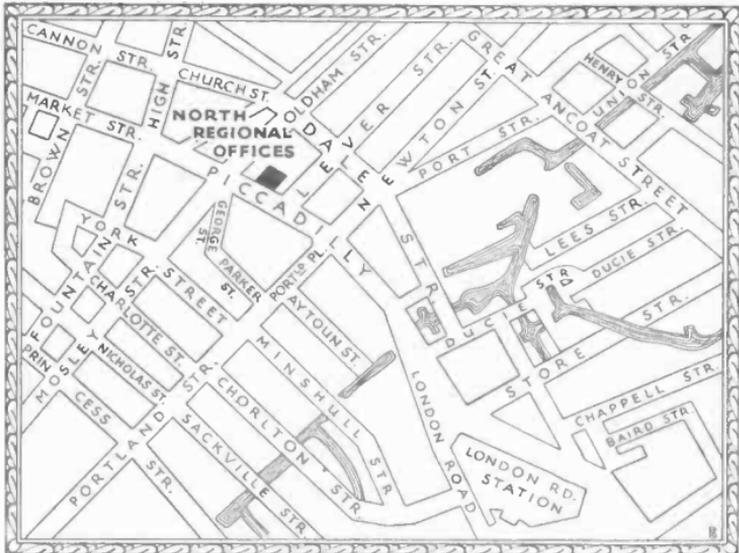
PLANS SHOWING THE B.B.C. OFFICES



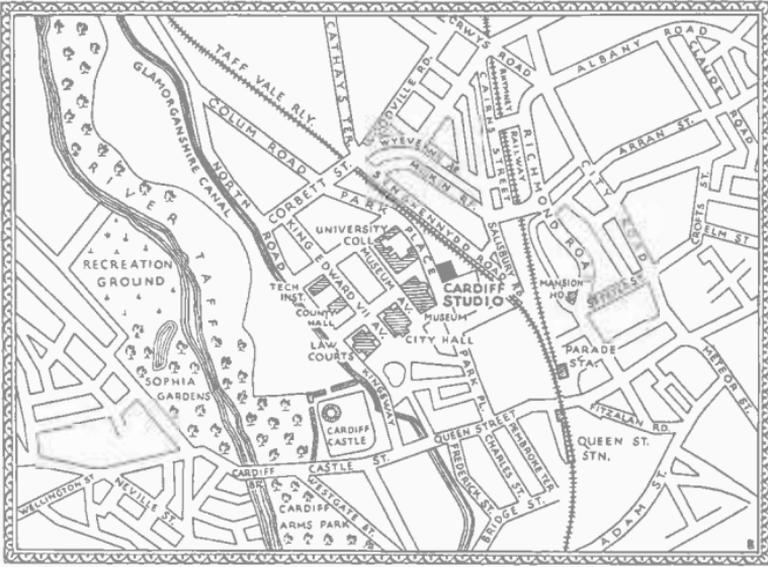
LONDON



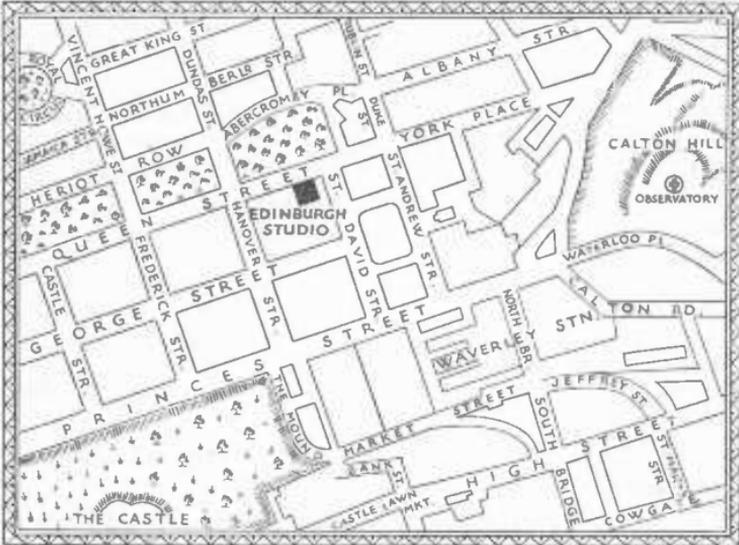
BIRMINGHAM



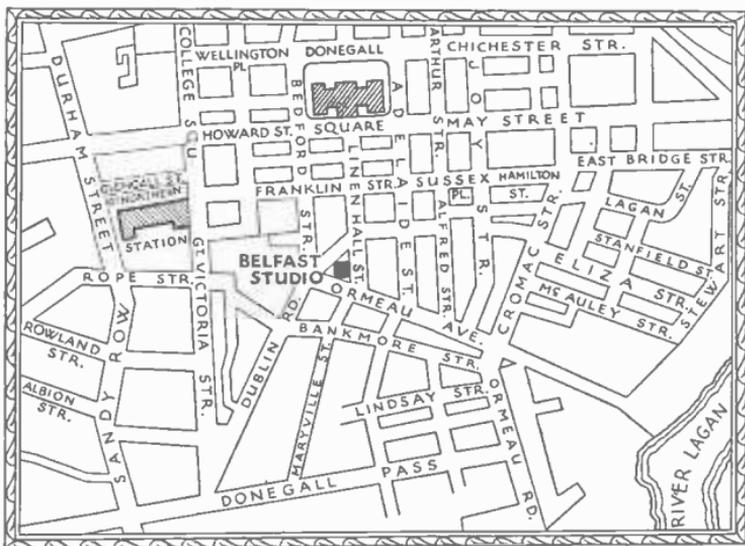
MANCHESTER



CARDIFF



EDINBURGH



BELFAST

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. Conducted parties at 2 p.m. daily except Saturdays and Sundays: lists closed until March 1932.

Variety Audiences: lists closed until June 1932.

Manchester. 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.

RULES FOR S.O.S. MESSAGES

1. 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.

WEATHER FORECASTS

- 10.30. Daventry 5XX. Weather Forecast for ships. Read twice—first at natural speed, second time at long-hand dictation speed.
6.0. General Weather Forecast (National Programme).
9.0. General Weather Forecast " "
9.15. Daventry 5XX. Weather Forecast for ships only.
10.15. General Weather Forecast (Regional Programme).

In addition:—

Gale Warnings are broadcast with the Shipping Forecasts, and at 1, 4.45, and 6.30 p.m., and on Sundays at 3 p.m., when received from the Meteorological Office.

MARKET BULLETINS, ETC.

The following Bulletins are broadcast at regular intervals. The actual time will be found in the B.B.C.'s published programmes in the *Radio Times*.

- | | |
|-----------------------|--|
| <i>Every Weekday.</i> | London and New York Stock Exchange Report.
Bulletins for Farmers. |
| <i>Weekly.</i> | Horticultural Bulletin.
Empire Marketing Board Bulletin. |
| <i>Fortnightly.</i> | Agricultural Bulletin. |
-

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 up to 15 years of age.
2. The Senior, for listeners over 15 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. Membership of the Junior Section gives the privilege of a broadcast birthday greeting. 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)

THE B.B.C. SYMPHONY ORCHESTRA

<i>First Violins</i>	<i>Violas (contd.)</i>	<i>Oboes</i>	<i>Trumpets</i>
Catterall, Arthur (<i>Leader</i>)	Gladden, Mary	Whittaker, Alec	Hall, Ernest
Turner, L.	Carrell, N.	Pantling, J.	Pritchard, E.
Wilson, Marie	Hart, Muriel	Field, J.	Barr, H.
Hill, F. W.	Southworth, L.		
O'Donnell, M.	Copperwheat, W.	<i>Cor Anglais</i>	<i>Piccolo Trumpet</i>
Rutledge, E.	Wyand, H. B.	MacDonagh, T.	<i>in D</i>
Peatfield, T.	Lucas, Patience	Pantling, J.	Hall, Ernest
Hinchliffe, Jessie	Knowles, J. G.		<i>Cornets</i>
Cass, W. J.	Edwards, G.	<i>Heckelphone &</i>	Mackintosh, Jack
Washbourne, K.		<i>Bass Oboe</i>	Hamilton, H.
Blech, H.	<i>Violoncellos</i>	Field, John	
Houghton, Doris	Kennedy, Lauri		<i>Bass Trumpets</i>
Bor, S. H.	Gauntlett, A.	<i>Clarinets</i>	Falkner, A.
Bates, Doris	Shinebourne, J.	Thurston, F.	Shackleton, A.
Meachem J.	Clark, Raymond	Clarke, R.	
Bailey, Enid	Muscant P.	Tschaikoff, A.	<i>Trombones</i>
Good, R.	Beers, B.		Stamp, Jesse
Mason, Lena	Nifosi, A. P.	<i>E Flat Clarinet</i>	Falkner, A.
Tookey, W.	Beattie, C. D.	Clarke, R.	Garvin, S.
Braham, Editha	Ford, A.		Shackleton, A.
	Revell, H. A.	<i>Bass Clarinet &</i>	<i>Alto Trombone</i>
<i>Second Violins</i>	Blackford, G.	<i>Saxophones</i>	Stamp, Jesse
Squire, Barry	Briggs, R.	Lear, Walter	
Ungerson, J.	<i>Double Basses</i>		<i>Bass Trombones</i>
Caprara, E. G.	Cruft, Eugene	<i>Clarinet and Saxo-</i>	Taylor, Frank
Hamilton, J.	Hobday, C.	<i>phones</i>	Risdon, J.
Stratford, E.	Sutton, S.	Whelan, P.	
Thornton, Evelyn	Powell, F. G.	<i>Bassoons</i>	<i>Tuba</i>
Sherman, A.	Chesterman, E. D.	Newton, Richard	Barlow, Harry
Browne, L.	Burton, D.	Wilson, A. E.	<i>Tympani</i>
Malcolm, S.	Murray, G. T.	Hinchliff, E.	Bender, Charles
Hepton, A.	Conhoff, C.		Lees, J. B.
Lones, Gwen	Cockerill, A. E.	<i>Contra-Bassoon</i>	<i>Percussion</i>
Young, J.	Robinson, R. E.	Dickie, Thomas J.	Gillegin, E. J.
Ellingford, C.		Hinchliff, E.	Wheelhouse, F. H.
Kenning, H.	<i>Flutes</i>		Franklin, R. G.
Pirani, Leila	Murchie, Robert	<i>Horns</i>	<i>Harp</i>
Pusey, Violet	Almgill, F.	Brain, Aubrey	Goossens, Sidonie
	Whittaker, K.	Graydon, M.	Chevreaux, Jeanne
<i>Violas</i>		Burrows, V.	<i>Organ and Celesta</i>
Shore, Bernard	<i>Piccolos</i>	Thornton, H. F.	Mason, Berkeley
Sainton, P.	Walker, Edward	Cursue, A. J.	
Bray, E.	Almgill, F.	Probyn, F.	
Wolfe, Anne	<i>Bass Flute</i>		
Harding, K.	Stainer, Charles		

B. B. C. THEATRE ORCHESTRA

<i>First Violins</i>	<i>Violas</i>	<i>Flute and Piccolo</i>	<i>Horns</i>
Kelley, S. Kneale (<i>Leader</i>) Principal First Violin	Lowe, Harold	Flack, Lambert	Alexandra, J. F.
Brearley, M.	d'Oliveira, Louis		Chapman, W.
Davidson, Belle	<i>'Cellos</i>	<i>Oboe</i>	<i>Trumpets</i>
Green Sidney	Collins, M. (also Banjo & Guitar)	Melliars, Maude	Merriman, P.
	Goddard, C. H. (also Saxophone)	<i>Clarinets and Saxophones</i>	Dudley, J. W.
<i>Second Violins</i>		Kealey, Wilfred	<i>Trombones</i>
Busfield, Leonard	<i>Double Bass</i>	Clarkson, G. J.	Sherringham, R.
Pringle, Elsie	Merrett, James	<i>Bassoon</i>	Duguid, J.
Wyatt, Ernest		Butler, A. G.	<i>Tymp. and Percussion</i>
			Wilson, H. J.

BELFAST WIRELESS ORCHESTRA

<i>First Violins</i>	<i>'Cellos</i>	<i>Clarinets and Bass</i>	<i>Trumpets</i>
Whiteway, Philip	Wykeham-George,	<i>Clarinets</i>	Kidd, Cecil
Redfern, Stuart	Gethyn	Gomez, Frank	Taylor, H.
Harper, Harold	Brown, Marjorie	Chambers, F.	
Curry, David	<i>Double Bass</i>		<i>Trombones</i>
	Davies, T.	<i>Bassoons</i>	McDonough, M.
<i>Second Violins</i>	<i>Flutes</i>	Bates, W. S.	Martin, F.
FitzGerald, A.	Dyson, Harry	Cunningham, A.	Yardley, G.
Huxley, Margaret	Darvill, S. H.		
Shaw, E.	<i>Oboes and Cor</i>	<i>French Horns</i>	<i>Tympani, etc.</i>
	<i>Anglais</i>	Gray, Vivian	Sefton, J.
<i>Violas</i>	John, David	Primmer, E.	
Amor, F. R.	Hartley, J.	Thompson, W.	<i>Harp</i>
Derbyshire, J.		Beale, S.	Jenkins, Doreen

THE MIDLAND STUDIO ORCHESTRA

<i>Violins</i>	<i>Viola</i>	<i>Double Bass</i>	<i>Clarinet</i>
Cantell, F. (Leader)	Kennedy, A.	Cockerill, A.	Cotterell, S. C.
Stell, E.	<i>'Cello</i>	<i>Flute</i>	<i>Piano</i>
Moore, A. E.	Dennis, L. G.	Heard, W.	Dallaway, N.

THE WESTERN STUDIO ORCHESTRA

<i>Violins</i>	<i>'Cello</i>	<i>Flute</i>	<i>Trumpet</i>
Levitus, L. (Leader)	Harding, Ronald	Evans, Hilary	Trotman, A. H.
Thomas, Frank			
<i>Viola</i>	<i>Double Bass</i>	<i>Clarinet</i>	<i>Piano</i>
Donovan, W.	Haigh, E. G.	Clements, F. H.	Pengelly, Hubert

SCOTTISH WIRELESS ORCHESTRA

<i>Violins</i>	<i>Viola</i>	<i>Double Bass</i>	<i>Clarinet</i>
Daines, G.	Williams, A. B.	Cole, Fred G.	Clucas, J.
(Leader)			
Carpenter, Harry	<i>'Cello</i>	<i>Flute and Piccolo</i>	<i>Piano</i>
Ross, A. C.	Dickson, John B.	Halstead, Alfred	Bryson, Andrew

THE NORTHERN STUDIO ORCHESTRA

<i>Violins</i>	<i>'Cello</i>	<i>Clarinet</i>	<i>Trombone</i>
Bridge, J. (Leader)	Twelvetrees, C.	Ryan, Pat	Holt, Sam
Hyden, Don			
<i>Viola</i>	<i>Double Bass</i>	<i>French Horn</i>	<i>Piano</i>
Park, Frank	Stott, Alfred	Paersch, Otto	Fogg, Eric

THE WIRELESS CHORUS

<i>Sopranos</i>	<i>Contraltos</i>	<i>Tenors</i>	<i>Basses</i>
Watkins, Doris	Boughton, Ruby	Collett, John	Smart, Graham
Otley, Elsie	Roper, Jean	Purvis, Tom	Gove, Radley
Robinson, Hilda	Wilson, Muriel	Scott, Mountford	Utting, Victor
Tunbridge, Eileen	Hay, Elsie	Saxton, Lloyd	Henry, Michael
Green, Rose	Wynn, Elsie	Baker, Felix	Montgomery, W.
Evers, Olive	Bowen, Frances	Hayes, Frederick	Wingrove, Charles
		Congdon, Joseph	Bond, James
		Wilde, Harold	McLean, Joseph
			Masters, Frederick
			Sapsed, Charles

THE WIRELESS SINGERS

Hamlin, Mary	Winmill, Gladys	Reach, Edward	Riley, Stanley
Rowell, Rosalind	Owens, Doris	White, Bradbridge	Dyson, Samuel

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Chorus Master : STANFORD ROBINSON *Hon. Secretary* : ERNEST WOOD

Sopranos :

Ballam, A. J. G.	Fellingham, G. E.	Kemp, M. D.	Palumbo, O.
Beeby, D. M.	Fricker, L.	Knights, R. K.	Pearson, H. M.
Bignell, J. P.	Garnsey, G. M.	Lamb, K.	Pendlebury, E.
Blareau, M.	Geen, E. V.	Lance, F. M.	Percival, A. C.
Booth, K.	Goodey, E. M.	Lander, E. D.	Price, N. G.
Brooks, D. L. P.	Hall, A. D.	Lawrence, E.	Prior, H. M. T.
Buckle, V. M.	Hall, H.	Leach, F. H.	Reeve, J. M.
Burke, D. M.	Hayman, W.	Lodge, A.	Shaw, M.
Calow, D. C.	Hayward, L. M.	Longden, M.	Smith, E. H.
Carter, A. M.	Heard, V. A.	Luhman, H.	Taylor, C. E.
Carter, G. E.	Henderson, I.	Mason, D. E.	Thake, M.
Carter, P. V.	Hewson, D.	Miles, E. J. H.	Thompson, K.
Chibnall, C.	Hodges, G.	Morley-Taylor, J. M.	Wade, I. M.
Clarke, C. E.	Holgate, J.	Nettlehip, M.	Walton, V. A.
Clements, R.	Hooper, M. B.	Newall, F.	Warner, E. M.
Collen, D. M.	Huckle, E.	Oram, L. O.	Williams, J. E.
Cox, F. M.	Jackson, E. I.	Orgles, E. C.	Williams, M.
Dean, O. A.	Jackson, J.	Page, D.	Wood, K. B.
Dickens, P. E.	Jones, O.	Page, S. E.	Woodin, V. G.
Drury, E.	Kemp, A. J.	Palmer, M. H.	

Contraltos :

Adams, W.	Franklin, D.	Kirk, D. E.	Shier, M. A.
Arran, F.	Fredericks, E.	Labdon, G. I. A.	Smith, G. M.
Bagley, B.	Goodale, W. J.	Leeson, W.	Stewart, N. E.
Bailey, L. M.	Gordon-Ruggins, W.	Leigh Hunt, B. R.	Stone, N.
Billson, L.	Gwynne-Jones, D.	Lewis, E.	Swain, R. G.
Bowden, V. B.	Hammond, L.	Lovibond, J.	Theed, P. E.
Brough, G. T.	Hay, D. M.	Newby, F. E.	Tingley, C.
Butler, V.	Hodder, M. P.	Nicholas, K. M.	Veale, C.
Catanach, E.	Innes, M. M.	O'Connor, M.	Waggett, W.
Conquest, C. A.	Jackson, E.	Perry, C. E.	Warn, C. M.
Dale, L. M.	James, D. M. T.	Roadnight, H. F.	Waterer, D.
Dorée, P. B.	Jarrett, W. E.	Rodway, E.	Western M. K.
Downer, W.		Salthouse, B.	Williams, E. M.

Tenors :

Becket, F. H.	Durrant, A. T.	Isaacson, F.	Scopes, A. T.
Bergen, F. v.	Everburne, C. H. G.	Inskip, J. M.	Skelton, J. S.
Birkett, S. J.	Everitt, W.	Labdon, R. M.	Smith, P. E.
Bray, E. M.	Foster, A.	Latham, B. S.	Smith, R. J. E.
Cable, C. J. E.	Fowler, B. H. C.	Miles, T. F.	Sowerbutts, H. H.
Carpenter, S.	Gibbon, J. N.	Neville, L. R.	Thompson, F.
Carroll, W. H.	Gibson, S. V.	Ogden, W. L.	Toms, A.
Cozens, J.	Grundy, F.	Orchard, A.	Watson, H. W.
Dacre, R.	Hale, A.	Pitchford, R. W.	Witts, H. L.
Dedrick, C. H.	Hubbard, F. A.	Ratcliffe, W. H.	Williams, A. E.
Dunn, H. H.	Hunter, A. T.		Willson, A. O.

Basses :

Baker, S. O.	Hill, G. F.	Oliver, W. C.	Tappin, J. P.
Bell, C. J.	Hilton, J. B.	Peters, M. W.	Taylor, G. J.
Bowyer, C. T.	Hixson, W. H.	Powley, T.	Taylor, J. A. G.
Brigden, J. H.	Holland, A.	Prangell G. C.	Thomas, C.
Cooper, A. A.	Holland, R. H.	Ramsey, G. A.	Thorpe, A.
Cory, H. E.	Hughes, J. L.	Rapp, R. B.	Thorpe, F. W.
Crees, H. V.	Jenkin, C. V.	Rees, W. T.	Thorpe, W.
Cullen, W. F.	Kane, P.	Rolton, E. H.	Trodd, H. B.
East, H. A.	Kerridge, H. H.	Sack, T. J.	Ward, L. H.
Eaton, E. C.	Keyte, C. F.	Salmon, A. T.	Wilson, F. G.
Eaton, W.	Lewis, A. T. D.	Sheriff, H. B.	Winslade, G. O.
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Edwards, S. C.	Lloyd, J.	Stevens, P. A. S.	Wood, R. C.
Ellis, C. J.	Lorn, H. E.	Stevens, W. J.	Woods, C. R.
Fletcher, W. W.	Mascall, P.	Steward, A. P.	Wright, H. F.
Flindall, W. G.	Masters, F.	Syrett, H. G.	Yates, E.
Harrison, H. C.			

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National Society of Art Masters	
Scottish Education Department	J. W. Peck.
Association of Directors of Education in Scotland	Gregor McGregor.
Educational Institute of Scotland	Dr. Peter Comrie.
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<i>Chairman</i>	Bertram Talbot.
<i>Chairman of Scottish Executive</i>	G. A. Burnett.
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SCOTTISH SUB-COUNCIL.

Chairman : Bertram Talbot.

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Association of Directors of Education in Scot- land	Gregor Macgregor.
Educational Institute of Scotland	Dr. Peter Comrie.
<i>Nominated Member on Central and Scottish Councils</i>	J. T. Ewen.
<i>Nominated Member on Central Council.</i>	Sir J. A. Thomson.

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Association of Directors of Education in Scot- land	R. C. T. Mair.
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Educational Institute of Scotland	{ John Summers. David J. Young.

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British Institute of Adult Education: J. W. Brown.
Workers' Educational Association: Ernest Green.
The Co-operative Union: J. Reeves.
Trades Union Congress: To be nominated.
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Association of University Teachers: Prof. C. W. Valentine.
Co-operative Union: E. C. Curtis.
Director of Extra Mural Studies: B. I. Macalpine.
Educational Settlements Association: W. W. Lee.
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National Federation of Women's Institutes: Miss M. B. Strachan.
National Industrial Alliance: L. Magson.
National Union of Teachers: E. W. Jones.
Religious Education: Dr. B. A. Yeaxlee.
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University of Birmingham: Prof. W. Cramp.
Workers' Educational Association (Brotherhood Federation): H. G.
Wood.
Working Men's Club and Institute Union: J. Barber.
Wolverhampton Union of Adult Education Associations: Dr. R. S.
Morrell.
Y.M.C.A.: H. G. Gerrard.
Y.W.C.A.: Miss E. Downes.

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Association of Teachers in Technical Institutes: G. H. Burkhardt.
Bristol Group of S.W. Federation of Trades Councils: Ald. A. W. S.
Burgess.
Co-operative Union: S. C. Pope.
Educational Settlements Association: Paul Sturge.
Federal Council of Teachers: A. E. Bullock.
Library Association: James Ross.
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Bristol. Dr. Ludford Freeman.
Gloucester City. Mrs. E. Cullis.
Gloucestershire. H. W. Household.
Somerset. W. A. Knight.
Wiltshire. Reuben George.
National Adult School Union: H. W. G. Dyer. A. Foster.
National Council of Women: Miss A. Deane.
National Federation of Womens' Institutes: Gloucester. Mrs. Veal.
Somerset. Mrs. Poynton.
Wiltshire. Miss I. M. Impey.

National Union of Teachers: H. T. Morgan.
Gloucester Rural Community Council: G. H. Castle.
Somerset Rural Community Council: Mrs. E. B. Clothier.
Tutors' Association: J. H. Nicholson.
University of Bristol: Ald. F. Sheppard.
W.E.A.: W. R. Straker, J.P. H. G. Crudge.
Y.M.C.A.: Capt. R. A. Norman.
Y.W.C.A.: Mrs. A. D. Field.

Nominated Members

H. E. Boothroyd.	S. B. Dalston.
S. H. Cair.	W. E. Salt.

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County Education Authorities:

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Cheshire: F. F. Potter.
Westmorland: C. J. R. Tipper.

County Borough Education Authorities:

Manchester: —
Liverpool: C. F. Mott.
Wallasey: T. Samuel.
Burnley: A. R. Pickles.

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Workers' Educational Association (N.W. District): Eli Bibby.
(W. Lancashire and Cheshire District): F. Garstang.
Co-operative Union: F. Hall.
Education Settlements Association: F. S. Milligan.
Joint Committee of the Four Secondary Associations: Miss D. E. Limebeer.
Joint Committee of the Three Technical and Art Associations:
R. A. Dawson.
Lancashire Federation of Trades Councils: F. Knights.
Library Association: J. W. Singleton.
National Adult School Union (Lancs. and Ches. Union): W. J. Tuckett.
National Federation of Women's Institutes: Mrs. Crowther.
National Union of Teachers: W. Merrick.
Tutors' Association: Mrs. Stocks.
Women's Co-operative Guild: Mrs. F. Lightfoot.
Y.M.C.A.: J. T. McKerrigan.
Y.W.C.A.: Miss F. M. Yates.

Nominated Members

H. Pilkington Turner. C. James.
Rev. F. Heming Vaughan. A. A. Purcell.

YORKSHIRE AREA COUNCIL

Universities:

Leeds: Dr. J. B. Baillie (*Chairman*).
Sheffield: W. M. Gibbons.
Hull: Prof. T. H. Searls.

County Education Authorities:

West Riding: Sir Percy Jackson.
East Riding: P. J. Whitehead.
North Riding: Rev. A. R. Lee.

County Borough Education Authorities:

Hull: R. C. Moore.
Leeds: W. A. Scarr.
Sheffield: P. Sharpe.
Bradford: Thomas Boyce.
North Riding: Martin Wilson.

Yorks Council for further Education:

S. Price.

Voluntary Bodies:

W.E.A. (N. Yorks): G. H. Thompson.
W.E.A. (S. Yorks): E. Fisher.
Co-operative Union: J. Cragg.
Educational Settlements: W. Allott.
Joint Committee of the Four Secondary Associations: T. Curzon.
Joint Committee of the Three Technical and Art Associations:
 B. C. Gregory.
Yorks Federated Trades Councils: Councillor T. Crowe.
Library Association: R. J. Gordon.
National Adult School Union: F. J. Gillman.
National Federation of Women's Institutes: Miss J. B. Kitson.
National Union of Teachers: H. N. Penlington.
Women's Co-operative Guild: Mrs. Priestley.
Y.M.C.A.: J. W. Schofield.
Y.W.C.A.: Miss Crosse.
Tutors' Association: A. H. Dainton.

Nominated Members.

W. F. Dann. M. Wigglesworth.
A. J. J. Ratcliffe. E. P. Bates.

SCOTTISH ORGANISING COMMITTEE

(Carnegie Experiment in Group Listening)

British Institute of Adult Education (Scotland): Principal R. S. Rait (*Chairman*).

*Education Committee: Rev. C. Rolland Ramsay.

†Education Committee: Miss Elizabeth Mitchell.

*Director of Education: Dr. T. R. Burnett (*Vice-Chairman*).

†Director of Education: R. C. T. Mair.

*County Librarian: Miss L. R. Andrews.

†County Librarian: A. Ogilvie.

Scottish Trades Union Congress: C. N. Gallie.

Workers' Educational Association: John Macleod.

†Miners' Welfare District Committee: R. J. Prince.

*Educational Institute of Scotland: Robert Hamilton.

†Educational Institute of Scotland: John Thomson.

†Scottish Women's Rural Institutes: Mrs. Douglas.

*Scottish Women's Rural Institutes: Mrs. Reid.

University of Glasgow Extra-Mural Committee: D. M. Stewart.

Co-operative Union, Educational Committee Association: James Lucas.

Scottish Co-operative Women's Guild: Mrs. A. C. L. Wilson.

Young Men's Christian Association: John Humphries.

Young Women's Christian Association of Great Britain (Scottish District): Miss Jeanette Service.

Nominated Members

Rev. R. P. Fairlie.

Dr. J. Murray.

Robert Fraser.

John Mitchell.

James A. Ferguson.

* Dumfriesshire.

† Lanarkshire.

Listeners' Societies

THE INCORPORATED RADIO SOCIETY OF
GREAT BRITAIN

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

Hon. Secretary : John Clarricoats.

THE RADIO ASSOCIATION

22, Laurence Pountney Lane, E.C.4.

• *General Secretary* : R. R. Pecorini.

THE WIRELESS LEAGUE

INCORPORATING

THE WIRELESS ASSOCIATION OF GREAT BRITAIN

12, Grosvenor Crescent, S.W.1.

Secretary : Miss I. Joss.

Wireless Trade Associations

RADIO MANUFACTURERS' ASSOCIATION

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

Hon. Secretary : D. Grant Strachan.

THE WIRELESS RETAILERS' ASSOCIATION OF
GREAT BRITAIN AND NORTHERN IRELAND

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

Hon. Secretary : Capt. H. A. Bain.

BRITISH RADIO VALVE MANUFACTURERS'
ASSOCIATION

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

Hon. Secretary : H. Howitt.

RADIO WHOLESALERS' FEDERATION

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

Hon. Secretary : J. Macfarlane.

B.B.C. TIME SIGNAL CHART

WEEK-DAY SERVICE

Station.	10.15 a.m.	10.30 a.m.	12.0 noon.	1.0 p.m.	4.45 p.m.	6.30 p.m.	9.0 p.m.	10.15 p.m.	11.30 p.m.
National 1554.4 m.	Big Ben	G.T.S.†	Big* Ben	G.T.S.	G.T.S.	G.T.S.	G.T.S.		G.T.S.
London National 261.3 m.			Big* Ben	G.T.S.		G.T.S.	G.T.S.		
London Regional 356 m.	Big Ben	G.T.S.	Big* Ben			G.T.S.		G.T.S.	
Midland Regional 479.2 m.			Big*† Ben			G.T.S.		G.T.S.	
Provinces						G.T.S.	G.T.S.		

SUNDAY SERVICE—TIME SIGNALS

Station.	10.30 a.m.	3.0 p.m.	9.0 p.m.
National 1554.4 m.	G.T.S.	G.T.S.	G.T.S.
London National 261.3 m.		G.T.S.	G.T.S.
London Regional 356 m. and Midland Regional 479.2 m.		G.T.S.	G.T.S.
Provinces		G.T.S.	G.T.S.

BIG BEN

If circumstances are favourable, Big Ben will be broadcast at the beginning of any programme emanating from London. The day's programme on week-days will also be concluded, when possible, with Big Ben.

NOTES

G.T.S. on 1554.4 m. is compulsory and will always be broadcast even if this means its super-imposition.

* Saturdays excluded.

† Greenwich Mean Time.

‡ Only when taking London programme



SHORT-WAVE STATION AND TIME

A list giving the key to the reference numbers on the above map will to time and should be checked, when necessary, with the list of Short-Wave To ascertain the time at any station shown, add to or subtract from G.M.T. Abyssinia, Borneo, Sumatra, Venezuela, Bolivia, Guatemala, Franklin, mos or no legal time is kept.



ZONE MAP OF THE WORLD

found on the next two pages. The details there given vary from time zones published in *World-Radio* each week.

the appropriate zone number. In China, Afghanistan, Persia, Arabia, Greenland, and part of New Guinea, either the legal time is not known,

KEY TO THE MAP OF SHORT-WAVE STATIONS

N.B.—The Map on the two preceding pages is based on the *Time Zone Chart of the World*, published by the Admiralty under the direction of the Hydrographer to the Royal Navy.

Ref.	Station.	Call.	Metres.
1	Constantine (Algeria)	8KR	45
2	Rome (Italy)	3RO	25·4
3	Kharbarovsk (Russia)	—	70·2
4	Radio LL (France)	—	33
	Paris (France)	FLJ	32·5
	Pontoise (Paris)	—	25·63
	" "	—	25·2
	" "	—	19·68
5	Prague (Czechoslovakia)	OK1MPT	58
6	New York (U.S.A.)	W2XAL	49·67
	Brooklyn (New York)	W2XBH	54·52
	Richmond Hill (U.S.A.)	W2XE	49·02
7	Belgrade (Yugoslavia)	—	30
8	Moscow (Russia)	—	45·38
	" "	—	50
9	Barcelona Radio Club (Spain)	EAJ25	50
10	Chicago (U.S.A.)	W9XF	49·83
	" "	W9XAA	49·34
	" "	"	25·34
	" "	"	16·57
11	Cincinnati (U.S.A.)	W8XAL	49·5
12	Vancouver (B.C.)	VE9CS	49·43
13	Philadelphia (U.S.A.)	W3XAU	49·5
	" "	"	31·3
14	Sydney (Australia)	VK3ME	31·28
15	Calcutta (India)	VUC	25·27
16	Bangkok (Siam)	HSP2	41
17	Toronto (Canada)	VE9GW	49·22
	" "	"	25·4
18	Bound Brook (U.S.A.)	W3XAL	49·18
	" "	"	46·69
19	Nairobi (Kenya)	7LO	49·5
20	Pittsburgh East (U.S.A.)	W8XK	48·86
	" "	"	25·25
	" "	"	19·72
21	Mexico City	X1F	48·65

Ref.	Station.	Call.	Metres.
22	Tegucigalpa (Honduras)	HRB	48·62
23	Bogotá (Colombia)	HKC	48·35
		HKF	39·7
24	Funchal (Madeira)	CT ₃ AQ	24
26	Nuevo Laredo (Mexico)	X ₂ 6A	40·7
27	Madrid (Spain)	EAR ₁₁₀	43
28	Tenerife Radio Club (Canary Islands)	EAR ₅₈	41·6
29	Agen (France)	—	30·75
30	Long Island (U.S.A.)	W ₂ XV	62·5
		"	34·68
31	Saigon (French Indo-China)	—	49·05
32	Skamlebaek (Denmark)	OXY	31·51
33	Schnectady (U.S.A.)	W ₂ XAF	31·48
		W ₂ XAD	19·56
34	Zeesen (Germany)	—	31·38
35	Springfield (U.S.A.)	W ₁ XAZ	31·35
36	Eindhoven (Holland)	PCJ	31·28
37	Melbourne (Australia)	VK ₃ ME	31·55
		"	31·28
38	Heredia (Costa Rica)	NRH	29·3
39	Poznan (Poland)	SR ₁	31·35
40	Buenos Aires (Argentina)	LSX	28·98
41	Winnipeg (Canada)	VE ₉ CL	49·5
		"	48·8
42	Chelmsford (England)	G ₅ SW	25·53
43	Bucharest (Romania)	—	50
		—	21·5
44	Casablanca (N. Africa)	CN ₈ MC	48
	Rabat (Radio Maroc) (Morocco)	—	32·26
		—	23·8
45	Bandoeng (Java)	PLW	36·92
	" "	PLR	28·2
	" "	PLE	31·86
46	Johannesburg (S. Africa)	—	49·4
47	Rio de Janeiro (Brazil)	—	31·75
48	Lisbon (Portugal)	CT ₁ AA	42·9
49	Singapore	VS ₁ AB	41·7

SIX MONTHS' APPEALS

RESULTS OF THE APPEALS BROADCAST FROM LONDON
DURING THE FIRST HALF OF 1931 (TO THE NEAREST
POUND)

January	4*	Friends of the Poor.	Hon. Mrs. Sydney Marsham.	£2200
"	11†	St. Peter's Hospital.	Sir Ernest Wild.	£1559
"	18*	Theatre Girls' Hostel in Paris.	The Rev. F. Ans-truther Cardew.	£1100
"	25†	Boys' Garden Colony, Basingstoke.	A. J. Tassell.	£100
February	1†	Marie Curie Hospital.	Sir Oliver Lodge.	£1551
"	8†	London and Greater London Playing-Fields Association.	Major Raphael Jackson.	£70
"	15†	Musicians Benevolent Fund.	Sir Nigel Playfair.	£2750
"	22†	City of London Truss Society.	Alderman and Sheriff Jenks.	£107
March	1*	Shipwrecked Fishermen and Mariners' Royal Benevolent Society.	Rear-Admiral Gordon Campbell, V.C.	£884
"	8†	Children's Fresh Air Mission	Sir Ernest Wild.	£895
"	15*	National Society for the Prevention of Cruelty to Children.	Hon. A. Holland-Hibbert.	£2205
"	22†	London House Hostel.	Rt. Hon. L. S. Amery.	£46
"	29†	Skilled Employment and Apprenticeship Association.	Dame Henrietta Barnett.	£59
April	5*	Ypres British Settlement.	Field-Marshal Lord Plumer.	£550
"	12†	Women's Settlement, Canning Town.	Miss Catherine Towers.	£230
"	19*	Church of England Council of Empire Settlement.	Brig.-Gen. Sir Wyndham Deedes.	£73
"	26†	King's College Hospital.	Edgar Wallace.	£1149
May	3*	National Children's Home and Orphanage.	Lord Wakefield.	£5095
"	10†	East London Hospital for Children.	Lady Tree.	£465
"	17*	Alexandra Day.	Miss C. May Beeman.	£43
"	24†	Robert Browning Settlement, Walworth.	Lady Lawrence.	£67
"	31†	Naval and Training Ships' Leave Camp.	Henry Ainley.	£140
June	7*	Church of England Zenana Missionary Society.	Miss M. E. Pell.	£824
"	14†	Metropolitan Hospital Sunday Fund.	"Audax."	£200
"	21*	Fellowship of St. Michael and All Angels.	Lady Maud Hoare.	£51
"	28†	Margaret Club and Day Nursery.	Lady Titchfield.	£54

* National.

† London Regional.

WIRELESS FOR THE BLIND

LESS than two years ago the British "Wireless for the Blind" Fund was inaugurated with the object of ensuring that no blind person in Great Britain and Northern Ireland should be without a wireless set.

To-day the sum of £37,000 has been subscribed by the listening public to the Fund, and 17,000 sets have been supplied to the blind throughout the country. A further sum of £4,000 is still needed to complete the work of the Fund, this money mainly being required for supplying sets with loud-speakers to people who, in addition to blindness, have other infirmities.

Great efforts are at the moment being made to obtain the additional sum required, and it can be assumed that in two years over 20,000 sets will have been supplied by the Fund, and that in 1932 no blind person in this country will be without wireless.

This is a remarkable response to an appeal for a fine cause. In a time of unprecedented industrial depression and financial stringency, thousands of pounds—mostly in small sums—have been subscribed voluntarily by sympathisers with the blind.

None but the blind can tell of the transformation effected in the habits and outlook of many thousands of our fellow-countrymen by wireless. The empty, monotonous day is now a day of varied events. The dull, vacant mind is now a mind thrilling with new ideas. The blind man with his wireless set is now no longer outside the march of progress, but a participator in the movement of the times.

Innumerable letters have been received by the Fund showing the gratitude of the blind to those who have helped them to emerge from a dark world into a world of light. Their simple expressions of thanks and pleasure are eloquent in appeal for those blind people who are still without sets. To them let us add the words of H.R.H. the Prince of Wales during his broadcast appeal early in 1931 from the Clothworkers' Hall:—

"This appeal," he said, "has touched the hearts of the British public. It is a cause about which there can be no shadow of doubt—to see that in this country at least the blind are less unhappy than anywhere else in the whole world. . . . There must not be a single blind person in this country without the inestimable benefits of wireless."

All donations and offers of personal service in erection of aerials, maintenance, etc., will be most gratefully received by the Rt. Hon. Reginald McKenna, Hon. Treasurer, British "Wireless for the Blind" Fund, 226, Great Portland Street, London, W.1.

LIST OF BOOKS FOUNDED ON BROADCAST MATERIAL

- Everyday Life in Old Scotland (I. F. Grant). 7s. 6d. Allen & Unwin.
 The Bible and its Background (C. H. Dodd). In preparation.
 About 2s. 6d. Allen & Unwin.
 Points of View (H. G. Wells, Dean Inge, Sir Oliver Lodge, J. B. S. Haldane, Sir Walford Davies, and G. Lowes Dickinson). 4s. 6d. Allen & Unwin.
 More Points of View (the Archbishop of York, Sir James Jeans, Dame Ethel Smyth, Sir Josiah Stamp, Viscount Grey of Fallodon, Hilaire Belloc, Sir Henry Newbolt). 4s. 6d. Allen & Unwin.
 Electricity in our Bodies (Bryan H. C. Matthews). 4s. 6d. Allen & Unwin.
 The Discovery of Poetry (P. H. B. Lyon). 2s. 6d. Edward Arnold.
 Poetry and the Ordinary Reader (M. R. Ridley). 3s. 6d. G. Bell.
 The Beginnings of Christian Theology. (J. K. Mozley). 5s. Cambridge U.P.
 The Medieval Scene (G. G. Coulton). 5s. Cambridge U.P.
 The Stars in their Courses (Sir James Jeans). 5s. Cambridge U.P.
 How it Happened: Myths and Folk-Tales (Rhoda Power). 7s. 6d. Cambridge U.P.
 Eight Victorian Poets (F. L. Lucas). 4s. 6d. Cambridge U.P.
 The Spider's Palace (Richard Hughes). 21s. and 6s. Chatto & Windus.
 Squirrel's Cage and Two other Microphone Plays (Tyrone Guthrie). 3s. 6d. Cobden Sanderson.
 People and Things (Harold Nicolson). 5s. Constable.
 The New Russia (H. R. Knickerbocker, Sir John Russell, Sir Bernard Pares, Dr. Margaret S. Miller, B. Mouat-Jones, Stafford Talbot, Frank Owen, and H. G. Wells). 3s. 6d. Faber.
 Two Broadcast Talks on India (Sir John Simon). 1s. Faber.
 The Meaning of Art (Herbert Read). 3s. 6d. Faber.
 Escapes (English and German contributors). In preparation. Faber.
 The Buggineses (Mabel Constanduros and Michael Hogan). 3s. 6d. and 2s. Hutchinson.
 Good-Evening Everyone (A. J. Alan). 3s. 6d. and 2s. 6d. Hutchinson.
 Christ's Message to us To-day (Rev. W. P. G. McCormick). 2s. Longmans Green.
 Trade Depression and the Way Out (R. G. Hawtrey). 2s. 6d. Longmans Green.
 The Radio Times Dictionary of Musical Terms. 1s. Oxford U.P.
 A Miniature History of Music (Percy Scholes). 1s. and 1s. 6d. Oxford U.P.
 A Miniature History of Opera (Percy Scholes). 1s. and 1s. 6d. Oxford U.P.
 Hullo, Playgoers (Archibald Haddon). 3s. 6d. Cecil Palmer.
 The Men Behind the Music (Filson Young, H. N. Brailsford, Richard Church, Winifred Holtby, J. C. Squire, Sacheverell Sitwell, J. W. N. Sullivan, and others). 2s. 6d. Routledge.
 England in Transition (M. Dorothy George). 7s. 6d. Routledge.

REVENUE ACCOUNT for the Year ended 31st December, 1930.

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)	£	s.	d.
„ Maintenance of Plant, Power, Salaries and Expenses of Engineering Staff, Development and Research, &c.	192,720	13	6
„ Rent, Rates, Taxes, Insurance, Heating and Lighting, Upkeep and Expenditure upon Premises, Telephones, &c.	90,686	13	10
„ Administration Salaries and Expenses	59,420	10	7
„ Contributions to Staff Provident Fund	10,515	11	2
„ Governors' Fees	6,100	0	0
„ Provision for Depreciation and Renewal of Premises, Plant, Furniture and Fittings, &c.	48,605	0	0
„ Provision for Income Tax	50,000	0	0
„ Balance carried down, being Net Revenue for year	186,002	14	1
	£1,224,355	1	9

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INCOME.

By Licence Income	£	s.	d.
„ Net Revenue from Publications, after providing Reserves for Doubtful Debts and Contingencies	160,209	5	5
„ Interest and Sundry Receipts (Net)	21,122	9	1
	£1,043,023	7	3

REVENUE APPROPRIATION ACCOUNT.

To Transfer to Capital Account to cover:—	£	s.	d.
Capital Expenditure incurred by the Corporation during the year (other than upon Regional Stations)	4,459	16	10
Provision for future Capital Expenditure including expenditure on the construction and equipment of Regional Stations	180,000	0	0
„ Balance carried forward as per Balance Sheet	3,353	11	6
	£187,813	8	4
By Balance brought from 31st December, 1929	£	s.	d.
„ Balance brought down, being Net Revenue for year	186,002	14	1
	£1,224,355	1	9

£187,813 8 4

BALANCE SHEET

LIABILITIES.

	£	s.	d.	£	s.	d.
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 to cover Capital Expenditure incurred by the Corporation to date and to provide for future Capital Expenditure including Expenditure on the construction and equipment of Regional Stations—						
Appropriated at 31st December, 1929 (per last Balance Sheet)	390,701	5	5			
Appropriated at 31st December, 1930	184,459	16	10			
				750,099	2	3
RESERVE FOR DEPRECIATION AND RENEWAL OF PREMISES, PLANT, FURNITURE AND FITTINGS, &c.—						
Balance at 31st December, 1929, per last Balance Sheet	92,604	8	9			
Add: Further provision during 1930, per Revenue Account	48,605	0	0			
	141,209	8	9			
Less: Book value (net) of Plant and Furniture discarded during 1930	11,007	10	11			
				130,201	17	10
CREDITORS AND INCOME TAX RESERVE—						
Sundry Creditors and Reserve for Contingencies	124,961	16	2			
Income Tax Reserve	100,000	0	0			
Provident Fund Trustees	4,684	19	6			
				229,646	15	8
REVENUE ACCOUNT—						
Balance at credit at 31st December, 1930, carried forward as per Account					3,353	11 6

GAINFORD }
 M. J. RENDALL } Governors.
 J. C. W. REITH, Director-General.

£1,113,301 7 3

REPORT OF THE AUDITORS TO THE MEMBERS

We have examined the above Balance Sheet dated 31st December, 1930, obtained all the information and explanations we have required.

The Balance Sheet is, in our opinion, properly drawn up so as to exhibit a best of our information and the explanations given to us and as shown by the

5, LONDON WALL BUILDINGS, LONDON, E.C. 2.

27th February, 1931.

as at 31st December, 1930.

ASSETS.

	£	s.	d.	£	s.	d.
FREEHOLD AND LEASEHOLD PREMISES—						
Acquired from the British Broadcasting Co., Ltd., as valued by the Corporation's Officials, plus additions made by the Corporation to 31st December, 1929, at cost, per last Balance Sheet	113,494	18	1			
Additions during 1930, at cost (<i>less</i> book value of premises sold or written off during year)	31,040	18	11			
				144,535	17	0
PLANT—						
Acquired from the British Broadcasting Co., Ltd., as valued by the Corporation's Officials, plus additions made by the Corporation to 31st December, 1929, at cost, per last Balance Sheet	207,270	8	11			
Additions during 1930, at cost (<i>less</i> book value of Plant discarded during the year)	44,297	18	10			
				251,568	7	9
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, 1929, at cost, per last Balance Sheet	55,869	6	10			
Additions during 1930, at cost (<i>less</i> book value of Furniture discarded during the year)	5,493	2	6			
				61,362	9	4
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, 1929, at cost, per last Balance Sheet	24,606	9	5			
Additions during 1930, at cost	4,387	0	10			
				28,993	10	3
				486,460	4	4
STORES ON HAND AND WORK IN PROGRESS, at cost or under						
				5,631	11	2
DEBTORS AND UNEXPIRED CHARGES—						
Sundry Debtors, <i>less</i> provision for Doubtful Debts	67,993	2	11			
Unexpired Charges	12,023	12	1			
				80,016	15	0
INVESTMENTS—						
£475,000 5% War Loan, 1929/47, at cost (Market Value at 31st December, 1930, <i>less</i> accrued interest—£488,414 5s. <i>od.</i>)				481,086	0	11
CASH AT BANK AND IN HAND				60,106	15	10
				1,113,301	7	3

OF THE BRITISH BROADCASTING CORPORATION.

with the books and vouchers of the British Broadcasting Corporation, and have true and correct view of the state of the Corporation's affairs according to the books of the Corporation.

DELOITTE, PLENDER, GRIFFITHS & CO., Auditors,
Chartered Accountants.

BUYER'S GUIDE AND INDEX OF ADVERTISERS

GENERAL

AIDS FOR THE DEAF	<i>See page</i>	HEALTH	<i>See page</i>
Ardente	375	British Nature Cure Assoc.	358
APPEALS, CHARITABLE		Henry J. Rivers	364
Alexandra Orphanage	370	Royhill Camp	369
Cancer Hospital	364	HOTEL	
Child Emigration Society	416	Imperial Hotel	421
Church Army	364	MOTOR REQUISITES	
Church Lads' Brigade.	421	K.L.G. Plugs, Ltd.	390
Dr. Barnardo's Home.	358	PAINT	
Friends of the Poor	370	Blundell, Spence & Co., Ltd.	354
Imperial Cancer Research Fund	370	PIANOS	
Lord Mayor Treloar Cripples' Hos- pital and College	11	Challen	335
Moorfields Eye Hospital (<i>on wrapper</i>)		Chappell Piano Co., Ltd.	363
N.S.P.C.C.	375	PREMISES	
Shaftesbury Homes and "Are- thusa" Training Ship	415	Langham House	7
Shaftesbury Society	416	Roxburghe House	7
Spurgeon's Orphan Homes	375	OILS	
Waifs and Strays Society	405	Shell-Mex, Ltd.	319
BISCUITS		ORGANS	
Peck Frean	369	J. W. Walker & Sons, Ltd.	354
BOOKS		TEA	
G. Bell & Son	421	Mazawattee Tea Co.	369
Hodder & Stoughton	390	TOILET	
DISINFECTANTS		Anzora Perfumery Co., Ltd.	415
Bacterol Ltd.	358	TRAVEL	
DOMESTIC EQUIPMENT		Guernsey	415
Pander Mfg. Co.	416	H.M. Eastern African Dependen- cies	390
ELOCUTION		WIRELESS	
R. E. Besant	375	<i>See page</i>	<i>See page</i>
GRAMOPHONES AND RECORDS		Exide Batteries	328
Columbia Graphophone Co., Ltd..	379	General Electric Co., Ltd.	353
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