



WORLD-RADIO

DOMINION & FOREIGN PROGRAMMES

The Official Foreign & Technical
Journal of the B.B.C.

Vol. IX No. 225

Registered at the G.P.O.
as a Newspaper

FRIDAY, NOVEMBER 15, 1929

Two Pence

PRINCIPAL CONTENTS

English and Continental Reception
A Comparison

Letters to the Editor
Butterflies and Wireless

Short Wave Calibration

Radio Reminiscences

The Carrier Current System

Foreign Languages

French, Spanish, Esperanto

WORLD-RADIO

Station Identification Panel
BERNE (SWITZERLAND)
(Revised)

Frequency: 743 kc/s.

Wavelength: 403 m.

Power (Aerial): 1 kw.

Approximate distance from London:
464 miles.

Opening Signal: Tune on musical box.

Opening Call: "Hallo! Radio Bern"
(pronounced "Rah-dec-oh-Bairn"),
"Auf Welle . . . Sie hören . . ."
(in German and French).

Women and Men Announcers. Calls in
German and French.

Interval Signal: Clock ticking.

Closes down with "Wir schliessen und
wünschen alle eine recht gute Nacht;"
also in French, Italian, and English
("Good night, everybody, good
night!"). Terminating with old
Bernese march on a gramophone.
Final call in Bernese dialect: "Alli
mi en ander, schlafet rächt wohl!"

A booklet containing a reprint of these panels can
be obtained from the B.B.C. Publications, Savoy
Hill, W.C.2. Price 1s.

Letters should be addressed to The Editor,
"WORLD-RADIO," Savoy Hill, Strand, London,
W.C.2.

RATES OF SUBSCRIPTION to "World-Radio" (including
postage). Twelve months: Inland 13s., Canadian 13s.,
Foreign 14s.; Six Months: Inland 6s. 6d., Canadian 6s. 6d.,
Foreign 7s. Address—"World-Radio," 8-11, Southampton
Street, Strand, London, W.C.2.

BRITAIN'S HIGHEST QUALITY PORTABLE



ALL ENGLAND - PARIS
BERLIN - ROME
MADRID - VIENNA - Etc.
without an aerial

Send for
Catalogue
W.R. 13

TEST IT
FREE FOR
A WEEK

Any Selector Portable
will gladly be sent for
a week's free trial. If
it does not do all we
claim send it back and
your money will be re-
funded at once.

THE Selector Screened Grid
Portable brings in the best
broadcast programmes from all
Europe, simply by turning the
controls to the readings given
on the set. If London is dull,
turn to Paris; if Paris is 'talk-
ing,' Berlin may offer you the
opera or Vienna a symphony
concert. You can go all round
Europe as fast as you can set the
controls. You can arrange your
programme days ahead and pick
up each item just when you want
it. Foreign stations can be
received perfectly even when
Brookman's Park is broadcasting.

WONDERFUL TONE—

The tone of the Selector is be-
yond praise. It brings
voices into the room
beside you! It lets
you hear every note
and every drum
tap in a full
orchestra.

AS GOOD AS AN ALL- ELECTRIC—

The Selector accumulator can be
charged from the electric light
at home without removing it
from the set. An indicator tells
you when recharging is neces-
sary. The Selector thus gives
all-electric convenience without
ANY connecting wires—airial,
earth or mains. You can take
the Selector anywhere and it
will play anywhere—even as you
carry it along.

The Selector is built for people
who want "quality." It is the
best portable that money can
buy. All Selector sets are fully
guaranteed for twelve months.

The Selector Attache Case set (illus-
trated) is finished in blue morocco
leather and costs complete 32 gns.
cash or £7 down and 10 monthly
instalments of £3.



SELECTORS, LTD., 206, Bedford Avenue, Slough
Trading Estate, Slough, Bucks. Telephone: Slough 818.
London Office—1, Dover Street, W.1. Phone: Regent 4771.

THE PERFECTED ELIMINATOR

A FINE PROPOSITION
FOR RADIO USERS
WITH ELECTRIC MAINS.

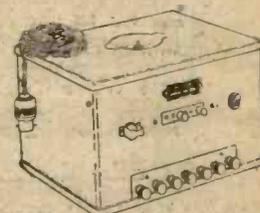


MET-VICK MODEL "BS"
ELIMINATOR for A.C. Mains
Operation (Combined L.T., H.T.,
G.B., and S.G.V. Eliminator
A.C. Type). Price—40/100 cycle
Model, £ 8 (complete with
valve); 25 cycle Model, £ 10
(complete with valve).

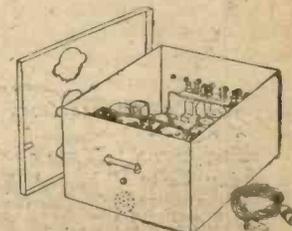
Cut out the L.T. and H.T. batteries and the attendant bother and expense of replacing or recharging at frequent intervals. First cost will be last cost if you get a Met-Vick Eliminator.

In the wide range of Met-Vick Eliminators there is one to suit every need—there's the model "D" for the man with the big power valves and moving coil loudspeakers and there is the model "B.S." for the listener with a modest 3-valver.

Order from your radio dealer who has full particulars of the complete range of Battery Eliminators, Chargers and Power Components, or write to us for the Ediswan Blue Book.



MET-VICK MODEL "C"
ELIMINATOR MEDIUM POWER
TYPE for A.C. Mains Operation
(Combined L.T., H.T., G.B.,
and S.G.V. Eliminator).
Price—40/100 cycles, £ 10 10s.
(complete with valves; 25 cycle
Model, £ 11 5s. (complete
with valves).



MET-VICK MODEL "D"
ALL-ELECTRIC POWER
ELIMINATOR HIGH VOLTAGE
TYPE. Price, £ 21 0s. (in-
cluding valves).

EDISWAN RADIO PRODUCTS

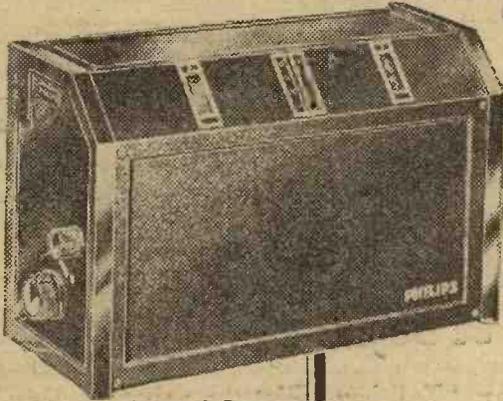
THE EDISON SWAN ELECTRIC CO., LTD.,

HEAD OFFICE & SHOWROOMS EDISWAN RADIO DIVISION:

1a, NEWMAN STREET, OXFORD STREET, W.1.

(Phone: MUSEUM 9601).

PHILIPS Radio Receivers and Loudspeakers

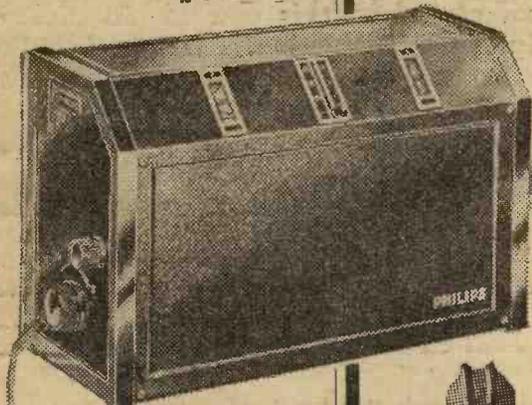


General Purpose Receiver. Type 2502
£12 : 10 : 0.

If you have D. C. Mains or if no electric current is available, ask for this receiver with its corresponding Speaker.



Loudspeaker Type 2016.
£2 : 10 : 0.



All-Electric Receiver Type 2514.
£23 : 0 : 0.

This is the famous Philips All-Electric 3-Valve Receiver 2514 with loudspeaker 2007. Just plug into A.C. Mains.

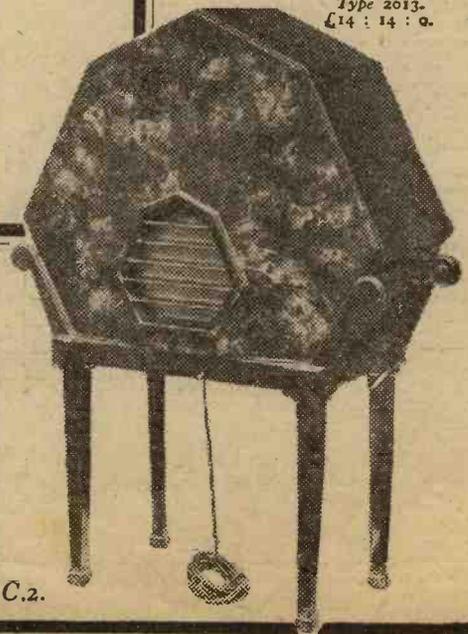


Loudspeaker Type 2007.
£5 : 5 : 0.



All-Electric Receiver Type 2511.
£37 : 10 : 0.

Philips De Luxe 4-Valve All-Electric Receiver with moving coil speaker 2013.



Moving Coil Loudspeaker Type 2013.
£14 : 14 : 0.

These receivers embody the latest developments in Radio science and give the finest reproduction from British and Continental stations.

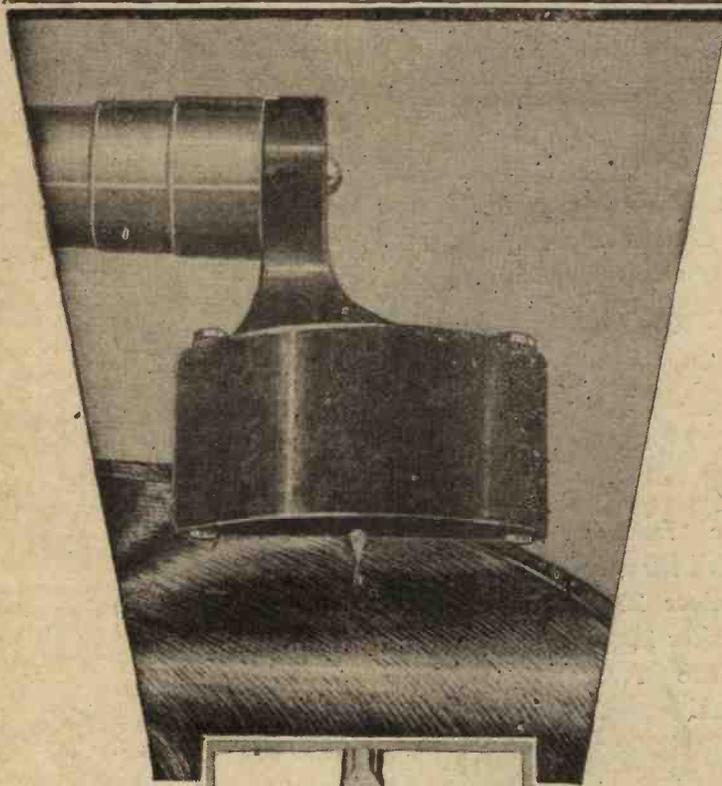
Deferred payments may be arranged through any dealer.

Write for illustrated brochure.

PHILIPS RADIO, PHILIPS HOUSE, 145, CHARING CROSS ROAD, LONDON, W.C.2.

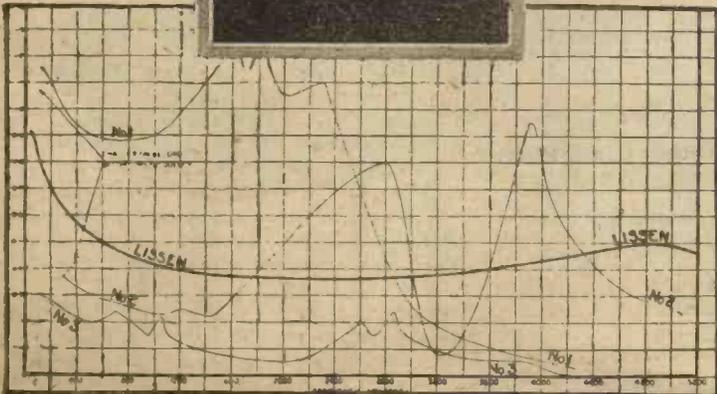
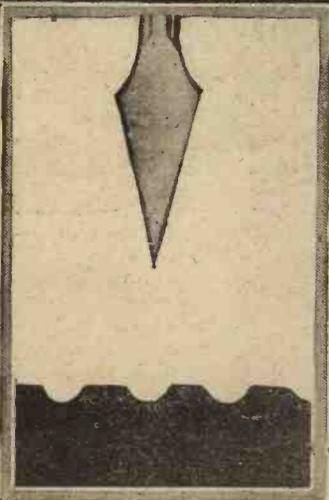
Revolutionary new Lissen Pick-up

MAKES EVERY RECORD A PICTURE TRUE IN TONE COLOUR



THE SIGNIFICANCE OF THE CURVE.

Look at Curve 1. A particularly fine response for part of its curve, but notice the peaks and depressions and the very serious falling off in output after 2,800 cycles—after 200 cycles it would not remain on the record. In Curves 2 and 3 the same deficiencies exist. Now look at the Lissen Curve. It is the only even curve. These are actual tests under ordinary conditions. The real significance of the Lissen curve is that you get true musical values from one end of the scale to the other.



New Needle-Armature so light that response is perfect at all frequencies

“Better than ‘Talking’ Picture reproduction”—that is what everybody says who hears a gramophone record played by this new Lissen Pickup. And actually the reproduction is better than the film experts have achieved—more natural, nearer to reality, because no longer are the high notes thinned out or the lower bass notes lost. The Lissen Pickup is so responsive that even the perfect electrical recordings of today can hardly do it justice. It responds to the most minute indentation on the record—the needle-armature is so light that the needle-point actually *feels* its way along the record groove.

And you'll find your records almost everlasting when you use this new Lissen Pickup, because the needle follows the groove and does not plough its way along.

If you want every single record to sound much better than those you hear at demonstrations—if you want radio-gramophone reproduction that comes so near to reality that in a darkened room you would suspect the presence of the artist—get this new Lissen Pickup and learn what perfection means. Any Lissen radio dealer will demonstrate it for you.

LISSEN

NEEDLE-ARMATURE PICK-UP

30/-

Complete With Moulded Tone-Arm 37/6

LISSEN LIMITED,

Worples Rd., Isleworth, Middlesex.
Factories also at Richmond and
Edmonton.

(Managing Director : Thos. N. Cole.)

WORLD-RADIO

Vol. IX. No. 225.

Registered at the G.P.O.
as a Newspaper.

FRIDAY, NOVEMBER 15, 1929

TWO PENCE

English and Continental Reception

A Comparison

By "Yodeller."

[Correspondents in England have written to our contributor "Yodeller," commenting on the general excellence of his reception as described in his monthly programme review "From the Swiss Alps," and contrasting it with their own. In the following *apologia* "Yodeller" explains the circumstances of his reception.]

SO much could be said in reply to correspondents' comments that one hardly knows where to begin. For myself, I have frequently wondered why it should be that "Northerner" and "The Searcher" should be able to pick up a station such as, say, Berne, so satisfactorily in England, while I, living not many miles distant from this transmitter, find it extremely difficult to get it at all. Yet I know perfectly well that Berne is heard well in England, for only a few days ago I received a letter from a radio friend actually describing a Saturday night broadcast from the little Swiss transmitter.

Then another correspondent, writing from the West of England, close to the Bristol Channel, tells me that he has great difficulty with 5GB, and that frequently Langenberg almost wipes out this station.

To me, this again seems almost incredible. Here in Switzerland, with Daventry 5GB some hundreds of miles farther from me than the German high-power station, I find our home transmitter coming in with double the strength of Langenberg, which very often I cannot find at all.

Leningrad I can seldom "pull in" out here, yet in England this station is frequently heard.

Again, by way of contrast, Glasgow is sometimes impossible to South of England listeners, yet last night, while searching for Bucarest, I stumbled on the Scottish station and, with only two valves (H.F. and det.), earphones, and an indoor aerial slung round my ceiling, I was able to listen to the whole of the second news bulletin relayed from London, and hardly missed a word.

How can one account for these astonishing contradictions? Frankly, I don't know, and I think it would be a very clever man who did.

Geneva is thirty miles from my aerial, and I have never yet succeeded in logging it. But Stamboul, Radio-Maroc, Motala, and even Schenectady on the medium wavelength (at 2 a.m.), have all been "pulled in," besides others too numerous to mention.

Some people look wise and mutter "screening." My own opinion—and I have little doubt that it will call down much scorn upon my humble head—is that screening is almost non-existent—at the receiving end, I mean.

Stations which are open to me—that is to say, which have no mountains between my aerial and

their studio—come in no whit better, sometimes even worse, than stations which are blanketed by 5,000 feet of solid mountain which lies to the north of me.

I have used a "portable" down in the Rhone Valley, at a spot completely surrounded by mountains, and have brought the same set up to my chalet at 5,000 feet above sea level, and have been unable to detect any increase in volume which one might attribute to freedom from screening. Natives even tell me that

little effect, for as fast as one quotes one instance in support of this contention, twenty other examples can be found of its reverse effect.

Another factor which illustrates very effectively the waywardness of the new science—for I suppose wireless is still new—is "atmospherics." For years this subject has puzzled me, and many others, too, I imagine. This summer I decided to make a sort of chart, simply for my own satisfaction, in order to see if any sequence of causes could be found to account for these disturbances.

I asked several correspondents—one in India, two in Egypt (at Cairo and Alexandria), one in Boston (U.S.A.), and two or three in England—with whom I regularly exchange wireless gossip, to keep me supplied with jottings as to the state of the ether in their own particular districts. Furthermore, I kept an eye on "Searcher's" and "Northerner's" notes.

The phase of the moon, dates, weather, direction of wind, notes of any violent storms raging at any point of the globe—all these particulars I tabulated, together with mention of the amount of atmospheric discernible here in the Alps. And the net result of my labours is that I know not a single thing more than when I started, save that there seems to be no general rule whatever.

Obviously, we have been much freer from all static disturbances out here than you have been in England, for some nights when reception was perfect on my set my friends have logged "violent atmospheric—impossible to listen."

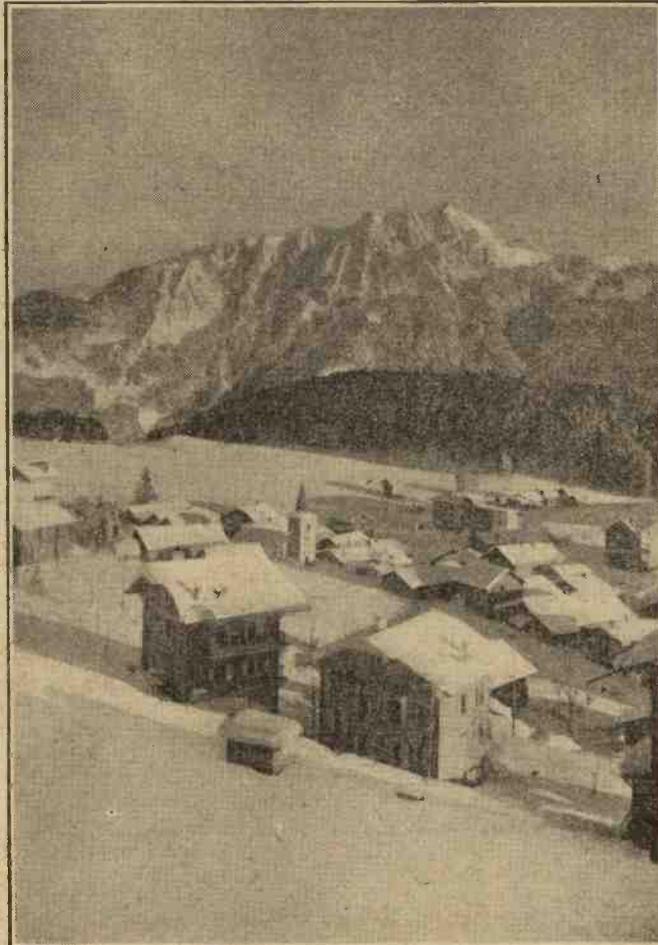
One fact and one fact only did I get clear, and that was that whenever the announcer at Savoy Hill spoke of "gale warnings," then—and this rule was invariably true—the following day I found it impossible to listen.

Snow in the offing seems to indicate trouble, too, while light mountain mist frequently gives me wonderfully powerful reception.

Again, much depends on the set itself, and the manipulator, and here I would like to make a statement which I know is very much open to contradiction. Since the early days of wireless, I have had almost every type of set through my hands, from the primitive little crystal apparatus to the last word in screened grid and pentode, and sets made by the

best-known English, American, and Continental firms. But always I come back to my little straight four-valver.

Modern sets have become much simpler, and both for the beginner and for ladies who do not wish to learn anything of the technical side of the business, these sets are excellent. For myself, however, I have arrived at that stage when the best, and nothing but the best, reception will suffice. The days when one enjoyed



A view of the district in the Swiss Alps in which the writer of this article listens to European stations

reception is better on the shores of Geneva than it is in the mountains, but of this I am not certain, and I prefer to deal with facts.

Trees, one is told, act as screens to wireless. Here, again, I have never found this so, for one end of my aerial is attached to a pine-tree bordering a huge forest, which covers the entire mountain-side. No: screening, I am sure, has little to do with the freakishness of reception.

Again, geographical situation seems to have

the faint squeal of Timbuctoo or some equally distant, and distorted, station are past. *World-Radio* arrives out here each week, and it is carefully looked over, items worthy of note being blue-pencilled. Then, if on tuning in one of these items reception is bad, a further search is at once made for something that is more pleasing. And, finally, if nothing good can be heard, the set is closed down for the evening, and my notebook remains unopened.

But the set must be well constructed, and its user must know how to handle it in order to get the best possible results. All this, of course, if one can erect an efficient outdoor aerial; and, for bad weather, or during the summer when atmospheric are rampant, an indoor one. Then, using only two valves, the det. and H.F., and earphones, all outside interference is reduced to the minimum, and one hears music as it *should* be heard—pure, sweet, and undistorted. If I could find a better arrangement than this, I would willingly scrap my four-year-old friend, and invest in a set which would improve on it. But hitherto all my questing has been in vain.

In Switzerland—and it is possible that its central position gives us a little advantage over England—stations such as Vienna, Budapest, Rome, Milan, Radio-Paris, Prague, Katowice, Königswusterhausen, Toulouse, etc., come in at such tremendous strength in the evening *all* the year round that almost without exception they will completely wipe out even quite a healthy crop of static interference. But even so, if, as sometimes happens, a programme is not worth listening to, and nothing else can be found to take its place, I prefer to close down for the night; so that a bad performance rarely finds itself included in my monthly programme review.

I feel sure that my English correspondents can get far better reception from some stations than I can here. Stations such as Hilversum, Kalundborg, Brussels, are very unreliable in Switzerland; whilst I have the advantage over him where certain other transmitters are concerned.

A funny business altogether, this wireless. To me its very uncertainty, its unaccountable vagaries, are an added charm. Who would have believed that two airmen flying over England using a tiny, low-power transmitter, should have their messages picked up in Egypt? Or that an explorer at the South Pole should receive concerts broadcast from America for his especial benefit! But so it is! Where will it all end? One cannot say. One can only wonder!

Zagreb's Activities.

In an interesting talk with the Director of Radio-Zagreb, Dr. Stern, I gleaned the following information regarding the forthcoming activities of that station. Although still in a very precarious financial position, it is intended to continue developing the work as far as possible with the existing facilities. Zagreb was one of the first stations to consider international relays, and if, hitherto, it has only been the relayer of important concerts from Prague, Budapest, Warsaw, and Berlin, this is mainly due to technical difficulties. During the coming winter the Czech stations will relay twelve concerts or operas from Zagreb, Dvorák's *Rusalka* being one of the first of this series, to take place on November 15, at 7 p.m. G.M.T. Dr. Stern hopes that the Polish stations, and perhaps from time to time Budapest and Vienna, will take these relays. With this step, Zagreb, and with it Yugoslavia, has become an active member of the Eastern-Central-European programme exchange group. The programme exchange between the Yugoslavian stations is working excellently. Ljubljana and Zagreb have a regular bi-weekly exchange. Belgrade has not been included so far, although the lines are there, but the reason will probably be found in the fact that Belgrade does not possess suitable amplifiers as yet.

Letters to the Editor

Butterflies and Wireless

To the Editor WORLD-RADIO,

SIR,—With reference to the very interesting letters which you have published under the above heading, I think the following extract from the German radio-paper, *Die Sendung*, is very well worth reading:—

"The various tests made by the well-known scientist, M. E. H. Fabre, with regard to the sense of smell in male butterflies, are very interesting. He made a thorough search in the neighbourhood of his home for the (locally) extremely rare Oakspinner (*Gastropacha quercus*). At last he found—and took very great care of—a pupa, which eventually resulted in a female specimen. This he placed in his house some five yards or so from an open window and under a wire screen. The next day sixty males of this rare butterfly had gathered in the room. They came into the town from the distant woods. Fabre ascribed this to the almost inconceivable perfection of the butterfly's smelling sense. And yet he made the following experiment. He overcame the supposed peculiar smell of the female butterfly by means of naphthaline, sulphuretted hydrogen, etc. And still the males found their way to the female. Could not this phenomenon be much more satisfactorily explained by a supposed radiation of electric waves than by the sense of smell alone?"

"Bees travel miles away from their hive in looking for their favourite blooms. It seems to be out of the question that such long flights can be undertaken through the sense of smell only. The scientist, Herr von Frisch, has proved, by the aid of so-called 'scent-caskets' saturated with various scents, that the sense of smell of bees is not essentially greater than that of the average human being. The certainty with which bees nevertheless find their way to unknown feeding grounds is, therefore, unexplained.

"There is still a secret hidden here as well as in the fact that carrier-pigeons can find their way over enormous distances. But the veil is on the verge of being rent. Is the secret simply this, that still unknown electric waves and radiations have more to do with the animal life as a whole than we dream of to-day?"

"The Frenchman, M. M. G. Lakhowsky, has observed at the wireless station near Valencia, in Spain, that carrier pigeons entirely lose their sense of direction as soon as they come near an aerial. This fact has also been proved in other countries. M. Lakhowsky has advanced the theory that all living beings radiate from their electrically charged bodies, short radiations, or waves, which are received by other beings by means of their aural nerve-centres, which serve as reception aeriols.

Yours truly,

J. C. DE VIBE.

Oslo.

To the Editor WORLD-RADIO.

SIR,—The experiment to which J. D. W. refers in your issue of November 1 is very interesting, but I must disagree with the statement that "Esher vibrations are inconceivable under these circumstances." That sense of smell plays a part can be deduced, but, taking into consideration the difficulties which distance, wind, etc., can impose, surely it is not inconceivable that some other attraction also operates.

Then there is that problem of the peculiar fascination of light for moths; these ether vibrations in any case exert an irresistible call, and the attraction may not necessarily be those rays given off which we can at present observe. I wonder if a male moth would prefer to flutter round a powerful light or seek its confined mate if both were in the same room.

Mr. C. W. Tordiffe gives an instance of dogs detecting water at great distances; there are many strange powers which cannot be explained satisfactorily. Why do vultures come tremendous distances out of a cloudless sky to hover over an animal which they know is going to die?

When one realises that there are an infinite number of waves in the ether, and we can only

detect and use a few of them, what gaps in our knowledge of common things might be filled from this source alone?

Yours truly,

VICTOR MUNZING.

Les Héliantes, Chateau d'Oex,
Switzerland, November 5, 1929.

Wholesale Interference

To the Editor WORLD-RADIO.

SIR,—I possess a selective four-valve set which is capable of bringing in foreign stations at ample strength, to which I sometimes turn for a change of programme, though I am by no means a "DX fan." Since the "Prague Plan" came into operation conditions have been very good on the long waves, to which I mainly listen, as they are less subject to the ailment of fading. But of late things have been going from bad to worse, and I should like you to place on record (though "The Searcher" will probably do the same) the truly appalling state of things which prevailed on Monday night, October 28. To begin with, as soon as Hilversum opened up at 5.40 p.m. on 280 kc/s, he was blotted out by a heterodyne. This has been present more or less for the last year or so, but never at such strength. Going up the band, Novosibirsk, the Russian station, which was stronger than I have ever known him to be, was suffering from a similar complaint. Stamboul was heard for the first time for a long while, but Boden made listening impossible. Motala also had an attendant whistle, though this did disappear at about 9 p.m. The Warsaw-Eiffel Tower-Moscow section produced such a glorious muddle that it was impossible to make head or tail of it. Berlin seemed to have strayed from the fold and was interfering with Radio-Paris. Lahti, which I tried just before he closed down, had a background of Radio-Paris. Finally, to crown all, Huizen had two morse stations working bang on top of him for nearly the whole evening. Now Huizen's frequency of 160 kc/s is supposed to be exclusive to broadcasting, according to the Washington Convention, so why the morse? It is not that morse was heard for the first time on this frequency on the 28th; it can be heard on 160 kc/s every day at some time or other and the transmitters used are mainly of the I.C.W. type, but there seems to be no 5 kc/s separation spoken of in the issue of *World-Radio* of October 18.

So that, to sum up, between 5.30 p.m. and 10.30 p.m. there were only two stations on the long waves, namely Daventry 5XX and Kalundborg, on 193 and 260 kc/s respectively, that could be received for the whole evening without any interference, on that date. All the stations mentioned were coming in at phenomenal strength. I have made no mention so far of Kaunas on 155 kc/s, which is usually badly jammed by "mush" of various types here, and so I only listened to him for about five minutes on this occasion and he was unintelligible.

If you should consent to publish this, Mr. Editor, it might be interesting to see if any other readers found similar conditions prevailing at any other time.

Yours faithfully,

Jersey, C.I.

R. E. PARSONS.

[The Prague Plan was designed first and foremost for local listening. In the absence of a local station in Jersey, you may perhaps consider yourself in the service areas of Daventry 5XX and Radio-Paris, from which stations you obtain good reception.—ED.]

Vienna's "Wandering Microphone."

THE wandering microphone of Ravag is giving us in the latter part of November relays from gasworks, electricity works, and a smelting works. Ravag will be grateful for suggestions from its hearers as to new fields to conquer in this branch of broadcasting.

Dominion and Foreign Broadcasting Intelligence

AUSTRALIA

(From our Australian Correspondent)
Prospective Relay Stations.

SYDNEY, OCT. 1.

Within six months a broadcasting relay station will be working in the Newcastle district, one of the worst areas for reception in Australia. The information was given this week by Mr. H. P. Brown, Director-General of Postal Services, after a visit to the Newcastle district. It had been generally expected that the Government would come to this decision, but now for the first time something definite is promised in regard to time. On the occasion of the opening of the new broadcasting service, Mr. Brown stated that the Newcastle district relay station would be the first of eleven or twelve which the Government intends to establish in the next two years. The department has tentatively fixed the positions of the relay stations which, being placed in various parts of Australia, are considered capable of giving reasonable service to 95 per cent. of the population of Australia. The relay stations will go a long way towards providing facilities for country residents to hear the programmes of the Sydney stations. Except for about an hour a week the relay stations will, according to plans, relay the programmes of the Sydney stations. There is much curiosity therefore on the part of country listeners as to the sites of the proposed stations.

AUSTRIA.

(From our Vienna Correspondent.)

For Music-Lovers.

On Tuesday, November 19, there will be a relay of Verdi's *Rigoletto* from the State Opera, and on the next day Dvorak's *Requiem* from the Musikverein Hall, at 6.30. On Thursday, November 21, Austrian music will be chosen for the second time this year for a National Evening, and Germany will also have a second turn shortly. On Saturday, November 23, we have Kalman's *Circus Princess* operetta in the studio.

FRANCE.

(From our Paris Correspondent)

A False Report.

Considerable annoyance is felt here because of a practical joke in the worst possible taste which was played on a well-known French transmitting station. A telephone call, purporting to come from the Havas News Distributing Agency, was received announcing the sudden death of King George from heart failure. This was accepted as correct and promptly broadcast. Many English listeners heard the announcement, but on turning to Daventry and London discovered that the programmes were going on as usual, and concluded that the report was false. An unsuccessful attempt was also made to bluff the Havas Agency itself.

Ex-Minister's Speech on French Broadcasting.

In connection with the National Wireless Exhibition, the French Federation of Manufacturers gave a banquet, followed by a ball, at the Hotel Claridge on Saturday, October 26. The principal speakers were M. Paul Brenot, the president of the Federation, and the guest of the evening, M. Germain-Martin, Under-Secretary of Posts, Telegraphs, and Telephones in the last two Cabinets, and the promoter of the French Broadcasting Bill which has not yet become law. There were many other distinguished guests—political, literary, and technical—and the proceedings were broadcast by both the State and the privately-owned stations of France.

M. Brenot in his speech stated that the Federation was not in principle opposed to an International Wireless Exhibition, and had studied the question during the last three years. Unfortunately, the Grand Palais was not able to offer more than was necessary for French exhibitors. In fact, they only occupied 6,000 square metres in comparison with 10,000 square metres occupied by both the London and Berlin exhibitions. The idea, however, was not abandoned. M. Brenot further spoke about the disabilities under which French broadcasting was labouring—heavy taxation, particularly the luxury tax; the feeble total power of the French stations; the temporary ban placed on stations by the law of March 19, 1928, preventing expansion, and the delay in passing the Broadcasting Bill, which, although not perfect, was the first governmental effort calculated to bring a satisfactory solution to the problem. He concluded by an appeal to all—and particularly members of Parliament—to use their best endeavours to remedy these disabilities in order that the voice of France should be adequately heard in the vast international concert.

M. Germain-Martin, in reply, stated that broadcasting should be a national and not a political question. The Broadcasting Bill which he had brought forward had received so much support, not only from the Government but from jurists and technicians also, that, although he was no longer a member of the Government, he would continue to do his best to hasten its discussion and adoption. He further indicated the steps he had taken while in office to advance French broadcasting, and the steps he considered necessary for the future.

(From a Correspondent)

Picture Transmissions.

Radio-Toulouse started regular picture transmissions on October 28. The transmissions, on the Bélin system, take place daily from 8.45 to 9 p.m. Three photographs are broadcast during this period, separated by short announcements to give listeners time to readjust their apparatus for the reception of the next picture. A contract has been signed with Parisian dailies and the big illustrated weeklies for the supply of the latest news pictures. The apparatus is termed the Bélinograph. On the same date as Radio-Toulouse, the Parisian station Petit Parisien, and the stations of Radio-Lyon and Radio-Bordeaux-Sud-Ouest, took up regular picture transmissions, using the same type of apparatus.

GERMANY.

(From our Berlin Correspondent)

Appreciation of English Musicians.

Königswusterhausen broadcast on Thursday, November 7, at 8.30, a concert by the London Brosa Quartet. The German Press praised the "clearness and quiet confidence with which the quartet played difficult pieces." The programme consisted of Frederick Delius's String Quartet and Frank Bridge's Quartet No. 3. Much appreciation was also shown of the recital by Mr. Richard Crooks, the American tenor, at the Bachsaal on the following day, Friday, November 8, which was similarly broadcast by the Deutschlandsender.

U.S.A.

STOKOWSKI AND TOSCANINI.

(From our New York Correspondent)

Last week's wireless programmes marked a return to activity "on the air" after the comparative quiet of the early autumn "silly season." For the music lover, they represented

the most memorable week in the history of American wireless. No less than nine symphony orchestras broadcast concerts of classical music, several of them over coast-to-coast networks.

The outstanding event was the first appearance before the microphone of the Philadelphia Symphony Orchestra with Leopold Stokowski conducting. New York, two hours previously had broadcast a programme by the Philharmonic-Symphony Orchestra, conducted by Arturo Toscanini, who for the first time has been persuaded to direct the major part of this orchestra's performances this season. Walter Damrosch began his famous "musical appreciation" concerts over station WEA, New York, to an audience estimated at 4,000,000 school children, and also gave the first of a new series of "sponsored" programmes.

Leopold Stokowski's concert almost put Philadelphia *en fête*. The music was broadcast over a widespread system linked with WEA, and station WFI did the local broadcast. About 2,000 people gathered outside the Academy of Music (where a special amplifier had been installed), many of them dragging benches to points of vantage behind the Municipal Bureau of Music broadcasting wagon. In fourteen other districts of Philadelphia thousands heard the concert by means of amplifiers erected in recreation centres and parks.

The scene contrasted oddly with the interior of the Academy, which was dark and almost empty. Stokowski wore plus fours without coat and an open shirt when he conducted the programme, consisting of items from Bach, Mozart, Brahms, and Wagner. At the conclusion of his concert he leaned over to the microphone and said, "Do radio listeners like such music? If not, let me know and I'll broadcast no more concerts."

The work of broadcasting this programme presented new problems of transmission which were met with new methods of radio technique. A single condenser microphone mounted on the top of a stand in the centre of the auditorium received the sound waves. The orchestra played on the stage as if giving a performance before the usual type of audience. The microphone was "focussed" to meet the requirements of a large group of players, in much the same way as a camera is focussed for large-scale photography. A special microphone behind the conductor served for his announcements. The control room was situated in the centre box of the first tier directly before, and in full view of, the orchestra. It was not sound-proof, as is usually the case. The engineer had before him the regular portable control panel with its many dials and pointers. A room on the third floor of the building had been fitted up as a monitoring room from which another engineer listened to the music through a loud-speaker, and was in telephonic communication with the control room.

The other concerts which went to make up a rare musical feast for American listeners were given by the orchestra of John Philip Sousa, whose marches have brought him fame. A WEA network from coast-to-coast took charge of the transmission. The Rochester Symphony Orchestra broadcast over WJZ and affiliated stations. Nathaniel Shilkret and his orchestra broadcast over a national chain through WEA, and Henry Hadley's orchestra over the WABC national system. The week was brought to a close with a symphony concert conducted by David Mendoza over the WABC system on Saturday night. All these concerts, with the exception of the Philharmonic Symphony led by Arturo Toscanini, were "sponsored" by advertisers.

Radio Reminiscences

MY earliest recollection of wireless goes back to 1909. In that year the passengers of the sinking ship *Republic* were rescued by ships summoned by the wireless operator, Jack Binns, who fearlessly stuck to his post. This first striking practical service of the use of wireless caused a great sensation throughout the world, and the subsequent laws passed requiring the installation of wireless on all passenger vessels mainly originated from this event.

Shortly after this event, I assisted in giving one of the first lectures in wireless telegraphy ever held in London, and I well recall how we "brought the house down" on the conclusion of the lecture, by throwing on the magic lantern screen a photo of Jack Binns. His wonderful exploit was still fresh in the minds of the audience, and the sight of his face aroused great enthusiasm.

Early in 1913 I went to one of London's largest polytechnics, and requested an interview with the wireless lecturer there. I remember that I said to him: "Wireless telegraphy has ten years' start of me and I can never hope to pick up arrears. But wireless telephony is as yet in its infancy, and I want to start right away." He replied: "I am afraid we know

Although I did not actually receive Eiffel Tower or Writtle, I was nevertheless well to the front when broadcasting proper started in November, 1922. I do not propose to give details of the progress I made, but will confine myself to a little description of a personal nature, which will illustrate what a wonder and blessing wireless was to one of the most isolated places in England, in the early days of broadcasting.

My brother had been badly gassed early in the Great War, and in the hope of effecting a fresh-air cure, had bought a lonely house on the edge of the cliffs in North Cornwall. The loneliness and solitude of the place were extreme, for he was nearly five miles from the nearest village and nine miles from a railway station. On his behalf I purchased a two-valve set, o-V-1, together with a one-valve amplifier as a separate unit. This was early in 1923, and I then obtained an "experimental" licence for him on the grounds that the station "was situated on the edge of the cliffs overlooking the Atlantic and was admirably suited for trans-Atlantic experiments."

The advent of a wireless set to this distant and lonely spot was without precedent, and although my brother did his best to keep the

station—gravely inquired if it was really true that we had a wireless set with us. As a special treat he was shown the packages, which he regarded with great interest and awe. He was still more gratified to receive an invitation to come along in a week's time and hear for himself what it would do. We found afterwards that he was a retired solicitor, greatly "looked up to" by the local policeman, from whom he had obtained the news. In due course he journeyed the four miles to our home, and we were able to let him hear quite a passable concert from Glasgow—400 miles away.

The fame and magic of our achievement spread like wild-fire, and was soon the talk of the district for thirty miles around. It must be recollected that in those days—Easter, 1923 (Glasgow started in March, 1923)—the ignorance regarding wireless in such isolated parts of the country, where many a person had never even seen a train, was very great. One old lady told a friend of ours, "I hear that Mr. —, out at M—, has got one of these new-fangled wireless things. I warrant as how the place at night time must be lit up for miles around!" Evidently she associated wireless with some new sort of electric light.

In those days, too, all wireless sets had a red wax seal affixed by the manufacturer, and we were forbidden to break the seal. Owing to this fact I ruined a brand-new H.T. battery in a night! For the set contained an enclosed H.T. battery, and when it had given out, rather than break the seal on the set, I attempted to connect up externally, by connecting the H.T. minus to the L.T. minus terminal on the set, but as the set was wired internally so that the H.T. minus was connected to the L.T. plus, the new battery was shorted. Needless to say, the seal was soon broken after that.

Those were the days, too, of the cheap Dutch valves, which sometimes used to give out a blue glow, and cause us much anxiety.

Nevertheless, the set, considering the time and circumstances, worked very efficiently, although most of our best results were obtained by tuning by "hand capacity" effects. Within a year we had become sufficiently expert as to be able to get America direct on a favourable night. And yet our signals were so weak from the home stations that we used to pray in the daytime for darkness to fall early, so great was our impatience, because it was practically useless to listen in, in broad daylight.

But oh, the magic and wonder of it all to us lonely listeners! Outside the wind would be howling and roaring, and the crash of the waves at the base of the cliffs, 400 feet below, adding to the din, whilst inside was a cosy room with a log fire burning, and the wonderful companionship of human speech coming to us from out of the void! Speech which to us was far more wonderful even than the music which we loved ever so dearly. And oh, how we learnt to love the wonderful voice of the announcer, so deep and rich and kindly! To us he was a new and treasured friend, and every night, without fail, when he said "Good-night, everybody. Good-night," we would all reply, "Good-night, old man. Good-night."

My brother did not live long to enjoy his new "joy in life," but the memory of it will ever remain with me, and those he left behind to mourn his loss.

C. G. P.



[By courtesy of the Oesterreichische Lichtbildstelle.]

November 21 is the "National Programme" devoted to Austria. This picture shows a part of the famous "Ring" in Vienna, with the Parliament House and Town Hall on the left and the Burgtheater on the right.

very little about wireless telephony, but if you will first put in a year, at least, in attending our telegraphy classes, I will arrange for you to have the run of our laboratory to carry out any experiments that may be practicable." As the laboratory in question contained about £8,000 worth of equipment, this was a valuable concession, so I joined right away.

At that time I recollect that the maximum range for wireless telephony was thirty miles, and was, I think, carried out by Marconi from an Italian warship.

I spent a twelvemonth learning all there was to know about the three practical systems then in use—the Marconi, the Poulsen, and the Lepel—and during that time we carried out many very interesting experiments in the laboratory. I was particularly interested in the Poulsen arc—we used to make it talk and whistle a tune in a crude fashion—and also in the use of the Fleming Cymometer for measuring frequencies. I was then granted a certificate, which I still hold, and looked forward with great eagerness to the winter of 1914, when I hoped to start on telephony. But alas! the Great War came along, and, although at a later date I went along to New Scotland Yard and attempted to enlist as a wireless operator, I was rejected on account of my age, and all further progress in radio "went west," for many years.

matter a secret until I had actually arrived from London with the apparatus, it leaked out in a strange fashion. He had commissioned the local blacksmith to make certain iron fittings for our wireless masts, and he, by putting two and two together, had guessed their purport and solemnly communicated the fact to the local policeman! Our masts, by the way, consisted of two specially selected pine trees, which after trimming gave two splendid poles each thirty-five feet in length. These we had to transport a distance of fourteen miles to the site!

I recall now, with great amusement, the infinite pains I took in bringing the set down from London as "personal luggage"—contrary to the railway regulations—and how, during the nine miles' journey by road, I trembled at every bump of the vehicle over the rough country roads lest the concussion should "bust" a valve, or damage the wiring of the set. From the time of leaving Waterloo to the arrival home, a case of dynamite could not have been handled more gently, so great was my fear that some damage might result, and so cause my invalid brother intense disappointment after all our waiting and labours.

On our journey from the lonely moorland station we were, to our great surprise, stopped by an old gentleman, who, after making certain of our identity—we were now five miles from

Next Week's Issue of

WORLD-RADIO

will contain special

articles and pictures from GERMANY

Viâ Ether

Verdi and His Operas?

THE two outstanding names among opera composers of the nineteenth century were Richard Wagner and Giuseppe Verdi, and just as the former created a new school with his music dramas, so did the latter with operas which had a distinct style of their own, operas which by reason of their masterly music became immediate international successes and have remained popular ever since. Curiously enough, both composers were born in the same year (1813). Verdi's parents were innkeepers in a small village near Parma, and he received his first introduction to the realms of music at the hands of the village organist. At the age of twenty-six, he wrote his first work, and in the remaining sixty years of his life he developed into one of the most prolific composers of opera. Quite a number of Verdi's operas will be broadcast during the coming week. On SUNDAY, November 17, at 6.30 p.m., *A Masked Ball* will be transmitted by Stuttgart and Frankfurt, and at 7.30 p.m. by Milan. A performance of *Rigoletto*, relayed from the Vienna Opera House, will follow on TUESDAY, at 7.30 p.m. This opera, like Verdi's other popular work, *Aida*, always evokes memories of Caruso at his best, and to have heard him sing the aria "Donna e mobile" is an event that the passing of time will never obliterate. The Verdi programme will conclude with a performance of *Falstaff*, which will be broadcast by Milan on WEDNESDAY, November 20, at 7.30 p.m.

* * *

Chesterton's "Magic"

A STUDIO performance of Mr. G. K. Chesterton's fantastic comedy, *Magic*, is being given by the Frankfurt and Stuttgart stations on MONDAY, November 18, at 8.15 p.m. This play, which was originally presented in London, at The Little Theatre, on November 7, 1913, is a delightful fantasy based on a conjurer who deludes a girl of Irish descent, with a belief in fairies, into accepting him as a wizard, and then, in an attempt to impress her Americanised "know-all" brother, does one trick which mystifies everybody, including himself. The boy, tantalised by the only phenomena he has met which he cannot "explain," becomes mentally ill. Knowing that the shadow of insanity hovers over the family, his uncle and the family physician offer the conjurer a cheque for £2,000 to divulge the secret of the trick and get the boy's mind at ease. The conjurer answers that he cannot tell them the truth for the simple reason that they would never believe it. Under pressure from all sides, he confesses that he has no formula; he did the trick by magic. They refuse to believe, and suspect him of mercenary motives. He tears up the proffered cheque, and, at last, in response to the girl's entreaties, he tries to find a practical solution of the trick. Out in the garden he prays for aid, and at last he divines a method by which the trick may be fabricated. Thus he saves the boy's reason, and gains the sister as a believer, not to say the minister and the family doctor.

Serious Music

PROTESTANT parts of Germany celebrate November 20 as a religious holiday, known as *Busstag*—a "day of penance"—and I see on looking through the broadcasting programmes of the coming week that they reflect the character of the day. At 6.30 p.m. on WEDNESDAY Frankfurt and Stuttgart will transmit Brahms's *Deutsches Requiem*; Bach's *Mass in B Minor* will be broadcast by Leipzig at 7 p.m.; and at 7.30 p.m. Dvorák's immortal *Requiem* will be heard from Vienna. In addition to these oratorios a new work by the eminent contemporary Austrian composer, Josef Matthias Hauer, will be produced and broadcast by Berlin and Königswusterhausen at 7.30 p.m., and will be relayed by the majority of German stations. This composition, which is entitled *Vom Leben* ("About Life"), is defined in the programmes as "a poetical reading, with music, based on poetry by Friedrich Hölderlin." The music is written for a large orchestra, which on this occasion will be presided over by the well-known conductor, Hermann Scherchen, and for a large chorus, which is to be led by Professor Hugo Rüdell. The performance of this interesting work will be preceded at 7 p.m. by an introductory lecture, to be given by Professor Schünemann, a director of the Berlin Academy of Music, on "Present-day Music."

* * *

Rome on High Power

AT last, it seems, the new transmitting station at Rome is complete, and we may expect to hear experimental signals any day now, if, indeed, they have not already been received. Thus one more piece of heavy artillery is added to Europe's already formidable broadcasting battery—one which, I trust, will be used only in the great peace offensive of international acquaintanceship and mutual appreciation. The aerial power of the unmodulated carrier wave is to be 50 kw., which is 20 kw. in excess of Motala, some 24 kw. greater than Zeesen (Königswusterhausen), and of 10 kw. greater strength than the recent Moscow Station. Unless, therefore, the new Oslo transmitter should begin its trials immediately, Rome will be for the time being the most powerful station in Europe. But it is not only in the technical realm that Italian broadcasting is striding forward. Radio drama is now claiming the particular attention of the E.I.A.R., and already they have enlisted the active co-operation of Signor Luigi Pirandello and of Signor Rosso di San Secondo. A dramatic company, consisting of some of the best of Italy's actors and actresses, has been formed, and apparently nothing is to be left undone which could promote the object which the broadcasting authorities have at heart—the establishment of a school of radio drama of a high level. It is intended, I believe, to produce two broadcast plays each week.

* * *

"Conducted Tours" by Microphone

THE "wandering microphone" is rapidly becoming an institution in broadcasting stations—particularly in Germany and Austria, and now the interesting idea of a "conducted tour" of picture galleries and museums has

been evolved by the South-West German Broadcasting Company, whose two stations, Frankfurt and Cassel, broadcast another of these items last Sunday. On this occasion a visit was paid with the microphone to the Cassel picture gallery, where Frau Professor Luthmer and Herr Manfred Marlo, escorted by the director of the gallery, Professor Luthmer, discussed pictures of outstanding interest. The Cassel gallery, which was founded in the eighteenth century, is for its size particularly rich in works of the Dutch and Flemish schools. Lovers of art and antiquities will no doubt find a special charm in being able to tour the museums in this manner. From the German standpoint also, the method has the advantage of rendering a visit possible at times when the gallery or museum in the ordinary way is closed. As visitors to Germany often note with surprise, German galleries have a habit of closing their doors in the early hours of the afternoon—when, presumably, the staff accompanies the visitors to dinner and a siesta. Many of the institutions, however, like this gallery at Cassel, are open at 3 o'clock on three days of the week for an hour or so.

* * *

Socrates by Microphone

IT will be recollected that an impressive reading of the death of Socrates was broadcast from London and Daventry recently, and during the past week Socrates has been tried and condemned to death twice in Berlin—the first time on Thursday, when his trial was broadcast by Witzleben, and the second time on Saturday, when Königswusterhausen repeated the broadcast. The *Trial of Socrates* has been written for the Funk-Stunde by Herr Hans Kyser from Plato's "Dialogues" and other historical sources. This is not the first time the story has been included in the Berlin programmes, as the *Trial of Socrates* was one of the first subjects in the historical series started some time ago by Herr Hans Bodenstedt and relayed from Hamburg, by Berlin and other stations. The Hamburg series, which is entitled "Three Thousand Years of Parliament," began with a staging of Cicero's famous denunciation of the Cataline conspirators. It includes, among many other interesting themes, the Trial of Mary Stuart.

* * *

The B.B.C. National Lectures

ON Monday next many listeners—and those not merely in Great Britain—will sit at the feet of their loud speakers with special interest and attention, for on that evening Professor G. M. Trevelyan is to deliver the third of the series of National Lectures, which was inaugurated last February by Mr. Robert Bridges, Poet Laureate. Prof. Trevelyan needs no introduction to readers of history. His *History of England* is a household word, and the lecture on Monday, dealing with the "Historical Aspect of the Union of England and Scotland in 1707," will do much to add, for the ordinary listener, to the interest he already takes in that event.

ETHERVIATOR.

Foreign Languages

Aids to Listening

FRENCH

Michelet *

JULES MICHELET naquit à Paris en 1798. Son père y dirigeait une petite imprimerie que la sévérité impériale l'obligea à fermer en 1810. L'enfant, d'une santé très délicate et d'une sensibilité extraordinaire, grandit au milieu des scènes les plus émouvantes. "Jusqu'à l'âge de quinze ans, point de viande, point de vin, point de feu. Du pain, des légumes, le plus souvent cuits à l'eau et au sel." La petite imprimerie fait de mauvaises affaires, et finalement le père est jeté en prison. Pour le sauver toute la famille se met au travail : grand-père, oncle, femme, enfant. Imaginez-vous le jeune Michelet dans le sous-sol de l'imprimerie, boulevard Saint-Martin, travaillant comme un homme "à côté d'une araignée amie." Il apprend d'abord quelques rudiments de latin dans une petite pension du quartier, puis il entre en troisième au lycée Charlemagne. Chétif, timide, "tout effarouché comme un hibou en plein soleil" il est en butte aux toquineries de ses camarades. Son déjeuner quotidien, c'est un bonhomme de pain d'épices de deux sous ! Quand la faim est par trop forte, il mange l'une des pattes de son bonhomme en disant à ses camarades étonnés : "C'est mon dessert !"

Mais dans ce pauvre corps malingre vit une âme stoïcienne. Le jeune Michelet complète son éducation à pas de géant. Au concours général de 1816 il remporte trois premiers prix : discours latin, dissertation française, version latine. Enfin le voilà licencié, puis docteur et agrégé. En 1821 il est nommé suppléant à Charlemagne, deux ans plus tard il est professeur au lycée Rollin. C'est à partir de ce moment que paraissent ses premiers livres. La haute compétence et l'originalité du jeune historien attirent l'attention de ses supérieurs et bientôt Michelet est appelé à d'autres postes. En 1827 il est nommé Maître de conférences à l'École Normale Supérieure, puis suppléant de Guizot à la Sorbonne et enfin Professeur au Collège de France. Ce fut la Révolution de Juillet 1830 qui permit à notre grand historien de trouver sa véritable voie et de donner toute sa mesure. Il appartenait au peuple par ses origines ; et cette révolution, qui marquait le triomphe des idées démocratiques, exalta le libéralisme naturel du jeune professeur. A partir de ce moment son enseignement devint un véritable apostolat. Ses cours d'histoire, au Collège de France, obtinrent un succès énorme, non seulement à cause de l'originalité de ses méthodes, mais aussi, et peut-être surtout, à cause de la hardiesse avec laquelle il y attaqua le clergé et le gouvernement. Sa méthode historique consistait surtout en ceci : tâcher d'expliquer les faits par l'étude des milieux sociaux ; s'efforcer de dégager les affinités géographiques ; reconstituer les mœurs, les passions, etc. . . . En un mot faire de l'histoire une "résurrection du passé" ; et par suite, une œuvre de morale, de psychologie et d'art, et non plus uniquement une œuvre d'érudition.

Michelet a fait l'épopée lyrique de la France ; l'historien qui entend de s'effacer en écrivant, qui entend de ne pas être, n'est point du tout un historien à ses yeux. Il l'a parfaitement exprimé lui-même quand il a dit : "L'histoire c'est le passé qui se réfracte à travers une âme."

La génie de Michelet est un génie aussi lyrique que celui de Victor Hugo. Pour Augustin Thierry l'histoire était une narration, pour Guizot c'était une analyse exacte, mais

*There is a Talk on Michelet by M. Jacques Boulanger, from Radio-Paris, on Friday, 22nd November, 1929, at 7.05 p.m.

(Continued on page 763.)

This is the *Interesting* Way to LEARN FRENCH—

Not by Grammar Book
but by GRAMOPHONE

IF you are really to get the best out of the Foreign Broadcasts you *must* have a knowledge of foreign languages. That used to mean months of hard work—endless grinding at grammar. But to-day—thanks to the Linguaphone Method—language study has become one of the most fascinating of spare-time occupations.



Read what Mr. Compton Mackenzie Says

This famous novelist, like Mr. Bernard Shaw, Mr. H. G. Wells, Sir Max Pemberton, and many other great writers, has tried Linguaphone Language Records and speaks from experience—

"I have already written in praise of Linguaphone Language records, and now I write with real enthusiasm of the new French Course. I do recommend it whole-heartedly."

It is partly because the Linguaphone Courses are of such absorbing interest that the progress you make by this method is so amazingly rapid.

Test this for Yourself **FREE**
on Your Own GRAMOPHONE

Write to-day for the 24-page Book which tells you how you can obtain a course in any of the following languages

FRENCH,	GERMAN,	SPANISH,
ITALIAN,	RUSSIAN,	DUTCH,
AFRIKAANS,	IRISH,	ENGLISH,
PERSIAN,	CHINESE,	ESPERANTO,

on a Week's **FREE** trial

Literary Courses and Travel
Talks for Advanced Students.

The **LINGUAPHONE**
LANGUAGE INSTITUTE

POST THIS COUPON TO-DAY,

or if in London call for a personal demonstration at our Head Office, 24-27, High Holborn, or at 30, Victoria Street, S.W.1, or 90, Gracechurch Street.

To THE LINGUAPHONE INSTITUTE, 626, Napier House, 27, High Holborn, London, W.C.1.
Please send me (post free) your 24-page book about the quick, new and easy Linguaphone way of learning languages.

Name Address

FOREIGN LANGUAGES.

(Continued from page 762.)

froide et sèche, pour Michelet c'était une résurrection. Voyez-le, entraîné par son imagination de feu, vivre s'agiter et devenir un acteur dans ce passé qu'il étudiait aux Archives : " Ces papiers ne sont pas des papiers, mais des vies d'hommes, de provinces, de peuples . . . ; et à mesure que je soufflais sur leur poussière, je les voyais se soulever, ils tiraient du sépulcre, qui la main, qui la tête . . . ; j'étais l'acteur, j'étais le théâtre, la pièce se jouait par moi et en moi. . . "

Michelet est un écrivain incomparable ; son style, plein de vie et de couleur est admirablement adapté au but proposé, qui était de mettre en relief des tableaux et des portraits. De plus, comme Chateaubriand, il a le don de l'harmonie poétique, et trouve toujours les sons et les rythmes voulus pour décrire les objets. Sa pensée est haute, noble ; il est plein d'une sympathie ardente pour les êtres et les choses, et jusqu'à la fin il a eu une foi invincible dans le progrès.

L'historien a été plus discuté que l'écrivain. On lui a reproché surtout d'avoir idéalisé des faits positifs, et d'avoir donné libre cours à son imagination dans une matière qui n'en comportait pas. Il est certain aussi que sa sincérité, qui est toujours hors de doute, a parfois été faussée par ses préjugés démocratiques et anticléricaux. Mais on ne saurait parler en termes trop élogieux de son érudition. Il n'a rien avancé à la légère, et les notes qui accompagnaient ses livres et surtout celles qu'on a trouvées depuis dans ses papiers montrent avec quel soin il étudiait les documents originaux et sur quelle science il s'est appuyé pour construire son œuvre.

Il fut destitué de toutes ses fonctions sous l'Empire, à cause de son libéralisme exalté ; pauvre de nouveau, il lui fallut se remettre à la

tâche. Il se retira près de Nantes et y continua ses travaux. Les désastres de la guerre franco-allemande (1870-1871) le frappèrent profondément, et il mourut à Hyères, d'une attaque d'apoplexie (1874), avant d'avoir pu donner la dernière main à l'Histoire du XIXème Siècle dont il avait entrepris la publication quelques années auparavant.

E. M. STÉPHAN.

SPANISH

¡ Aprended (learn) la lengua de Cervantes !

DURANTE los treinta y cinco años que vengo dedicándome a la enseñanza del noble idioma castellano, deben de llegar ya a algunos centenares las veces que se me ha hecho la necia (silly) pregunta : ¿ cuánto tiempo tardaré en aprender el español ? Digo necia porque es una pregunta a la cual es completamente imposible dar una respuesta definitiva ni aproximada. Todo depende del estudiante mismo (himself), del tiempo que esté dispuesto a dedicar (willing to devote) al idioma, y más que nada (above all), del entusiasmo con que se entregue (gives himself up) a su estudio.

" En una " charla española " radiada recientemente, el conferenciante (lecturer) expresó la opinión de que el español, al igual que (like) la mayoría de los lenguajes europeos, podía adquirirse (be acquired, learned) en seis meses si, durante ese período, el alumno concentraba su atención *enteramente* sobre el estudio, leyendo únicamente (only) libros y periódicos españoles, haciendo cada día ejercicios de fonética, aprendiendo de memoria (by heart) los nombres de todos los objetos que le rodeaban (surrounded) y tratando de traducir al español los modismos (idioms) y expresiones familiares que a cada momento llegaban a sus oídos. Añadió el conferenciante que de lo que aprendiera el alumno en esos seis meses probablemente dependía el que (whether) el estudiante pudiera llegar a dominar (master) el idioma o no.

A muchos alumnos que, con loable empeño (praiseworthy determination) y perseverancia, vienen estudiando el español desde hace varios años, no ha dejado de desalentarles (discourage them) dicha observación del conferenciante. Pero a éstos les suplico que cobren ánimo (take heart). El estudio de un lenguaje es un estudio que nunca termina. ¿ Cuál de mis lectores conoce a fondo el inglés ? Hay quien nace (some are born) con cierta aptitud para lenguas, y las aprende con la mayor facilidad, en tanto que otros van, como quien dice (so to speak) con pies de plomo, y sólo adelantan muy penosamente y a fuerza de machacar (by dint of hard work). Pero al fin y al cabo, tarde o temprano, la mayoría de los que perseveran y estudian con método y regularidad logran (succeed in) llegar a la meta (goal), o muy cerca de ella. El que aprende un poco cada día, en un año aprende mucho y en dos años el doble. Dejémonos (let us refrain), pues, de fijar límites arbitrarios y ¡ adelante todos !

Debo acentuar la necesidad de que el alumno se acostumbre desde un (el) principio a hablar y oír hablar el lenguaje que estudia, y si no tiene con quien conversar en español, como sucede en tantísimos (so very many) casos en este país, siempre le queda el recurso—una vez bien aprendida la sencilla fonética española—de encerrarse (shut himself) en su cuarto por media hora cada día, y leer *en alta voz* (aloud), pronunciando cada palabra lo más claramente posible, un capítulo o dos de algún libro interesante, como, por ejemplo, una novela moderna. Así, el oído se va acostumbrando a los nuevos sonidos (sounds), quedando éstos grabados inconscientemente en el cerebro (brain), y al alumno se le va soltando (loosening) la lengua de un modo increíble para el que no haya hecho la prueba. Ensáyenlo (ensayar—to try) mis lectores, se lo ruego.

Ahora, algunas palabras sobre la enorme importancia comercial del idioma castellano. A

muchos de mis lectores les sorprenderá en extremo saber que después del inglés, y exceptuando únicamente el ruso, el español es el más hablado de todos los idiomas europeos, siendo la lengua nativa de más de 90 millones de personas. Le sigue muy de cerca (closely) el alemán con unos 85 millones, quedando muy en zaga (a long way behind) el francés con 57 millones. España misma sólo cuenta con unos 24 millones de habitantes, pero—con la única excepción del Brasil, cuyo idioma es el portugués—se habla la lengua de Cervantes en todas las repúblicas latino-americanas, desde las fronteras de los Estados Unidos hasta el Cabo de Hornos. Todos aquellos países están aún en su infancia, relativamente, y poseen enormes riquezas naturales que apenas se han tocado todavía. Allá hay un gran porvenir (future) para el comercio británico si queremos tomarnos la molestia de aprender el idioma de aquellas tierras, y mandar allá viajantes que lo hablen con facilidad y sepan entenderse y congraciarse con (gain the favour of) los comerciantes a quienes queramos vender nuestros productos. ¿ Porqué no le hacemos ?

El norteamericano y el alemán, con la imaginación y la iniciativa que les son características, se están aprovechando de nuestra dejadez (slackness) en esto del idioma. Cada año va en aumento (increases) el volumen de sus negocios con la América Latina. Nuestra pérdida es para ellos ganancia.

W. F. BLETCHER.

ESPERANTO

THE suffix—*ig*—conveys the idea of transition from one state to another, of " becoming " : *sana*, healthy ; *saniĝi*, to become well, to recover ; *ruĝa*, red ; *ruĝiĝi*, to become red, to redden, to blush ; *fama*, famous ; *famiĝi*, to become famous ; *famiĝo*, a rise to fame.

This suffix is also used to make an intransitive verb from a transitive verb : *fini*, to finish (something) ; *finiĝi*, to finish (i. e., to come to an end) ; *movi*, to move (something) ; *moviĝi*, to move (of one's own accord) ; *naski*, to give birth ; *naskiĝi*, to be born.

The suffix—*aj*—denotes objects, and corresponds to the personal suffix—*ul*—(which denotes a person having the quality given in the root) : i. e.,—*aj*—denotes an object having the quality or made of the material mentioned in the root : *bela*, beautiful ; *belajo*, a beautiful thing ; *ligno*, wood ; *lignaĵo*, a wooden object ; *likva*, in a liquid state ; *likvaĵo*, a liquid. It can also be used to denote an action having a certain characteristic : *amiko*, friend ; *amikaĵo*, a friendly act ; *malsaĝa*, foolish ; *malsaĝaĵo*, a foolish deed.

An adjective in Esperanto may be put either before or after its noun without altering the meaning of the phrase : *homo bona* (a good man) is the same as *bona homo*. This does not hold good in English, for " I believe the true tale " is not the same as " I believe the tale true. " So some other means must be found in Esperanto to express the second idea. The first (" I believe the true tale ") would be translated *mi kredas la veran rakonton*. If we examine the second sentence we find it is an abbreviation of " I believe the tale to be true. " This we can translate word for word and get the true meaning : *mi kredas la rakonton esti vera*. Although *vera* describes the accusative noun *rakonton*, it does not take the accusative—*n* because it is in another sentence. Usually the word *esti* is omitted in such sentences, for the sense is made quite clear by the fact that the noun is accusative and the adjective nominative. Other examples are : *mi opinias lin honesta*, I think him honest ; *ili trovis la manĝaĵojn tre malbonaj*, they found the eatables very bad.

Some Esperanto broadcasts :—

LEIPZIG (1,157 kc, 259 m., 1.5 kv.). Dato : Vendredo, 29a de Novembro. Horo : 5.5 p.m.

(Continued on page 772.)

Learn LANGUAGES at BERLITZ

Private Lessons.

Small Day and Evening Classes.

Lessons at Residence.

Special Accelerated Courses for Persons going Abroad.

By the

BERLITZ CONVERSATIONAL METHOD

Learning a Language is

EASY, RAPID AND AGREEABLE.

Convince yourself and take a

TRIAL LESSON FREE

without any obligation.

Write or call for Booklet "W."

LONDON

321, Oxford Street, W.1.
60, Queen Victoria Street (City).
3, Harrington Road, South Ken.
2, Queen's Road, Bayswater.

BIRMINGHAM: 32, Paradise Street.
BRADFORD: Penny Bank Buildings.
BRIGHTON: 117a, Western Road.
LIVERPOOL: May Buildings, 51, North John Street.
MANCHESTER: 126, Portland Street.
NEWCASTLE: Barras Bridge.
SHEFFIELD: Bank Chambers, 60/64, Fargate.
GLASGOW: 206, Sauchiehall Street.
EDINBURGH: 75, Princes Street.
Etc., Etc.

TECHNICAL SECTION

The Carrier Current System

Principles of Wireless applied to line telephony. Details of the system sometimes termed "Wired Wireless"

IT is well known that apart from its use in the entertainment sphere, radio transmission serves an important rôle in international telephone communications. A commercial radio telephone service between this country and the United States has now been in operation for some time and Continental links with South America have recently been put into service, while links with Australia and Egypt, not to mention other countries, are now under consideration. In addition to these long-distance telephone services, however, a rather novel application of radio transmission is now finding increased favour in the form of the carrier current telephone system.

The carrier current system represents the outcome of the adoption of radio principles to the problem of providing, at an economic cost, additional speech channels on a telephone or telegraph line already carrying a maximum number of conversations under normal conditions. In a carrier current system, telephone and telegraph messages are impressed on different radio frequency currents and these modulated currents are simultaneously superposed on a pair of wires. The individual high frequency currents in effect "carry" the telephone and telegraph messages, and it is from this principle that the carrier systems get their name. The principle involved can be considered as "broadcasting" along a wire, thus giving rise to the title of wired wireless which is often applied to carrier current systems in non-technical descriptions.

The operation of a broadcasting station is, of course, familiar. In brief, audio frequency currents representing speech—sound or music—are, by means of a suitable valve device, used to modulate a high frequency current. The modulated radio frequency current is broadcast

distinction, in that whereas the complete modulated carrier wave is transmitted by a broadcasting station, in the case of carrier systems "single sidebands" only are transmitted.

If two components differing in frequency are modulated together the resulting modulated wave can be shown to contain, among others, components at both of the original frequencies and also at the sum and difference of these frequencies. If, for instance, a carrier current of 20,000 cycles is modulated by a current of 1,000 cycles the products of modulation would include frequencies of 1,000 cycles, 20,000 cycles, 20,000+1,000 cycles (21,000 cycles), and 20,000-1,000 cycles (19,000 cycles), among other components at double the original carrier frequency and double the modulating frequency.

Method of Transmission

In the case of a carrier telephone system the modulating current is, of course, at voice frequency, and if the group of components at and about the modulating frequency were transmitted, they would cause interference with the normal speech channel. These audio frequency components of modulation must accordingly be suppressed. Neglecting these frequencies and the higher frequencies, the group of components at and about the carrier frequency remains to be considered. These can be analysed into a large component at the carrier frequency with an amplitude independent of the modulating wave, and two side bands, one above and one below the carrier frequency, each preserving all of the characteristics of the speech wave to be transmitted. Since the component at the carrier frequency does not convey any of the characteristics of the speech wave, it is sufficient only to transmit either of the side bands, provided, of course, that a local oscillator is used to reintroduce the suppressed carrier frequency at the receiving end prior to demodulation.

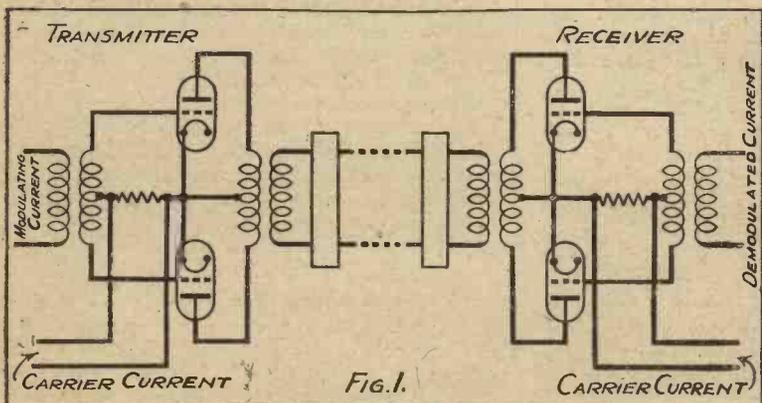
For this purpose a circuit similar to that shown in Figure 1 is employed. The balanced modulator suppresses the carrier frequency, and one of the side bands is eliminated by an electrical band filter device.

The usual type of carrier telephone system enables three "carrier" conversations to be

carried on along a single pair of wires at the same time as one normal conversation. Voice frequencies over a range of 2,500 cycles, from 200 cycles to 2,700 cycles, are transmitted by the carrier system and six carrier frequencies are employed, three for transmitting in each direction. The carrier waves and transmitted side bands are shown in the table, the three higher frequencies being used for transmitting in one direction and the low frequencies for transmitting in the other.

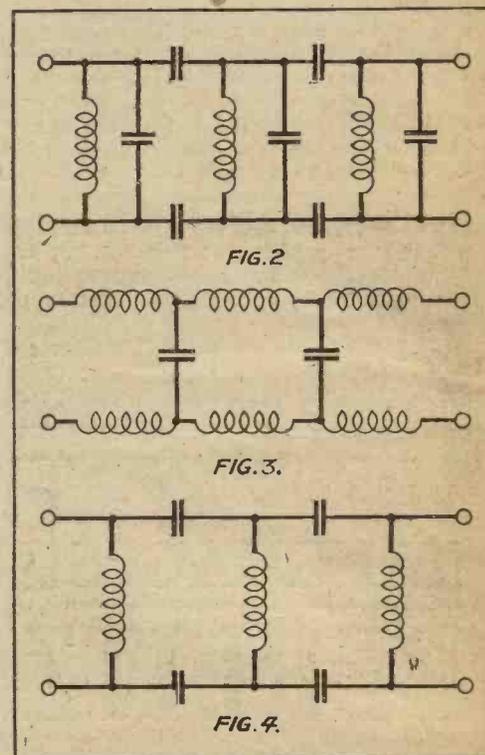
CARRIER.	SIDE BAND.
	LOW GROUP.
7,700 cycles	5,000-7,500 cycles
10,700 "	8,000-10,500 "
14,000 "	11,300-13,800 "
	UPPER GROUP.
16,100 "	16,300-18,800 "
19,750 "	19,950-22,450 "
23,400 "	23,600-26,100 "

The main advantage of the single side band suppressed carrier system is that it enables the maximum number of speech channels to be accommodated within the available frequency range, which, of course, is limited by line conditions. In addition, the occurrence of audible beat notes resulting from interaction in the demodulator circuit between the carrier frequencies normally present and others which



Circuit arrangements of Transmitter and Receiver for Carrier Current Telephony

from the aerial system of the transmitting station and induced currents are demodulated at a receiving station to yield their audio frequency and radio frequency components. In a carrier current system several different high frequency currents, each modulated by distinct and separate speech currents, are transmitted simultaneously along a copper wire circuit to a receiving station, where they are separated by a capacity inductance filter device and individually demodulated. There is, however, an important



Theoretical diagrams of various band filters

may be present through crosstalk or lack of perfect balance, is prevented. Moreover, the effects on the transmission of variations in the attenuation of the line due to changes in weather and other causes, are minimised, and crosstalk from neighbouring circuits is rendered negligible.

Band Filters

The band filter used for eliminating the unwanted side bands consists of an inductance and capacity arrangement similar to that shown in Figure 2. This arrangement is a combination of a low-pass filter and a high-pass filter. A low-pass filter, shown in Figure 3, allows frequencies below a certain limit to pass freely but restricts the passage of higher frequencies by introducing excessive attenuation. Similarly, a high-pass filter such as Figure 4 allows frequencies above a certain limit to pass but eliminates frequencies below that level. By a combination of the two, any desired frequency band can be selected. For instance, a band of 5,000-7,500 cycles can be selected by employing a low-pass filter to cut out frequencies about 7,500 cycles, and a high-pass filter to cut out frequencies below 5,000 cycles. A. W. W.

The Mystery of Magnetism

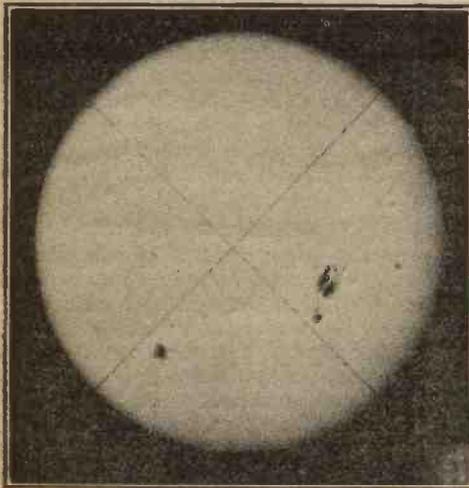
By RALPH STRANGER

Author of "Wireless—the Modern Magic Carpet." "Mystery of Electricity," etc.

IX.—Interplanetary Magnetism (2)

SIR J. H. JEANS, the leading world authority of to-day on the stellar physics (cosmogony), was the first to point out, in 1927, that neither molecules nor atoms could exist in the central portions of the sun, as they are known to us on earth. It would appear that under such conditions the atoms should be completely broken up, their nuclei being practically stripped of all their electrons. Such a state of affairs would mean that there are atoms with enormous positive charges, and countless free electrons darting at terrific speed to and fro between the bare nuclei. An electron may be temporarily attracted to a nucleus, but, owing to the enormous temperature and consequent enormous speed of the nucleus, it would not stay there long.

It is therefore apparent that only at the upper surface of the sun will atoms begin to be formed, and this explains the reason why surface spectroscopy of the sun reveals the presence of only some of the chemical elements. When we look at the sun, the disc that we see is called the *photosphere* of the sun. This is the



(Reproduced by courtesy of the Astronomer Royal.)
Photosphere of the sun with groups of sun-spots

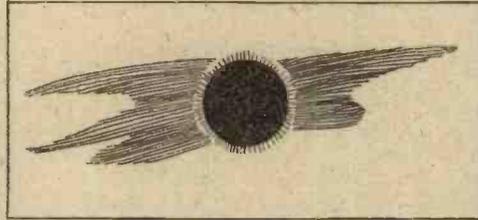
solar body apparently consisting of uncombined gases. These gases appear to radiate in the same manner as would incandescent bodies. It is questionable if the gases of the photosphere behave as true gases since they are subjected to an enormous pressure, a pressure never reached on earth. We do not know how they would behave in such circumstances. Thus the photosphere is made up of a number of chemical elements as enumerated in last week's article, and is in a state that is not truly gaseous.

Solar Atmosphere

Around the photosphere, in the same manner as our own atmosphere surrounds the earth, there is an envelope of gases called the *chromosphere*, rising above the photosphere to a height of 5,000 miles. Above the chromosphere is another enormous envelope, consisting partly of gases and partly of liquid and solid particles, called the *corona*. Above the corona is another vast space, filled with material particles, the extent of which is unknown, and which is the cause of the so-called *zodiacal light*. A photograph of the photosphere, *i.e.* the true surface of the sun,

shows a flaky appearance on a dark background. Successive photographs show that the appearance of the photosphere changes all the time and is no more permanent than the appearance of the earthly clouds. Enormous spots are observed from time to time on this surface and these are what we call the sun-spots.

What are these sun-spots? Are they rifts in the surface of the sun? The most puzzling thing



Illustrating extensive corona sometimes seen during eclipse

about them is that their temperature appears to be lower than that of the rest of the surface of the photosphere. It was Fabricius who, in 1610, was the first to examine a solar spot by projecting the image of the sun on to a screen, thus discovering that the sun rotates, owing to the motion of the sun-spot. You can easily observe sun-spots for yourself through a small telescope, but you must take the precaution of placing before the eyepiece a strongly coloured glass, otherwise you will injure your eyesight. If you make such an observation and succeed of finding a sun-spot, you will notice that its centre is quite dark. This dark portion is called the *umbra* of the spot. Around the darkest portion you will observe a shadowy portion, darker than the surrounding photosphere, but not so dark as the centre of the spot. This is called the *penumbra*. The telescope will also reveal to you that the surface of the sun is granular in appearance, each granule appearing



Surface of Photosphere with vortex of large sun-spot

grey with dark lines around it. The real size of each granule is, approximately, from 124 to 186 miles in diameter!

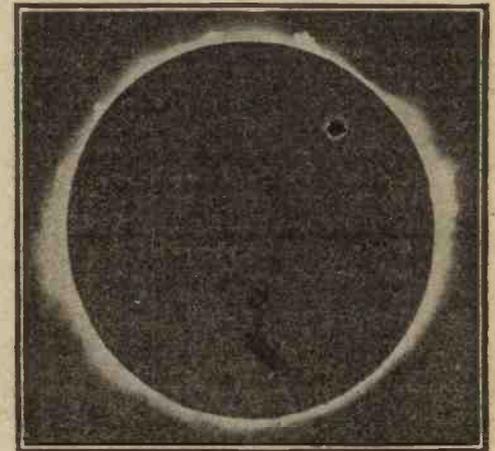
The sun-spots vary in number and size. They seem to be numerous in the neighbourhood of the sun's equator, and comparatively scarce beyond 45 degrees of latitude. The diameter of a spot may be as large as 65,000 miles.

In 1892 the Chicago Kenwood Observatory used a new instrument called the spectro-

heliograph. This instrument enabled the operator to take photographs which revealed details that were invisible in photographs taken in the ordinary way. Thus, not only was it possible to photograph the sun-spots but also the state of affairs thousands of miles above the level of the sun-spot. The photographs thus taken have proved conclusively that there are great vortices above each sun-spot, and that the vortices on each hemisphere of the sun have a different direction of rotation. (See "The Depths of the Universe," by George Ellery Hale, Hon. Director of Mount Wilson Observatory.) Thus it would appear that the gases of the sun are being involved in those vortices and, owing to their expansion on account of the centrifugal action, they cool, and the centre of the vortex, emitting much less light than the surrounding surface, appears as a black spot on a brilliant background with appropriate semi-shadows. It is easy enough to imagine that there are enormous quantities of free electrons involved in such a vortex.

Solar Magnetic Fields

It was Rowland who was the first to prove that there is a magnetic field around a rapidly revolving charged body. Thus there is little doubt that there is a magnetic field around a single rotating electron. It is also quite easy to imagine that there will be an enormous magnetic field around a vortex in which electrons are being revolved at a prodigious speed. As a matter of fact, the astronomers of the Mount Wilson Observatory have proved to their satisfaction that there is a magnetic field in each



(Reproduced by courtesy of the Astronomer Royal.)
Solar Eclipse of June 29, 1927, showing corona

sun-spot, and that sun-spots forming left-hand and right-hand vortices have different polarities.

If you consider the enormous size of sun-spots and the large number of them occurring in cycles, you will realise whence comes the magnetic influence of sun-spots on the terrestrial magnetism.

Now that we have established that an electron in motion has a magnetic field associated with it, we should realise that each atom must have a magnetic field around it and, therefore, each molecule should also have magnetic properties. As you already know, this is, however, not the case, with the exception, as far as it is known at present, of the three elements: iron, cobalt and nickel. Since, in every atom, there are electrons rotating round the nucleus at great speeds in a definite orbit, each moving electron can be considered as a unit electrical current. What happens when large numbers of electrons are jumping from atom to atom inside an electrical conductor? Is there a magnetic field around the conductor? This we shall consider in detail in the next article.

(To be continued.)

Short - Wave Calibration

IN the articles, "Calibration Up To Date," which appeared in *World-Radio* of April 26 and May 3, a simple method of calibrating medium- and long-wave sets was described in detail. It was shown that to meet modern conditions calibration in kilocycles is essential and that this can be most conveniently done where straight-line frequency condensers are used in tuned circuits. The same method applies broadly to the short-wave receiving set, but there are certain differences of the first importance. In the present article these will be discussed, and a method for calibrating short-wave sets will be suggested.

If a frequency calibration is desirable upon the medium and long waves it is essential upon the short. A glance at the table showing the frequencies and wavelengths of such stations, which appears in *World-Radio*, will at once show the reason. Let us take one or two examples. The wavelength of Huizen (PHI) is 16.88 metres, and that of Bandoeng, Java (PLF) 16.8. The wavelength difference is thus .08 metre. PLF is separated from Nauen (AGC) on 17.20 metres by only .4 metre. Now suppose that the variable condenser is of the straight-line wavelength pattern and that with one set of coils it covers the range between 15 and 30 metres. On a 100-division dial, if the condenser's performances were approximately "straight-line," each metre would be represented by an average of 6.6 divisions. The settings for Huizen and Bandoeng thus differ by only a fraction of a division, and there are just about two divisions between those of Bandoeng and Nauen. Unless the calibration chart is drawn to a rather large scale there will be considerable difficulty in recording accurately wavelengths involving small fractions of a metre.

Calibrate in Frequencies

The frequency differences are very much greater. That between Huizen and Bandoeng is 81 kilocycles, whilst there are 409 kilocycles between Bandoeng and Nauen. Instead of .14 metre we have a separation of 141 kilocycles between W2XK (Schenectady) and Nauen, whilst the 6.01 metres between W2XK and W2XO are represented by no less than 4,450 kilocycles. If we take it that a straight-line frequency condenser covers the same range as the straight-line wavelength condenser previously mentioned—that is, from 15 to 30 metres or from 20,000 to 10,000 kilocycles—we find that each division of the SLF condenser's dial averages 100 kilocycles. We now have no two settings closer to one another than about one division, and a much more even separation is obtained throughout the band covered; there is no crowding towards the lower end of the scale followed by a wide separation at the upper end.

The calibration chart also becomes simpler. By making the vertical side of each large square of a sheet of graph paper represent 1,000 kilocycles and its horizontal side ten dial divisions, we can draw a preliminary small scale calibration chart, only 10 divisions high by 10 wide, with a fair amount of accuracy. The vertical side of each small square will represent 100 kilocycles, and the horizontal side one division of a 100-scale condenser dial. Subsequently, a chart on a larger scale may be constructed.

Before any useful calibration can be done there are several vital points to notice. In the first place it is improbable that anything like the same straight-line graph will be obtainable as in the case of medium and long-wave receiving circuits. In calculating the shape and dimensions of straight-line frequency variable condenser vanes an allowance must be made for all other "fixed" capacities in the circuit in

which it is to be used. These include the self-capacity of the coil, the inter-electrode capacity of the valve and the capacities introduced by the coilholder, the valveholder and the wiring. The calibration graph of a given variable condenser will be a straight line over its greater part *only* if the total of the actual fixed capacities in the circuit is the same as that assumed by the designer in his calculations. In the medium and long-wave set, where we are dealing with comparatively low frequencies, slight differences in fixed capacities in the circuit will not greatly affect the straightness of the calibration graph. But matters are very different when the frequencies to which the circuit is tuned run into tens of millions of cycles.

Effect of Stray Capacities

The graph is much more affected here by small differences between the designer's assumed total incidental capacity and that actually present in the circuit. Now in the average short-wave set fixed capacities in a tuned circuit are much smaller than they are in the medium or long-wave receiver. The self-capacity of short-wave coils with their few air-spaced turns, wound on low-loss formers or even without formers at all, is less than that of "broadcast-wave" inductances. Short-wave coilholders, too, are often designed to reduce capacity as much as possible and most of us are very particular to use in the short-wave set, valveholders containing the minimum of solid dielectric material. Our efforts to cut down external capacities are to some extent successful, and their very success is likely to take us further away from a straight-line calibration graph!

Obviously we must make sure before calibrating that the capacities that I have called "fixed" (by which I mean those inherent in the tuned circuit) really are fixed and unchanging. It is of little use to calibrate a short-wave set when it is in a half-finished condition; slight alterations made in the wiring, in the components, or even in the position of the latter may seriously upset the calibration. It must be remembered, too, that, generally speaking, a calibration chart will hold good only for one particular detector valve.

Still more important is it to see that the circuit used is one in which reaction is stable and constant in its effects. It is sometimes stated that in suitable modifications of the Reinartz circuit the frequency to which the circuit is tuned is not affected by reaction. The effect may be unnoticed on the medium and long waves, but on the short waves it may prove quite noticeable. The reaction control should be such that the set glides easily into or out of oscillation and for calibration purposes readings should always be taken with the set just off the oscillation point.

Condenser Connections

A word about variable condensers. In order to eliminate noise due to what may be rather an imperfect contact between the spindle carrying the moving vanes and its bearing, what is known as a "pig-tail," is often fitted. This consists of a thin strip of copper foil coiled into watch-spring form, the inner end being attached to the spindle and the outer to a projection upon the bearing. As the moving vanes are turned in one direction the spiral uncoils, coiling up when they are moved in the other direction. Now all the turns in the spiral are at the same potential as the moving vanes, which are usually earthed, and each turn has a capacity to the fixed vanes. The total capacity between the pig-tail and the fixed vanes may alter considerably as the former is coiled or uncoiled and quite appreciable kinks in the short-wave

calibration curve may be produced if some of the turns, as is often the case, are slightly out of alignment with others. On the whole it is better for calibration purposes to use a good quality condenser either without a pig-tail or with one so arranged that it is effectively screened and therefore has no noticeable effect.

Lastly, we must remember the importance of using as calibration points transmissions whose frequency can be relied upon. Luckily, there are numbers of these conveniently situated in various parts of the frequency band between 20,000 and 3,000 kilocycles. Towards the bottom of the band are many reliable stations. The two stations at Bandoeng and all of those at Schenectady are crystal controlled. Crystal control is also used by KDKA's short-wave relays and probably by Hilversum and Huizen. At any rate, these two Dutch stations never seem to vary from their announced frequency. The Eiffel Tower on 9,230 kilocycles is also reliable, the transmissions taking the form of time signals at 8.56 a.m. and 8.56 p.m., and the call-sign (FL) in Morse: ----- We have also on 4,434 and 7,500 kilocycles the transmissions of Döberitz, whose frequency is well maintained. It is recommended that before any attempt is made to produce a graph upon paper the settings of as many reliable stations as possible should be collected. It is best not to rely upon one reading for each, but to tune a station in at least three times and to record the average setting. If there is a wide divergence between the readings obtained it is probable that the set is not sufficiently constant in its action to be calibrated successfully. The fault may, however, lie in the aerial if it sags a good deal, or if there is a long slack lead-in. Such an aerial and lead-in, swaying in the wind, will cause readings to differ a little—in fact, the effect produced by their movements is often mistaken for fading.

Constructing the Chart

For the calibration chart it is recommended that, except in special circumstances, condenser readings between 0 and 20 and between 80 and 100 for the 100-division dial should not be taken into account. The corresponding figures for a 0 to 180 degree dial are 35 and 145, or if round figures are preferred, 30 and 150. For the first rough chart take a piece of the best quality graph paper six large squares wide for a 0 to 100 division dial and twelve divisions wide where the dial reads from 0 to 180 degrees. The height of the paper may be from ten to fifteen large squares, according to the maximum capacity of the condenser in circuit to be calibrated. Mark off the left-hand vertical edge of the paper so that each large square represents 1,000 kilocycles. Along the lower edge of the paper make each of the large squares represent 10 condenser dial divisions. Plot dial readings against frequencies for the stations recorded, but do not attempt to draw the graph until a considerable number of dots appear upon the chart. Then draw in the calibration curve, either freehand or with the aid of draughtsman's curves.

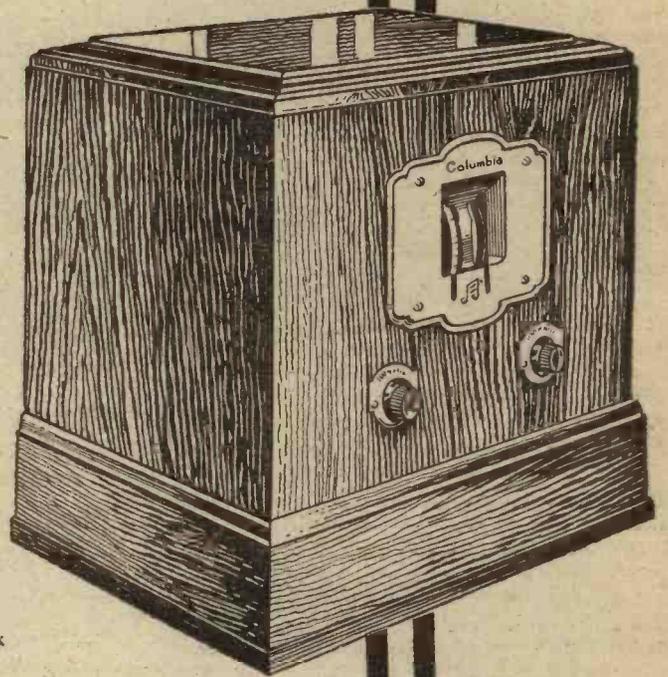
Verify the chart for some time both by tuning in stations according to the settings shown and by identifying stations tuned in from it, making sure in every case also to get the call-sign. Then proceed to make the larger chart, previously referred to. This is made on exactly double the scale. The vertical sides of each large square now represent 500 kilocycles, those of each small square thus being equivalent to 50 kilocycles. The horizontal side of each large square stands for 5 degrees or divisions, those of the small squares being equivalent to half a degree or division. In this way an exceedingly close and accurate chart can be made, which will be of the greatest possible service in short-wave searching.

R. W. H.

such **SIMPLICITY** is new to radio

The 304 Columbia. . . . £33
(all-electric, A.C. or D.C.)

THE table model Columbia is without question the most advanced radio of the day; yet for the user it is simplicity itself. The control dial is marked in wave lengths, making the tuning-in of almost any European station the matter of a moment. This wonderful set works directly from the electric light socket, and all the apparatus is contained in one handsome cabinet. To complete the model only a Columbia loud-speaker is needed.



Columbia
TRADE MARK
RADIO

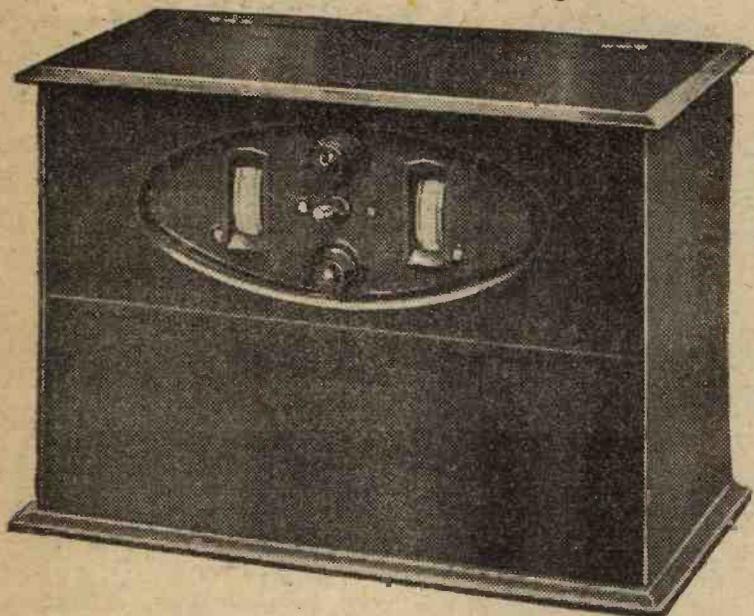
MADE BY THE
MAKERS OF
COLUMBIA
GRAMOPHONES
AND RECORDS

There is a Columbia Dealer nearby

Columbia RADIO

41 Radio Programmes

in an hour !



An astonishing FACT !

You can get over 40 different stations on the wonderful Brown Receiver! That is not a vain boast; it is a statement of sober fact—backed by the reputation of the oldest loud speaker firm in the country.

It has been done many times, and on Tuesday, October 1st, 41 stations were obtained at full loud speaker strength in less than an hour—33 on the short and eight on the long waveband.

The reason for such amazing performance is the careful balance of the circuit and the use of the finest components that money can buy—a 39/- Brown Transformer, high precision Polar Variable Condensers, the world-famous T.C.C. Fixed Condensers and the highly efficient Brown Dual-wave Coils.

If you paid £100, you could not get a better 3-valve Set than the Brown Screened Grid Receiver. It may cost a little more than some Sets—good things always cost more than poor ones, but it is well worth the extra cost. Prove this for yourself at any Wireless Dealer's!

In 4 Models—
for battery or electric mains operation.
Prices from

£9 to £20

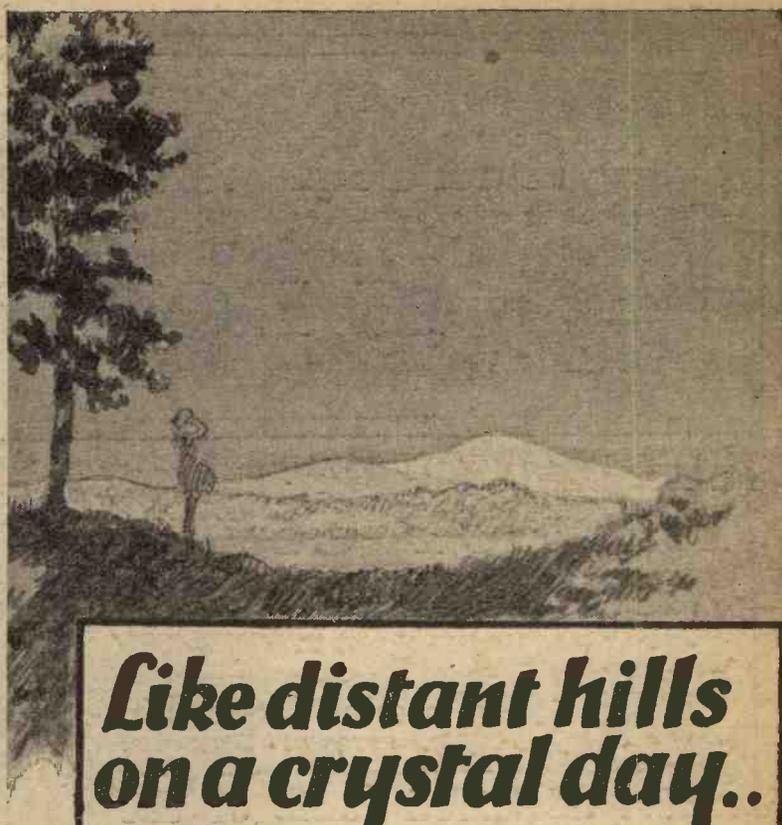
All obtainable on easy payments.

The Brown

3-Valve Screened Grid RECEIVER

Add. S. G. Brown, Ltd., Western Ave., N. Acton, London, W.3.

2177



Like distant hills on a crystal day..

The McMichael Screened Dimic Three gives a reproduction of the broadcast music clearly, strongly and truly. Designed by skilled engineers to give the finest tone value coupled with high selectivity, its scientific circuit takes full advantage of the latest screened grid valves. The McMichael Screened Dimic Three is without doubt superior to many a 4 or 5 valve receiver.

Thirty stations guaranteed on the Loud Speaker on long and normal wavelengths. Many additional stations are, however, obtainable under normally good conditions. Many additional stations can also be obtained on the short wave band by the use of two extra plug-in Dimic Coils (price 5/- each).

THE McMICHAEL SCREENED DIMIC THREE

The "3" that surpasses many a "5." Compels interest by reason of its supreme performance.

NOTE REDUCTION IN PRICE FOR FORTHCOMING SEASON.

Cash Price 19 Gns.

(Including Royalties and 3 Valves specially tested in Receiver) or by "Deferred Payments on Hire Purchase Terms" system if desired. Ask your local dealer for a demonstration.

THE HOME ASSEMBLY SCREENED DIMIC THREE. A comprehensive booklet giving complete instructions for the building of the Screened Dimic Three from an assembly of our components may be had on application. The approximate cost of the whole of the parts necessary for the construction of this unique receiver is £8 8s. 9d. (Extras: Valves 58/-; Oak Cabinet 35/-, Loud Speaker to choice.)

L.M. MICHAEL LTD

Manufacturers of Wireless and Scientific Apparatus
WEXHAM ROAD, SLOUCH, BUCKS.



Telephone:
Slough 441-442.
Telegrams:
Radiether, Slough.
London Showrooms:
179, Strand, W.C.2.
(Telephone: Holborn 2466).

Calculating Speed

A FEW weeks ago thousands of listeners heard the roar of the seaplanes as they flew past the B.B.C. observation post, heard the excited comments of the announcers, and waited with breathless interest for the official times to be read out. How few of these listeners had any idea of the enormous speed until the first announcement was made! How few could make any accurate comparison of the various machines, independently of the commentators, who were not always correct in their first impressions! And yet the majority were in a position to obtain a reasonably good estimate of the speed of each machine as it passed if they had known how to do so.

Most of us, at some time or other, have stood upon a station platform and heard a whistling express dash through, and we have observed that the pitch of the whistle appeared to drop several semitones.

Now, the number of semitones through which the pitch drops is dependent upon the speed of the source of sound (in this case the engine), and with certain provisos one can immediately say that such and such a drop was produced by something going at such and such a speed.

This phenomenon is well known in physics under the name of the Doppler Effect, and if *n* is the number of semitones dropped, the speed in m.p.h. is given by the expression:

$$750 \times \frac{1 - 2 \frac{n}{12}}{1 + 2 \frac{n}{12}}$$

The following table gives the relation computed from this formula, and for any number of semitones dropped the corresponding approximate speed may be read off.

No. of semitones	Speed in m.p.h. (approx.)	No. of semitones	Speed in m.p.h. (approx.)
1	25	13	270
2	50	14	290
3	70	15	305
4	90	16	325
5	110	17	340
6	128.6	18	360
7	150	19	375
8	170	20	390
9	190	21	405
10	210	22	420
11	230	23	435
12	250	24	450

Now, this drop of pitch which is familiar with a train is much more exaggerated with a high speed seaplane. Listeners must have been struck with the enormous change in the roar of the engines as they passed the microphone. The machine approached with a high whine, passed with a dropping, spluttering roar, and faded away as a low hum.

Now to find the speed it was only necessary to stand by a piano, and quickly identify the approaching note by a hasty trial, then in a similar way find the receding note, and count the number of semitones between the two. Reference to the above table immediately gives the approximate speed of the machine when passing the microphone.

It will be seen that an express train causes only a drop of three semitones, but the fast seaplanes produced a far greater drop, which in the case of Major Waghorn attained the value of eighteen semitones. This indicates a speed of 360 m.p.h. which is considerably greater than that recorded, but it must be remembered that the records are averages, including the turns, whereas that calculated above is a momentary value in the middle of one of the best stretches. It is interesting to note that this is about the speed that the same machine made on the straight with Squadron-Leader Orlebar on the following Tuesday.

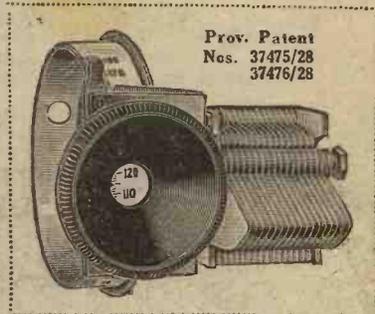
W. A. H. R.

SHORT WAVE STATIONS

The times quoted are reduced to G.M.T.

M.	Kc/s	Station
104.5	2780	Perth (Australia), 6 WF, 0.25 kw.
99	3030	Motala (Sweden). Relays Stockholm irregularly.
80	3750	Constantine (Algeria) 8KR, MON. and FRI.
79	4285	Vienna (OHK2). Transmits on SUN. for 15 minutes after each hour from 5 p.m.
67.65	4434	Döberitz (AFK), 5 kw. MON., WED., and FRI., 10 a.m. to 11 a.m. and 6-7 p.m.
62.5	4800	Pittsburgh East (Westinghouse Electric), W8XK. Relays KDKA at intervals.
61	4918	Radio L.L. (France).
58	5172	Prague (Czechoslovakia).
56.7	5291	Nauen (AGI), occasionally after 5 p.m.
52	5769	Bergedorf (Germany) AFL, 3 kw.
50	6000	Moscow, R.F.N. TUES., THURS., and SAT., 12-1 p.m.
50	6000	Barcelona Radio Club EAJ25. SAT., 8 p.m. to 9 p.m. News and gram. rec.
49.83	6020	New York, N.Y. W2XBR. Relays WBNY, 1 kw.
49.5	6060	Cincinnati (Ohio) W8XAL, 0.25 kw. Relays WLW from 11.50 p.m., except FRI. and SAT.
49.5	6060	Council Bluffs (Iowa) W9XU, 0.5 kw. Relays KOIL.
49.4	6072	Vienna (UOR2), 0.4 kw. Testing TUES. and THURS., 12.10-1.10 p.m.; WED. and SAT. after evening programme.
49.34	6080	Newark (N.J.) W2XCX. Relays WOR, 0.5 kw.
49.02	6120	Richmond Hill, N.Y. (W2XE). Relays WABC Weekdays, 11 p.m. to 5 a.m. SUN., 3.50 p.m. to 5.30 p.m.
49	6123	Motala (Sweden). Relays Stockholm daily.
49.3	6147	Manila (Philippine Islands) KZRM. Daily 8 a.m. to 3 p.m. (except Monday).
44	6818	San Lazaro (Mexico) XC5r. 7 a.m. and 7 p.m.
43.6	6881	Coethen (Germany) D4AFF. Testing.
43.5	6896	Rome (Italy) IMA. SUN., 4-6.30 p.m.
43	6976	Madrid EAR 110. TUES. and SAT., from 10.30 p.m. to 12 midnight.
42	7142	Perth (Australia) 6AG, 10.30 a.m. and 3 p.m.
41	7316	Radio Vitus. Testing.
40.2	7463	Lyons (Rhône) YR. Daily except SUN. from 4.30-5.30 p.m.
40	7500	Döberitz AFK (or DOA). 5-7 p.m. daily; occasionally other times.
37	8108	Vienna (EATH). MON. and THURS., 9.30 p.m.-11 p.m.
34.5	8696	Schenectady W2XAC. (General Elec. Co.). Relays WGY to Byrd Antarctic Expedition.
32.5	9230	Sydney (2BL).
32.5	9230	Paris, Eiffel Tower (FL). Time Signal 8.56 a.m. and 8.56 p.m.
32	9375	Berne (Switzerland) EH90C.
31.8	9434	Posen (Poland), 0.25 kw. TUES., 6.50-9.30 p.m. SAT., 6.25 p.m.-11 a.m.
31.65	9479	Paris Experimental Radio, 2 kw. 9 p.m. weekdays, 3 p.m. on Sundays.
31.6	9494	Lyngby (Denmark) (Experimental).
31.48	9530	Denver (Col.) W9XA. Relays KOA, 0.75 kw.
31.48	9530	Schenectady (General Electric Co.), N.Y. W2XAF. 10 kw. (Acr.) MON., 11 p.m. to 5 a.m. TUES., 11 p.m. to 4.30 a.m. THURS., 11 p.m. to 5.30 a.m. SAT., 11 p.m. to 5 a.m. Relays WGY.
31.4	9554	Hilversum, Holland PCJ, 25 kw. THURS., 7-9 p.m., in English; 12 midnight-1 a.m., in Spanish. FRI., 1-2 a.m., in Portuguese; 2-4 a.m., in Spanish; 7-9 p.m., in English. SAT., 1-2 a.m. in Dutch; 2-5 a.m., in English, French, and Spanish; 5-7 a.m., in English.
31.38	9560	Zeesen (Germany). Relays Königswusterhausen daily from 7 p.m. (Uses two other near frequencies.)
31.28	9590	Sydney 2FC.
31.28	9600	Bergen LGN.
31	9677	Nairobi (Kenya) 7LO. Daily, 4-7 p.m. Relays 5SW occasionally from 7-8 p.m.
30.91	9700	New York (W2XAL). TUES., 1 mdnt.-5 a.m. WED., 12 mdnt.-2 a.m. FRI., 12 mdnt.-4 a.m. SAT., 12 mdnt.-3 a.m. 0.5 kw.
30.75	9756	Agen. TUES. and FRI., 9-10.15 p.m.
25.6	11,718	Winnipeg (Canada) CJRX, 2 kw. DAILY (except SUN.), from 10.0 p.m.-12.30 a.m. SAT., 6 a.m.-7 a.m.
25.53	11,751	Chelmsford (5SW), 15 kw. (Acr.) DAILY (except SAT. and SUN.), from 12.30-1.30 p.m., and from 7 p.m.-12 mdnt.
25.25	11,880	Pittsburg East (Westinghouse Electric) W8XK. Relays KDKA at intervals.
24.5	12,240	Manila (Philippine Islands) KIXI. Weekdays, 10.30 a.m. to noon.
23.35	12,850	Oakland (Calif.) W6XN. Relays KGO. TUES., WED., and FRI., from 5.30-9 p.m. (G.M.T.), 5 kw. WED., also 2 a.m. to 8 a.m.
23.35	12,850	Schenectady W2XO. TUES., THURS. and SAT., 5-10 p.m. Relays WGY (Tests).
22.2	13,513	Vienna, 0.24 kw.
19.55	15,340	Schenectady (General Electric Co.) W2XAD. 6 kw. SUN., 7.30 p.m.-4 a.m. MON., WED. and FRI., 3-5 p.m. and 11 p.m.-5 a.m. SAT., 5 p.m.-5 a.m. Relays WGY.
17.34	17,300	Schenectady, W2XK, MON., WED. and FRI., 5-10 p.m. Relays WGY. (Test).
17.34	17,441	Nauen (AGC).
16.8	17,850	Bandoeng, Java, PLF, 30 kw.
16.83	17,769	Huizen (Holland) PHI, 40 kw. Usually transmits from 3-5 p.m.
16.3	18,404	Kootwyk (Holland) PCK. From 6 a.m.
15.94	18,820	Bandoeng, Java (Radio Service) PLE. WED., 12.40-2.40 p.m.
15.5	19,351	Nancy (France), 9-10 p.m.
15.02	19,973	Buenos Aires (Monte Grande) LP3.

For Long and Medium Wave Stations see pp. 792.



Prov. Patent Nos. 37475/28 37476/28

"MITE" Drum Dial Condenser

—another fine addition to the "UTILITY" Range

The appearance and diminutive size of this fitting scored a notable triumph at the Radio Show . . . it will please you also, being an ideal combination of small condenser with an easily-read dial . . . most adaptable for portable sets on account of the small amount of space it occupies.

The Condenser is our popular "Mite," designed on low loss principles similar to our standard pattern. The centre spindle revolves on ball bearings and one end plate only is fitted. The Dial is a new Drum pattern. Readings appear through the central aperture and the appearance is very pleasing.

SUPPLIED FOR LEFT OR RIGHT HAND OPERATION

Many dealers now have this new "Utility" Component in stock . . . they will be pleased to show it to you. It carries the full "Utility" Guarantee as supplied with our Switches and Dials, and sells at the following prices.

PRICES

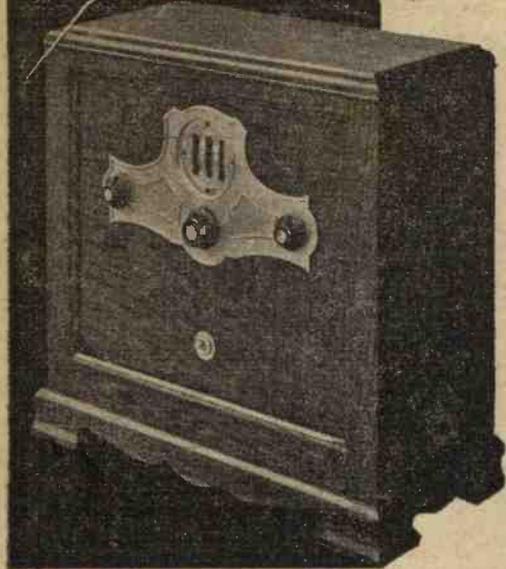
Cat. No.	Cap.	Price.
W. 201.	0005	11/6
W. 202.	0003	11/-
W. 203.	0002	10/6

Always use "UTILITY" Components, and so get the acknowledged best—at ordinary prices.

Have you a copy of our latest Illustrated List? We shall be pleased to send you one along on application.

WILKINS & WRIGHT LTD
HOLYHEAD BIRMINGHAM

KB 161 & 169



FOR THE KOLSTER-BRANDES SUNDAY CONCERTS

K-B 161 or 169 All-Mains 3-Valve receiver, Price £17 10s., including valves and royalty, for best reception of the fortnightly Sunday Concerts broadcast from the Hilversum Vara station by the Kolster-Brandes Radio Orchestra, under the direction of Hugo de Groot.

KOLSTER-BRANDES CONCERT, November 17

(1,071 metres) 5.40 p.m.

1. Overture from the Operette "Frau Luna"
Paul Lincke
2. A Waltz from Vienna *Benatzky*
3. A while in a Russian Village (Russian Popular Songs) *Artemieff*
4. Chant Hindoue *Rimsky-Korssakoff*
(Solo on the V.A.R.A. STANDAART Organ by Joh. Jong)
5. Records
6. Sir Roger (English Dance) *J. P. Gotthard*
7. Three Irish Tunes *Ansell*
8. Whistle for me (Whistling Serenade)
Arthur Fane
9. Four Ways Suite *Eric Coates*

Kolster Brandes

RADIO MANUFACTURERS
CRAY WORKS · SIDCUP · KENT



PROGRAMME SECTION

Continental Programme Events

SUNDAY, November 17

Concerts

- 7.0 p.m. Berlin: Orchestral concert.
7.0 " Munich: Orchestral concert.
7.0 " Prague, Brno, Moravska-Ostrava: Dutch music.
7.45 " Cologne: "The Seasons" (Haydn).
8.15 " Brussels: Orchestral and vocal concert.
8.20 " Copenhagen: Danish songs.
8.25 " Königsberg: Song recital.
8.55 " Hilversum: Orchestral concert.

Operas and Operettas

- 6.30 p.m. Budapest: "Turandot" (Puccini).
6.30 " Stuttgart, Frankfurt: "A Masked Ball" (Verdi).
7.30 " Milan: "A Masked Ball" (Verdi).
8.2 " Rome: "Manon Lescaut" (Puccini).

Plays

- 2.0 p.m. Berlin, Breslau: "The Three Musketeers" (Dumas).

MONDAY, November 18

Concerts

- 6.30 p.m. Munich: Symphony concert.
7.0 " Madrid: Orchestral concert.
7.6 " Copenhagen: "St. Paul" (Mendelssohn).
7.30 " Hamburg: Selections from popular operas.
7.30 " Warsaw, Posen: Relay from Riga of National Fête day.
8.0 " Berlin: Selections from less-known operas.
8.0 " Radio-Paris: Recitations and chamber music.
8.30 " Leipzig: Chamber music.
10.5 " Barcelona: Orchestral and vocal concert.

Operas and Operettas

- 6.45 p.m. Budapest: "János Vitéz" (music by Kacsóh).

Plays

- 7.30 p.m. Königswusterhausen: "Sister Henriette."
8.15 " Frankfurt, Stuttgart: "Magic" (G. K. Chesterton).

TUESDAY, November 19

Concerts

- 6.40 p.m. Cologne: Symphony concert.
7.30 " Leipzig: Recital of songs by contemporary composers.
8.0 " Radio-Paris: Loiti Lehmann and Symphony concert.
8.15 " Brussels: Orchestral and vocal concert.
8.45 " Bucarest: Orchestral concert.
8.45 " Copenhagen: Mozart concert.

Operas and Operettas

- 6.30 p.m. Vienna: "Rigoletto" (Verdi).

Plays

- 7.35 p.m. Munich: The Death of Tizian (Hoffmannsthal).
8.0 " Berlin: "Sister Henriette."

WEDNESDAY, November 20

Concerts

- 6.30 p.m. Frankfurt, Stuttgart: "Deutsches Requiem" (Brahms).
7.0 " Hamburg: Orchestral concert.
7.0 " Leipzig: Mass in B minor (J. S. Bach).
7.0 " Prague, Brno, Moravska-Ostrava: Symphony concert.
7.15 " Copenhagen: Orchestral concert.

- 7.30 p.m. Vienna: "Requiem" (Dvorák).
8.0 " Radio-Paris: Selections from "Barber of Seville."
8.15 " Brussels: Orchestral and vocal concert.

Operas and Operettas

- 7.30 p.m. Milan: "Falstaff" (Verdi).

Other Events

- 7.30 p.m. Berlin, Breslau, Cologne, Königsberg, Munich: "About Life." Based on poetical works of Friedrich Hölderlin, music by J. M. Hauer.
7.40 " Hilversum: "Lady Windermere's Fan" (Oscar Wilde).

THURSDAY, November 21

Concerts

- 7.0 p.m. Berlin: Viennese operetta music.
7.0 " Frankfurt, Stuttgart, Hamburg, Königswusterhausen, Munich: Jan Kiepura recital.
7.0 " Vienna, Prague, Brno, Moravska-Ostrava: Austrian evening.
7.45 " Leipzig: Austrian evening.
8.0 " Hilversum, Brussels: Orchestral concert.
8.0 " Cologne: Austrian evening.
8.20 " Vienna: Orchestral concert (Austrian composers).
8.30 " Hamburg: Austrian evening.
8.45 " Copenhagen: Scandinavian music.
9.45 " Frankfurt, Stuttgart: Austrian evening.
10.0 " Madrid: Austrian evening.

FRIDAY, November 22

Concerts

- 7.0 p.m. Königsberg: Symphony concert.
7.0 " Hamburg: Popular concert.
7.0 " Berlin: Orchestral and chamber music.
7.0 " Stuttgart, Frankfurt: Symphony concert.
7.0 " Vienna: Elisabeth Schumann recital.
7.15 " Budapest: Symphony concert.
7.15 " Warsaw, Posen: Symphony concert.
7.30 " Breslau: Arias and Symphony concert.
8.0 " Prague, Brno, Moravska-Ostrava: Contemporary Czech music.
8.35 " Radio-Paris: Symphony concert.

Operas and Operettas.

- 6.30 p.m. Leipzig: "The Grand Duchess of Gerolstein" (Offenbach).
6.35 " Munich: "Le donne curiose" (Wolf-Ferrari).

SATURDAY, November 23

Concerts

- 7.0 p.m. Hamburg: March music of five centuries.
7.15 " Copenhagen: Selections from operettas.
8.0 " Radio-Paris: Old French songs.
8.15 " Brussels: Orchestral and vocal concert.
9.45 " Hamburg: Night music.

Operas and Operettas

- 6.30 p.m. Leipzig: "Boris Godounoff" (Mussorgski).
7.5 " Vienna: "The Circus Princess" (Kálmán).

Last Week's Log

By "THE SEARCHER"
(November 3 to 9)

THOUGH I touch wood as I write it, it seems as if we could now look forward to a long period of first-rate conditions for the reception of foreign stations. Not for a long time has there been any patchiness; evening after evening one has found stations coming in well with very little atmospheric interference. The only night during the week now discussed when atmospheric were at all troublesome was the Friday, when they were of the continuous, but mild type.

Jamming and Heterodyning.

Turin was very badly jammed during the early part of the week, but from the Wednesday onwards he was working on a wavelength considerably higher than that assigned to him in the lists. He seemed to be quite happy in his new position, for he came through strongly and clearly without any heterodyne interference. The Berlin relay on the 283-metre common wave still comes through, surprisingly enough, unjammed, though he has no less than five group partners. Almost the only station of note which has suffered from persistent heterodyning is Leipzig, though this station was good on the Monday. Others which have been affected at times, though they have usually been clear, are Berlin Witzleben, Stuttgart, Toulouse, Katowice and Madrid Union Radio. Nürnberg is by no means as good as he was. Though I do not often find him badly heterodyned at my station, readers living in other parts of the country tell me that he now very seldom gives them clear reception.

One of the best stations of the week has been Budapest, whose strength just now is extraordinary. I have had this station as early as 4.30 p.m. It is a pity that those who live near the coast find it difficult to receive him owing to spark interference. Moravska-Ostrava provides great strength and good quality when he is clear, as he was on several nights during the week. He was at his best on the Friday. Cologne was good on most nights, but suffered from a heterodyne on the Saturday. A station that is now coming in very well is Milan, who is nearly always worth trying for. Other stations that should be noted are Frankfurt, Königsberg, Limoges, Berne (until recently this station was badly interfered with by San Sebastian, I think, but lately he has been clear of interference), Brussels, Gleiwitz, Kaiserslautern, Hamburg, Rennes, and, on the longer waves, Huizen, Radio-Paris, Königswusterhausen, and Kalundborg. Hilversum, who is now working on 1,071 metres after 5.40 p.m., seems to suffer very badly from jamming.

Up to What Pitch Can You Hear?

An Eastbourne reader raises an exceedingly interesting point with regard to the apparent variation of heterodyne interference in different parts of the country. He is himself unable to hear notes whose pitch is much above 5,000 cycles per second, and frequently finds when he has tuned in a station that members of his family can detect a heterodyne whistle, though he cannot do so. In such cases, however, he does, as a rule, notice that distortion is present. Is it possible that the reason why a station is reported clear by some observers and heterodyned by others on the same evening and at the same time, is that only certain of them can hear a very high-pitched whistle? This may explain certain apparent discrepancies in the reports received, though it is not a completely satisfactory explanation: I often find a station clear when others report a heterodyne, yet I can hear clearly very high pitches, such as the squeak of a bat,

(Continued on page 772)

Which Station Was That?

Answers to Correspondents

FRANK GORDON (Norfolk): Kharkov (Narkomopshtel) on 1,304 m. A woman announcer. **SONNY** (Cornwall): Turin (Italy) now working on about 293 m. **R. F. NEALE** (Wyre): (1) Milan; call: "Stazione Radiofonia di Milano" (2) Flensburg relaying Hamburg. **BANDON** (Wallington): Bratislava relaying Prague (Praha). **SONNY BOY** (Eastbourne): Radio Toulouse (records). **PIXIE** (Eastbourne): Bucharest (Roumania); a woman announcer. **SCHOOLBOY** (N.3): Apparently the Teatro Opolo (Portugal), said to be transmitting on 25 m., but cannot definitely confirm. **TRAMP SHIP** (Newcastle-on-Tyne): Leningrad; interval signal: call of the cuckoo. **ORCHESTRON** (Bury): Radio Toulouse. **SOPHOGLES** (Birmingham): (1) this was Brno, relaying a concert from a Café, (2) a relay of the Stockholm programme; the only one on about that WL is Upsala (453 m.), (3) Augsburg relaying Munich. **A. B. C.** (North Wales): The short-wave station at Königswusterhausen on 31.38 m. relaying the Berlin programme. **W. E. N. R.** (Leeds): 2ME Sydney on 28.5 m., possibly working with GBU, Rugby on 30.15 m. or GBW, Rugby on 36.645 m. If you are sure WL was lower than 30 m. then Grimsby (beam station on 25.906 m.). **TITANIC** (Gloucester): (1) Fécamp, Radio Normandie (France). (2) this was the Berlin relay of the Six Days' Cycle Race from the Sports Palace, received through either Nürnberg or Cologne. **A. B. 3** (Herts): Leningrad relaying concert from the Radio Theatre. **IGOTIT** (Kent): Regret, cannot trace; we do not understand your WL as you say between Bordeaux and Cardiff, and yet on 270 m. **GWYDDOR** (Maesteg): Brno relaying Prague, (2) PTT Grenoble relaying the Pasdeloup concert from the Theatre des Champs Elysées at Paris. **B. S. A.** (Brum.): Budapest (Hungary); this interval signal is played on a musical box. **S. B. 3** (Lewes): This was Turin, now working on 293 m. relaying the opera *Daphne* (Mülé) from Milan. **BOY LISTENER** (Ireland): Although not advertised to do so, apparently Posen relaying Wilno (Poland), as the latter station has a cuckoo call as an interval signal. 14-45 (Ayr): This was the Berlin programme (midday concert), apparently received through Döberitz (on several wavelengths). There is a short wave transmitter at Königswusterhausen on 31.38 m. which relays Berlin. **KONK** (Sleaford): Yes, this was Kharkov (Narkomopshtel) on 1,304 m. **GRETCH** (Manchester): Gramophone records from Leipzig. **NORWEST** (W.14): Moscow Popoff on 1,100 m.; a relay of an opera. **BM/GEJE** (Cheltenham): Riga (Letland); news. (A woman announcer). **GLUNY** (Levenhall): Turin (Italy) now working on about 293 m. **CURIOUS** (Truro): Either Munich received direct or through one of this station's relays, but cannot say which, as you give no estimate of WL. **GOOD EGG** (Whitehaven): Posen (Poland). **GREEN GRID** (3) (Hull): PTT Limoges relaying PTT Paris. **REG FAZE** (Ramsgate): (1) 7LO Nairobi (Kenya) on 31 m., (2) W2XAF short wave relay of WGY (Schenectady). **WABEZ** (Hove): Nürnberg relaying Munich. **PERPLEXED** (Bath): Langenberg relaying from the Municipal Concert House at Duisberg. See programme in *World-Radio*. **ETHER PLOUGHMAN** (Kent): No relay of Vienna on that WL; apparently the first harmonic of Klagenburg. **NOXE** (Exeter): *Radio Normandie*, Fécamp (France). **STOCKWORK** (Birmingham): (1) possibly an amateur transmitter, (2) short-wave station at Motala (49 m.) relaying Göteborg (light music). **TONY** (W.5): Kaiserslautern relaying Munich; this was advertised for November 3, but altered to November 2. **R. H.** (Coventry): We do not understand your query. **ICK ICK PAH BOO** (Brandon): (1) estimate of WL vague, but would tally with Frankfurt. (2) Nürnberg relaying Munich; *King David*, a Symphonic Psalm by Honegger. **KERNOW** (Cornwall): Posen (Poland); records. **VOLENS SCIRL** (Stratford): Buda-Pest (Hungary); three plays. **BM/DAON** (Warrington): No, this was Moscow Popoff on 1,100 m. (40 kw.). **W. H. W.** (Caeleon): Possibly Dublin, but you state no time. **KNODES** (Hull): Katowice relaying concert from the Café Esplanade at Posen. **BIANCA** (Brighton): This was Kaunas (Lithuania). **MISF F. C.** (Bognor Regis): Either Munich received direct or through one of the relays, but cannot say which as you give no estimate of WL. A Guest Performance by "The English Players" advertised for Sunday, November 3, but broadcast on November 2. **BUCK** (Kent): A test, possibly for calibration of WL. Apparently Zeesen. **PERPLEXED** (Grimsby): This was Bratislava relaying operetta from Brno. **PHO** (Eastbourne): Ljubljana (Yugoslavia); interval signal; call of the cuckoo. **SCREENED WORKER** (Dublin): (1) possibly PTT Lille, (2) Breslau (weather report), (3) Kaiserslautern relaying Munich. **HOWEYITE** (Swansea): We cannot understand your WL for details tally with the test given by PTT Algiers. **B. W.** (Rochdale): This was Prague; a talk on Smetana's compositions (with illustrations). **MA** (Morrington): Prague (Czechoslovakia) worked late on that date giving election results with gramophone records in the intervals; apparently you received this through Kosice, if your WL is approximately correct. **A. J. C.** (Ramsgate): Eiffel Tower, relaying the PTT Paris early morning broadcast. **EVERATIT** (Golders Green): Your details are rather vague, but apparently an amateur transmitter. **ADDLESTONE** (Surrey): Kharkov (Narkomopshtel), on 1,304 m. **L. E. J.** (London): (1) an amateur transmitter, (2) PTT Algiers (North Africa) testing on 364 m. **NOVICE** (Guisborough): (1) *Elsa von Brabant* (Marie Nazadal) and (2) *Lohengrin* (Fritz Krauss). **KENRIOS** (Upper Tooting): Nürnberg relaying Munich. **LIGHTNING** (Cambridge): (1) yes, Lahti (Finland); a lecture on history, (2) Leipzig relaying dance music from Berlin. **JACKO** (Manchester): Munich; songs from unknown operas. **JIM** (Weymouth): San Sebastian (EAJ8) on 403 m. **CHEZ NOUS** (Barry): PTT Paris relaying from the Coliseum; apparently working later than advertised. **TINY** (Erdington): Radio Toulouse. **WATT** (Muswell Hill): Kaiserslautern relaying Munich. Turin (Italy) is now on 291.1 m. **NOVA SCOTIA** (Leeds): Radio Toulouse; symphony concert. **W. W.** (Boscombe): Huizen (Holland); early morning broadcast of gramophone records. **KENTISH** (Gumb.): An amateur transmitter. **G. A.** (Kendon): PTT Rennes relaying Pasdeloup concert from Paris. **REVEAL** (Chiswick): Yes, this was Zürich (Reformation Sunday). **ANGHORITE** (Clapham): Ljubljana (Yugoslavia); interval signal: call of the cuckoo. **DEEJAYBE** (Dungarvan): Belgrade; the dance music was from the Palace Hotel. **11d. PLEASE** (Crumpsall): Fog Beacons on 1,000 m. Apparently you have mistaken the last letter of this call for either a G or K; GGG (Round Island Lighthouse), and GGG (Skerries Lighthouse). **INTERESTED** (Stockport): Estimate of WL rather vague, but apparently the Eiffel Tower relaying PTT Paris. **H.** (Pitlochry): If on the long waves, Huizen (Holland). **SCOTSMAN** (Maidenhead): Yes, a harmonic of 2LO. **IOMA** (Manchester): Milan (Italy); operatic solo and duets. The interval signal you heard was the morse letter T (—). **RADNOR**: Riga (Latvia); a lady

announcer. **MELFORD** (E.C.1): (1) yes, this was Hilversum the concert included gramophone records, (2) no, Huizen; a fortnightly concert provided by the Kolster-Brandes firm for the benefit of English listeners; announcements are then made in Dutch and English. **SCALPEL** (Wolverhampton): Turin, now working on 291.1 m. **BANEL** (Guernsey): (1) Berlin (Witzleben); midday concert, (2) PTT Paris, (3) the best time to listen for Australian transmissions is about 7 a.m.—9 a.m. **HALESOWEN SPECIALS** (Smethwick): Bratislava (Czechoslovakia). **DENTON**: (1) PTT Algiers (North Africa), transmitter testing, (2) no, this is Moscow Popoff on 1,100 m. (40 kw.). **REFLEX** (W. 10): (1) regret, but can trace no German station to tally with your details at that time; surely this was San Sebastian (EAJ8), on 403 m., (2) either Lille or Rennes relaying PTT Paris; Beethoven's Ninth Symphony. **HUNT SLIPPER** (Croydon): Nürnberg relaying Munich; a Guest Performance by "The English Players," advertised for November 3, but given on November 2. **2TO** (Ipswich): We believe on about 250 m. Not a query for these columns. **PADRO** (Southborough): (1) Turin (Italy) on 291.1 m., (2) Nice-Juan-les-Pins, apparently working on slightly higher WL. **R. H.** (Coventry): We do not understand your query, with regard to WL. Regret, but details are too vague to trace. **FREEBOOTER** (Edinburgh): Yes, PTT Lyons relaying PTT Paris. **CONTI** (Bath): (1) Langenberg relaying concert from the Bastei Café at Cologne, (2) WL would point to Madrid (EAJ7), but we know of no station with this interval signal. **G. J. ELLETT** (Shefford): (1) a test by Louvain (Belgium), (2) Brno (Czechoslovakia) a sketch. The organ solo was from Posen (Poland), (3) Moscow Popoff on 1,100 m. (40 kw.). **HONTUS** (Cologne): (38) Lahti (Finland); a lady announcer, (39) yes, Bratislava, (37) Leningrad, (40) Katowice relaying Posen (Poland). **M. A. S.** (Brentford): Bandoeng (Java) on 17 m. working with Kootwijk (Holland). **BOY LISTENER** (Ireland): (1) possibly Bandoeng (Java), (2) Zeesen on 31.38 m. relaying the Berlin programme. **PSITTAGUS** (Edinburgh): San Sebastian (EAJ8) on 403 m. **SEARCHER** (Woodford): Your estimate of WL is much too vague to trace; there are innumerable stations between 20 and 50 m. **BETH** (E. E. 16): An amateur transmitter. **CADET** (N. 12): (1) direction finding station at Cuxhaven (German); submarine signals, (2) write to the Radio Society of Great Britain, 53, Victoria Street, S.W.1, (3) GBR, Rugby; RNO, Russia; FUA, Bizerta, Tunisia; DHA, Nauen, Germany; EAW Spain; SAJ, Karlsborg; FTG, St. Assise, near Paris; FOO, St. Assise, near Paris; GYO, Devil's Point. **EXPERIMENTER** (Lichfield): Either Munich direct or through one of this station's relays, but cannot say which as you give no WL. **OHIDONO** (Essex): (1) Kharkov (Narkomopshtel), (2) Radio Toulouse (a harmonic; about 190 m.). **JOCK** (West Norwood): **ANNEUX** (Torquay): **KEYBILL** (Nottingham); **SIRT** (Twickenham); **TURINO** (S.E. 12): Turin (Italy) is now working on 291.1 m. **T. W.** (Pontypridd): **SEDNEM** (Antwerp); **BON ACCORD** (Aberdeen); **BOLSHY** (Romsey); **SPOTS** (Osterley); **N. R.** (Morley) (Skegness); **VILLEVER** (Dover); **QUEENS PARK** (Glasgow); **ETHER RANGER** (N. Ireland); **ST. MAUR** (Leicester); **TRANSCOKE** (Yorks); **PTT Algiers** (North Africa); **GAINGO** (Mon.). **H. D.** (W. 9): If you are sure of call, an amateur transmitter; write to the Radio Society of Great Britain, 53, Victoria Street, London, S.W.1. **GUCKOO** (Manchester): Breslau relaying Berlin; a relay from the Sports Palace of the Six Days' Cycle Races. **JAYBEJAY** (Edinburgh): Barcelona (EAJ13) on 465 m. **INFINITY** (W.9): Moscow PTT on 825 m. Words heard were Radio Stantjisa (the last word meaning "station"). **CONDENSER** (Weaste): Nürnberg relaying Munich. A Guest Performance by "The English Players," advertised for November 3, but given on November 2. **A. V. P.** (Worthing): (2) possibly Uppsala relaying Stockholm, but cannot confirm. No station on a WL between PTT Paris and Lyons advertised a cornet solo at that time. (1) Belgrade (Yugoslavia). **PHIL** (Bolton): Motala relaying the early morning broadcast of physical exercises from Stockholm. **CHERCHEUR** (Hove): Königswusterhausen (Press) on 2,900 m. **EFFBEE** (Liverpool): Yes, Katowice (Poland); news in French nightly. **ISLAND**: Nürnberg relaying Munich; this is the latter station's interval signal. **GRID** (Manchester): (1) Belgrade, (Yugoslavia), (2) Luxembourg (Grand-Duchy) on 223 m. **D. X.** (Leamington Spa): (1) the only French station on about that WL is Ste. Assise (near Paris); telephony with Buenos Aires (South America), (2) WND (Ocean Township, New Jersey) on 16.45 m. (18,348 kc.). **HEFTY** (Kent): Apparently a test by some station, but regret, cannot trace. **NOVEMBER THE 5TH** (Wolverhampton): Göteborg relaying Stockholm (modern dance music). **SAPIS ROTUNDO** (S.E. 18): **A. Z.** (Liverpool): **SUPPER** (HammerSmith); **GUY FAWKES** (Plymouth); **SCREEN GRID** (3) (Hull); **GUST DUCK** (N.W.1); **PTT Algiers** (North Africa). **PIXIE** (Eastbourne): Belgrade (Yugoslavia); Symphony concert relayed from the Philharmonic Hall. This included a selection from *Tristan and Isolde*, (Wagner). **Pengonian** (Purley): **DEEJAYBE** (Dungarvan): Turin (Italy) now working on 291.1 m. **NIGERIA** (Bristol): If call as heard, apparently a test, but regret, cannot trace. **SKIPPER** (Cotes): (1) new station at Algiers (12 kw.), (2) Belgrade (EAJ1). **A NOVICE** (Glasgow, S.1): Radio Toulouse (gramophone record). **ECKNARP** (Torquay): (1) Turin working on new wavelength (291.1 m.); (2) apparently Radio Salon, St. Quentin (France) on 175/180 m. (variable). We do not know of the existence of such a list. **SOLLY** (E.17): (1) Munich relaying 6 Days' Cycle Race from Sports Palace, Berlin; (2) Moscow PTT, Experimental. Please number or letter your queries. **STOCKY** (Cheshire): (1) Bordeaux-Lafayette (own concert); (2) Radio Luxembourg (gramophone records although not so advertised); (3) undoubtedly a fox beacon or D.F. station, but cannot trace. **BOOB00** (Bognor Regis): You give no estimate of wavelength. From interval signal heard, either Kaiserslautern or Nürnberg relaying Munich. **GUS** (Workop): Warsaw time signal heard through Katowice. **REGENT** (Great Crosby, Liverpool): Yes, Radio Maroc. We presume that 140 is your condenser dial reading and not wavelength as stated. **CHOPIN** (Saltash): Yes, definitely Radio Maroc (Rabat). **GREEN** (London, W.): Scheveningen Haven on 1,071 m. **HARROW STEEPLE** (Kenton): Surely Eiffel Tower (gramophone records). **KOKO** (Marlow): Croydon aerodrome communicating with aeroplanes. **QUE DIT-IL** (Dorset): Leningrad. **JOYFUL JACK** (Erdington): Turin on new wavelength (291.1 m.). **WARRIOR** (Middlesbrough): You give no indication of wavelength so cannot trace. **MOTLEY** (Bristol): Moscow PTT Experimental. The first part of the concert terminated at 10.45 p.m. G.M.T.; was later carried on until past midnight. Announcements were given out in Russian and German. **CHAMBER MUSIC** (Acock's Green): New Algiers 12 kw. transmitter testing. **COBCKOX** (East Finchley): Further enquiries being made; see next week's paper.

The Alternative Postal Service.

In addition to the free published service of "Which Station was That?" replies to queries can be obtained within forty-eight hours of receipt of details on payment of 6d. in stamps or P.O., accompanied by coupon and stamped addressed envelope. Each query should be numbered and the questions on the coupon carefully answered. Letters must be addressed to the Editor, *World-Radio*, Savoy Hill, W.C.2. Envelopes to be marked in left-hand top corner "Postal Query Service."

IDENTIFICATION COUPON (No. 43.)

This coupon is valid for ONE QUESTION only, and should be cut out and attached to a separate sheet, upon which the following questions should be answered in the order shown. No coupon more than one month old is valid.

1. Time and Date of reception.
2. Approximate frequency in kilocycles per sec. (or wavelength in metres).
3. Nearest known stations, above and below.
4. Call or interval signal, if heard.
5. Language.
6. Type of receiver in use and strength of signal.
7. Details of programme or signal received.
8. Name and address.
9. Nom de plume. (*Proprietary names must not be used.*)

LAST WEEK'S LOG

(Continued from page 771)

which are completely inaudible to many people. Readers who care to undertake an interesting series of experiments can make tests with members of their families and friends with a view to discovering how the ability to detect a high-pitched heterodyne note varies in different people.

The worst enemy to reception from distant stations just now is fading, which has been particularly bad on some recent evenings. It is usually of the very slow, rhythmical type, several minutes sometimes elapsing between maximum and minimum signal strength.

The short waves continue to be rather disappointing—at least I have found them so whenever I have brought my short-wave set into operation lately. Sometimes one strikes a lucky moment when stations are coming in well, but, as a rule, strength all round is so poor that it is impossible to obtain first-rate reception.

FOREIGN LANGUAGES

(Continued from page 763)

D-ro Dietterle parolos pri "Literaturo kaj Movado." Sendu raporton al Mirag, Leipzig. TORINO (1,094 k/c, 274 m., 7 kv.). Datoj: mardo, 19-a de novembro. Horo: 7.45 p.t.m. Profesoro G. Canuto brodkastos lecionon pri Esperanto. Sendu raporton al E.I.A.R., Torino.

TRANSLATION EXERCISE: Seĝo estas lignaĵo, ĉar ĝi estas farita el ligno. La brodkasto komenciĝos je la 8-a vespere. Si resaniĝos post nelonge. Mi ricevis vian sendaĵon hieraŭ. Ni opinias la rakonton tro longa. Mi ne supozis ĝin mia. Mi havas kun mi nur kelkajn necesajojn.

NEW WORDS : *Serio*, a series ; *Silezio*, Silesia ; *kutimo*, a custom ; *karakterizi*, to characterise ; *animo*, soul ; *tribo*, tribe ; *proverbo*, a proverb ; *seĝo*, a chair ; *ligno*, wood (substance) ; *opini*, to have the opinion, to think ; *rakonti*, to relate (a tale) ; *supoz*, to suppose ; *kelkaj*, a few ; *necesa*, necessary. RADIO-DUO!

\$100 Guarantee

If found unsatisfactory and returned within seven days of purchasing from us direct, we guarantee to return your money in full or forfeit the sum of £100. A similar arrangement can be made with your dealer.



LOCAL STATION CUT OUT
UNWANTED STATION CUT OUT
DISTANT STATIONS WITHOUT INTERFERENCE
INCREASED VOLUME FROM FOREIGN STATIONS

TWO MODELS
 A. 200-700 metres (for 2LO, 5GB, etc.)
 B. 700-2,000 metres (for 5XX, etc.)

If desired, either model will be sent on receipt of 12/6 or per C.O.D. upon receipt of Post-card.

12/6 ONLY

Brookman's Park cut out at will. No alterations to set. No Valves to burn out. No drilling. Easily plugged in between aerial and set.

Harlie WAVE SELECTOR

A Human & Lifelike Moving Coil Loud-Speaker at Half Price!

Reproduces every note from the highest treble to the lowest bass. No drumming or chatter.

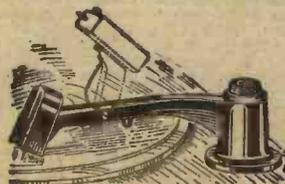
MODEL 28, 220v. D.C. } £3 10s.
 MODEL 29, 4-6v. }
 In Oak or Mahogany Cabinet, £7 15s.



There is also special model for A.C. Mains

Harlie MOVING COIL Loud-Speaker.

This Pick-up is tuned to catch every light & shadow



The Harlie Pick-up gets all the music realistically. Includes height and suspension tension adjustment.

P.U.A. Pick-up with Tone Arm and Volume Control, £1 17 0. P.U.B. as above, without Volume Control, £1 15 0. P.U.O. Pick-up only, £1 7 6. P.U.D. Tone Arm only, with Volume Control, 9s. 6d. P.U.E. Tone Arm only, without Volume Control, 6s. 9d.

Harlie GRAMOPHONE Pick-up & Tone Arm

Write for particulars of these and other Harlie Components to:
HARLIE BROS. (Dept. B.4),
 Balham Rd., Lr. Edmonton, London, N.9.
 Tel.: Tottenham 3446.

URGENT . . .
 from across the world



When men do business thousands of miles apart, they use Marconi Valves

Headquarters of 'Empiradio' beam wireless system, London. Message from Bombay: "Speed up delivery main-line rolling stock." Cape Town merchant wireleses: "Consignment oranges shipped today as arranged." British wholesaler sends urgent demand for Canadian furs. Melbourne newspaper reporter transmits latest Test Match scores. All day . . . all night . . . messages, orders, contracts . . . through Marconi Valves.

'Empiradio' beam wireless uses Marconi Valves. For their long range, their reliability. Put them in your wireless set, too. Cost not a penny more. Fit any set. Give you better service, greater volume, clearer tone. Use less current.

Marconiphone Company Limited, 210 Tottenham Court Road, London, W.1.

MARCONI VALVES
 The first and greatest name in wireless

Programmes for Monday—(Cont.)

PARIS (France)
Eiffel Tower (FL). 206 kc/s (1,455 m.); 12 kw.
7.56 a.m.—Time Signal on 9,231 kc/s (32.5 m.).
9.26 a.m.—Time Signal on 113.13 kc/s (2,650 m.).
5.45 p.m.—Le Journal Parlé.
7.10 p.m.—Meteorological Report.
7.20 p.m.—Concert. The Queen Symphony (Haydn). Programme from the Works of Mme. Simone Plé, with the collaboration of the Composer. Sonata in B for Violin, with Pianoforte accompaniment by the Composer. Deux anciens chants du terroir: (a) La fille aux champs, (b) La fille au lavoir, accompanied by the Composer. Pianoforte Solo by the Composer: Scherzo from the Pianoforte Sonata. Chansons franciscaines, accompanied by the Composer: (a) L'Angélus de l'aube, (b) Le jardin de notre soeur Claire, (c) Chanson pour la route, (d) L'alouette, (e) Aqua fresca. Conte, for Flute and Piano. Prémambule and Dance from the "Suite en trio," for Violin, Cello and Pianoforte, followed by *Orchestral Selections: Retour à l'endroit familier* (Schmitt). Cortège from the "Petite Suite" (Debussy). At 7.56 p.m.—Time Signal on 9,231 kc/s (32.5 m.).
10.26 p.m.—Time Signal on 113.13 kc/s (2,650 m.).

PARIS (France)
Petit Parisien. 914 kc/s (329 m.); 0.5 kw.
8.30 p.m.—Transmission of Pictures.
9.0 p.m.—Quintet Concert. Overture, "Die Fledermaus" (Joh. Strauss). Waltz, La Mandragore (Cools). Selection from "The Circus Princess" (Kálmán). Afghan Parade (Reuchsel). Scherzo, The Dryads (Raff). Entr'acte from "Jacques Callot" (Le Rey). Selection from "La Péricale" (Offenbach). Entr'acte from "Madame Chrysanthème" (Messager). Divertissement russe and Czardas (Michiels). Ballet Music from "Hiawatha" (Coleridge-Taylor). Amoureuse sérénade (Filippucci). Cortège polonais (Doneddu).
10.30 p.m. (approx.)—Close Down.

PARIS (France)
Radio-Paris (CFR). 174 kc/s (1,725 m.); 12 kw.
Transmits at intervals from 6.45 a.m.
12.30 p.m.—Gramophone Concert.
In the interval at 1.0 p.m.—Exchange Quotations and News.
2.0 p.m.—Exchange; Market Prices.
3.30 p.m.—Exchange Quotations.
3.45 p.m.—Gramophone Concert.
4.55 p.m.—News and Exchange.
6.0 p.m.—Agricultural Report and Racing Results.
6.30 p.m.—New York Exchange Rates.
6.35 p.m.—Gramophone Concert.
7.5 p.m.—Gramophone Records.
7.30 p.m.—Lesson in Book-keeping.
7.45 p.m.—Commercial Prices, Sports Notes and News.
8.0 p.m.—Concert. Historical Documents—"The Twenty-Fifth and Twenty-Sixth of February, 1848"—Sketch after Documents compiled by M. Arnaud, by M. Roger Montaux and his Company. Songs by Mme. Sonia Verlevtzky. Chamber Music by the Modern Society of Wind-Instruments in Paris. In the interval: Closing Prices of the American Markets, Sports Notes and News.
9.15 p.m.—Press Review; Time.
9.30 p.m.—Concert (continued).

POSEN (Poland)
806 kc/s (335 m.); 1.2 kw.
Transmits at intervals from 12.0 noon.
6.30 p.m.—Talk: Wireless Technique.
6.50 p.m.—Review of Books.
7.10 p.m.—Talk: The Past.
7.30 p.m.—Programme from *Warsaw*. Theatre and Wireless Notes in the intervals.
9.0 p.m.—Time and News.
9.15 p.m.—Transmission of Pictures.
9.45 p.m.—Dancing Lesson.
10.10 p.m. (approx.)—Close Down.

PRAGUE (Czechoslovakia)
Strasnice. 617 kc/s (487 m.); 5k.w.
Transmits at intervals from 10.15 a.m.
6.0 p.m.—Time and News.
6.5 p.m.—Programme from *Bratislava*.
7.0 p.m.—Cabaret Programme, relayed from *Brünn*, 878 kc/s (342 m.).
8.30 p.m.—Pianoforte Recital by Emma Saxlova.
9.0 p.m.—Time; News; Sports Notes.

9.15 p.m.—Gramophone Records.
9.55 p.m.—News, Theatre Review, and Programme Announcements.
10.0 p.m.—Time Signal.

ROME (Italy)
Ente Italiano Audizioni Radiofoniche (IRO). 680 kc/s (441 m.); 24 kw.
Transmits at intervals from 12 noon.
7.15 p.m.—News, Sports Notes, Weather and Press Review.
8.0 p.m.—Time Signal.
8.2 p.m.—Variety Programme, including "Davanti ar Monte de Pietà"—Sketch in Dialect (Durante) and Dance Music.
10.5 p.m.—News Bulletin.

SCHENECTADY (U.S.A.)
General Electric Company (WGY). 790 kc/s (379.5 m.); 50 kw. Relay by W2XAD on 15,340 kc/s; (19.56 m.) and W2XAF on 9,524 kc/s; (31.48 m.) from 11.0 p.m.
Transmits at intervals from 11.45 a.m.
11.30 p.m.—Time Signal.
11.32 p.m.—Dinner Music from the Hotel Van Curler, Schenectady.
12 midnight.—Talk on Water, from *Watertown, N.Y.*
12.15 a.m. (Tuesday).—Dinner Music (continued).
12.25 a.m.—Eye Health Talk.
12.30 a.m.—Weather Forecast.
12.34 a.m.—Dinner Music from the Hotel Van Curler.
12.45 a.m.—Steeffel Brothers Programme.
1.0—4.0 a.m.—New York Relay.
4.0 a.m.—Weather Forecast.

STOCKHOLM (Sweden)
Radiotjänst (SASA). 680 kc/s (436 m.); 1.5 kw. Relay by *Boden*, 250 kc/s (1,200 m.); *Göteborg*, 932 kc/s (322 m.); *Hörby*, 1,166 kc/s (257 m.); *Motala*, 223 kc/s (1,345 m.); *Ostersund*, 389 kc/s (770 m.); *Sundsvall*, 554 kc/s (542 m.).
Transmits at intervals from 6.15 a.m.
5.30 p.m.—Concert of Light Music.
6.10 p.m.—Talk for Women.
6.30 p.m.—Talk in English by Mr. S. J. Charleston: Some Aspects of English Education.
7.0 p.m.—Talk on Foreign Politics.
7.20 p.m.—Soprano and Pianoforte Recital from the Works of Knut Håkanson, relayed from *Göteborg*.
8.0 p.m.—Reading of Lyrics.
8.15 p.m.—News and Weather.

8.40 p.m.—Talk on Eugenics, relayed from *Malmö* 1,301 kc/s (231 m.).
9.10 p.m.—Concert of Scandinavian Music by Male Voice Choir.
9.40 p.m. (approx.)—Close Down.

STUTTGART (Germany)
Süddeutscher Rundfunk, 833 kc/s (360 m.); 1.5 kw. Relay by *Freiburg*, 527 kc/s (570 m.).
Transmits at intervals from 9.0 a.m.
3.0 p.m.—Orchestral Concert.
4.45 p.m.—Time, Weather and Labour Market Report.
5.0 p.m.—Talk: The Intellectual Crisis in American Culture, and the Repudiation of Puritanism.
5.30 p.m.—Talk: Large Observatories.
6.0 p.m.—Literary Programme—Rudolf G. Binding.
6.30 p.m.—Programme from *Frankfurt*.
8.15 p.m.—"It"—Drama (Karl Schönherr). Characters: A Doctor and a Woman. After the Programme, News.

TOULOUSE (France)
Radiophonie du Midi. 788 kc/s (381 m.); 8 kw.
Transmits at intervals from 1.0 p.m.
6.0 p.m.—Dance Music Programme. In the interval at 6.15 p.m.—Talk on French History.
6.45 p.m.—Exchange Quotations and Racing Results.
7.0 p.m.—Concert of Russian Songs.
7.15 p.m.—News Bulletin.
7.30 p.m.—Dance Music Programme.
8.0 p.m.—Exchange Quotations.
8.15 p.m.—Orchestral Concert. Marche aux flambeaux (Meyerbeer). Aria (Bach). Norwegian Dance (Grieg). Overture, "Egmont" (Beethoven). Minuet in G Major. Marche au supplice (Berlioz).
8.45 p.m.—Concert. In the interval, Relay of a Short Comedy.
10.15 p.m.—North African News.
10.30 p.m. (approx.)—Close Down.

TURIN (Italy)
Ente Italiano Audizioni Radiofoniche (ITO), 1,094 kc/s (274 m.); 7 kw.
Transmits at intervals from 7.15 a.m.
6.15 p.m.—Concert. March, Halali (Tartarini). Danza di schiava (Montanari). Waltz, Fête de roses. Tango, Vahdah (Hamud). Selection from "Les Saltimbanques"

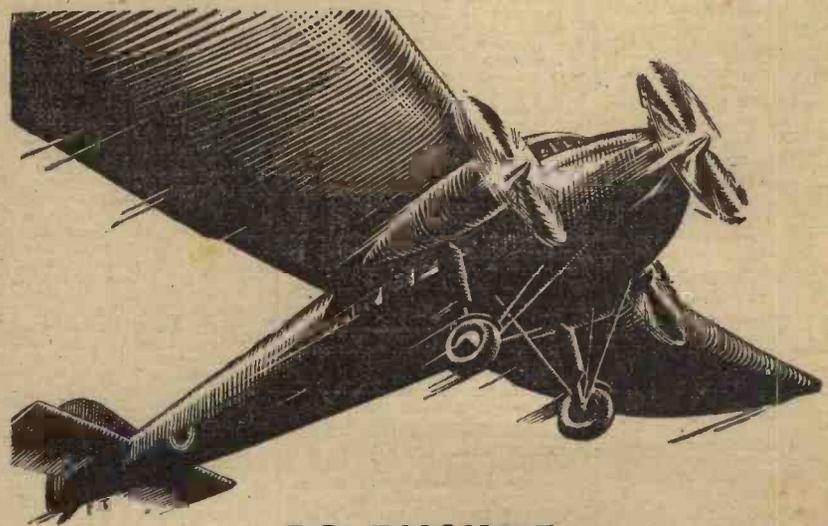
(Ganne). Foxtrot, Occhi grigi (Cominotti). Tango, Lancy Dear (Sansoni). One-step, Vola Vola (Liberati).
7.20 p.m.—ITO Station Notes.
7.30 p.m.—Time Signal.
7.32 p.m.—Evening Concert.
8.0 p.m.—Variety Concert. In the intervals, Talk and Wireless Notes.
11.0 p.m. (approx.)—Close Down.

VIENNA (Austria)
Radio-Wien. 581 kc/s (516.3 m.); 15 kw. Relay by *Graz*, 851 kc/s (352.5 m.); *Innsbruck*, 1,058 kc/s (283.5 m.); *Klagenfurt*, 662 kc/s (453.2 m.); and *Linz*, 1,220 kc/s (245.9 m.).
Transmits at intervals from 10.0 a.m.
5.30 p.m.—Talk: Modern Dutch Art.
6.0 p.m.—Talk: River Navigation in Former Times and Now.
6.30 p.m.—Talk: Over Austria in an Aeroplane.
6.55 p.m.—Time and Weather.
7.0 p.m.—Talk: Ghost and Detective Stories; followed by "The Beast" Sketch (Auer).
8.30 p.m.—Popular Concert. Overture, "Frühlingsluft" (Jos. Strauss). Intermezzo, Blumen-gruss (Wacek). The British Patrol (Asch). Waltz, Freut euch des Lebens (Strauss). Selection from "La Traviata" (Verdi). Solveig's Song (Grieg). Selections from "The Gipsy Baron" (Joh. Strauss). Suite from "La Source" (Delibes). Waltz, Schneeballen (Ziehrer). Pudding Potpourri (Morena). Polka, Kleine Chronik (Mahler); followed by Phototelegraphy Transmission.

WARSAW (Poland)
Polskie Radio. 212 kc/s (1,411 m.); 8 kw.
Transmits at intervals from 10.58 a.m.
6.25 p.m.—Gramophone Records.
6.58 p.m.—Time Signal.
7.0 p.m.—Programme Announcements.
7.5 p.m.—Programme in Commemoration of the Latvian National Festival.
9.15 p.m.—Weather, Police and Sports Notes.
9.25 p.m.—Talk: Whilst smoking a Cigarette.
9.35 p.m.—News Bulletin.
10.0 p.m.—Chamber Music relayed from the Oaza Restaurant.
11.0 p.m. (approx.)—Close Down.

ON TRANSATLANTIC FLIGHTS

WHERE THE WIRELESS MAY BE THE LAST HOPE THEY PIN THEIR FAITH TO THE EXIDE BATTERY



Exide THE LONG LIFE BATTERY

TO ENSURE PERFECT RECEPTION ALWAYS HAVE THIS FAMOUS WELL-NIGH INFALLIBLE BATTERY IN YOUR OWN SET

Obtainable from Exide Service Agents and all reputable dealers. Exide Service Agents give service on every make of battery.

EXIDE BATTERIES (London Sales & Service Depot) 215-229, SHAFTESBURY AVENUE, W.C.2

PROGRAMMES FOR TUESDAY

(November 19)

NOTE: THE HOURS OF TRANSMISSION ARE REDUCED TO GREENWICH MEAN TIME

BARCELONA (Spain)

Radio-Barcelona (EAJ 1). 860 kc/s (349 m.); 8 kw.
Transmits at intervals from 11.0 a.m. 8.30 p.m.—Elementary English Lesson.
9.0 p.m.—Chimes; Weather; News.
9.5 p.m.—Partial Relay of an Opera from the Grand Teatro del Liceo, followed by Barcelona Exhibition Notes.
11.0 p.m. (approx.)—Close Down.

BERLIN (Germany)

Königswusterhausen. 183 kc/s (1,635 m.); 26 kw.
Transmits at intervals from 5.55 a.m. 4.30 p.m.—Talk: Religious Music—The Music in the Catholic Service.
5.0 p.m.—Talk: The Understanding of Music.—The Smaller Forms of Pianoforte Music.
5.30 p.m.—Advanced French Lesson.
5.55 p.m.—Talk: Good German for Everybody.
6.20 p.m.—Talk: The Fate of the Previously Convicted.
7.0 p.m.—See Berlin (Witzleben).
8.0 p.m.—Concert from the Hotel Esplanade, followed by Press Review, News and Picture Transmission from Berlin (Witzleben).

BERLIN (Germany)

Witzleben. 716 kc/s (418 m.); 1.5 kw.
Transmits at intervals from 5.55 a.m. 3.30 p.m.—Orchestral Concert.
5.30 p.m.—Review of Books, Biographies and Reminiscences of Politicians.
6.0 p.m.—Talk: The Physical Aspect of the World To-day—Natural Science and the Aspect of the World.
6.30 p.m.—Hans Reimann and his Animals—Hans Reimann at the Microphone.
7.0 p.m.—Talk: Thoughts of the Time—The Young Plan from the Point of View of Foreign Politics.
7.25 p.m.—Talk by Dr. Rudolf Breitscheid.
8.0 p.m.—"Sister Henrietta"—Play (Kesser); followed by Press Review, Time, Weather, News, Sports Notes and Picture Transmission.

BERNE (Switzerland)

Radio-Bern. 743 kc/s (403 m.); 1 kw.
Transmits at intervals from 11.43 a.m. 6.28 p.m.—Time and Weather.
6.30 p.m.—Talk: The Care of Dogs.
7.0 p.m.—Popular Programme of Readings and Zither Selections.
7.45 p.m.—Orchestral Selections.
8.0 p.m. (approx.)—"Dorothea"—Musical Play (Offenbach).
9.0 p.m.—News, Weather and Close Down.

BRATISLAVA (Czechoslovakia)

1,076 kc/s (279 m.); 12.5 kw.
Transmits at intervals from 10.30 a.m. 6.0 p.m.—Programme from Prague.
6.5 p.m.—"Old Students"—Comedy in Three Acts (Strejcek), relayed from Brinn, 878 kc/s (342 m.).
7.30 p.m.—Programme from Prague.
8.15 p.m.—Popular Music.
9.0 p.m.—Programme from Prague.
9.15 p.m.—Concert of Tzigane Music.
9.55 p.m.—News and Programme Announcements.

BRESLAU (Germany)

923 kc/s (325 m.); 2 kw. Relay by Gleitwitz, 1,184 kc/s (253 m.).
Transmits at intervals from 10.15 a.m. 6.20 p.m.—Weather Report for Farmers.
6.22 p.m.—Gramophone Concert illustrating the Demoniacal in Music.
7.5 p.m.—Talk for Women who work.
7.50 p.m.—Film Stars discuss the Making of a Big Film.
7.50 p.m.—Instrumental Cabaret Programme.
8.25 p.m.—Wireless Snapshots.
9.0 p.m.—Press Review from Berlin (Witzleben).
9.25 p.m.—News Bulletin.
9.45 p.m.—Report by the Silesian Wireless Society.

BRUSSELS (Belgium)

Radio-Belgique. 590 kc/s (508.5 m.); 1 kw.
5.0 p.m.—Dance Music from the St. Sauveur Palais de Danse.
6.0 p.m.—Elementary French Lesson, arranged by the Berlitz School.
6.30 p.m.—Gramophone Records.
7.30 p.m.—Le Journal Parlé.

8.15 p.m.—Orchestral Concert. Overture, "Le petit Faust" (Hervé), Hardi les bleus (Cléric), Selection from "Gretina Green" (Guiraud). Dances from "Tom Jones" (German). Ton p'tit cœur (Gauvain). Bouton d'or (Piermé). Song. Selection from "Madame Butterfly" (Puccini). Song. Scènes brabançonnnes (Sarly). Fantasia for Clarinet (Rabaud). Ballet russe (Luigini). In the intervals at 8.30 p.m.—Talk: A Century of Art Industries, and at 9.0 p.m.—Topical Talk.
10.15 p.m.—News Bulletin.

BUDAPEST (Hungary)

545 kc/s (550 m.); 20 kw.
Transmits at intervals from 8.15 a.m. 6.30 p.m.—Humorous Programme.
7.30 p.m.—Concert of Light Music. March, Ubi bene, ibi patria (Pécsi). Im Reiche des Indra (Lincke). Potpourri of Operetta Music (Buttykay). "Way down South (Myddleton). African Intermezzo, Kuko-kama estapo (Lincke). Potpourri of Hungarian Songs (Pazeller). Polka, Tritsch-tratsch (Strauss).
8.30 p.m.—Talk in French: Hungarian History.
9.0 p.m.—Time Signal, Weather Report and News, followed by Tzigane Music from the Hotel Britannia.

COLOGNE (Germany)

Westdeutscher Rundfunk. 1,319 kc/s (227 m.); 2 kw.
See Langenberg Programme.

COPENHAGEN (Denmark)

1,067 kc/s (281 m.); 0.75 kw. Relay by Kalundborg, 260 kc/s (1,153 m.).
Transmits at intervals from 6.30 a.m. 5.20 p.m.—German Language Lesson.
5.50 p.m. (Kalundborg only)—Weather.
6.0 p.m.—News Bulletin.
6.15 p.m.—Time Signal.
6.16 p.m.—Talk: Mass Production.
6.45 p.m.—Talk: Excavations in Palestine and the Neighbouring Countries.
7.15 p.m.—Recital of Danish Songs.—Du dejlige Danmark (Knudsen). I Danmark ligger der Hus ved Hus (Kjerulf). Jeg vil bygge mit Land (Toft). Havet omkring Danmark (Nielsen). Du danske Mand (Nielsen).
7.30 p.m.—"The Hansen Family"—Humorous Episode (Jens Locher).
7.45 p.m.—Recital of Duets. Norwegian Folk Songs translated into Danish.
8.5 p.m.—Reading from "Sister Carrie" (Theodore Dreiser).
8.30 p.m.—News Bulletin.
8.45 p.m.—Concert from the Works of Mozart. Overture, "Lucio Silla." Symphony in C major. Pianoforte Concerto in A major. Overture, "Idomeneus."

CORK (Ireland)

(6CK). 1,337 kc/s (225 m.); 1 kw.
1.30 p.m.—Weather Forecast and Gramophone Selections.
6.0 p.m.—Exchange, News Bulletin and Gramophone Records.
6.15 p.m.—Programme from Dublin.

CRACOW (Poland)

Polskie Radio. 959 kc/s (313 m.); 0.5 kw.
Transmits at intervals from 10.58 a.m. 6.50 p.m.—Programme from Posen, followed by News from Warsaw, and Relay of Foreign Stations.
11.0 p.m.—Chimes from the Church of Notre Dame.

DUBLIN (Ireland)

(2RN). 725 kc/s (413 m.); 1 kw.
1.30 p.m.—Time, Weather, Exchange and Gramophone Records.
6.0 p.m.—Gramophone Records.
6.15 p.m.—Programme for Children.
7.0 p.m.—Gramophone Records.
7.20 p.m.—News Bulletin.
7.30 p.m.—Time Signal.
7.32 p.m.—Leighacht Gaedhilge.
7.45 p.m.—C. M. Ni Dhubhgaill; Talk.
8.0 p.m.—Concert. Dr. Annie Patterson: Original Compositions. The Station Orchestra. Sheila O'Sullivan and Company: A Sketch. H. R. White: Musical Talk.
9.30 p.m.—Organ Recital by Vincent Pentony, relayed from St. Francis Xavier's Church.
10.0 p.m.—Concert (continued). A. J. O'Farrell (Baritone). Comdt. Sauerzweig and the Station Orchestra: International Musical Variety.

10.30 p.m.—Time, News, Weather and Close Down.

FRANKFURT-am-MAIN (Germany)

770 kc/s (390 m.); 1.5 kw. Relay by Cassel, 1,220 kc/s (246 m.).
Transmits at intervals from 5.30 a.m. 3.0 p.m.—Orchestral Concert.
5.0 p.m. (from Cassel)—Talk: Spain and the Barcelona Exhibition.
5.20 p.m.—Talk on Health.
5.40 p.m.—French Literature.
5.55 p.m.—French Language Lesson.
6.20 p.m.—Hints for Ramblers, by the Taurus Club.
6.30 p.m.—Programme from Stuttgart.
8.15 p.m.—Song Recital by Friedl Kaan of Vienna.
9.0 p.m.—"Faces"—Programme of Orchestral and Literary Selections.
10.0 p.m.—Dance Music Programme.

HAMBURG (Germany)

Norag (ha, in Morse). 806 kc/s (372 m.); 1.5 kw. Relay by Bremen, 941 kc/s (319 m.); Flensburg, 1,373 kc/s (218 m.); Hanover, 536 kc/s (560 m.); and Kiel, 1,220 kc/s (246 m.).
Transmits at intervals from 5.20 a.m. 3.15 p.m. (from Kiel)—Soprano Song Recital from the Works of Rossini and Bellini.
4.0 p.m. (from Bremen)—Ernst Licht Programme—Vocal and Instrumental Selections with the Composer at the Pianoforte.
4.50 p.m.—Talk in connection with the North German Philatelists' Society's Exhibition of Postage Stamps: Stamp-collecting in North Germany.
5.15 p.m.—Orchestral Concert.
6.0 p.m.—Agricultural Talk: The Effects of the first Night-Frosts.
6.25 p.m.—Talk on the occasion of the Kollwitz Exhibition in the Galerie Commetter: Käthe Kollwitz.
6.50 p.m.—Frankfurt Exchange; Weather.
7.0 p.m. (from Kiel)—"Unse olen Dage"—Dialect Play in Three Acts (Ingeborg Andresen).
9.15 p.m.—Talks, News, Weather, Sports and Miscellaneous Announcements.
9.35 p.m.—Relay of Foreign Stations.

HILVERSUM (Holland)

1,004 kc/s (298 m.). After 5.40 p.m. 280 kc/s (1,071 m.); 6.5 kw.
9.40 a.m. till Close Down.—Programme of the Algemeene Vereeniging Radio Omroep (A.V.R.O.).
9.40 a.m.—Time and Daily Service.
11.40 a.m.—Police Announcements.
11.55 a.m.—Quartet Concert.
1.40 p.m.—Gramophone Records.
2.40 p.m.—Talk (to be announced).
3.40 p.m.—Afternoon Concert.
4.40 p.m.—5.10 p.m.—Interval.
5.10 p.m.—Tzigane Orchestra Music.
5.40 p.m.—Time and Concert (contd.).
6.10 p.m.—Exchange Quotations.
6.25 p.m.—English Language Lessons.
7.25 p.m.—Police Announcements.
7.40 p.m.—Time and Concert by a Mandoline Orchestra, relayed from Amsterdam. March, Entre nous (Hendriksen). Ballet Music from "Rosamunde" (Schubert). Quatre variations sur un thème simple (Charlerny). Violin Solos: (a) Romance in F Major (Beethoven), (b) Syncopation (Kreisler), (c) Hejre Kati (Hubay). Songs to the Harpsichord: (a) Ave Maria (Gounod), (b) Fairy Nightingale (Bacilek), (c) Chant du rossignol (Saint-Saëns). Hungarian Melodies for Harpsichord. Violin Solos: (a) Cradle Song (Brahms), (b) Sérénade badine (Gabriel-Marie), (c) Sérénade (Lensky), (d) La fontaine fantasque (Lensky), (e) Heksen-zardas (Lensky). Czech and Tzigane Songs with Harpsichord Accompaniment. Scandinavian Suite (Frederiksen).
8.40 p.m.—Orchestral Concert. Overture, "Fra Diavolo" (Auber). Ballet Music from "Le Cid" (Massenet). Extase (Ganne). Fantasia on "The Pearl Fishers" (Pares). Menuet des petits précieuses (Pares). Zaragozana (Filippucci). Bien aimées (Waldteufel). Au son des cloches (Popy). Selection from "Les Saltimbanques" (Ganne). Pizzicato Polka (Samehntin). Fué al Pasar (Ghirlanda). Soldat d'Carton—March (Frémaux). In the interval at 9.40 p.m.—Weather and News.
10.40 p.m.—Gramophone Records.
11.40 p.m. (approx.)—Close Down.

LAHTI (Finland)

167 kc/s (1,800 m.); 40 kw. Relay by Helsingfors, 1,357 kc/s (221 m.).
Transmits at intervals from 10.0 a.m. 6.0 p.m.—Orchestral Concert. Harlequin Suite (Bizet). Andante elegiaco for String Orchestra, (Eino Linnala). Recital of Songs. On the Steppes of Central Asia (Borodine). Overture, "Benvenuto Cellini" (Berlioz).
7.0 p.m.—Recitations.
7.25 p.m.—Gramophone Music.
7.45 p.m.—News in Finnish and Swedish.

LANGENBERG (Germany)

Westdeutscher Rundfunk. 635 kc/s (473 m.); 13 kw. Relay by Aix-la-Chapelle, 662 kc/s (453 m.); Cologne, 1,319 kc/s (227 m.); and Münster, 1,283 kc/s (234 m.).
Transmits at intervals from 5.45 a.m. 4.30 p.m.—Orchestral Concert. Ballet des Parfums (Popy). Overture, "Mignon" (Thomas). Légende, No. 7 (Dvorák). Scandinavian Caprice (Danisch). Thermen-Walzer (Strauss). Spring Serenade (Lacombe). Froschkönigs Fackelzug (Kronberger).
5.30 p.m.—French Conversation.
5.50 p.m.—Topical Talk.
6.0 p.m.—Economic Report, Weather and Sports Notes.
6.10 p.m.—Discussion on Mankind by Hardt, Honigsheim, Stein and Worm.
6.40 p.m.—Symphony Concert by the Königberg Wireless Orchestra, relayed from the Grosse Saal der Lese, Cologne. Symphony in A Major, No. 29 (Mozart). Symphonic Poem, Pelles and Melisande, Op. 5 (Schönberg). The Third Symphony in F Major, Op. 90 (Brahms); followed by News, Sports and Miscellaneous Notes and Silent Night.

LEIPZIG (Germany)

Mitteldeutscher Rundfunk. 1,157 kc/s (259 m.); 1.5 kw. Relay by Dresden, 941 kc/s (319 m.).
Transmits at intervals from 8.30 a.m. 4.0 p.m.—Concert of Fairy Music. Overture, "Genoveva" (Schumann).
11.10 a.m. till Close Down. Programme of the Catholic Radio Society (K.R.O.).

MILAN (Italy)

Ente Italiano Audizioni Radiofoniche. 599 kc/s (501 m.); 7 kw. Transmits at intervals from 7.15 a.m. 7.30 p.m.—Time Signal.
7.32 p.m.—Concert. Soprano Solo from "Carmen" (Bizet). Tenor Solo from "André Chénier" (Giordano). Contralto Solos: (a) Le rien d'amour (Spontini), (b) O notte grand Dea del mistero (Piccinni), (c) Canzonetta (Pasquini). Sonata in D for Violin (Nardini). Three Lyrics for Soprano (Guarino). Bilder aus dem Osten for Four-handed Piano (Schumann). Contralto Solos: (a) Antica stampa italiana (Santoliquido), (b) Notturno alla luna (Toni), (c) Strimpellata (Tarenghi). Aria (Frescobaldi). Waltz, Op. 64 (Chopin). Tenor Solo from "La Tosca" (Puccini). Talk in the interval.
9.0 p.m.—Programme from Turin. In the interval at 10.30 p.m.—Wireless News.
11.0 p.m. (approx.)—Close Down.

MORAVSKA-OSTRAVA (Czechoslovakia)

1,139 kc/s (263 m.); 10 kw. Transmits at intervals from 10.30 a.m. 6.0 p.m.—See Prague Programme.
6.5 p.m.—"Old Students"—Comedy (Strejcek), relayed from Brinn 878 kc/s (342 m.).
7.30 p.m.—Programme from Prague.
8.15 p.m.—Programme from Bratislava.
9.0 p.m.—Programme from Prague.

MOTALA (Sweden)

223 kc/s (1,345 m.); 30 kw. See Stockholm Programme.

MUNICH (Germany)

563 kc/s (533 m.); 1.5 kw. Relay by Augsburg, 536 kc/s (560 m.); Kaiserslautern, 1,112 kc/s (270 m.); and Nuremberg, 1,256 kc/s (239 m.).
Transmits at intervals from 5.45 a.m. 5.15 p.m.—French Language Lesson.
5.45 p.m.—Talk: Mountains and Mountaineers.
6.0 p.m.—Wireless Report: The State.
6.30 p.m.—Orchestral Concert from the Works of Fall.
7.30 p.m.—"Das rosetide ne Strumpfbandl"—Sketch (Weichand).
7.55 p.m.—Baritone Recital of Songs

11.10 a.m.—Religious Recital.
11.40 a.m.—11.55 a.m.—Interval.
11.55 a.m.—Trio Concert.
12.55 p.m.—Gramophone Records.
1.40 p.m.—Programme for Women.
2.40 p.m.—Dressmaking Lesson.
3.10 p.m.—Programme for Schools.
3.40 p.m.—Gramophone Selections.
4.40 p.m.—Talk by Prof. van Ginneken.
5.30 p.m.—Gramophone Records.
5.55 p.m.—Exchange Quotations.
6.0 p.m.—Gramophone Records.
6.25 p.m.—Talk by Mr. Borsten.
6.40 p.m.—Latin Lesson.
7.10 p.m.—Talk by Mr. Donders.
7.41 p.m.—An Interesting Visit to Rademaker's Royal Chocolate and Cocoa Factory, The Hague, conducted by one of the Directors.
8.25 p.m.—Orchestral Concert. Concerto grosso (Vivaldi). Concerto for Violin (Beethoven). Suite, Mother Goose (Ravel). Overture, "Carnival roman" (Berlioz). In the interval: News and Gramophone Records.
10.10 p.m. (approx.)—Close Down.

KALUNDBORG (Denmark)

Kalundborg Radio. 260 kc/s (1,153 m.); 7.5 kw.
See Copenhagen Programme.

KÖNIGSBERG (Germany)

Ostmarken Rundfunk. 1,085 kc/s (276 m.); 2.5 kw. Relay from Danzig, 662 kc/s (453 m.).
Transmits at intervals from 4.55 a.m. 5.15 p.m.—(from Danzig)—Talk: Proper Nourishment and the Health of the People.
5.45 p.m.—Talk: The Artisan's Relation to Nature.
6.15 p.m.—Topical Talk.
6.30 p.m.—(from Danzig)—Elementary French Lesson.
6.55 p.m.—Weather Report.
7.0 p.m.—Orchestral Concert relayed from Danzig. Ballet Music from "Samson and Delilah" (Saint-Saëns). Chopiniana (Glazounoff). Polish Dance. Melodies (Scharwenka). Dance Intermezzo (Sibelius). Selection from "Sylvia" (Delibes). Ballet Music from "Faust" (Gounod).
8.30 p.m.—The East Prussian Poet Ernst Wiechert reads from his Unpublished Works.
9.15 p.m.—Weather, News and Sports Notes.
9.30 p.m.—Concert relayed from the Central Hotel.

LAHTI (Finland)

Ente Italiano Audizioni Radiofoniche. 599 kc/s (501 m.); 7 kw. Transmits at intervals from 7.15 a.m. 7.30 p.m.—Time Signal.
7.32 p.m.—Concert. Soprano Solo from "Carmen" (Bizet). Tenor Solo from "André Chénier" (Giordano). Contralto Solos: (a) Le rien d'amour (Spontini), (b) O notte grand Dea del mistero (Piccinni), (c) Canzonetta (Pasquini). Sonata in D for Violin (Nardini). Three Lyrics for Soprano (Guarino). Bilder aus dem Osten for Four-handed Piano (Schumann). Contralto Solos: (a) Antica stampa italiana (Santoliquido), (b) Notturno alla luna (Toni), (c) Strimpellata (Tarenghi). Aria (Frescobaldi). Waltz, Op. 64 (Chopin). Tenor Solo from "La Tosca" (Puccini). Talk in the interval.
9.0 p.m.—Programme from Turin. In the interval at 10.30 p.m.—Wireless News.
11.0 p.m. (approx.)—Close Down.

MILAN (Italy)

Ente Italiano Audizioni Radiofoniche. 599 kc/s (501 m.); 7 kw. Transmits at intervals from 7.15 a.m. 7.30 p.m.—Time Signal.
7.32 p.m.—Concert. Soprano Solo from "Carmen" (Bizet). Tenor Solo from "André Chénier" (Giordano). Contralto Solos: (a) Le rien d'amour (Spontini), (b) O notte grand Dea del mistero (Piccinni), (c) Canzonetta (Pasquini). Sonata in D for Violin (Nardini). Three Lyrics for Soprano (Guarino). Bilder aus dem Osten for Four-handed Piano (Schumann). Contralto Solos: (a) Antica stampa italiana (Santoliquido), (b) Notturno alla luna (Toni), (c) Strimpellata (Tarenghi). Aria (Frescobaldi). Waltz, Op. 64 (Chopin). Tenor Solo from "La Tosca" (Puccini). Talk in the interval.
9.0 p.m.—Programme from Turin. In the interval at 10.30 p.m.—Wireless News.
11.0 p.m. (approx.)—Close Down.

MORAVSKA-OSTRAVA (Czechoslovakia)

1,139 kc/s (263 m.); 10 kw. Transmits at intervals from 10.30 a.m. 6.0 p.m.—See Prague Programme.
6.5 p.m.—"Old Students"—Comedy (Strejcek), relayed from Brinn 878 kc/s (342 m.).
7.30 p.m.—Programme from Prague.
8.15 p.m.—Programme from Bratislava.
9.0 p.m.—Programme from Prague.

MOTALA (Sweden)

223 kc/s (1,345 m.); 30 kw. See Stockholm Programme.

MUNICH (Germany)

563 kc/s (533 m.); 1.5 kw. Relay by Augsburg, 536 kc/s (560 m.); Kaiserslautern, 1,112 kc/s (270 m.); and Nuremberg, 1,256 kc/s (239 m.).
Transmits at intervals from 5.45 a.m. 5.15 p.m.—French Language Lesson.
5.45 p.m.—Talk: Mountains and Mountaineers.
6.0 p.m.—Wireless Report: The State.
6.30 p.m.—Orchestral Concert from the Works of Fall.
7.30 p.m.—"Das rosetide ne Strumpfbandl"—Sketch (Weichand).
7.55 p.m.—Baritone Recital of Songs

Programmes for Tuesday—(Cont.)

and Ballads. Pierrot lunaire—Song Cycle Op. 4 (Kovalsky). Two Ballads (Löwe): (a) Die Lauer, (b) Hochzeitlied.
8.35 p.m.—Austrian Programme. Extracts from "The Death of Titian"—Drama in Verse (Hofmannsthal); followed by News.
9.45 p.m.—Dancing Lesson.

OSLO (Norway)
Kringkastingselskapet. 608 kc/s (493 m.); 1.2 kw. Relayed by Fredrikstad, 761 kc/s (394 m.); Hamar, 527 kc/s (570 m.); Notodden, 1,058 kc/s (283 m.); Porsgrund, 662 kc/s (453 m.).
Transmits at intervals from 10.10 a.m. 6.15 p.m.—Weather and News.
6.30 p.m.—Elementary English Lesson.

7.0 p.m.—Time and Talk: The Cultivation of Flax.
7.30 p.m.—Orchestral Concert. Florentinske Stemninger (Danning). Aftenstemning (Lunde) Dröm (Lunde). Coquette (Lunde). Siste reis (Alnaes). Legend and Minuet (Kristoffersen).
8.30 p.m.—Weather and News.
8.50 p.m.—Talk: Current Events.
9.5 p.m.—Talk: One Hundred Years of Locomotives—Rainhill and George Stephenson.
9.35 p.m. (approx.)—Close Down.

PARIS (France)
Ecole Supérieure (FPTT). 671 kc/s (447 m.); 0.8 kw.
Transmits at intervals from 8.0 a.m. 6.30 p.m.—Radio Journal de France.
8.0 p.m.—English Language Lesson, arranged by the Berlitz School.
8.30 p.m.—Talk on Aviation.
8.45 p.m.—Concert arranged by the Association Générale des auditeurs de T.S.F., followed by News, Time and Weather.
10.0 p.m.—Talk on Foreign Affairs.

PARIS (France)
Eiffel Tower (FL). 206 kc/s (1,455 m.); 12 kw.
7.56 p.m.—Time Signal on 9,231 kc/s (32.5 m.).
9.26 p.m.—Time Signal on 113.13 kc/s (2,650 m.).
5.45 p.m.—Le Journal Parlé.
7.10 p.m.—Weather Report.
7.20 p.m.—Concert. At 7.56 p.m.—Time Signal on 9,231 kc/s (32.5 m.).

10.26 p.m.—Time Signal on 113.13 kc/s (2,650 m.).
PARIS (France)
Petit Parisien. 914 kc/s (329 m.); 0.5 kw.
8.30 p.m.—Transmission of Pictures.
8.45 p.m.—Gramophone Records, Talk and News.
9.0 p.m.—Concert. Ouverture de Brumaire (Massenet), Waltz from "Raymonda" (Glazounoff). Hungarian Rhapsody No. 2 (Liszt). First Suite from "Peer Gynt" (Grieg). La boîte à bijoux (Debussy). Slavonic Dance No. 5 (Dvorák).

PARIS (France)
Radio-Paris. (CFR). 174 kc/s (1,725 m.); 12 kw.
Transmits at intervals from 6.45 a.m. 12.30 p.m.—Gramophone Concert. In the interval at 1.0 p.m.—Exchange Quotations and News.
2.0 p.m.—Exchange; Market Prices.
3.30 p.m.—Exchange Quotations.
3.45 p.m.—Concert. Orchestral Selection: Overture, "Le Châlet" (Adam). Sonata for Cello (Vivaldi). Orchestral Selection: L'Envolée (Trémisot-Rudd). Two Etudes for Pianoforte (Zouabaloff). Orchestral Selection: Adoration (Filippucci). Sonata for Violin (Grieg). Orchestral Selection: Histoires (Imbert).

4.55 p.m.—News and Exchange.
6.0 p.m.—Agricultural Report and Racing Results.
6.30 p.m.—New York Exchange Rates.
6.35 p.m.—Gramophone Concert.
7.15 p.m.—Literary Review.
7.30 p.m.—Elementary English Lesson.
7.45 p.m.—Commercial Prices, Economic and Social Notes and Amusement Guide.
8.0 p.m.—Concert of Symphony Music by the Orchestra and Mlle. Lotte Lehmann. In the intervals, at 1.725 p.m.—Closing Prices of the American Markets, Sports Notes and News, and at 9.15 p.m.—Press Review and Time.

POSEN (Poland)
896 kc/s (335 m.); 81.2 kw. Relayed on 9,428 kc/s (31.8 m.) from 6.5 p.m.—6.30 p.m., 6.50 p.m.—9.30 p.m., and 9.45 p.m.—10.15 p.m.

Transmits at intervals from 6.15 a.m. 5.45 p.m.—Miscellaneous Items.
6.30 p.m.—Musical Selections.
6.50 p.m.—Literary Dialogues.
6.50 p.m.—An Opera Relay. Theatre and Wireless Notes in the interval.
9.30 p.m.—Time and News.
9.45 p.m.—Transmission of Pictures.
10.15 p.m.—Dance Music relayed from the Café Esplanade.
11.0 p.m. (approx.)—Close Down.

PRAGUE (Czechoslovakia)
Strasnice. 617 kc/s (487 m.); 5 kw. Transmits at intervals from 10.15 a.m. 6.0 p.m.—Time and News.
6.5 p.m.—"Old Students"—Comedy in Three Acts (Strejcek), relayed from Brunn, 878 kc/s (342 m.).
7.30 p.m.—Pianoforte Recital. Le Corsaire (Berlioz). Concerto in A major (Liszt).
8.30 p.m.—Popular Song Recital.
9.0 p.m.—Time, News, Sports Notes.
9.15 p.m.—Popular Music.
9.55 p.m.—News, Programme Announcements and Theatre Review.
10.0 p.m.—Time Signal.

ROME (Italy)
Ente Italiano Audizioni Radiofoniche (IRO). 680 kc/s (441 m.); 2.4 kw.
Transmits at intervals from 12 noon. 7.15 p.m.—News, Sports Notes, Exchange, Weather and Press Review.
8.0 p.m.—Time Signal.
8.2 p.m.—"Romeo and Juliet"—Opera in Three Acts (Zandonai). In the intervals: Reading, and Review of Art and Archaeology.
10.5 p.m.—News Bulletin.

SCHENECTADY (U.S.A.)
General Electric Company (WGY). 790 kc/s (379.5 m.); 50 kw. Relayed by W2XAF on 9,524 kc/s (31.48 m.) from 11.0 p.m. Transmits at intervals from 11.45 a.m. 11.30 p.m.—Time Signal.
11.32 p.m.—Dinner Music from the Hotel Ten Eyck, Albany, N.Y.
11.54 p.m.—Talk on Banking, from Albany, N.Y.
12 midnight.—General Electric Concert Orchestra.
12.29 a.m. (Wednesday).—Weather Forecast.
12.30 a.m.—New York Relay.
1.0 a.m.—Weather Forecast.
1.2—4.30 a.m.—New York Relay.
4.30 a.m.—Organ Recital relayed from Albany, N.Y.
5.0 a.m. (approx.)—Close Down.

STOCKHOLM (Sweden)
Radiotjänst (SASA). 689 kc/s (436 m.); 1.5 kw. Relayed by Boden, 250 kc/s (1,200 m.); Göteborg, 932 kc/s (322 m.); Hörby, 1,166 kc/s (257 m.); Motala, 223 kc/s (1,345 m.); Östersund, 389 kc/s (770 m.); Sundsvall, 554 kc/s (542 m.).
Transmits at intervals from 6.15 a.m. 5.30 p.m.—Concert of Light Music.
6.10 p.m.—Agricultural Talk.
6.30 p.m.—From Uppsala, 662 kc/s 453 m.). Talk: The Phenomenon of Light in Atmosphere.
7.0 p.m.—(from Göteborg). Concert by a String Orchestra. Aria after Sebastian Bach's "O Mensch, bewein dein Sünde gross" (Reger). Nocturne, Op. 40 (Dvorák). Serenade, From the far West (Bantock).
7.40 p.m.—Relay of Foreign Stations.
8.15 p.m.—News and Weather.
8.40 p.m.—from Malmö, 1,301 kc/s (231 m.). Literary Review.
9.10 p.m.—Relay of Foreign Stations.
10.0 p.m. (approx.)—Close Down.

STUTTGART (Germany)
Süddeutscher Rundfunk. 833 kc/s (360 m.); 1.5 kw. Relayed by Freiburg, 527 kc/s (570 m.).
Transmits at intervals from 9.0 a.m. 3.0 p.m.—Programme from Frankfurt.
4.45 p.m.—Time, Weather and Agricultural Report.
5.0 p.m.—Talk: The Principles of Musical Interpretation.
5.30 p.m.—Talk: Prevailing Intellectual Forces in America.
6.0 p.m.—Talk: German Educational Work in Reichenberg.
6.30 p.m.—Orchestral Selections of Classical Waltzes. Hofballtänze (Lanner). The Blue Danube (Joh. Strauss). Waltz from "Coppélia" (Delibes). Waltz from "Faust" (Gounod). Waltz from "Der Rosenkavalier" (R. Strauss).
7.15 p.m.—Violin and Pianoforte Recital of Russian Music. Sonata for Violin and Pianoforte (Nicolai). Pianoforte Solos (Rachmaninoff, Scriabine, Liapunoff, Moussorgsky). Violin Solos (Spindiaroff, Rimsky-Korsakoff, and Rachmaninoff).
8.15 p.m.—Programme from Frankfurt.

TOULOUSE (France)
Radiophonie du Midi. 788 kc/s (381 m.); 8 kw.

Transmits at intervals from 1.0 p.m. 6.30 p.m.—Dance Music Programme.
6.45 p.m.—Exchange Quotations and Racing Results.
7.0 p.m.—Recital of Spanish Songs.
7.15 p.m.—News Bulletin.
7.30 p.m.—Dance Music Programme.
8.0 p.m.—Exchange Quotations.
8.15 p.m.—Concert of Operatic Music arranged by Philips-Radio.
10.15 p.m.—North African News.
10.30 p.m. (approx.)—Close Down.

TURIN (Italy)
Ente Italiano Audizioni Radiofoniche (ITO). 1,094 kc/s (274 m.); 7 kw.
Transmits at intervals from 7.15 a.m. 7.15 p.m.—Wireless Notes.
7.30 p.m.—Time Signal.
7.32 p.m.—Concert for Soloists.
9.0 p.m.—Symphony Concert. Prelude to "The Mastersingers" (Wagner). "The Fifth Symphony" (Beethoven). In the interval, Talk: The Blind and Wireless.
10.0 p.m.—Dance Music Programme. In the interval at 10.30 p.m.—Wireless News.
11.0 p.m. (approx.)—Close Down.

VIENNA (Austria)
Radio-Wien. 581 kc/s (516.3 m.); 15 kw. Relayed by Graz, 851 kc/s (352.5 m.); Innsbruck, 1,958 kc/s (283.5 m.); Klagenfurt, 662 kc/s (453.2 m.); and Linz, 1,220 kc/s (245.9 m.).
Transmits at intervals from 10.0 a.m. 5.0 p.m.—Talk: The Earth—the Origin and Subsidence of Minerals and Rocks.
5.30 p.m.—Talk: 1929 in the Alps.
6.0 p.m.—French Language Lesson.
6.25 p.m.—Time and Weather.
6.30 p.m.—"Rigoletto"—Opera in Three Acts (Verdi), relayed from the State Opera House.
9.0 p.m.—Light Music and Phototelegraphy Transmission.

WARSAW (Poland)
Polskie Radio. 212 kc/s (1,411 m.); 8 kw.
Transmits at intervals from 10.58 a.m. 6.10 p.m.—Agricultural Report.
6.50 p.m.—Programme from Posen. Theatre Notes in the interval. After the Programme, Weather, Police and Sports News, Talk: Whist smoking a Cigarette, and News.

FERRANTI

The SCREENED GRID THREE

The Set that after 12 months has not become obsolete. It is still pre-eminent as the Set for the home constructor, for easy control without coil changing, and easy construction without soldering.

In one respect improvement is possible with this Receiver, as with all Sets employing only one stage of L.F. amplification. It is desirable to have greater L.F. amplification than has hitherto been obtainable with one stage, and to meet this need Ferranti have introduced the

AF 6 TRANSFORMER

RATIO 1/7 INDUCTANCE 65 HENRIES, which combines double the amplification with a quality of output formerly unattainable with transformers of this high ratio. Price 30s.

Ask your dealer or write direct for free constructional chart, and build the Ferranti Screened Grid Three with the assurance of superb performance.



PROGRAMMES FOR WEDNESDAY (November 20)

NOTE: THE HOURS OF TRANSMISSION ARE REDUCED TO GREENWICH MEAN TIME

BARCELONA (Spain)

Radio-Barcelona (EAJ 1). 860 kc/s (349 m.); 8 kw.
Transmits at intervals from 11.0 a.m.
8.30 p.m.—Elementary French Lesson.
9.0 p.m.—Chimes, Weather, News and Exchange Quotations.
9.5 p.m.—Orchestral Selections.
9.45 p.m.—Talk on Literature by Domingo de Fuenmayor.
10.0 p.m.—News Bulletin.
10.5 p.m.—Recital of Songs.
10.25 p.m.—Orchestral Concert. Overture, "Maritana" (Wallace) Selection from "Hamlet" (Thomas). Rhapsody No. 2 (Liszt). Sevilla (Albeniz). Jota (Jimenez); followed by Barcelona Exhibition Notes.
11.30 p.m. (approx.)—Close Down.

BELGRADE (Yugoslavia)

699 kc/s (429 m.); 2.5 kw.
Transmits at intervals from 11.40 a.m.
7.0 p.m.—Quartet Concert from the Works of French Composers. Scènes pittoresques (Massenet). Song: Aria from "Hérodiade" (Massenet). Aria from "Lakmé" (Delibes). Prelude (Debussy). La fille aux cheveux de lin (Debussy). Selection from "Louise" (Charpentier). Hymn to Christmas (Adam).
8.20 p.m.—Friedrich von Schiller Commemorative Programme on the 170th Anniversary of his Birth. Talk: What Schiller means to us to-day, followed by Readings from Serbian Translations of "Cassandra," "Wallenstein" and "Die Räuber."
9.5 p.m.—Time and News.
9.15 p.m.—Gramophone Records of Celebrated Singers.

BERLIN (Germany)

Königswusterhausen. 183 kc/s (1,635 m.); 26 kw.
Transmits at intervals from 6.0 a.m.
2.0 p.m.—Relay from the Sports Palace of the Demonstration of the Berlin Catholic Organization. Feierlicher Einzug (R. Strauss). Adagio from the Third Symphony (Bruckner). Address by the President of the Berlin Catholic Organization. Speech by Dr. Christian Schreiber, Bishop of Meissen: The Bishop and the People. Symphonic Poem, Les Préludes (Liszt); followed by Orchestral Concert.
5.0 p.m.—Fifteen Minutes' Reflections.
5.20 p.m.—Talk: The 1929 Kleist Prize Winners—Eduard Reinecker and Alfred Brust. Introductory Talk and Reading from the Works of the Authors.
6.0 p.m.—Talk: Visiting the Sick.
6.25 p.m.—Talk: Elsa Brandström and her Work.
7.0 p.m.—Programme relayed from Berlin (Witzleben).

BERLIN (Germany)

Witzleben. 716 kc/s (418 m.); 1.5 kw.
Transmits at intervals from 5.55 a.m.
2.0 p.m.—Relay of the Demonstration of the Berlin Catholic Organization from the Sports Palace (See Königswusterhausen); followed by Orchestral Concert.
5.0 p.m.—Talk: The "Invaliden-Friedhof" in Berlin.
5.30 p.m.—Talk by Prof. Windelband.
6.0 p.m.—Cello Recital. Sonata (Valentini). Arioso (Bach). Les Chérubins (Couperin). Minuet (Debussy). Après un rêve (Fauré). Tarantella (Piafiti).
7.0 p.m.—Contemporary Music.
7.30 p.m.—"Vom Leben"—Op. 57—A Poetic Reading with Music to Words by F. Holderlin (J. M. Hauer); followed by Time, Weather, News, Sports Notes and Picture Transmission.

BERNE (Switzerland)

Radio-Bern. 743 kc/s (403 m.); 1 kw.
Transmits at intervals from 9.45 a.m.
6.28 p.m.—Time and Weather.
6.30 p.m.—Talk in French.
7.0 p.m.—"Intermezzo"—Comedy in Two Acts with Symphonic Entr'actes (R. Strauss), relayed from the Municipal Theatre.
9.30 p.m. (approx.)—News and Close Down.

BRATISLAVA (Czechoslovakia)

1,076 kc/s (279 m.); 12.5 kw.
Transmits at intervals from 10.30 a.m.
6.0 p.m.—Programme from Prague.
9.15 p.m.—Popular Music relayed from Brünn, 878 kc/s; (342 m.).
9.55 p.m.—News and Programme Announcements

BRESLAU (Germany)

923 kc/s (325 m.); 2 kw. Relay by Gleitz, 1,184 kc/s (253 m.).
Transmits at intervals from 8.15 a.m.
7.0 p.m.—Weather Forecast.
7.2 p.m.—Two Technical Talks: (a) Gold in Silesia. (b) Food for Thought.
7.30 p.m.—Programme from Berlin (Witzleben).
8.50 p.m.—Topical Talk.
9.20 p.m.—News Bulletin.
9.45 p.m.—Answers to Correspondents
10.0 p.m.—Agricultural Report.

BRUSSELS (Belgium)

Radio-Belgique. 590 kc/s (508.5 m.); 1 kw.
5.0 p.m.—Trio Concert. Selection from "The Mastersingers" (Wagner). Pianoforte Solo. Simple histoire (Gandolfo). Amoureuse parenthèse (Salomone). Cez Bonne-Maman (Antrens). Le Nil (Leroux). Sérénade florentine (Lemaire). Intermezzo (Zilker). Cello Solo. Selection from "Paul et Virginie" (Massé). Violin Solo. Selection from "Sigurd" (Reyer).
6.0 p.m.—Selected Readings.
6.15 p.m.—Lesson in Esperanto, conducted in Flemish.
6.30 p.m.—Gramophone Records.
7.30 p.m.—Le Journal Parlé.
8.15 p.m.—Orchestral Concert. Selection from "Euryanthe" (Weber). Four Ways—March, Waltz, Eastern Dance and Rhythm (Coates). Song-Waltz from "Faust" (Gounod). On the Blue Hawaiian Waters (Ketelbey). Malaguena (Moszkowsky). Selection from "Il Trovatore" (Verdi). Song. Violin Solo: Chanson d'Arléte (De Tave). Cantilène for Cello (Van Goens). Selected Item. Song-Ballet égyptien (Luigini). La Czarine (Ganne). La Féria (Lacôme).
10.15 p.m.—News Bulletin.

BUDAPEST (Hungary)

545 kc/s (550 m.); 20 kw.
Transmits at intervals from 8.15 a.m.
6.25 p.m.—Answers to Correspondents.
7.10 p.m.—Concert by the Opera House Choir.
8.45 p.m.—E. Dohnanyi: Pianoforte Recital, followed by Time Signal, Weather Report, News and Tziganic Music from the Café Spolarich.

COLOGNE (Germany)

Westdeutscher Rundfunk. 1,319 kc/s (227 m.); 2 kw.
See Langenberg Programme.

COPENHAGEN (Denmark)

1,067 kc/s (281 m.); 0.75 kw. Relay by Kalundborg, 260 kc/s (1,153 m.).
Transmits at intervals from 6.30 a.m.
5.50 p.m. (Kalundborg only).—Weather.
6.0 p.m.—News Bulletin.
6.15 p.m.—Time Signal.
6.16 p.m.—Talk: Crime and Punishment.
6.45 p.m.—Psychological Talk: The New Ego.
7.15 p.m.—Orchestral Concert. Overture, "The Merry Wives of Windsor" (Nicolaï). Waltz from "Hänsel and Gretel" (Humperdinck). Air and Rigaudon for Strings from the Holberg Suite (Grieg). Intermezzo from "Tiefand" (d'Albert). Devil's Dance (Kuula). Prelude (Rachmaninoff). Bacchanal from "The Seasons" (Glazounoff). Selection from "Madame Butterfly" (Puccini). Norwegian Artists' Carnival (Svendsen).
8.15 p.m.—Programme in Memory of Paul Levin—Talk and Reading.
9.0 p.m. (approx.)—News Bulletin.
9.15 p.m.—Concert of Autumn Songs.
9.40 p.m.—Cello Recital. Adagio cantabile (Tartini). Sonata in G Minor (Marcello). Allegro spiritoso (Senallé).
10.5 p.m. (approx.)—Close Down.

CORK (Ireland)

(6CK). 1,337 kc/s (225 m.); 1 kw.
1.30 p.m.—Weather Forecast and Gramophone Selections.
6.0 p.m.—Exchange, News Bulletin and Gramophone Records.
6.15 p.m.—Programme from Dublin.

CRAĆOW (Poland)

Polskie Radio. 959 kc/s (313 m.); 0.5 kw.
Transmits at intervals from 10.58 a.m.
6.25 p.m.—Talk: The Castle of Wawel.
6.58 p.m.—Time and Chimes.
7.15 p.m.—Programme from Warsaw.
11.0 p.m.—Chimes from the Church of Notre Dame.

DUBLIN (Ireland)

(2RN). 725 kc/s (413 m.); 1 kw.
1.30 p.m.—Time, Weather, Stock Report and Gramophone Records.
6.0 p.m.—Gramophone Records.
6.15 p.m.—Programme for Children.
7.0 p.m.—Programme for Women.
7.20 p.m.—News Bulletin.
7.30 p.m.—Time Signal.
7.32 p.m.—Irish Language Lesson.
7.45 p.m.—German Language Lesson.
8.0—10.0 p.m.—Relay of Concert by the Sligo Musical Society.
10.0 p.m.—"Campbell of Kilmore"—Play, by Dorothy Day and Company
10.30 p.m.—Time, News, Weather and Close Down.

FRANKFURT-am-MAIN (Germany)

770 kc/s (390 m.); 1.5 kw. Relay by Cassel, 1,220 kc/s (246 m.).
Transmits at intervals from 7.15 a.m.
3.0 p.m.—Day of Attonement Concert—Orchestral, Soprano and Organ Selections.
5.0 p.m.—See Stuttgart.
5.30 p.m.—Talk: As a Purser on Board a Tank-ship to Scotland.
5.50 p.m.—Natural Science Talk: Climbing Plants.
6.5 p.m.—Talk: Modern Technique.
6.30 p.m.—"German Requiem" (Brahms), relayed from the Saalbau.
8.30 p.m.—Talk: Literature of the Autumn and its Authors.
9.30 p.m. (approx.)—Silent Night.

HAMBURG (Germany)

Norag (ha, in Morse). 806 kc/s (372 m.); 1.5 kw. Relay by Bremen, 941 kc/s (319 m.); Flensburg, 1,373 kc/s (218 m.); Hanover, 536 kc/s (560 m.); and Kiel, 1,220 kc/s (246 m.).
Transmits at intervals from 5.20 a.m.
2.45 p.m.—Vocal and Instrumental Concert from the Works of Anton Rubinstein.
3.35 p.m. (from Hanover).—Talk: Runes and Runic Inscriptions.
4.0 p.m. (from Bremen).—Organ Recital with Instrumental and Vocal Selections, relayed from the Woltershaus Christus-kirche.
5.0 p.m. (from Bremen).—Vocal and Orchestral Concert. Aria from "Iphigenia in Tauris" (Gluck). Cavatina from "The Marriage of Figaro" (Mozart). Overture, "Iphigenia in Tauris" (Gluck). Cavatina from "Oberon" (Weber). Overture, "Zaide" (Mozart). Prayer from "La Tosca" (Puccini).
5.45 p.m.—Orchestral Concert.
6.30 p.m.—Talk: The School and the Home—Similarities and Differences.
6.55 p.m.—Weather Report.

7.0 p.m.—Detlev von Liliencron Programme. Orchestra: Overture, "Oberon" (Weber). Talk: What we want. Orchestra: Les préludes (Liszt). Talk: Liliencron—the Man. Symphonic Prologue (Schillings). Talk: Liliencron—the Poet. Three Songs after Poems by Liliencron (Horst Platen, Gerhard Maasz and Adolf Secker). Orchestra: Die Musik kommt (Strauss).
9.10 p.m.—Talks, News, Weather, Miscellaneous and Sports Notes.
9.30 p.m.—Orchestral Concert.

HILVERSUM (Holland)

1,004 kc/s (298 m.). After 5.40 p.m. 280 kc/s (1,071 m.); 6.5 kw.
9.40 a.m. till Close Down: Programme of the Algemeene Vereeniging Radio Omroep (A.V.R.O.).
9.40 a.m.—Time and Daily Service.
11.40 a.m.—Police Announcements.
11.55 a.m.—Quartet Concert.
1.40 p.m.—Concert by a Children's Choir.
2.40 p.m.—Talk (to be announced).
3.40 p.m.—Study Music for the Pianoforte, with Introductory Talk.
4.10—4.40 p.m.—Interval.
4.40 p.m.—Concert from the Café Moderne, Amsterdam.
5.40 p.m.—Time and Concert (continued).
6.10 p.m.—Exchange Quotations.
6.25 p.m.—Italian Language Lesson.
7.25 p.m.—Police Announcements.
7.40 p.m.—Time and "Lady Windermerre's Fan"—Play in Four Acts

(Oscar Wilde), followed by Weather and News, and Dance Music from the Gaité Cabaret, Amsterdam.
11.40 p.m. (approx.)—Close Down.

HUIZEN (Holland)

160 kc/s (1,875 m.); 6.5 kw.
7.55 a.m. till Close Down:—Programme of the Christian Radio Society (N.C.R.V.).
7.55 a.m.—Concert.
10.10 a.m.—Programme for Hospitals.
10.40 a.m.—Gramophone Records.
12.10 p.m.—Concert of Violin, Flute, Piano and Organ Music.
1.40 p.m.—Concert of Vocal, Violin and Piano Music.
2.25 p.m.—Programme of Readings.
2.55 p.m.—Concert (Continued).
3.55 p.m.—Gramophone Records.
4.40 p.m.—Programme for Children.
5.40 p.m.—Gramophone Records.
6.10 p.m.—Technical Talk.
7.10 p.m.—Talk by Mr. Blankenburg.
7.40 p.m.—Report by Mr. v. d. Deure, N.C.R.V. President.
8.10 p.m.—Programme by the Dutch Bible Society, relayed from the Reformed Church at 's Gravenzande. Choir: Loof God met geklank der Bazuin. Opening Speech by Mr. van Dijk. Psalm 25. Choir: (a) Bede voor het Vaderland (Valerius), Pilgrims' Night-Song (Hauptmann). String Orchestra Selections: (a) Intermezzo (Bizet), (b) Wedding March (Mendelssohn). Tenor Solos: (a) Mijn Moedertaal (Brandt Buys) (b) Hemelhuis (Hullebroek). Talk by Pastor Barkey Wolf. The National Anthem, Choir: (a) Vrede (Hamel), (b) Wat beweegt daar (Wilminck). Mercedes (Kessels). March, Princess Juliana (Bouwman). Epilogue by the Mayor of 's Gravenzande; followed by News.

KALUNDBORG (Denmark)

Kalundborg Radio. 260 kc/s (1,153 m.); 7.5 kw.
See Copenhagen Programme.

KÖNIGSBERG (Germany)

Ostmarken Rundfunk. 1,085 kc/s (276 m.); 2.5 kw. Relay by Danzig, 662 kc/s (453 m.).
Transmits at intervals from 4.55 a.m.
5.14 p.m.—Talk for Parents: Healthy Youth.
5.50 p.m.—Recitations and Mezzo-Soprano Songs from the Works of Arno Holz.
6.50 p.m.—Cello Recital. Suite (Cassado). Die Uhr, die Spinnerin und der Galant (Cassado). Etude (Chopin-Glazounoff).
7.30 p.m.—Programme from Berlin.
11.30 p.m.—Gramophone Concert.
12.30 a.m. (Thursday).—Close Down.

LAHTI (Finland)

167 kc/s (1,800 m.); 40 kw. Relay by Helsingfors, 1,357 kc/s (221 m.).
Transmits at intervals from 10.0 a.m.
4.0 p.m.—Programme for Children.
5.15 p.m.—English Language Lesson.
5.45 p.m.—Talk on Sports.
6.5 p.m.—Orchestral Concert.
7.45 p.m.—News in Finnish and Swedish.

LANGENBERG (Germany)

Westdeutscher Rundfunk. 635 kc/s (473 m.); 13 kw. Relay by Aix-la-Chapelle, 662 kc/s (453 m.); Cologne, 1,319 kc/s (227 m.); and Münster, 1,283 kc/s (234 m.).
Transmits at intervals from 5.45 a.m.
3.30 p.m.—Chamber Music. Quartet in F Minor, Op. 95 (Beethoven). Soprano Solos (Mark Lothar). Pianoforte Solos: (a) Trauerzug um Schneewitz (b) Wichtel-männer in der Nacht, from "Märchenstimmungen", Op. 8 (Lothar). Quartet in D Major (Borodine).
5.0 p.m.—Thirty Young Workers talk on their own Lives.
5.30 p.m.—Talk on Economics: The Race as Consumer.
5.55 p.m.—Topical Talk.
6.0 p.m.—Report on Economics, Weather and Sports Notes.
6.15 p.m.—"The Ploughman from Bohemia" (v. Saaz), translated into Modern German and arranged for the Wireless by Rudolf Frank.
7.30 p.m.—See Berlin (Witzleben), followed by News, Sports and Miscellaneous Notes and Silent Night.

LEIPZIG (Germany)

Mitteldeutscher Rundfunk. 1,157 kc/s (259 m.); 1.5 kw. Relay by Dresden, 941 kc/s (319 m.).
Transmits at intervals from 7.30 a.m.
3.30 p.m.—Orchestral Concert.
5.0 p.m.—Hans Franck reads from his Book of Short Stories: "Recht ist Unrecht."

5.30 p.m.—Chamber Music for Wind-Instruments, Quintet for Flute, Oboe, Clarinet, Horn and Bassoon (Kauffmann).
6.0 p.m.—"The Prodigal Son" (Gide), arranged for Wireless by Dr. Kurt Fischer.
7.0 p.m.—"High Mass in B Minor" for Soloists, Choir and Orchestra (Bach) relayed from St. Thomas's Church.
9.0 p.m.—Time, News, Sports Notes and Gramophone Selections from "Aida"—Opera in Four Acts (Verdi).

LJUBLJANA (Yugoslavia)

Radio-Ljubljana. 530 kc/s (566 m.). 2.5 kw.
Transmits at intervals from 11.30 a.m.
6.0 p.m.—Talk: The Life of an Ant.
6.30 p.m.—French Language Lesson.
7.0 p.m.—Programme from Prague.
9.0 p.m.—Time, News and Programme Announcements.

MADRID (Spain)

Union Radio (EAJ7). 707 kc/s (424 m.); 2 kw.
Transmits at intervals from 11.45 a.m.
7.0 p.m.—Chimes, Exchange Quotations and Dance Music.
8.25 p.m.—News Bulletin.
8.30—10.0 p.m.—No Transmission.
10.0 p.m.—Chimes, Time Exchange, Quotations and Band Concert from the Hotel Nacional.
12 midnight.—Chimes, News and Dance Music from the Palacio de Belles Artes.
12.30 a.m. (Thursday).—Close Down.

MILAN (Italy)

Ente Italiano Audizioni Radiofoniche. 599 kc/s (501 m.); 7 kw.
Transmits at intervals from 7.15 a.m.
7.30 p.m.—Time Signal.
7.32 p.m.—"Falstaff" (Opera (Verdi)), with Introductory Talk. Talks in the intervals.
10.30 p.m.—Wireless News. After the Opera, Concert.
11.0 p.m. (approx.)—Close Down.

MORAVSKA-OSTRAVA (Czechoslovakia)

1,139 kc/s (263 m.); 10 kw.
Transmits at intervals from 10.30 a.m.
6.0 p.m.—Programme from Prague.
9.15 p.m.—Concert of Popular Music relayed from Brünn (878 kc/s 342 m.).
9.55 p.m.—News and Programme Announcements.

MOTALA (Sweden)

223 kc/s (1,345 m.); 30 kw.
See Stockholm Programme.

MUNICH (Germany)

563 kc/s (533 m.); 1.5 kw. Relay by Augsburg, 536 kc/s (500 m.); Kaiserslautern, 1,112 kc/s (270 m.); and Nuremberg, 1,256 kc/s (239 m.).
Transmits at intervals from 5.45 a.m.
5.45 p.m.—Zither Recital.
6.30 p.m.—Report on Foreign Affairs.
7.0 p.m.—Programme from Berlin (Witzleben), followed by Concert and Dance Music from the Café Reichsadler.
9.20 p.m. (in the interval).—News Bulletin.
11.0 p.m. (approx.)—Close Down.

OSLO (Norway)

Kringkastingselskapet. 608 kc/s (493 m.); 1.2 kw. Relay by Fredrikstad, 761 kc/s (394 m.); Hamar, 527 kc/s (570 m.); Notodden, 1,058 kc/s (283 m.); Porsgrund, 662 kc/s (453 m.).
Transmits at intervals from 10.10 a.m.
6.15 p.m.—Weather and News.
6.30 p.m.—Talk from Oslo University: Language and Speech.
7.0 p.m.—Time and Austrian Programme. Presto from the Oxford Symphony (Haydn). Motet, Exultate, jubilate, with Soprano Solo (Mozart). Scherzo (Schubert). Der Hirt auf dem Felsen, for Soprano, Clarinet and Piano, Op. 129 (Schubert). Rheinlegende (Mahler). Adagio from the Seventh Symphony (Bruckner). Overture and Serenade from "Der Schiennemann" (Korngold).
8.15 p.m.—Reading of Austrian Lyrical Poetry.
8.30 p.m.—Weather and News.
8.50 p.m.—Talk: Current Events.
9.5 p.m.—Orchestral Concert (continued). Radetzky March (Strauss). Waltz, Nachtschwärmer (Ziehrer). Waltz, The Blue Danube (Strauss). Selection from "The Dollar Princess" (Fall).
9.35 p.m.—Gramophone Records.
11.0 p.m. (approx.)—Close Down.

Programmes for Wednesday—(Cont.)

PARIS (France)

Ecole Supérieure (FPTT). 671 kc/s (447 m.); 0.8 kw. Transmits at intervals from 8.0 a.m. 6.30 p.m.—Radio de France. 8.0 p.m.—English Language Lesson, arranged by the Berlitz School. 8.30 p.m.—Talk on Literature. 8.45 p.m.—Concert, followed by News, Time, Weather and Dance Music from the Coliseum de Paris. 12 midnight (approx.)—Close Down.

PARIS (France)

Eiffel Tower (FL). 206 kc/s (1,455 m.); 12 kw. 7.50 a.m.—Time Signal on 9,231 kc/s (32.5 m.). 9.20 a.m.—Time Signal on 113.13 kc/s (2,650 m.). 5.45 p.m.—Le Journal Parlé. 7.10 p.m.—Meteorological Report. 7.20 p.m.—Concert. Gavotte from "Masques et Bergamasques" (Fauré). Pianoforte Solos: (a) Chromatic Fantasia and Fugue in D Minor (Bach), (b) Campanella (Liszt), Pavane d'Angelo (Bruneau). Songs: (a) Salome's Aria from "Hérodiade" (Massenet), (b) Solitude from "Sappho" (Massenet). Chaconne de l'Impératrice (Honegger-Salabert). Selections for Musical Saw: (a) Sicilienne (Pergolesi), (b) Madrigal (Simonetti), (c) Chants russes (Lalo). Minuet (Schubert). Songs: (a) Joli tambour (Weckerlin), (b) Les époux du Berry (Lhuillier), (c) Chantez, chantez, grand-mère (Gabaroché), (d) Les Canards tyroliens (Thérèse). Waltz from "Isoline" (Messager). At 7.56 p.m.—Time Signal on 9,231 kc/s (32.5 m.). 10.26 p.m.—Time Signal on 113.13 kc/s (2,650 m.).

PARIS (France)

Petit Parisien. 914 kc/s (329 m.); 0.5 kw. 8.30 p.m.—Transmission of Pictures. 9.0 p.m.—Quintet Concert. Overture, Vanity Fair (Percy Fletcher). Russian Dance (Moszkovsky). Selection from "La Teresina" (O. Straus). Romance (Grunfeld). In a Persian Garden (Lehmann). Largo (Casadesu). Selection from "The Girl in the Taxi" (Gilbert). Serenade (Lange-Müller). Two Dances from "Glady's" (Puget).

PARIS (France)

Selection from "La Belle Hélène" (Offenbach). Waltz, A l'allemande (Gédaud). Ballet Music from "Les Fantocchini" (Lecocq). 10.30 p.m. (approx.)—Close Down.

PARIS (France)

Radio-Paris. (CFR). 174 kc/s (1,725 m.); 12 kw. Transmits at intervals from 6.45 a.m. 12.30 p.m.—Gramophone Concert. In the interval at 1.0 p.m.—Exchange Quotations and News. 2.0 p.m.—Exchange; Market Prices. 3.30 p.m.—Exchange Quotations. 3.45 p.m.—Concert. Orchestral Selection: Overture, Mozart (Hahn-Mouton). Sonata for Violin (Händel). Orchestral Selection. Madrilène (Infante). Pianoforte Solo: Planisphère (Vellones). Orchestral Selection: Nocturne (Février). "Cello Solos: (a) Elégie (Massenet), (b) Le Cygne (Saint-Saëns), (c) Melody (Rubinstein). Orchestral Selection from "Madame Butterfly" (Puccini-Tafan). 4.55 p.m.—Exchange and News. 6.0 p.m.—Agricultural Report and Racing Results. 6.30 p.m.—New York Exchange Rates. 6.35 p.m.—Gramophone Concert. 7.15 p.m.—Talk by M. Georges Colomb. 7.45 p.m.—Commercial Prices, Social and Economic Notes and Amusement Guide. 8.0 p.m.—"The Barber of Seville."—Opera (Rossini). In the intervals, at 8.30 p.m.—Closing Prices of the American Markets, Sports Notes and News, and at 9.15 p.m.—Press Review and Time Signal.

POSEN (Poland)

806 kc/s (335 m.); 1.2 kw. Transmits at intervals from 12 noon. 6.5 p.m.—Humorous Talk. 6.25 p.m.—Talk in French. 6.45 p.m.—Weekly Review of the "Tydzien Radjowy." 7.5 p.m.—Talk: "Travels in Poland." 7.30 p.m.—Choral and Organ Recital of Sacred Music. In the interval at 8.10 p.m.—Literary Programme from Warsaw, and in other intervals Theatre and Wireless Notes. 9.0 p.m.—Time and News. 9.15 p.m.—Transmission of Pictures. 9.45 p.m.—Dance Music relayed from the Carlton Restaurant. 11.0 p.m. (approx.)—Close Down.

POSEN (Poland)

806 kc/s (335 m.); 1.2 kw. Transmits at intervals from 12 noon. 6.5 p.m.—Humorous Talk. 6.25 p.m.—Talk in French. 6.45 p.m.—Weekly Review of the "Tydzien Radjowy." 7.5 p.m.—Talk: "Travels in Poland." 7.30 p.m.—Choral and Organ Recital of Sacred Music. In the interval at 8.10 p.m.—Literary Programme from Warsaw, and in other intervals Theatre and Wireless Notes. 9.0 p.m.—Time and News. 9.15 p.m.—Transmission of Pictures. 9.45 p.m.—Dance Music relayed from the Carlton Restaurant. 11.0 p.m. (approx.)—Close Down.

POSEN (Poland)

806 kc/s (335 m.); 1.2 kw. Transmits at intervals from 12 noon. 6.5 p.m.—Humorous Talk. 6.25 p.m.—Talk in French. 6.45 p.m.—Weekly Review of the "Tydzien Radjowy." 7.5 p.m.—Talk: "Travels in Poland." 7.30 p.m.—Choral and Organ Recital of Sacred Music. In the interval at 8.10 p.m.—Literary Programme from Warsaw, and in other intervals Theatre and Wireless Notes. 9.0 p.m.—Time and News. 9.15 p.m.—Transmission of Pictures. 9.45 p.m.—Dance Music relayed from the Carlton Restaurant. 11.0 p.m. (approx.)—Close Down.

PRAGUE (Czechoslovakia)

Strasnice. 617 kc/s (487 m.); 5 kw. Transmits at intervals from 10.15 a.m. 6.0 p.m.—Time and News. 6.5 p.m.—Talk: Stage Management. 6.45 p.m.—Introductory Talk to the following Transmission. 7.0 p.m.—Symphony Concert by the Czech Philharmonia, from the Works of J. B. Foerster. 9.0 p.m.—Time; News; Sports Notes. 9.15 p.m.—News, Theatre Review and Programme Announcements.

ROME (Italy)

Ente Italiano Audizioni Radiofoniche (IRO). 680 kc/s (441 m.); 2.4 kw. Transmits at intervals from 12 noon. 7.15 p.m.—News, Sports Notes, Weather and Press Review. 8.0 p.m.—Time Signal. 8.2 p.m.—Opera or Studio Concert. In the intervals: New Gramophone Records, Humorous Items and Topical Review. News after the Programme.

SCHENECTADY (U.S.A.)

General Electric Company (WGY). 790 kc/s (379.5 m.); 50 kw. Relay by W2XAD on 15,340 kc/s (19.56 m.) from 11.0 p.m. Transmits at intervals from 11.45 a.m. 10.59 p.m.—Time Signal. 11.0 p.m.—New York Relay. 1.0 a.m. (Thursday).—General Electric Programme with Leslie Frick (Contralto). 1.30—3.30 a.m.—New York Relay. 3.30 a.m.—General Electric Programme with Telechron Timesters. 4.0 a.m.—Weather Forecast. 4.2 a.m.—Dance Music from the Hotel Ten Eyck, Albany, N.Y. 5.0 a.m. (approx.)—Close Down.

STOCKHOLM (Sweden)

Radiotjänst (SASA). 680 kc/s (436 m.); 1.5 kw. Relay by Boden, 250 kc/s (1,200 m.); Göteborg, 932 kc/s (322 m.); Hörby, 1,166 kc/s (257 m.); Motala, 223 kc/s (1,345 m.); Östersund, 380 kc/s (770 m.); Sundsvall, 554 kc/s (542 m.). Transmits at intervals from 6.15 a.m. 5.30 p.m.—Cabaret Programme. 6.30 p.m. (from Uppsala, 662 kc/s; 453 m.)—Talk arranged by the Swedish Red Cross: Mental Deficiency.

STUTTGART (Germany)

Süddeutscher Rundfunk. 833 kc/s (360 m.); 1.5 kw. Relay by Freiburg, 527 kc/s (570 m.). Transmits at intervals from 9.0 a.m. 3.0 p.m.—Orchestral Concert with Tenor Solos. 4.45 p.m.—Time, Weather and Agricultural Report. 5.0 p.m. (from Mannheim).—Talk for Women; Women in Legal Affairs. 5.30 p.m.—Talk: The Original Inhabitants of New Pomerania. 6.0 p.m.—Lesson in Esperanto. 6.30 p.m.—Programme from Frankfurt. 8.30 p.m.—"Die Messer"—Series of Short Stories (Valentin Kataeff), followed by News and Silent Night for Distant Reception.

TOULOUSE (France)

Radiophonie du Midi. 788 kc/s (381 m.); 8 kw. Transmits at intervals from 1.0 p.m. 6.30 p.m.—Dance Music Programme. 6.45 p.m.—Exchange Quotations and Racing Results. 7.0 p.m.—Chansonnette Recital. 7.15 p.m.—News Bulletin. 7.30 p.m.—Dance Music Programme. 8.0 p.m.—Exchange Quotations. 8.15 p.m.—Concert by a Viennese Orchestra. Selection from "The Mill in the Black Forest" (Eulenberg). Les Pantins (Lehár). Napolitana. Tales of the Vienna Woods, and Künstlerleben (Job. Strauss). Pomone (Waldteufel). 8.45 p.m.—Recital of Russian and Portuguese Songs, followed by Concert. 10.15 p.m.—North African News. 10.30 p.m. (approx.)—Close Down.

TURIN (Italy)

Ente Italiano Audizioni Radiofoniche (I TO). 1,094 kc/s (274 m.); 7 kw. Transmits at intervals from 7.15 a.m. 6.15 p.m.—Concert. March, Alalà (Amadei). Song, Quando ti sveglierai (Cabella). Waltz, Mu-

VIENNA (Austria)

Radio-Wien. 581 kc/s (516.3 m.); 15 kw. Relay by Graz, 851 kc/s (352.5 m.); Innsbruck, 1,058 kc/s (283.5 m.); Klagenfurt, 662 kc/s (453.2 m.); and Linz, 1,220 kc/s (245.9 m.). Transmits at intervals from 10.0 a.m. 5.15 p.m.—Talk: The Misuse of Alcohol and Mental Hygiene. 5.45 p.m.—Esperanto Propaganda for Austria. 6.0 p.m.—Talk for Workers: Women as Nurses. 6.25 p.m.—Time and Weather. 6.30 p.m.—"Requiem" for Soloists, Choir, Orchestra and Organ (Dvorák) in Commemoration of the 25th Anniversary of Dvorák's Death, relayed from the Musikvereinssaal. 8.30 p.m.—Light Music and Phototelegraphy Transmission.

WARSAW (Poland)

Polskie Radio. 212 kc/s (1,411 m.); 8 kw. Transmits at intervals from 10.58 a.m. 6.58 p.m.—Time Signal. 7.0 p.m.—Programme Announcements; News. 7.15 p.m.—Talk: Fiction and Truth in History. 7.30 p.m.—Instrumental and Vocal Concert of Chamber Music. 8.10 p.m.—Short Story Reading (Buniewicz). 8.25 p.m.—Solist Recital. Theatre Notes in the interval. 9.10 p.m.—Talk on Chicago. 9.25 p.m.—Talk: Whist smoking a Cigarette. 9.35 p.m.—News Bulletin. 10.0 p.m.—Dance Music relayed from the Hotel Bristol. 11.0 p.m. (approx.)—Close Down.

ACCUMULATOR TROUBLES SOLVED

Join our C.A.V. HIRE SERVICE

It is better, cheaper, and safer to use our C.A.V. Low Tension and High Tension Accumulator Service. Regular delivery and collection of charged Accumulators at moderate fixed charges. If necessary we will service your own accumulators, supplying duplicates if necessary for continuous supply. Regular motor deliveries within 12 miles of Charing Cross. Over 10,000 satisfied users.

SAVE MONEY & IMPROVE RECEPTION

Write or phone for Descriptive Folder, Post Free.

RADIO SERVICE (LONDON) LTD

105, Torriano Avenue, Camden Town, N.W.5.

Phone North (623 (3 lines).



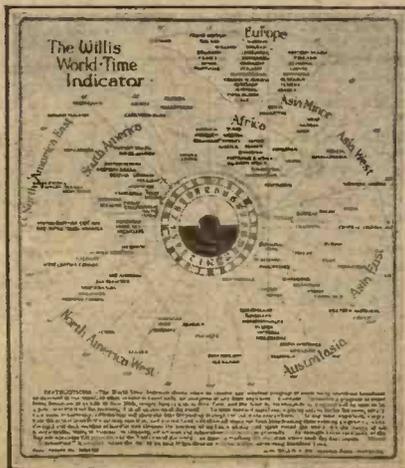
THE WILLIS WORLD-TIME INDICATOR.

An Almanac of the Hours.

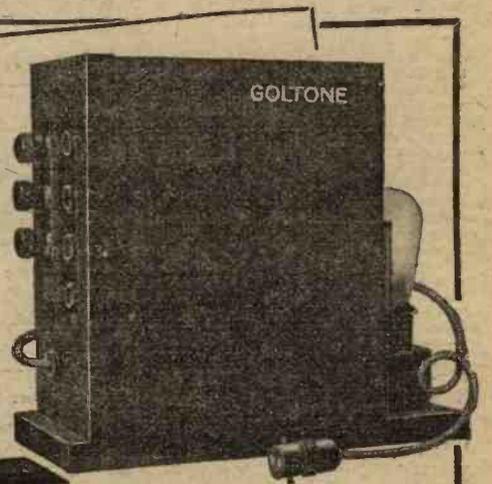
Almanacs instantly, automatically, everywhere, the position of all hours round the world, showing when to tune in all foreign programmes or events being anywhere broadcast, and when to time cables, 'phone calls and all international intercourse. The ideal Xmas gift. As essential to the world of to-day as an almanac of the days.

Reviews. "A remarkable device." "Of inestimable value." "Unique."

From dealers or J. H. Willis & Co., Ipswich Road, Norwich. Price 1/6, postage 2d. Refunded if unapproved.



CONVERT YOUR BATTERY OPERATED SET TO AN ALL-MAINS UNIT. NO H.T. BATTERY NO L.T. ACCUMULATOR.



"GOLTONE" ALL-MAINS UNIT

TO OPERATE FROM YOUR ELECTRIC LIGHT SUPPLY (A.C. only).

Enables your Radio Receiver to be converted to an "ALL-MAINS" set, thus saving the inconvenience and expense of Accumulator Charging and H.T. Battery Renewals. ADDS VOLUME, SELECTIVITY & RANGE

Suitable for Mullard, Cossor and Screened Grid Valve Circuits

Plug-in, that's all. Price £6 : 6 : 0 From all First Class Radio Dealers. Large illustrated Radio Catalogue FREE on request.

Refuse Substitutes. Full particulars on request.

LONDON DEPOT: 5 & 6, Eden Street, Hampstead Road, N.W.1.



LEEDS DEPOT: Upton's Yard, 49a, Briggate.

PROGRAMMES FOR THURSDAY

(November 21)

NOTE: THE HOURS OF TRANSMISSION ARE REDUCED TO GREENWICH MEAN TIME

BARCELONA (Spain)

Radio-Barcelona (EAJ1), 860 kc/s (349 m.); 8 kw.
Transmits at intervals from 11.0 a.m.
8.30 p.m.—Elementary English Lesson.
9.0 p.m.—Chimes, Weather, News and Exchange Quotations.
9.5 p.m.—Partial Relay of an Opera from the Gran Teatro del Liceo, followed by Barcelona Exhibition Notes.

BERLIN (Germany)

Königswusterhausen, 183 kc/s (1,635 m.); 26 kw.
Transmits at intervals from 5.55 a.m.
3.30 p.m.—See Berlin (Witzleben).
4.30 p.m.—Literary Programme. Henry Lilienfein reads from his own Works, on the occasion of his Fiftieth Birthday.
5.0 p.m.—Talk: Alsace-Lorraine.
5.30 p.m.—Advanced Spanish Lesson.
5.55 p.m.—Agricultural Talk.
6.20 p.m.—Talk: The Buyer and Retail Trade.
7.0 p.m.—Programme from Frankfurt.
8.0 p.m.—Topical Programme.
8.35 p.m.—Recital of Songs by Frances Allsom. The Cypress, Curtain of the Night and My Love has vowed (Campian). If my complaints could passions move (Dowland). When Laura smiles (Rossini). Das Erwachen (Fleischmann). In einen Garten (Erich Wolf). Das verlassene Mädchen (Hugo Wolf). Ruhe meine Seele (R. Strauss); followed by News, Dancing Lesson, Dance Music and Picture Transmission from Berlin (Witzleben).
11.30 p.m. (approx.)—Close Down.

BERLIN (Germany)

Witzleben, 716 kc/s (418 m.); 1.5 kw.
Transmits at intervals from 5.55 a.m.
3.30 p.m.—Concert. Pianoforte Solo: Silhouetten, Op. 53 (Reger). Bass Solos: (a) Aria from "Simone Boccanegra" (Verdi), (b) Aria from "La Juive" (Halévy), (c) Aria from "The Magic Flute" (Mozart). Pianoforte Solos: (a) Triana and (b) Seguidillas (Albeniz). Bass Solos: (a) In questa tomba oscura (Beethoven), (b) Selection from "Tannhäuser" (Wagner).
4.30 p.m.—Topical Programme.
5.0 p.m.—Tca Concert from the Hotel Bristol.
5.50 p.m.—Talk by Dr. Zielenziger.
6.15 p.m.—Legal Talk.
6.35 p.m.—Choral Concert.
7.0 p.m.—Austrian National Evening. Concert of Viennese Operetta Music Overture, "Boccaccio" (Suppé). Aria from "Gasparone" (Müllöcker). Song from "Der Bettelstudent" (Müllöcker). Selection from "Die Fledermaus" (Joh. Strauss). Love Song from "Nanon" (Genée). Duet from "The Court Jester" (Müller). Selection from "The Bird Fancier" (Zeller). March from "Der fliegende Rittmeister" (Dostal). Song from "Der Rastelbinder" (Lehár). Song from "Brüder Straubinger" (Eysler). Song from "Das süsse Mädel" (Reinhardt). Duet from "A Waltz Dream" (O. Straus). Duet from "Brüderlein fein" (Fual). Song from "Eva" (Lehár). Marching Song from "Polenblut" (Nedball). Waltz Duet from "The Czardas Princess" (Kálmán). Blues from "Evelyne" (Granichstaedten), followed by Time, Weather, News and Sports Notes.
9.30 p.m.—Dancing Lesson, followed by Dance Music from the Zoological Gardens. Picture Transmission in the interval.
11.30 p.m. (approx.)—Close Down.

BERNE (Switzerland)

Radio-Bern, 743 kc/s (403 m.); 1 kw.
Transmits at intervals from 11.43 a.m.
6.28 p.m.—Time and Weather.
6.30 p.m.—Talk on the Sun, relayed from Basle, 207 kc/s; (1,010 m.).
7.0 p.m. (approx.)—Austrian Programme relayed from Vienna.
9.0 p.m.—News and Weather.
9.15 p.m.—Orchestral Concert.
9.40 p.m. (approx.)—Close Down.

BRATISLAVA (Czechoslovakia)

1,076 kc/s (279 m.); 12.5 kw.
Transmits at intervals from 10.30 a.m.
6.0 p.m.—See Prague Programme.

6.5 p.m.—Recital of Slovakian Songs with accompaniment by a Tzigane Orchestra.
7.0 p.m.—See Prague Programme.
9.15 p.m.—Military Band Concert relayed from Brünn, 873 kc/s (342 m.).
9.55 p.m.—News and Programme Announcements.

BRESLAU (Germany)

923 kc/s (325 m.); 2 kw. Relay by Gleitwitz, 1,184 kc/s (253 m.).
Transmits at intervals from 8.30 a.m.
7.5 p.m.—Natural Science Talk: Seventy Years of the Darwinian Theory—Darwin's "Origin of Species."
7.30 p.m. (from Gleitwitz)—"The Blast Furnace"—a Relay from the Julien Works, Bobrek.
8.10 p.m.—"Modern Austria"—Programme of Orchestral Selections and Recitations. Austria as reflected in her Literature (H. v. Hofmannsthal). Selections for String Quartet, Op. 5 (y. Webern). Modern Austrian Poems: (a) The Peasant (Billinger), (b) The Worker (Theodor Kramer). Second and Third Movement from the String Quartet, Op. 28 (E. Toch).
9.10 p.m.—News Bulletin.
9.30 p.m.—Dancing Lesson and Dance Music relayed from Berlin (Witzleben).
11.0 p.m. (approx.)—Close Down.

BRUSSELS (Belgium)

Radios-Belgique, 590 kc/s (508.5 m.); 1 kw.
5.0 p.m.—Concert from the Armonville Tea-rooms.
6.0 p.m.—Flemish Language Lesson arranged by the Berlitz School.
6.30 p.m.—Gramophone Records.
7.30 p.m.—Le Journal Parlé.
8.0 p.m.—Concert relayed from the Concert Hall, Amsterdam. In the interval, Topical Talk.
10.15 p.m.—News Bulletin.

BUDAPEST (Hungary)

545 kc/s (550 m.); 20 kw.
Transmits at intervals from 8.15 a.m.
7.0 p.m.—Talk: The History of Art.
7.30 p.m.—Austrian National Evening.
9.0 p.m. (approx.)—Time, Weather, News and Tzigane Concert.

COLOGNE (Germany)

Westdeutscher Rundfunk, 1,319 kc/s (227 m.); 2 kw.
See Langenberg Programme.

COPENHAGEN (Denmark)

1,067 kc/s (281 m.); 0.75 kw. Relay by Kalundborg, 260 kc/s (1,153 m.).
Transmits at intervals from 6.30 a.m.
5.50 p.m.—(Kalundborg only).
Weather.
6.0 p.m.—News Bulletin.
6.15 p.m.—Time Signal.
6.30 p.m.—Talk: Matter and Energy.
6.45 p.m.—Talk: Helge Rode's "Ariel," from the Aalborg Studio.
7.15 p.m.—Austrian National Evening. "An Episode"—One Act Play (Arthur Schnitzler, translated by P. Nansen). String Quartet No. 14 in D minor, Death and the Maiden (Schubert).
8.30 p.m.—News.
8.45 p.m.—Concert of Scandinavian Music.
10.0 p.m.—Dance Music relayed from Nimb's Restaurant.
11.0 p.m.—(in an interval)—Town Hall Chimes.
12 midnight (approx.)—Close Down.

CORK (Ireland)

(6CK). 1,337 kc/s (225 m.); 1 kw.
1.30 p.m.—Weather Forecast and Gramophone Selections.
6.0 p.m.—Exchange, News Bulletin and Gramophone Records.
6.15 p.m.—Programme from Dublin.

CRACOW (Poland)

Polskie Radio, 959 kc/s (313 m.); 0.5 kw.
Transmits at intervals from 10.58 a.m.
6.25 p.m.—Talk on Classicism.
6.58 p.m.—Time and Chimes.
7.5 p.m.—Programme from Warsaw.
10.0 p.m.—Orchestral Concert from the Pavillon Restaurant.
11.0 p.m.—Chimes from the Church of Notre Dame.

DUBLIN (Ireland)

(2 RN). 725 kc/s (413 m.); 1 kw.
1.30 p.m.—Time, Weather, Exchange and Gramophone Concert.
6.0 p.m.—Gramophone Records.
6.15 p.m.—Programme for Children.
7.0 p.m.—Gramophone Records.
7.10 p.m.—News Bulletin.
7.30 p.m.—Time Signal.
7.32 p.m.—French Language Lesson.

7.45 p.m.—Seamus MacCall: History Talk.
8.0 p.m.—Concert of Austrian National Music. The Station Orchestra: Selections from the Works of Haydn and Schubert. P. J. Duffy (Baritone): Selections from Wolf and Korngold. Violin and Piano-forte Selections from the Works of Mozart. The Station Orchestra: Old Viennese Waltz and Selections from "Die Fledermaus" (J. Strauss).
9.15 p.m.—Victor Raymond Dance Band.
10.30 p.m.—Time, News, Weather and Close Down.

FRANKFURT-am-MAIN (Germany)

770 kc/s (390 m.); 1.5 kw. Relay by Cassel, 1,220 kc/s (246 m.).
Transmits at intervals from 5.30 a.m.
3.0 p.m.—Orchestral Concert relayed from the Kurhaus, Wiesbaden.
5.0 p.m.—Review of Books.
5.20 p.m.—Talk by Herr Dobler (Town-Councillor).
5.40 p.m.—(From Cassel). Talk: Chemistry in Everyday Life.
6.0 p.m.—Programme arranged by the Frankfurter Zeitung.
6.30 p.m.—Programme from Stuttgart.
7.0 p.m.—Song and Aria Recital by Jan Kiepura, relayed from the Saalbau. Arias from "Le Manon" (Massenet), (b) "La Bohème" (Puccini), (c) "Turandot" (Puccini), (d) "Halka" (Moniuszko), (e) "Das Wunder der Heliane" (Korngold). Three Songs: (a) Two German Songs (Schumann), (b) Spanish Song, Ay-Ay-Ay (Perez Freire), (c) Waltz sung in Italian from "Casanova" (Rozycki), (d) Italian Songs.
9.45 p.m.—Austrian National Evening. Selections from Posthumous Works (Hofmannsthal). Three Pieces for Cello and Pianoforte (Weber). Selection from a Drama (Bruckner). Pianoforte Piece, Op. 19 (Schönberg). Readings from Letters (Rilke). Trio for Pianoforte, Oboe and Viola (Kauder). Reading of Poems (Lerner-Polenia), followed by Dance Music.

HAMBURG (Germany)

Norag (ha, in Morse), 806 kc/s (372 m.); 1.5 kw. Relay by Bremen, 941 kc/s (319 m.); Flensburg, 1,373 kc/s (218 m.); Hanover, 536 kc/s (560 m.); and Kiel, 1,220 kc/s (246 m.).
Transmits at intervals from 5.20 a.m.
4.0 p.m.—Notes on Musical Publications.
5.0 p.m.—Variety Concert.
5.45 p.m.—Chess Talk.
6.0 p.m.—Talk: Women of Foreign Countries.
6.25 p.m.—Talk: A Demonstration and Criticism of the Montessori Method.
6.50 p.m.—Exchange and Weather.
7.0 p.m.—Programme from Frankfurt.
8.30 p.m.—Austrian National Evening. Introductory Talk. Recitation: Sehnsucht nach dem Norden (Hamerling). Overture, "The Magic Flute" (Mozart). Prelude, "Die Gezeichneten" (Schrecker). Recitations: (a) Entsagung (Grillparzer), (b) Ballade des äusseren Lebens (Hofmannsthal). Serenade for Strings in E Minor (Fuchs). Fifth Scene from the Third Act of "Der Meineidbauer" (Anzengrüber). Austrian Dances (Bittner).
9.30 p.m.—Talks, News, Weather, Sports and Miscellaneous Notes.
9.50 p.m.—"Through Gay Vienna"—Variety Programme by Soloists and the Scarpa Orchestra.

HILVERSUM (Holland)

1,004 kc/s (298 m.). After 5.40 p.m., 280 kc/s (1,071 m.); 6.5 kw.
9.40 a.m.—11.40 p.m.—Programme of the Algemeene Vereeniging Radio Omroep (A.V.R.O.).
9.40 a.m.—Time; Daily Service.
11.40 a.m.—Police Announcements.
11.55 a.m.—Quartet Concert.
1.40 p.m.—Gramophone Records.
2.40 p.m.—Talk (to be announced).
3.10 p.m.—Gramophone Records.
3.40 p.m.—Programme for Hospitals.
4.40—5.10 p.m.—Interval.
5.10 p.m.—Concert by a Hungarian Tzigane Band. At 5.40 p.m.—(in the interval) Time Signal.
6.10 p.m.—Exchange Quotations.
6.25 p.m.—Talk (to be announced).
6.55 p.m.—French Language Lesson.
7.25 p.m.—Police Announcements.
7.40 p.m.—Time Signal.
7.41—10.40 p.m.—Austrian National Evening.

7.41 p.m.—Introductory Talk by Mr. W. Vogt and Concert relayed from the Concert Hall, Amsterdam.
8.40 p.m.—Selection from "Anatol" Cycle of One-Act Plays (Arthur Schnitzler).
9.10 p.m.—Orchestral Concert. Overture, "The Gipsy Baron" (Joh. Strauss). Näscheri (Ziehrer). Waltz, Die Schönbrunner (Lanner). Pot-pourri, Wiener Spaziergänge (Komzak). Draussen in Schönbrunn (Benatzky). Im Prater blüh'n wieder die Bäume (Stolz). Ich setz' den Fall, from "Der Bettelstudent" (Müllöcker). Wiener Blut (Strauss). March, Wien bleibt Wien (Schrammel).
10.40 p.m.—Gramophone Records.
11.40 p.m. (approx.)—Close Down.

HUIZEN (Holland)

160 kc/s (1,875 m.); 6.5 kw.
7.40 a.m.—Close Down. Programme of the Christian Radio Society (N.C.R.V.).
7.40 a.m.—Gramophone Records.
7.55 a.m.—Programme for Country People.
8.40 a.m.—Concert.
9.40 a.m.—Selections by a Ladies' Choir.
10.10 a.m.—Programme for Hospitals.
10.40 a.m.—Programme of Readings.
12.10 p.m.—Tenor, Violoncello, Organ and Piano Selections.
1.40 p.m.—Programme for Schools.
2.25 p.m.—Art Course.
3.40 p.m.—Programme for Hospitals.
4.40 p.m.—Gramophone Records.
5.40 p.m.—Lesson in Malay.
6.10 p.m.—Organ Recital, with Vocal Solos.
7.10 p.m.—Relay of the Evangelical Assembly from the Evangelical Lutheran Church, Deventer. Talks, Soprano Solos, Organ and Quartet Music; followed by News.

KALUNDBORG (Denmark)

Kalundborg Radio, 260 kc/s (1,153 m.); 7.5 kw.
See Copenhagen Programme.

KÖNIGSBERG (Germany)

Ostmarken Rundfunk, 1,085 kc/s (276 m.); 2.5 kw. Relay by Danzig, 662 kc/s (453 m.).
Transmits at intervals from 4.55 a.m.
5.20 p.m.—(from Danzig)—Theatre Talk: Stage Secrets, with Gramophone Illustrations.
6.15 p.m.—Topical Talk.
6.30 p.m.—English Language Lesson.
7.0 p.m.—Programme from Frankfurt.
8.0 p.m.—Concert of Viennese Folk Music.
9.20 p.m. (approx.)—Weather, News and Sports Notes.

LAHTI (Finland)

167 kc/s (1,800 m.); 40 kw. Relay by Helsingfors, 1,357 kc/s (221 m.).
Transmits at intervals from 10.9 a.m.
5.40 p.m.—Pianoforte, Recital from the Works of Sibelius.
6.0 p.m.—Austrian National Evening. Overture, Titus (Mozart). Andante and Minuet for String Orchestra (Haydn). Ballet Music from "Rosamunde" (Schubert).
6.40 p.m.—Talk (to be announced).
7.0 p.m.—Song Recital from the Works of Schubert.
7.15 p.m.—Orchestral Concert (continued). Selections from Strauss: (a) Wine, Woman and Song, (b) Roses from the South, (c) Tales from the Vienna Woods.
7.45 p.m.—News in Finnish and Swedish.

LANGENBERG (Germany)

Westdeutscher Rundfunk, 635 kc/s (473 m.); 13 kw. Relay by Aix-la-Chapelle, 662 kc/s (453 m.); Cologne, 1,319 kc/s (227 m.); and Münster, 1,283 kc/s (234 m.).
Transmits at intervals from 5.45 a.m.
4.30 p.m.—Gramophone Concert.
5.30 p.m.—Talk: Good German.
5.50 p.m.—Topical Talk.
6.0 p.m.—Report on Industry, Weather and Sports Notes.
6.15 p.m.—Spanish Language Lesson.
6.40 p.m.—Talk: The International Fruit and Vegetable Industry.
7.0 p.m.—Orchestral Concert. March, Per aspera ad astra (Urbach). Waltz, Mein Lebenslauf ist Lieb und Lust (Strauss). Overture, "The Crown Diamonds" (Auber). Die Post im Walde (Schäffer). Pot-pourri, Lähäriana (Geiger). Lieblein (Steck). Czardas (Monti).
8.0 p.m.—Austrian National Evening. Romantic Concerto for Pianoforte (Marx). The Second Symphony

(Schmidt); followed by News, Sports and Miscellaneous Notes and Programme of Austrian Dances.
11.0 p.m. (approx.)—Close Down.

LEIPZIG (Germany)

Mitteldeutscher Rundfunk, 1,157 kc/s (259 m.); 1.5 kw. Relay by Dresden, 941 kc/s (319 m.).
Transmits at intervals from 9.0 a.m.
3.30 p.m.—Orchestral Concert.
4.55 p.m.—Economic Report.
5.5 p.m.—Talk on Taxation.
5.20 p.m.—Weather and Time.
5.30 p.m.—See Königsbrunn.
5.55 p.m.—Labour Intelligence.
6.0 p.m.—Talk: The History of Trade Unions.
6.30 p.m.—Dance Music Programme.
7.15 p.m.—Talk: Austrian Art.
7.45 p.m.—Austrian National Evening. Verkürzte Nacht, (Schönberg). Lieder eines fahrenden Gesellen (Mahler). Der Geburtstag der Infantin (Schreker). Dances from Austria (Bittner).
9.20 p.m.—Time, Weather, News and Sports Notes.
9.30 p.m.—Dancing Lesson relayed from Berlin (Witzleben), followed by Silent Night.

MADRID (Spain)

Union Radio (EAJ7), 707 kc/s (424 m.); 2 kw.
Transmits at intervals from 11.45 a.m.
7.0 p.m.—Chimes, Exchange Quotations and Dance Music.
8.25 p.m.—News Bulletin.
8.30—10.0 p.m.—No Transmission.
10.0 p.m.—Chimes, Time, Exchange Quotations and Austrian National Programme. Talk on Austria. Chamber Music Selections: (a) Quartet in D Minor, Op. 76, No. 2 (Haydn), (b) Song Cycle, Die schöne Müllerin (Schubert). Symphony Music: (a) Andante and Minuet from the Symphony in C—the Jupiter Symphony (Mozart), (b) First Movement from the Seventh Symphony in E (Bruckner). Light Music: (a) Selections from "The Bird-Fancier" (Zeller), (b) Waltz, Lustige Wien (J. Strauss), (c) Waltz, Der Kuss (J. Strauss), (d) March (Schrammel).
12 midnight.—Chimes, News and Dance Music relayed from the Palacio de Bellas Artes.
12.30 a.m. (Friday)—Close Down.

MILAN (Italy)

Ente Italiano Audizioni Radiofoniche, 599 kc/s (501 m.); 7 kw.
Transmits at intervals from 7.15 a.m.
7.30 p.m.—Literary Review.
7.45 p.m.—A Short Comedy.
8.15 p.m.—Programme from Turin. In the interval at 10.30 p.m.—Wireless News.
11.0 p.m. (approx.)—Close Down.

MORAVSKA-OSTRAVA (Czechoslovakia)

1,139 kc/s (263 m.); 10 kw.
Transmits at intervals from 10.30 a.m.
6.0 p.m.—See Prague Programme.
6.5 p.m.—Concert relayed from Brim (878 kc/s, 342 m.).
7.0 p.m.—Austrian Programme relayed from Vienna.
9.15 p.m.—Military Band Concert relayed from Brünn.
9.55 p.m.—News, Theatre Review and Programme Announcements.

MOTALA (Sweden)

223 kc/s (1,345 m.); 30 kw. See Stockholm Programme.

MUNICH (Germany)

503 kc/s (533 m.); 1.5 kw. Relay by Augsburg, 536 kc/s (560 m.); Kaiserslautern, 1,112 kc/s (270 m.); and Nürnberg, 1,256 kc/s (239 m.).
Transmits at intervals from 5.45 a.m.
5.15 p.m.—Agricultural Talk.
5.45 p.m.—Talk: Books in connection with the Programmes of the Week.
6.0 p.m.—"Developments in Stage Dancing"—Orchestral Concert.
7.0 p.m.—Programme from Frankfurt.
8.35 p.m.—Topical Dialogue.
9.5 p.m.—Programme to be announced.
9.20 p.m.—News Bulletin.

OSLO (Norway)

Kringkastingselskapet, 608 kc/s (493 m.); 1.2 kw. Relay by Fredrikstad, 761 kc/s (394 m.); Hamar, 527 kc/s (570 m.); Notodden, 1,058 kc/s (283 m.); Porsgrund, 662 kc/s (453 m.).
Transmits at intervals from 8.50 a.m.
6.15 p.m.—Weather and News.
6.30 p.m.—Elementary Music Lesson.
7.0 p.m.—Time and Chamber Music. Quarter in G Major, Op. 12 (Mozart). Quartet (Debussy).

Programmes for Thursday—(Cont.)

8.0 p.m.—Literary Review.
 8.30 p.m.—Weather and News.
 9.5 p.m.—Recital of Choral Music.
 9.35 p.m. (approx.)—Close Down.

PARIS (France)
 Ecole Supérieure (FPTT). 671 kc/s (447 m.); 0.8 kw.
 Transmits at intervals from 8.0 a.m.
 6.0 p.m.—Lesson in Esperanto.
 6.30 p.m.—Radio Journal de France.
 8.0 p.m.—German Language Lesson, arranged by the Berlitz School.
 8.30 p.m.—Talk: How to plant Rose-trees.
 9.0 p.m.—Austrian National Evening, followed by News, Time and Weather.

PARIS (France)
 Eiffel Tower (FL). 206 kc/s (1,455 m.); 12 kw.
 7.56 p.m.—Time Signal on 9,231 kc/s; (32.5 m.).
 9.26 a.m.—Time Signal on 113.13 kc/s; (2,650 m.).
 5.45 p.m.—Le Journal Parlé.
 7.10 p.m.—Meteorological Report.
 7.20 p.m.—Concert of Light Music—Songs for Children, Monologues and Fantasias. At 7.56 p.m.—Time Signal on 9,231 kc/s; (32.5 m.).
 10.26 p.m.—Time Signal on 113.13 kc/s; (2,650 m.).

PARIS (France)
 Petit Parisien. 914 kc/s (329 m.) 0.5 kw.
 8.30 p.m.—Transmission of Pictures.
 8.45 p.m.—Gramophone Selections, Talk and News.
 9.0 p.m.—Concert. Overture, "Der Schauspieldirektor" (Mozart). Nocturne (Boëllmann). Carnival des animaux (Saint-Saëns). Wedding Scenes (Smetana). Tarantella from the Italian Caprice (Tchaikovsky). Carnival from "Roma" (Bizet).

PARIS (France)
 Radio-Paris. (CFR). 174 kc/s (1,725 m.); 12 kw.
 Transmits at intervals from 6.45 a.m.
 12.0 p.m.—Protestant Address by the Rev. Freddy Durriemann.
 12.30 p.m.—Gramophone Concert. In the interval at 1.0 p.m.—Exchange and News.

2.0 p.m.—Exchange; Market Prices.
 3.30 p.m.—Exchange Quotations.
 3.45 p.m.—Programme for Children: A Visit to Alsace.
 4.15 p.m.—Dance Music Programme.
 4.55 p.m.—News, Market Prices and Exchange Quotations.
 6.0 p.m.—Agricultural Report and Racing Results.
 6.30 p.m.—New York Exchange.
 6.35 p.m.—Gramophone Records.
 7.5 p.m.—Talk: Contemporary Literature.
 7.30 p.m.—Elementary Book-keeping Lesson.
 7.45 p.m.—Market Prices, Economic and Social Review and Amusement Guide.
 8.0 p.m.—Concert. Chevalerie rustique (de Volga). Variety Programme. Concert dedicated to Normandy. In the intervals, at 8.30 p.m.—American Closing Prices, Sports Notes and News, and at 9.15 p.m.—Press Review, News and Longines Time.

POSEN (Poland)
 896 kc/s (335 m.); 1.2 kw.
 Transmits at intervals from 6.15 a.m.
 6.5 p.m.—Talk for Soldiers.
 6.20 p.m.—Agricultural Talk.
 6.40 p.m.—Agricultural Correspondence.
 7.0 p.m.—Instrumental Concert by the Auber Trio of Vienna. Trio, Op. 32 (Arensky). Spanish Symphony (Lalo). Trio in G Minor, Op. 15 (Smetana).
 8.30 p.m.—Programme from Warsaw. In the intervals: Theatre and Station Notes.
 9.15 p.m.—Time and News.
 9.30 p.m.—Transmission of Pictures.
 10.0 p.m. (approx.)—Close Down.

PRAGUE (Czechoslovakia)
 Strasnice. 617 kc/s (487 m.); 5 kw.
 Transmits at intervals from 10.15 a.m.
 6.0 p.m.—Time and News.
 6.5 p.m.—Brass Band Concert.
 6.45 p.m.—Talk: Art Treasures in Italy.
 7.0 p.m.—Austrian National Evening, relayed from Vienna.
 9.0 p.m.—Time, News, Sports Notes.
 9.15 p.m.—Gramophone Records, Time, Theatre Review and Programme Announcements.
 10.0 p.m.—Time Signal.

ROME (Italy)
 Ente Italiano Audizioni Radiofoniche (IRO). 680 kc/s (441 m.); 2.4 kw.
 Transmits at intervals from 12 noon.
 7.15 p.m.—News, Sports Notes, Weather and Press Review.
 8.0 p.m.—Time Signal.
 8.2 p.m.—Symphony Concert, including "The Generalissimo"—Play in One Act (Franz Molnar). In the intervals: Recitations and News. Dance Music after the Programme.
 10.45 p.m. (approx.)—Close Down.

STOCKHOLM (Sweden)
 Radiotjänst (SASA). 680 kc/s (436 m.); 1.5 kw. Relayd by Boden, 250 kc/s (1,200 m.); Göteborg, 932 kc/s (322 m.); Hörby, 1,166 kc/s (257 m.); Motala, 223 kc/s (1,345 m.); Östersund, 380 kc/s (770 m.); Sundsvall, 554 kc/s (542 m.).
 Transmits at intervals from 6.15 a.m.
 6.30 p.m.—Talk in German: Austria.
 6.50 p.m.—Austrian National Programme. Symphony in D Major (Haydn). "The Fool and Death"—Play (Hugo von Hoffmannsthal). Baritone Solos to Orchestral Accompaniment: (a) Gesang Weylas (Wolf), (b) Der Rattenfänger (Wolf), (c) Ich bin der Welt abhanden gekommen (Mahler), (d) Rheinlegendchen (Mahler). Waltz, Tales from the Vienna Woods (J. Strauss). Overture, "Morning, Noon and Night" (Suppé).
 8.15 p.m.—News and Weather.
 8.40 p.m.—(from Malmö, 1,301 kc/s; 231 m.)—Talk: Foreign Words in the Swedish Language.
 9.10 p.m. (approx.)—Close Down.

STUTTIGART (Germany)
 Süddeutscher Rundfunk. 833 kc/s (360 m.); 1.5 kw. Relayd by Freiburg, 527 kc/s (570 m.).
 Transmits at intervals from 9.0 a.m.
 3.0 p.m.—Orchestral Concert, relayed from the Kurhaus, Wiesbaden.
 4.45 p.m.—Time, Weather and Agricultural Report.
 5.0 p.m.—Talk: Champions of the New America.
 5.30 p.m.—(from Freiburg).—Medical Talk.
 6.0 p.m.—Talk: Electricity in Public Communications.
 6.30 p.m.—"Franz und Johann"—a

Fairy Tale for Children and Grown-ups (Karl Thoms), told by Carl Struve. Orchestral Selections in the intervals.
 7.0 p.m.—Programme from Frankfurt.

TOULOUSE (France)
 Radiophonie du Midi. 788 kc/s (381 m.); 8 kw.
 Transmits at intervals from 1.0 p.m.
 6.30 p.m.—Dance Music Programme.
 6.45 p.m.—Exchange Quotations and Racing Results.
 7.0 p.m.—Selected Readings.
 7.15 p.m.—News Bulletin.
 7.30 p.m.—Dance Music Programme.
 8.0 p.m.—Exchange Quotations.
 8.15 p.m.—Concert. Selections from "Lakmé" (Delibes), "Mireille" (Gounod), "Rigoletto" (Verdi), "Romeo and Juliet" (Gounod), "Louise" (Charpentier), "I Pagliacci" (Leoncavallo), "La Vie de Bohème" (Puccini), "Manon" (Massenet), "The Pearl Fishers" (Bizet), "La Tosca" and "La Vie de Bohème" (Puccini), and "Der Freischütz" (Weber).
 10.15 p.m.—North African News.
 10.30 p.m. (approx.)—Close Down.

TURIN (Italy)
 Ente Italiano Audizioni Radiofoniche (I TO). 1,094 kc/s (274 m.); 7 kw.
 Transmits at intervals from 7.15 a.m.
 7.30 p.m.—Time Signal.
 7.32 p.m.—Literary Review.
 7.45 p.m.—Programme from Milan.
 8.15 p.m.—Divertimento for Flute, Oboe, Clarinet, Cor anglais and Bassoon (Gandini), followed by Talk on New Music.
 8.45 p.m.—Chamber Music. Suite in C Major, No. 1, for Two Oboes, Bassoon, Two Violins, Viola and Bass (Bach). Sonata in G for Violin and Piano (Grieg). Septet for Clarinet, Bassoon, Horn, Violin, Viola, Cello and Bass (Beethoven).
 10.0 p.m.—Dance Music Programme. In the interval at 10.30 p.m.—Wireless News.
 11.0 p.m. (approx.)—Close Down.

VIENNA (Austria)
 Radio-Wien. 581 kc/s (516.3 m.); 15 kw. Relayd by Graz, 851 kc/s (352.5 m.); Innsbruck, 1,958 kc/s (283.5 m.); Klagenfurt, 662 kc/s (453.2 m.); and Linz, 1,220 kc/s (245.9 m.).

Transmits at intervals from 10.0 a.m.
 5.30 p.m.—Talk for Workers: Industrial Tribunals.
 6.0 p.m.—Talk: The Earth—the Origin and Subsidence of Minerals and Rocks.
 6.30 p.m.—English Language Lesson.
 6.55 p.m.—Time and Weather.
 7.0 p.m.—Austrian National Programme. Talk: Austrian Literature throughout the Ages.
 7.35 p.m.—"Paracelsus"—One-Act Play in Verse (Arthur Schnitzler).
 8.20 p.m.—Orchestral Concert. Verklärte Nacht (Schönberg). Songs with Orchestral Accompaniment: (a) Wer hat dies Liedlein erdacht (Mahler), (b) Rheinlegendchen (Mahler), (c) Und gestern hat er mir Rosen gebracht (Mack), (d) Er ist's (Wolf). Internezzo for Strings (Schreker). Haffner Serenade (Mozart). Entr'acte and Ballet Music from "Rosamunde" (Schubert). Waltz, Frühlingsstimmen (Strauss). Three Pieces from the Suite, "Much Ado about Nothing" (Korngold): (a) Overture, (b) Internezzo, (c) Hornpipe. Phototelegraphy. Transmission after the Programme.

WARSAW (Poland)
 Polskie Radio. 212 kc/s (1,411 m.); 8 kw.
 Transmits at intervals from 10.58 a.m.
 6.58 p.m.—Time Signal.
 7.0 p.m.—Programme Announcements.
 7.5 p.m.—Austrian National Evening. Talk on Austria, followed by Orchestral Concert of Austrian Music. Overture, "The Marriage of Figaro" (Mozart). Symphony in G Minor (Mozart). Bass Solos, with Orchestral Accompaniment: (a) Aria from "Don Juan," and (b) Aria from "The Marriage of Figaro" (Mozart). Overture, "Die Fledermaus" (Joh. Strauss). Waltz, The Blue Danube (Joh. Strauss). The Radetzky March (Joh. Strauss, Sen.), followed by Items not yet announced.
 9.15 p.m.—Weather, Police and Sports Notes.
 9.25 p.m.—Talk: Whilst smoking a Cigarette.
 9.35 p.m.—News Bulletin.
 10.0 p.m.—Dance Music, relayed from the Oaza Restaurant.
 11.0 p.m. (approx.)—Close Down.

PHILIPS RECTIFYING VALVES

- For:
- RELIABLE
 - H. T. SUPPLY
 - DEPENDABILITY
 - LONG LIFE
 - HIGH EFFICIENCY



—An output easily varied and smoothed

—The rectifier that has withstood the greatest of all tests—TIME.

Representative Types:

Type 506. Full wave type. Filament voltage 4 volts. Filament current 1 amp. Anode volts—2 x 300 volts. R.M.S. max. Rectified current 75 mA. Price 20/-

Type 505. Half wave type. Filament voltage 4 volts. Filament current approx. 1 amp. Anode volts R.M.S. 400 v. max. Max. value Rect Current 60 mA. Price 15/-

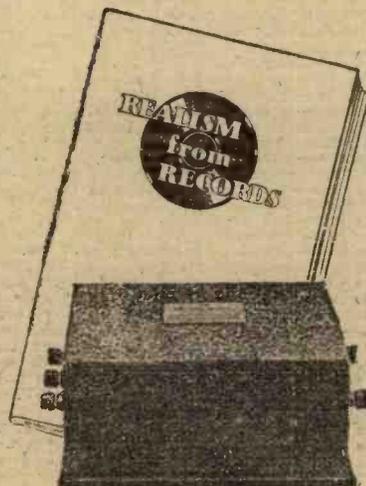
Type 373. Half wave type. Filament voltage 4 volts. Filament current 1 amp. Anode voltage 220 volts. R.M.S. max. Rectified current 40 mA. Price 15/-

Philips make rectifying valves for voltages up to 4,000 and currents up to 40 amps.

PHILIPS for Radio

Advert. PHILIPS RADIO, PHILIPS HOUSE, 145, CHARING CROSS ROAD, LONDON, W.C.2.

Pick-ups and the Novotone



THE NOVOTONE
 Mc Lachlan Tone Compensator.
 Patents Pending.

NOVOTONE PLACED FIRST by Public Ballot in the "Wireless World" Olympia Show Competition. (No. 7 Classification.)

GAMBRELL ALL-ELECTRIC RECEIVERS. Leaflets Free.

Every user of an electrical pick-up should immediately write for the "Novotone" Booklet.

The Novotone Tone Compensator invented by Dr. N. W. Mc Lachlan not only compensates for the inherent losses in pick-ups but also for the even greater losses in recording.

Read this extract from "The Wireless World," August 21st, 1929. Page 177.

"In ordinary records it is necessary to restrict the amplitude of notes below about 250 cycles in order that the vibration may be contained within the standard pitch of the groove."

THE NOVOTONE COMPENSATOR
 TURNS LOSSES INTO GAINS.
 PUTS IN BASS WITHOUT BOOM.
 IMPROVES REPRODUCTION OVER THE WHOLE MUSIC SCALE.
 GIVES REALISM FROM RECORDS.
 ALL ACHIEVED BY USING THE NOVOTONE.

Write now for the 8-page Explanatory Booklet "R.N." See the Diagram illustrating the effect of the Gambrell Novotone on electrically produced records.

GAMBRELL RADIO LTD.
 6, Buckingham St., Strand, London, W.C.2.
 Telephone: Temple Bar 3233.

PROGRAMMES FOR FRIDAY (November 22)

NOTE: THE HOURS OF TRANSMISSION ARE REDUCED TO GREENWICH MEAN TIME

BARCELONA (Spain)

Radio-Barcelona (E.A.J.). 860 kc/s (349 m.); 8 kw.
Transmits at intervals from 11.0 a.m.
8.30 p.m.—Elementary French Lesson.
9.0 p.m.—Chimes, Weather and Exchange Quotations.
9.5 p.m.—Orchestral Selections.
9.25 p.m.—Recital of Songs.
9.45 p.m.—Orchestral Selection: Spanish Rhapsody, Ritmos, de España, No. 4 (Raurich).
10.0 p.m.—News Bulletin.
10.5 p.m.—"Els Sacris de Vilatruta"—Catalan Comedy in Three Acts (Rusiñol-Martinez Sierra), followed by Barcelona Exhibition Notes.
11.30 p.m. (approx.)—Close Down.

BELGRADE (Yugoslavia)

699 kc/s (423 m.); 2.5 kw.
Transmits at intervals from 11.40 a.m.
5.0 p.m.—Orchestral Concert, relayed from the Moskva Café.
6.20 p.m.—German Language Lesson.
6.50 p.m.—Introductory Talk to the following Transmission.
7.0 p.m.—Opera Relay from the Belgrade National Theatre. In the interval at 8.30 p.m. (approx.)—Time and News.

BERLIN (Germany)

Königswusterhausen. 183 kc/s (1,635 m.); 26 kw.
Transmits at intervals from 5.55 a.m.
3.30 p.m.—Programme from Leipzig.
4.30 p.m.—Talk: Chemistry in Daily Life.
5.0 p.m.—Talk: The Importance of the Carpentering Trade in German Economic Life.
5.30 p.m.—Advanced English Lesson.
5.55 p.m.—Talk: The Importance of the Retail Branch of the Textile Industry.
6.20 p.m.—Talk for Veterinary Surgeons.
7.0 p.m.—Concert, relayed from the Singakademie. Grand Fugue in B flat Major, Op. 131 for two Pianos (Beethoven). Stabat Mater, for Soprano, Contralto, String Orchestra and Organ (Pergolesi).
8.0 p.m.—"Here speaks Berlin"—Variety Programme, followed by News, Picture Transmission and Concert from Berlin (Witzleben).

BERLIN (Germany)

Witzleben. 716 kc/s (418 m.); 1.5 kw.
Transmits at intervals from 5.55 a.m.
4.30 p.m.—Concert of Light Music.
6.0 p.m.—Talk: The Foundations of Geopolitics.
6.30 p.m.—"Es war nichts"—A Traveller's Tale, read by the Author (Hermann Kesser).
7.0 p.m.—Popular Concert. Selection from "Tip Toes" (Gershwin). Tango Serenade, Schläfe, mein kleines Sonnenkind (Stolz). Blütenreize and Victoria ring, from the Suite "Das Blumenwunder" (Künneke). Zig-Zag and Dein ist mein ganzes Herz, from "Das Land des Lächelns" (Lehár). Pierrrot's Heart (Clémus). Song and Tango. Schöner Gigolo (Casucci). Song and Boston, Deine Mutter bleibt immer bei dir (Jurmann). Pastoral, Im Frühlingwind (Dransmann). Waltz, Roses and Marguerites (Waldteufel).
8.0 p.m.—Chamber Music. String Quartet in C Minor, op. 51, No. 1 (Brahms). Talk: André Gide, on the occasion of his Sixtieth Birthday. String Quartet in F Major, op. 96.
9.15 p.m.—Time, News, Weather, Sports Notes and Picture Transmission, followed by Concert. Waltz, Wiener Bürger (Ziehrer). Parade im Kindergarten (Bendix). Soprano Solos: (a) Der Vogel im Walde (Taubert), (b) Waltz from "The Grass Widow" (Blech). Selection from "Das Land des Lächelns" (Lehár). An Indian Wedding (Percy). Soprano Waltz Song from "Eva" (Lehár). Tango Song, If you would only smile a little (Chapi). Cradle Song, Ninna Nanna (Michei). Waltz, Wo die Zitronen blüh'n (Joh. Strauss).

BERNE (Switzerland)

Radio-Bern. 743 kc/s (403 m.); 1 kw.
Transmits at intervals from 11.43 a.m.
6.28 p.m.—Time and Weather.

6.30 p.m.—Talk: Popular Types in French Literature, relayed from Laisanne, 441 kc/s (680 m.).
7.0 p.m.—Talk: Wireless Snapshots of Berlin.
7.35 p.m.—Variety Programme from Berne and Baste, 297 kc/s (1,010 m.).
9.0 p.m.—News, Weather and Close Down.

BRATISLAVA (Czechoslovakia)

1,076 kc/s (279 m.); 12.5 kw.
Transmits at intervals from 10.30 a.m.
6.0 p.m.—"Ilsa's Heart" Opera (Karel), relayed from the National Theatre, with Introductory Talk.
9.0 p.m.—Programme from Prague.
9.55 p.m.—News and Programme Announcements.

BRESLAU (Germany)

923 kc/s (325 m.); 2 kw. Relay by Gleiwitz, 1,184 kc/s (253 m.).
Transmits at intervals from 10.15 a.m.
6.5 p.m.—Weather for Farmers.
6.6 p.m. (from Gleiwitz).—Baritone Recital of Swedish Ballads and Songs.
7.5 p.m.—Natural Science Talk: The Construction of the Universe.
7.30 p.m.—Mezzo-Soprano Recital of Humorous Arias.
8.0 p.m.—Seventh Symphony in E Major (Bruckner), by the Silesian Philharmonic Society.
9.10 p.m.—News Bulletin.
9.35 p.m.—Dance Music.
11.0 p.m. (approx.)—Close down.

BRUSSELS (Belgium)

Radio-Belgique. 590 kc/s (508.5 m.); 1 kw.
5.0 p.m.—Concert from the Bon Marché Tea-rooms.
6.0 p.m.—Talk in Flemish.
6.15 p.m.—Talk: Doctors in the Congo.
6.30 p.m.—Gramophone Records.
7.30 p.m.—Le Journal Parlé.
8.15 p.m.—Gramophone Records.
8.45 p.m.—Concert relayed from Wavre. Festival March (Lassen). Selection from "Benvenuto Cellini" (Berlioz). Symphonic Variations (Gilsen). Tenor Solo. Overture, "The Magic Flute" (Mozart). Entr'acte from "Loreley" (Bruch). Tenor Solo. Selections from "L'Arlesienne" (Bizet).
10.15 p.m.—News Bulletin.

BUDAPEST (Hungary)

545 kc/s (550 m.); 20 kw.
Transmits at intervals from 8.15 a.m.
4.40 p.m.—Zither Recital.
5.50 p.m.—French Language Lesson.
6.25 p.m.—Talk in German.
7.15 p.m.—Programme from Warsaw.
9.30 p.m. (approx.). Time, Weather, News and Tzigane Concert from the Hotel Hungaria.

COLOGNE (Germany)

Westdeutscher Rundfunk. 1,319 kc/s (227 m.); 2 kw.
See Langenberg Programme.

COPENHAGEN (Denmark)

1,067 kc/s (281 m.); 0.75 kw. Relay by Kalundborg, 260 kc/s (1,153 m.).
Transmits at intervals from 6.30 a.m.
5.50 p.m.—(Kalundborg only).
6.0 p.m.—News Bulletin.
6.30 p.m.—Talk: Marie Montessori and the Montessori Method.
7.0 p.m.—Town Hall Chimes.
7.2 p.m.—"A Ladies' Man"—Farce with Music in Seven Scenes (Kjerulf-Nansen).
9.20 p.m.—News.
9.35 p.m.—Relay of Foreign Stations.
11.0 p.m.—Chimes and Close Down.

CORK (Ireland)

(6CK). 1,337 kc/s (225 m.); 1 kw.
1.30 p.m.—Weather Forecast and Gramophone Selections.
6.0 p.m.—Exchange, News Bulletin and Gramophone Records.
6.15 p.m.—Programme from Dublin.

CRACOW (Poland)

Polskie Radio. 959 kc/s (313 m.); 0.5 kw.
Transmits at intervals from 10.58 a.m.
6.25 p.m.—The Letter Box.
6.58 p.m.—Time and Chimes.
7.5 p.m.—Programme from Warsaw, followed by Relay of Foreign Stations.
11.0 p.m.—Chimes from the Church of Notre Dame.

DUBLIN (Ireland)

(2RN). 725 kc/s (413 m.); 1 kw.
1.30 p.m.—Time, Weather, Exchange and Gramophone Concert.
6.0 p.m.—Gramophone Records.
6.15 p.m.—Programme for Children.
7.0 p.m.—Gramophone Records.
7.20 p.m.—News Bulletin.

7.30 p.m.—Time Signal.
7.32 p.m.—Gardening Talk.
7.45 p.m.—Library Talk.
8.0 p.m.—Concert. The Station Orchestra: Selections from the Works of Early Italian Composers. P. Whitehead and Mrs. Boxwell: Vocal and Instrumental Selections. Mamie Dingle (Soprano). W. A. Manahan: Variety Items. Elizabeth Young and Company: Sketch. The Old Timers.
10.30 p.m.—Time, News, Weather and Close Down.

FRANKFURT-am-MAIN (Germany)

770 kc/s (390 m.); 1.5 kw. Relay by Cassel, 1,220 kc/s (246 m.).
Transmits at intervals from 5.30 a.m.
3.0 p.m.—Orchestral Concert.
5.0 p.m.—Talk: Science and Technology.
5.20 p.m.—Weekly Film Review.
5.30 p.m.—Shorthand Speed Dictation.
5.50 p.m.—Talk for Chess-Players.
6.10 p.m.—Talk: Deserts and Desert Towns.
6.30 p.m.—Mandoline Concert.
7.0 p.m.—Programme from Stuttgart.

HAMBURG (Germany)

Norag (ha, in Morse). 806 kc/s (372 m.); 1.5 kw. Relay by Bremen, 941 kc/s (319 m.); Flensburg, 1,373 kc/s (218 m.); Hanoever, 536 kc/s (560 m.); and Kiel, 1,220 kc/s (246 m.).
Transmits at intervals from 5.20 a.m.
3.15 p.m.—(from Hanoever).—Cradle Song Recital.
4.0 p.m.—Reading of Fairy-tales.
4.55 p.m.—Variety Concert.
5.30 p.m.—See Königswusterhausen.
6.0 p.m.—Educational Talk: The Backward Child.
6.25 p.m.—Talk: Have Walking Tours an Injurious Effect on the Health?

6.50 p.m.—Exchange and Weather.
7.0 p.m.—The Sixth "Norag" Concert relayed from the Large Hall of the Musikhalle. Programme of Waltzes and Operetta Music. Overture, "The Gipsy Baron" (Strauss). Eva's Song from "Eva" (Lehár). Ollendorf's Song from "Der Bettelstudent" (Millocker). Duet from "Eva" (Lehár). Selection from "Die Geisha" (Jones). Waltz, Roses of the South (Strauss). Overture, "Wiener Frauen" (Lehár). Ich bin der arme Jonathan, Song from "Der arme Jonathan" (Millocker). Selection from "Countess Maritza" (Kálmán). Duet from "Paganini" (Lehár). Waltz, The Blue Danube (Strauss).
9.0 p.m.—"A Cabaret in Runxendorf" with the collaboration of Ludwig Manfred Lommel.
9.50 p.m.—Talks, News, Weather, Sports and Miscellaneous Notes.
10.10 p.m.—Social Evening, with the Scarpa Orchestra.

HILVERSUM (Holland)

1,004 kc/s (298 m.). After 5.40 p.m. 280 kc/s (1,071 m.); 6.5 kw.
9.40 a.m.—11.40 p.m.—Programme of the Algemeene Vereeniging Radio Omroep (A.V.R.O.).
9.40 a.m.—Time and Daily Service.
11.40 a.m.—Police Announcements.
11.55 a.m.—Concert by a Hungarian Tzigane Orchestra.
1.45 p.m.—Talk for Schools.
2.25 p.m.—Gramophone Records.
2.40 p.m.—Talk (to be announced).
3.40 p.m.—4.10 p.m.—Interval.
4.10 p.m.—Organ Recital. Toccata in D Minor (J. S. Bach). Sonata in F Minor (Mendelssohn). Pièce héroïque (César Franck). Sonata (Felix Borovskiy). Three Pieces (Pierné). Toccata (Hendriks).
5.10 p.m.—Light Programme of Talks and Selections by a Concertina Orchestra.
5.40 p.m.—Time Signal.
6.10 p.m.—Exchange Quotations.
6.25 p.m.—Spanish Language Lesson.
6.55 p.m.—Talk (to be announced).
7.40 p.m.—Time Signal.
7.42 p.m.—Relay of a Play from the Grand Theatre, Amsterdam, followed by Weather, News and Gramophone Records.
11.40 p.m. (approx.)—Close Down.

HUIZEN (Holland)

160 kc/s (1,875 m.); 6.5 kw.
10.10—10.40 a.m.—Programme of the Christian Radio Society (N.C.R.V.). Programme for Hospitals.
11.10 a.m.—2.40 p.m.—Programme of the Catholic Radio Society (K.R.O.).
11.10 a.m.—Religious Address.
11.55 a.m.—K.R.O. Trio Concert.
12.55 p.m.—Gramophone Records.
2.10 p.m.—Programme for Schools.

2.40—3.40 p.m.—No Transmission.
3.40—6.10 p.m.—N.C.R.V. Programme.
3.40 p.m.—Gramophone Records.
4.40 p.m.—Concert of Soprano, Horn, Piano and Organ Selections.
6.40—7.10 p.m.—K.R.O. Programme. Writing Lesson.

KALUNDBORG (Denmark)

Kalundborg Radio. 260 kc/s (1,153 m.); 7.5 kw.
See Copenhagen Programme.

KÖNIGSBERG (Germany)

Ostmarken Rundfunk. 1,085 kc/s (276 m.); 2.5 kw. Relay by Danzig, 662 kc/s (453 m.).
Transmits at intervals from 4.55 a.m.
5.40 p.m.—Introductory Talk to the Symphony Concert at 7.0 p.m.
6.15 p.m.—Topical Talk.
6.30 p.m.—Elementary French Lesson, relayed from Danzig.
6.55 p.m.—Weather Report.
7.0 p.m.—Symphony Concert from the Stadthalle. The Seventh Symphony (Beethoven). Concerto for Pianoforte in A Major (Liszt). Suite (Stravinsky).
8.45 p.m.—Dancing Lesson.
9.15 p.m.—Weather, News and Sports Notes.
9.30 p.m.—Dance Music Programme relayed from Danzig.
10.30 p.m. (approx.)—Close Down.

LAHTI (Finland)

167 kc/s (1,800 m.); 40 kw. Relay by Helsingfors, 1,357 kc/s (221 m.).
Transmits at intervals from 10.0 a.m.
5.15 p.m.—Talk (to be announced).
5.35 p.m.—Choral Concert.
6.0 p.m.—"Gertrude"—Play (Hjalmar Söderberg).
6.30 p.m.—Orchestral Concert relayed from Helsingfors.
7.45 p.m.—News in Finnish and Swedish.

LANGENBERG (Germany)

Westdeutscher Rundfunk. 635 kc/s (473 m.); 13 kw. Relay by Aix-la-Chapelle, 662 kc/s (453 m.); Cologne, 1,319 kc/s (227 m.); and Münster, 1,283 kc/s (234 m.).
Transmits at intervals from 5.45 a.m.
4.30 p.m.—Orchestral Concert. Invitation to the Dance (Weber). Overture, "Raymond" (Thomas). Potpourri, Dem Andenken Beethovens (Urbach). A Norwegian Bridal Procession (Grieg). The Second Hungarian Rhapsody (Liszt). Canzone di Maggio (Michei).
5.30 p.m.—Talk: International Cultural Politics as a Means of Understanding and Strength.
5.50 p.m.—Topical Talk.
6.0 p.m.—Report on Industry, Weather and Sports Notes.
6.15 p.m.—English Conversation.
6.40 p.m.—Talk: The New Conception of the World—The Philosophy of Life.
7.0 p.m.—Gramophone Recital of Songs by Josef Schwaz (Baritone).
7.50 p.m.—"Kater Lampe"—Comedy (Emil Rosenow), followed by News, Sports and Miscellaneous Notes, and Concert relayed from the Handelshof, Essen.
11.0 p.m. (approx.)—Close Down.

LEIPZIG (Germany)

Mitteldeutscher Rundfunk. 1,157 kc/s (259 m.); 1.5 kw. Relay by Dresden, 941 kc/s (319 m.).
Transmits at intervals from 9.0 a.m.
3.30 p.m.—Orchestral Concert.—Prelude to "Der Evangelist" (Kienzl). Melodies from "Der Wildschütz" (Lortzing). Minuet and Gavotte from "Ein Tanzspiel" (Schreker). Melodies from "Jenufa" (Janacek). Melodies from "The Jewels of the Madonna" (Wolf-Ferrari).
4.55 p.m.—Economic Report.
5.5 p.m.—Talk on Social Insurance.
5.20 p.m.—Weather and Time.
5.30 p.m.—See Königswusterhausen.
5.55 p.m.—Labour Intelligence.
6.0 p.m.—Talk: The Art of making one's Will.
6.30 p.m.—"The Grand Duchess of Gerolstein"—Opera in Three Acts (Offenbach).
8.30 p.m.—Reading: Lyrics of the Post-War Period.
9.0 p.m.—Time, Weather, News and Sports Notes, followed by Concert of Light Music from the Naschmarkt Café.
11.0 p.m. (approx.)—Close Down.

LJUBLJANA (Yugoslavia)

Radio-Ljubljana. 530 kc/s (566 m.); 2.5 kw.
Transmits at intervals from 11.30 a.m.
6.0 p.m.—Programme for Women.

6.30 p.m.—Italian Language Lesson.
7.0 p.m.—Talk on Literature.
7.30 p.m.—Orchestral Concert.
9.0 p.m.—Time, Press Review and Programme Announcements.

MADRID (Spain)

Union Radio (E.A.J.). 707 kc/s (424 m.); 2 kw.
Transmits at intervals from 11.45 a.m.
7.0 p.m.—Chimes, Exchange Quotations and Dance Music.
8.25 p.m.—News Bulletin.
8.30—10.0 p.m.—No Transmission.
10.0 p.m.—Chimes, Time, Exchange Quotations and Concert. Overture, Regente (Mercadante). Selection from "El huésped del Sevillano" (Guerrero). Dances from "Prince Igor" (Borodine). Humorous Talk, followed by Tenor Song Recital.
12 midnight.—Chimes, News and Dance Music relayed from the Palacio de Bellas Artes.
12.30 a.m. (Saturday).—Close Down.

MILAN (Italy)

Ente Italiano Audizioni Radiofoniche. 599 kc/s (501 m.); 7 kw.
Transmits at intervals from 7.15 a.m.
7.30 p.m.—Time Signal.
7.32 p.m.—Symphony Concert. Overture, "Il Cavaliere romantico" (Toni). The Fifth Symphony (Beethoven). Tarantella (Castaldi). Symphonic Poem, Argentine Scenes (Buchardo). Overture, "The Flying Dutchman" (Wagner). In the intervals, Sports Notes and Talk: From near and far.

MORAVSKA-OSTRAVA (Czechoslovakia)

1,139 kc/s (263 m.); 10 kw.
Transmits at intervals from 10.30 a.m.
6.0 p.m.—See Prague Programme.
6.5 p.m.—"Orpheus in the Underworld"—Operetta (Offenbach) with Introductory Talk, relayed from Brünn (878 kc/s, 342 m.).
9.0 p.m.—Programme from Prague.
9.55 p.m.—News, Programme Announcements and Theatre Review.

MOTALA (Sweden)

223 kc/s (1,345 m.); 30 kw.
See Stockholm Programme.

MUNICH (Germany)

563 kc/s (533 m.); 1.5 kw. Relay by Augsburg, 536 kc/s (560 m.); Kaiserslautern, 1,112 kc/s (270 m.); and Nuremberg, 1,256 kc/s (239 m.).
Transmits at intervals from 5.45 a.m.
5.15 p.m.—Talk: The Defiant Child.
5.45 p.m.—Weekly Sports Review.
6.0 p.m.—Review of Social Problems.
6.30 p.m.—Introductory Talk to the following Opera.
6.35 p.m.—"Le donna curiosa"—Musical Comedy in Three Acts (Wolf-Ferrari), relayed from the National Theatre.
9.10 p.m.—Wireless Announcements.
9.20 p.m.—News Bulletin.
9.45 p.m.—Wireless Experimental Programme.

OSLO (Norway)

Kringkastingselskapet. 608 kc/s (493 m.); 1.2 kw. Relay by Fredrikstad, 761 kc/s (394 m.); Hamar, 527 kc/s (570 m.); Notodden, 1,058 kc/s (283 m.); Porsgründ, 662 kc/s (453 m.).
Transmits at intervals from 9.0 a.m.
6.15 p.m.—Weather and News.
6.30 p.m.—Elementary English Lesson.
7.0 p.m.—Orchestral Concert.
8.30 p.m.—Weather and News.
8.50 p.m.—Talk: Current Events.
9.5 p.m.—Talk: The First Railway in Norway.
9.35 p.m. (approx.)—Close Down.

PARIS (France)

Ecole Supérieure (F.P.T.T.). 671 kc/s (447 m.); 0.8 kw.
Transmits at intervals from 8.0 a.m.
6.30 p.m.—Radio-Journal de France.
8.0 p.m.—Spanish Lesson arranged by the Berlitz School.
8.30 p.m.—Talk arranged by the Union des Grandes Associations.
8.45 p.m.—Concert, followed by News, Time and Weather.

PARIS (France)

Eiffel Tower (F.L.). 206 kc/s (1,455 m.); 12 kw.
7.56 a.m.—Time Signal on 9,231 kc/s (32.5 m.).
9.26 a.m.—Time Signal on 113.13 kc/s (2,690 m.).
5.45 p.m.—Le Journal Parlé.

Programmes for Friday—(Cont.)

7.10 p.m.—Meteorological Report.
7.20 p.m.—Concert. At 7.56 p.m.—
Time Signal on 9,231 kc/s (32.5 m.).
10.26 p.m.—Time Signal on 113,13
kc/s (2,650 m.).

PARIS (France)

Petit Parisien. 914 kc/s (329 m.);
0.5 kw.
7.0 p.m.—Transmission of Pictures.
7.25 p.m.—Gramophone Selections.
8.0 p.m.—Concert of Dance Music.
9.0 p.m. (approx.)—Close Down.

PARIS (France)

Radio-Paris. (CFR). 174 kc/s
(1,725 m.); 12 kw.
Transmits at intervals from 6.45 a.m.
12.30 p.m.—Gramophone Concert.
In the interval at 1.0 p.m.—Ex-
change Quotations and News.
2.0 p.m.—Exchange; Market Prices.
3.30 p.m.—Exchange Quotations.
3.45 p.m.—Orchestral Concert. Pre-
lude to "Madame Roland" (Four-
drain). Sonata for 'Cello (Boell-
mann). Interlude from "Louis
XI" (Grécourt). Variations for
Pianoforte (Paul Paray). Bourée
fantasque (Chabrier-Rudd). Vi-
olin Solo: Serenade (Guinaud).
Les Hérétiques (Levadé).
4.55 p.m.—News and Exchange.
6.0 p.m.—Agricultural Report and
Racing Results.
6.30 p.m.—New York Exchange.
6.35 p.m.—Gramophone Records.
7.5 p.m.—Talk: Michelet.
7.30 p.m.—English Language Lesson.
7.45 p.m.—Market Prices, Economic
and Social Review, News and
Amusement Guide.
8.0 p.m.—Talk with Gramophone
Illustrations: Some Unpublished
Personal Reminiscences of Saint-
Saëns, Gabriel Fauré and Debussy.
8.30 p.m.—American Closing Prices,
Sports Notes and News.
8.35 p.m.—Concert of Symphony
Music arranged by Messrs. Philips.
9.15 p.m.—Press Review and Time.

POSEN (Poland)

806 kc/s (335 m.); 1.2 kw.
Transmits at intervals from 12 noon.
6.5 p.m.—Talk: Contemporary
France.
6.30 p.m.—Humorous Talk.

6.50 p.m.—Missionary Talk.
7.15 p.m.—Programme from Warsaw.
In the intervals, Theatre and Sta-
tion Notes.
9.0 p.m.—Time and News.
9.15 p.m.—Transmission of Pictures.
9.45 p.m.—Dancing Lesson.
10.10 p.m.—Dance Music relayed
from the Café Esplanade.
11.0 p.m. (approx.)—Close Down.

PRAGUE (Czechoslovakia)

Strasnice. 617 kc/s (487 m.);
5 kw.
Transmits at intervals from 10.15 a.m.
6.0 p.m.—Time and News.
6.5 p.m.—Orchestral Concert.
7.0 p.m.—Orchestral Music.
7.50 p.m.—Introductory Talk to the
following transmission.
8.0 p.m.—Concert of Contemporary
Music.
9.0 p.m.—Time, News, Sports Notes.
9.15 p.m.—Music from the Café
Lloyd.
9.55 p.m.—News, Theatre Review and
Programme Announcements.
10.0 p.m.—Time Signal.

ROME (Italy)

Ente Italiano Audizioni Radio-
foniche (IRO). 680 kc/s (441 m.);
2.4 kw.
Transmits at intervals from 12 noon.
7.15 p.m.—Sports Notes, News,
Weather and Press Review.
8.0 p.m.—Time Signal.
8.2 p.m.—"Cin-Ci-La"—Operetta in
Three Acts (Lombardo and Ran-
zato). Il Radio Travaso and
Topical Review in the intervals.
10.5 p.m.—News Bulletin.

SCHENECTADY (U.S.A.)

General Electric Company (WGY).
790 kc/s (379.5 m.); 50 kw.
Relayed by W2XAD on 15,340
kc/s (19.56 m.) from 11.0 p.m.
Transmits at intervals from 11.45 a.m.
11.0 p.m.—Stock and Produce Re-
ports, Farm Forum and News.
11.30 p.m.—Time Signal.
11.32 p.m.—New York Relay.
12 midnight.—Talk: Some Phases of
the Geology of Eastern North
America.
12.18 a.m. (Saturday)—Footnotes.
12.20 a.m.—Health Talk.
12.29 a.m.—Weather Forecast.

12.30 a.m.—Arpeako Minstrels re-
layed from Rochester, N.Y.
1.0 a.m.—General Electric Concert
Orchestra with Ira Blunt (Baritone).
2.0 a.m.—3.30 a.m.—New York Relay.
3.30 a.m.—Weather Forecast.
3.32 a.m.—Did you know?
4.0 a.m.—New York Relay.
5.0 a.m. (approx.)—Close Down.

STOCKHOLM (Sweden)

Radiotjänst (SASA). 689 kc/s
(436 m.); 1.5 kw. Relayed by
Boden, 250 kc/s (1,200 m.); Göte-
borg, 932 kc/s (322 m.); Hörby,
1,166 kc/s (257 m.); Motala,
223 kc/s (1,345 m.); Östersund,
389 kc/s (770 m.); Sundsvall, 554
kc/s (542 m.).
Transmits at intervals from 6.15 a.m.
6.10 p.m.—Accordion Music, relayed
from Eskilstuna, 1,220 kc/s (246 m.).
6.30 p.m.—Talk: Modern Means of
Transport—Aerial Transport.
7.0 p.m.—Concert of Opera Music.
Overture, "The Water Carrier"
(Cherubini). Baritone Solos: (a)
Il mio ben (Paisiello), (b) Aria from
"Leonora" (Donizetti), (c) Aria
from "Don Pasquale" (Donizetti).
Forest Murmurs, from "Siegfried"
(Wagner). Bacchanal from "Tann-
häuser" (Wagner). Baritone Solos:
(a) Aria from "Rigoletto"
(Verdi), (b) Cavatina from "The
Barber of Seville" (Rossini). Se-
lection from "Madame Butterfly"
(Puccini). Polka and Furiant from
"The Bartered Bride" (Smetana).
8.15 p.m.—News and Weather.
8.40 p.m.—French Language Lesson,
relayed from Malmö, 1,301 kc/s,
(231 m.).
9.10 p.m.—Sonata for Violin and
Pianoforte in G Major, Op. 13
(Grieg).
9.35 p.m. (approx.)—Close Down.

STUTTGART (Germany)

Süddeutscher Rundfunk. 833 kc/s
(360 m.); 1.5 kw. Relayed by
Freiburg, 527 kc/s (570 m.).
Transmits at intervals from 9.0 a.m.
3.0 p.m.—Programme from Frankfurt.
4.45 p.m.—Time, Weather and Agri-
cultural Report.
5.0 p.m.—Talk on the occasion of the
Sixtieth Birthday of André Gide.
5.0 p.m.—(Freiburg only). Talk on
the occasion of the Seventieth
Anniversary of the Birth of Helene
Böhlau.

5.30 p.m.—Talk: The Choice of a
Profession in 1930.
6.0 p.m.—Talk: The Place of Handi-
crafts in German Industry.
6.30 p.m.—"Famous Comedians."
7.0 p.m.—Jubilee Concert on the oc-
casion of the Fifth Anniversary of the
Stuttgart Philharmonic Orchestra,
relayed from the Liederhalle.
Overture, "The Magic Flute"
(Mozart). Concerto in D Major
for Violin and Orchestra, Op. 61
(Beethoven). Symphony No. 2 in
D Major, Op. 36 (Beethoven).
9.0 p.m.—Hans Reimann Humorous
Programme.
10.0 p.m.—Weekly Weather Review.
10.15 p.m.—News and Sports Notes.
10.30 p.m.—Dance Music from the
Cafés Café, Mannheim.
11.30 p.m. (approx.)—Close Down.

TOULOUSE (France)

Radiophonie du Midi 788 Kc/s
(381 m.); 8 kw.
Transmits at intervals from 1.0 p.m.
6.30 p.m.—Dance Music Programme.
6.45 p.m.—Exchange Quotations and
Racing Results.
7.0 p.m.—Vocal Tangos.
7.15 p.m.—News Bulletin.
7.30 p.m.—Dance Music Programme.
8.0 p.m.—Exchange Quotations.
8.15 p.m.—Concert. Le Cygne
(Saint-Saëns). Ave Maria (Gou-
nod). Villanelle des petits canards
(Chabrier). Le petit rentier
(Pierné). Tes yeux (Rubey). Selec-
tions from "Les Cloches de Noël"
(Lebail). Fascination (Marchetti).
L'heure exquise (Crémieux). The
Rosary (Nevin).
9.0 p.m.—Concert.
10.15 p.m.—North African News.
10.30 p.m. (approx.)—Close Down.

TURIN (Italy)

Ente Italiano Audizioni Radio-
foniche (I TO). 1,094 kc/s (274
m.); 7 kw.
Transmits at intervals from 7.15 a.m.
6.15 p.m.—Concert. March, Aquile
d'Italia (Malvezzi). Serenata
(Escobar). Waltz, Zefiro (Amadei).
Intermezzo, Sognando amore (For-
nasari). Selection from "The
Barber of Seville" (Rossini). Tango,
Messicana (Liberati). Inter-
mezzo, Nostalgia di Garatana
(Corti). One-step, Oibò (Mignone).
7.0 p.m.—German Language Lesson.
7.30 p.m.—Time Signal.

7.32 p.m.—Programme from Milan.
10.0 p.m.—Dance Music Programme.
In the interval at 10.30 p.m.—
Wireless Notes.
11.0 p.m. (approx.)—Close Down.

VIENNA (Austria)

Radio-Wien. 581 kc/s (516.3 m.);
15 kw. Relayed by Graz, 851 kc/s
(342.5 m.); Innsbruck, 1,058 kc/s
(283.5 m.); Klagenfurt, 662 kc/s
(453.2 m.); and Linz, 1,220 kc/s
(245.9 m.).
Transmits at intervals from 10.0 a.m.
5.0 p.m.—Talk: Richard Wagner
and the Viennese Male Voice Choir
Society.
5.30 p.m.—Talk: The History of
Viennese Art through Seven Cen-
turies.
6.0 p.m.—Report of the Second In-
ternational Accountants' Congress
in New York.
6.30 p.m.—Italian Language Lesson.
6.55 p.m.—Time and Weather.
7.0 p.m.—Elisabeth Schumann Re-
cital, relayed from the Musikvereins-
saal. Vado, ma dove (Mozart).
Auf dem Wasser zu singen, Der
Wanderer an den Mond, Gretchen
am Spinnrad, and Lied im Grünen
(Schubert). Frage und Antwort,
Bescheidene Liebe, Schon streckt'
ich aus, and Mausfallensprüchlein
(Wolf). Ich atmet' einen linden
Duft and Wer hat dies Liedlein
erdacht (Mahler). Ihre Augen,
Liebesgeschenke, from the "Ge-
sänge des Orients," Op. 77,
Freundliche Vision, and Hat's
gesagt, bleibt nicht dabei (R.
Strauss).
9.0 p.m.—Light Music and Photo-
telegaphy Transmission.

WARSAW (Poland)

Polskie Radio. 212 kc/s (1,411 m.);
8 kw.
Transmits at intervals from 10.58 a.m.
6.58 p.m.—Time Signal.
7.0 p.m.—Programme Announce-
ments.
7.5 p.m.—Talk on Music.
7.15 p.m.—Symphony Concert by the
Warsaw Philharmonic Society.
Programme of Polish and Hun-
garian Music. Theatre Notes in
the intervals. After the Concert:
News, Weather, Police and Sports
Notes, Talk: Whist smoking a
Cigarette and Relay of Foreign
Stations.



A 4-Pole
Balanced Armature
Cone Unit for

12/6

Central Adjustment.
Cobalt Steel Magnet.
Best Bakelite Casing.
Full Volume. Ex-
tremely Sensitive.
Pure Tone.

If you are building your own
Loudspeaker, the W.B. chassis is
what you want. Holds any Unit.
Only 10/6, complete with cone
and fittings.

WHITELEY, BONEHAM & CO., LTD.,
Nottingham Road, MANSFIELD, NOTTS.

Phone: Mansfield 762. Grams: "Whitebon, Mansfield."
London Office: 21, Bartlett's Buildings, Holborn
Circus, E.C.4. Telephone: Central 6669.

A
Radio
Receiver
is Like
a Chain

A chain of parts if you please
transformers, valves, condensers, resist-
ances and the like as links of the chain.
Unless each link performs to perfection,
the whole receiver is condemned.
A lot of grief can be traced to one little
part . . . the volume control. Noises
are set up . . . unevenness of control
develops . . . volume is hard to handle.
You can save yourself all trouble by
seeing that the name "Centralab" is
stamped on the volume control.
Write for full lists of Volume Controls,
Modulators, Power Rheostats and
Potentiometers.

THE ROTHERMEL CORPORATION, LTD.,
24, Maddox Street, London, W.1.

Phone: Mayfair 0578/9.

Centralab

The Brightest
Star of the
Eliminator world

A POWQUIP Eliminator is
the last word in Eliminator
construction. Those who have
tested one have been loud in
its praise. A POWQUIP Elim-
inator will not and cannot
hum. It is easily the bright-
est star of the Eliminator
world. POWQUIP Model "B"
(illustrated) is suitable for the

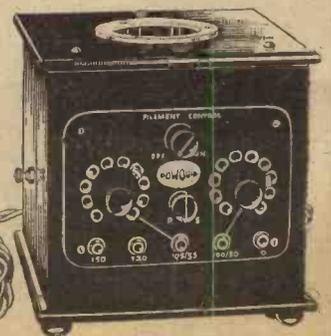
biggest multi-valve sets
having a full load capacity
of 45 m/a. It will give you
100 hours service for 6d. All
POWQUIP Eliminator are
mounted in sheet steel cases and
conform in every way to I.E.E.
regulations. Other models
from 50/-. Full particulars of
complete range on request.

Another POWQUIP product is the "Kingswan 3" Receiver.
This attractive Set costs 9 gns., complete with Loud Speaker.
A real "All-Europe" set that rivals receivers costing treble the
price. Cash refunded if found unsatisfactory within 14 days.
Full details on application.



MODEL "B"
5GNS.

Royalty Paid
Valve Extra
The POWER EQUIPMENT
CO., LTD.,
Kingsbury Works, The
Hyde, Hendon, N.W.8.



PROGRAMMES FOR SATURDAY

(November 23)

NOTE: THE HOURS OF TRANSMISSION ARE REDUCED TO GREENWICH MEAN TIME

BARCELONA (Spain)

Radio-Barcelona (EAJ1). 860 kc/s (349 m.); 8 kw.
Transmits at intervals from 11.0 a.m.
8.30 p.m.—Elementary German Lesson.
9.0 p.m.—Chimes, Weather, Exchange Quotations and Agricultural Report.
9.5 p.m.—Orchestral Concert. March (J. Buyst). Selection from "La fille de Madame Angot" (Lecocq). Sextet Selection: Minuetto a Sylvia (Albeniz). Japanese Caprice, Tokasai (Helenberg). Schottische, El magico (Soler). Fox-trot (Leslie and Gibert), followed by Barcelona Exhibition Notes.
10.5 p.m.—Programme from Madrid.

BERLIN (Germany)

Königsruherhaus. 183 kc/s (1,635 m.); 26 kw.
Transmits at intervals from 5.55 a.m.
4.30 p.m.—Talk: The State Railways under the Young Plan.
5.0 p.m.—Talk: The Artist as a Worker.
5.30 p.m.—Elementary French Lesson.
5.55 p.m.—Talk: Our European Neighbours—France—The Importance of the French Provinces.
6.20 p.m.—Talk: Political Wisdom: Marx and a Knowledge of Human Nature.
7.10 p.m.—Programme from Munich, followed by News, Dance Music and Picture Transmission from Berlin (Witzleben).
11.30 p.m. (approx.)—Close Down.

BERLIN (Germany)

Witzleben. 716 kc/s (418 m.); 1.5 kw.
Transmits at intervals from 5.55 a.m.
3.30 p.m.—Orchestral Concert.
5.0 p.m.—Talk: The Border-line of Americanism.
5.30 p.m.—See Königsruherhaus.
5.50 p.m.—Picture Transmission—Portrait to the Interview of the Week.
6.0 p.m.—Concert of Light Music. Sweet Sue (Young). Ewige Liebe, and Aranjuez (Wachsmann). Scheinbar liebste du mich (Sylvia, Brown and Henderson). Fox-trot Parody on "The Merry Widow" (Lehar). Melancholy Baby (Burnett). Cavatina, arranged as a Fox-trot (Wachsmann).
6.30 p.m.—The Interview of the Week.
7.0 p.m.—Concert from the Central Hotel.
7.30 p.m.—Variety Programme, followed by Time, Weather, News, Sports Notes and Dance Music. Picture Transmission in the interval.
11.30 p.m. (approx.)—Close Down.

BERNE (Switzerland)

Radio-Bern. 743 kc/s (403 m.); 1 kw.
Transmits at intervals from 11.43 a.m.
6.28 p.m.—Time and Weather.
6.30 p.m.—Dr. Rudolf von Tavel reads from his own Works.
7.5 p.m.—Partial Relay of the A-Cappella Concert of the Berne Male Voice Choir, with Siring Quartet Selections.
8.25 p.m.—Orchestral Concert. In the interval at 9.0 p.m.—News and Weather.
9.40 p.m.—Dance Music Programme.
11.0 p.m. (approx.)—Close Down.

BRATISLAVA (Czechoslovakia)

1,076 kc/s (279 m.); 12.5 kw.
Transmits at intervals from 10.30 a.m.
6.0 p.m.—See Prague Programme.
6.5 p.m.—Song Recital.
7.0 p.m.—Programme from Prague.
8.0 p.m.—Orchestral Concert.
9.0 p.m.—Programme from Prague. In the interval at 9.55 p.m.—News and Programme Announcements.

BRESLAU (Germany)

923 kc/s (325 m.); 2 kw. Relayed by Gleiwitz, 1,184 kc/s (253 m.).
Transmits at intervals from 10.15 a.m.
6.20 p.m.—Weather for Farmers.
6.22 p.m.—Gramophone Records of American Negro Spirituals.
7.5 p.m.—Philosophical Dialogue.
7.30 p.m.—Orchestral and Vocal Concert.
9.10 p.m.—News Bulletin.
9.35 p.m.—Shorthand Lesson.

BRUSSELS (Belgium)

Radio-Belgique. 590 kc/s (508.5 m.); 1 kw.
5.0 p.m.—Concert of Chamber Music.
5.45 p.m.—Elementary English Lesson.
6.10 p.m.—Intermediate English Lesson, arranged by the Berlitz School.
6.30 p.m.—Gramophone Records.
7.30 p.m.—Le Journal Parlé.
8.15 p.m.—Orchestral Concert. Overture, "Le Roi d'Ys" (Lalo). Mors et Vita (Gounod). Selections from "Louise" (Charpentier). Song. Caucasian Suite (Ippolitoff-Ivanoff). Tarantella for Flute and Clarinet (Saint-Saens). Waltz. The Blue Danube (Joh. Strauss). Song. Joyous Youth (Coates). In the interval at 9.0 p.m.—Topical Talk.
10.15 p.m.—Press Review and News in Esperanto.

COLOGNE (Germany)

Westdeutscher Rundfunk. 1,319 kc/s (227 m.); 2 kw.
See Langenberg Programme.

COPENHAGEN (Denmark)

1,167 kc/s (281 m.); 0.75 kw. Relayed by Kalundborg, 260 kc/s (1,153 m.).
Transmits at intervals from 6.30 a.m.
5.50 p.m.—(Kalundborg only.) Weather.
6.0 p.m.—News Bulletin.
6.15 p.m.—Time Signal.
6.16 p.m.—Talk: Paper Manufacture.
6.45 p.m.—Talk for Tourists.
7.15 p.m.—Concert of Classical Operetta and Waltz Music, from the Axelberg Studio. Overture, "Light Cavalry" (Suppé). Romance from "La Princesse de Trébizonde" (Offenbach). Aria from "Blue Bird" (Offenbach). Waltz, Nireille (Gounod). Ballet Music from "Les Brigands" (Offenbach). Duet from "The Gipsy Baron" (Joh. Strauss). Waltz, Die Schönbrenner (Lanner). Overture, "Orpheus in the Underworld" (Offenbach). Ten minutes interval. Emperor Waltz (Joh. Strauss). Waltz from "The Gipsy Baron" (Joh. Strauss). Waltz, Mein Lebenslauf ist Lieb und Lust (Jos. Strauss). Selection from "La belle Hélène" (Offenbach). Duet from "Boccaccio" (Suppé). Overture, "A Thousand and One Nights" (Johann Strauss).
9.15 p.m. (approx.)—News Bulletin.
9.30 p.m.—Dance Music relayed from the Industri Restaurant.
11.0 p.m.—(In an interval.) Town Hall Chimes.
11.15 p.m. (approx.)—Close Down.

CORK (Ireland)

(6CK). 1,337 kc/s (225 m.); 1 kw.
1.30 p.m.—Weather Forecast and Gramophone Selections.
7.20 p.m.—Programme from Dublin.

CRACOW (Poland)

Polskie Radio. 959 kc/s (313 m.); 0.5 kw.
Transmits at intervals from 10.58 a.m.
6.25 p.m.—Review of Foreign Politics during the Past Week.
6.58 p.m.—Time and Chimes.
7.15 p.m.—Programme from Warsaw.
7.30 p.m.—Concert of Chamber Music. Trio in D Minor, Op. 32 (Arensky). Spanish Symphony, Op. 3, for Violin (Lalo). Trio, Op. 15 (Smetana).
9.0 p.m.—Programme from Warsaw.
11.0 p.m.—Chimes from the Church of Notre Dame.

DUBLIN (Ireland)

(2 RN). 725 kc/s (413 m.); 1 kw.
1.30 p.m.—Time, Weather, Exchange and Gramophone Concert.
7.20 p.m.—News Bulletin.
7.30 p.m.—Time Signal.
7.32 p.m.—Frank Fay: Dramatic Scenes.

7.45 p.m.—Irish Language Lesson.
8.0 p.m.—Concert. The Augmented Station Orchestra. Marcus Ruddle (Baritone). Mrs. E. O'C. Mile's Quintet: Chamber Music. The Crofton Repertory Company: Sketch. Miss C. Kenny (Songs). E. Harty (Flute). Eva Brennan and Company: Concert Party. The Augmented Station Orchestra.

FRANKFURT-am-MAIN (Germany)

770 kc/s (390 m.); 1.5 kw. Relayed by Cassel, 1,220 kc/s (246 m.).
Transmits at intervals from 5.30 a.m.
3.0 p.m.—Programme from Stuttgart.
5.0 p.m.—Talk: In what cases does the German Post Office make

Compensation for Parcels lost or damaged in the Post?

5.15 p.m.—Lesson in Esperanto.
5.30 p.m.—Educational Talk: Proverbs.
6.0 p.m.—Talk for Workers: Vocational Schools.
6.30 p.m.—Programme from Stuttgart.

HAMBURG (Germany)

Norag (ha, in Morse). 806 kc/s (372 m.); 1.5 kw. Relayed by Bremen, 941 kc/s (319 m.); Flensburg, 1,373 kc/s (218 m.); Hanover, 536 kc/s (560 m.); and Kiel, 1,220 kc/s (246 m.).
Transmits at intervals from 5.20 a.m.

3.30 p.m.—(From Hanover.) Nicolas Lenau Recital. Dans le jardin (Debussy). Recitation: From the Cycle "Autumn." Song: An Agnes—Wo kein Strahl des Lichtes blinket (Marteau). Recitation: Der ewige Jude. Songs, with Viola obbligato (Marteau). Les Angelus (Debussy). Recitation from the Cycle "Liebesklänge." Songs (Marteau).
4.30 p.m.—Paul Graener Recital, from Kiel. Divertimento for Small Orchestra, Op. 67.
5.15 p.m.—Variety Concert.
6.0 p.m.—From Times of Gal-lantry—"Vocal and Instrumental Concert, relayed from Bremen.
6.55 p.m.—Weather Report.
7.0 p.m.—Concert—Five Centuries of March Music.
9.15 p.m.—Talks, News, Weather, Sports and Miscellaneous Notes.

9.45 p.m.—Concert of "Night" Music. Eine kleine Nachtmusik (Mozart). Songs: (a) Nacht und Träume, and (b) Berta's Lied in der Nacht (Schubert). (c) Nachtlied (Schumann). Verklärte Nacht, after a Poem by R. Delme (Schönberg).
11.0 p.m.—Programme in Memory of the Dead.

HILVERSUM (Holland)

1,004 kc/s (298 m.). After 5.40 p.m., 280 kc/s (1,071 m.); 6.5 kw.
9.40 a.m. till 7.40 p.m.—Programme of the Algemeene Vereeniging Radio Omroep.
9.40 a.m.—Time and Daily Service.
11.40 a.m.—Police Announcements.
11.55 a.m.—Concert of Quartet Music.
1.40 p.m.—Talk (to be announced).
2.10 p.m.—Music from the Tuschinski Picture House, Amsterdam.
3.40-4.10 p.m.—Interval.
4.10 p.m.—Talks (to be announced).
5.10 p.m.—German Language Lesson.
5.40 p.m.—Time and Orchestral Concert. Selection from "The Maid of Artois" (Balfé). Suite, Woodland Pictures (Fletcher). Narcissus (Nevin). Songs by Stella Fontaine. Selection from "I Pagliacci" (Leoncavallo). Sérénade florentine (Godard). Songs. Waltz. The Wedding of the Winds (Hall). Selection from "Sunny" (Kern). A.V.R.O. March (Treep).
7.25 p.m.—Police Announcements.
7.40 p.m. till Close Down.—Programme of the Workers' Radio Society (V.A.R.A.).
7.40 p.m.—Talk by Mr. Grimm.
7.55 p.m.—Orchestral Concert of Selections from Operas: Coronation March from "The Prophet" (Meyerbeer). Intermezzo from "Cavalleria Rusticana" (Mascagni). Entr'acte Gavotte from "Mignon" (Thomas). Violin Solo: Meditation from "Thaïs" (Massenet). Selection from "Faramors" (Rubinstein). Prelude to the Third Act of "Carmen" (Bizet). Czardas from "Der Geist des Wojwoden" (Grossmann).
8.40-10.10 p.m.—Programme of the Liberal Protestant Radio Society (V.P.R.O.).
10.10 p.m. till Close Down.—V.A.R.A. Programme.
10.10 p.m.—Variety Programme. Old Dance Favourites by Request: Polonaise, Polka, Polka-Mazurka, Kruspolka, Pas de quatre, Yswals, Frühlingsboten Waltz, Veleta, Spanish Waltz, Cake Walk.
10.55 p.m.—Gramophone Records.
11.40 p.m. (approx.)—Close Down.

LANGENBERG (Germany)

Westdeutscher Rundfunk. 635 kc/s (473 m.); 13 kw. Relayed by Aix-la-Chapelle, 662 kc/s (453 m.); Cologne, 1,319 kc/s (227 m.); and Münster, 1,283 kc/s (234 m.).
Transmits at intervals from 5.45 a.m.
4.30 p.m.—Orchestral Concert. Polonaise in D Major (Moszkovsky). Waltz, Vibrationen (Strauss). Pot-pourri, Frühlingstau auf Schumann's Grab (Urbach). Dance of the Rose Elves (Moszkovsky). Ballet Suite from "Sylvia" (Delibes). March, Venezia (Fabiani).
5.30 p.m.—Talk: The Growing Importance of the Rights of Man in the New Constitution.
5.50 p.m.—Wireless Notes.
6.0 p.m.—Report on Industry, Weather and Sports Notes.
6.15 p.m.—Talk for Workers on Social Insurance: Insurance against Sickness and Accidents.
6.40 p.m. (approx.)—Talk: The Fate of the South American Indian.
7.0 p.m.—Variety Programme, including "Fritschen und Lieschen"—One-Act Musical Play (Offenbach), followed by News, Sports and Miscellaneous Notes.
9.30 p.m.—Dancing Lesson for Beginners.
10.0 p.m.—Concert and Dance Music.
11.0 p.m.—Gramophone Jazz Music.
12 midnight (approx.)—Close Down.

HUIZEN (Holland)

160 kc/s (1,875 m.); 6.5 kw.
11.10 a.m. till Close Down.—Programme of the Catholic Radio Society (K.R.O.).
11.10 a.m.—Religious Address.
11.55 a.m.—K.R.O. Trio Concert.
12.55 p.m.—Gramophone Records.
1.40 p.m.—Programme for Children.
3.10 p.m.—Esperanto Lesson.
3.40 p.m.—Catholic Instruction.
4.10 p.m.—English Language Lesson.
4.40 p.m.—Gramophone Records.

5.25 p.m.—Weekly Journalistic Review.

5.40 p.m.—Exchange Quotations.
5.45 p.m.—Concert from the Chicago Theatre, Eindhoven.
7.10 p.m.—Talk by Dr. Auserms.
7.40 p.m.—Orchestral Concert. Florentine March (Fucik). Overture, "Nebuchadnezzar" (Verdi). Waltz, Wiener Blut (Joh. Strauss). Clarinet Solo: Diavolino (Mullot). Neerland's Taptoe (Roelen). Polka for Two Clarinets; Dernière pensée (Avon). Tubaphone Solo: Klein aber fein (Seel). Pot-pourri populaire No. 3 (Renaud). Popular March (Wierts). At 9.10 p.m. (approx.)—News Bulletin.
10.40 p.m.—Humorous Programme.
11.40 p.m. (approx.)—Close Down.

KALUNDBORG (Denmark)

Kalundborg Radio. 260 kc/s (1,153 m.); 7.5 kw.
See Copenhagen Programme.

KÖNIGSBERG (Germany)

Ostmarken Rundfunk. 1,085 kc/s (276 m.); 2.5 kw. Relayed by Danzig, 662 kc/s (453 m.).
Transmits at intervals from 4.55 a.m.
5.30 p.m.—Book Review: The Woman Student in Modern German Literature.
5.55 p.m.—Programme Announcements in Esperanto.
6.0 p.m.—Topical Talk.
6.30 p.m.—Talk: The Development of the Administration of Large Towns.
6.55 p.m.—Weather Report.
7.0 p.m.—Pianoforte Recital.
7.50 p.m.—Sailors' Programme by Soloists and Vocal Quartet.
9.20 p.m.—Weather, News and Sports Notes.
9.30 p.m. (approx.)—Dance Music from the Central Hotel.
11.0 p.m. (approx.)—Close Down.

LAHTI (Finland)

167 kc/s (1,800 m.); 40 kw. Relayed by Helsingfors, 1,357 kc/s (221 m.).
Transmits at intervals from 10.0 a.m.
5.15 p.m.—Orchestral Concert of Oriental Music. Indian War Dance (Lumbye). Indian Love Lyrics (A. Woodforde-Finden). Torch Dance (Rubinstein). Suite orientale (Popy). Odaliskens Tanz (Niemann). Festival in Bangkok (Norden).
6.0 p.m.—Talk (to be announced).
6.20 p.m.—Violin Recital.
6.40 p.m.—"Sota-ministeri" — A Play (Alli Wendelin).
7.5 p.m.—Orchestral Concert (continued). Selection from "La Bayadère" (Kálmán). Selection from "The Czarevitch" (Lehar). Selection from "Lysistrata" (Lincke). Melodies from "La vie parisienne" (Offenbach).
7.45 p.m. (in an interval)—News in Finnish and Swedish.
8.15 p.m.—Dance Music, relayed from the Pörsiä Restaurant.
10.0 p.m. (approx.)—Close Down.

LANGENBERG (Germany)

Westdeutscher Rundfunk. 635 kc/s (473 m.); 13 kw. Relayed by Aix-la-Chapelle, 662 kc/s (453 m.); Cologne, 1,319 kc/s (227 m.); and Münster, 1,283 kc/s (234 m.).
Transmits at intervals from 5.45 a.m.
4.30 p.m.—Orchestral Concert. Polonaise in D Major (Moszkovsky). Waltz, Vibrationen (Strauss). Pot-pourri, Frühlingstau auf Schumann's Grab (Urbach). Dance of the Rose Elves (Moszkovsky). Ballet Suite from "Sylvia" (Delibes). March, Venezia (Fabiani).
5.30 p.m.—Talk: The Growing Importance of the Rights of Man in the New Constitution.
5.50 p.m.—Wireless Notes.
6.0 p.m.—Report on Industry, Weather and Sports Notes.
6.15 p.m.—Talk for Workers on Social Insurance: Insurance against Sickness and Accidents.
6.40 p.m. (approx.)—Talk: The Fate of the South American Indian.
7.0 p.m.—Variety Programme, including "Fritschen und Lieschen"—One-Act Musical Play (Offenbach), followed by News, Sports and Miscellaneous Notes.
9.30 p.m.—Dancing Lesson for Beginners.
10.0 p.m.—Concert and Dance Music.
11.0 p.m.—Gramophone Jazz Music.
12 midnight (approx.)—Close Down.

LEIPZIG (Germany)

Mitteldeutscher Rundfunk (1,157 kc/s (259 m.). 1.5 kw. Relayed by Dresden, 941 kc/s (319 m.).
Transmits at intervals from 9.0 a.m.
4.0 p.m.—Soprano and Tenor Song

Recital. Arietta: Mein Kind, du weisst nicht (Glück). Tenor Solo from "Der Waffenschmidt" (Lortzing). Caroline's Aria from "Die beiden Schützen" (Lortzing). Duet from "The Bartered Bride" (Smetana). Waltz Song from "Les Cloches de Corneville" (Planquette). Four Soprano Solos (Bohm): (a) Rote Wangen, (b) Zuschauen, (c) Antwort, (d) Echo. Duet from "Die Fledermaus" (Joh. Strauss).

5.0 p.m.—Technical Talk.
5.20 p.m.—Weather and Time.
5.30 p.m.—Talk: The Protection of the Consumer.
5.55 p.m.—Labour Intelligence.
6.0 p.m.—Talk: The Work in a Girls' High School.
6.30 p.m.—Boris Godounoff—Opera in Five Acts (Moussorgsky), relayed from the New Theatre. In the intervals: Time, Weather, News, Sports Notes and Sunday Programme Announcements.
10.0 p.m. (approx.)—Gramophone Concert.

MADRID (Spain)

Union Radio (EAJ7). 707 kc/s (424 m.); 2 kw.
Transmits at intervals from 11.45 a.m.
7.0 p.m.—Chimes and Dance Music.
8.25 p.m.—News Bulletin.
8.30-10.0 p.m.—No Transmission.
10.0 p.m.—Chimes, Time and Musical Comedy Selection. News in the intervals.
12.30 a.m. (Sunday)—Close Down.

MILAN (Italy)

Ento Italiano Audizioni Radiofoniche. 599 kc/s (501 m.); 7 kw.
Transmits at intervals from 7.15 a.m.
7.15 p.m.—Wireless Notes and Topical Talk.
7.30 p.m.—Programme from Turin.
10.30 p.m.—Wireless News.
11.0 p.m. (approx.)—See Turin.
12 midnight (approx.)—Close Down.

MORAVSKA-OSTRAVA (Czechoslovakia)

1,139 kc/s (263 m.); 10 kw.
Transmits at intervals from 10.30 a.m.
6.0 p.m.—Programme from Prague.
6.5 p.m.—Popular Concert relayed from Brno 878 kc/s (342 m.).
7.0 p.m.—Programme from Prague.
8.0 p.m.—Dance Music relayed from Brno.
9.0 p.m.—Programme from Prague.
9.55 p.m.—News, Programme Announcements and Theatre Review.
10.0 p.m.—Programme from Prague.

MOTALA (Sweden)

223 kc/s (1,345 m.); 30 kw.
See Stockholm Programme.

MUNICH (Germany)

563 kc/s (533 m.); 1.5 kw. Relayed by Augsburg, 536 kc/s (560 m.); Kaiserslautern, 1,112 kc/s (270 m.); and Nürnberg, 1,256 kc/s (239 m.).
Transmits at intervals from 5.45 a.m.
5.50 p.m.—Organ Recital.
6.20 p.m.—Talk for Wireless Amateurs.
6.40 p.m. (from Nürnberg)—Report on Local Affairs.
7.10 p.m.—Variety Concert. Ay, ay, ay (Freire). Vorbei, vorbei (Stolz). The Old Song (Love). Was sagt mein Mädel dazu (Benatzky). Der Duft, der eine schöne Frau begleitet (May). Pepperl Weichand Programme. Pierrot, trag' mich nach Hause (Stolz). Willst du sehn ins Herz einer Frau (Krome). Dein ist mein Herz (Lehar). Es gibt eine Frau, die dich niemals vergisst (Cowley). Einmal sagt man sich Adieu (Schmidt-Gentner). "Arger breitet sich nicht aus, hast du Radio im Haus"—Sketch (Uzarsky). Selection from "Jonny spielt auf" (Krenek). High Tension (Bee). Huggable, Kissable You (Bibo). Baby, you have changed (Ralton). Dialogue: Things of No Importance. Pork and Beans (Bee). Vladivostok (Bee). Geht es so? (Friend). Song from the "Dreigroschenoper" (Weill).
9.20 p.m.—News Bulletin.
9.45 p.m.—Dance Music from the Reichsadler Hotel.
10.0 p.m. (in the interval): Musical Saw Selections.
11.30 p.m. (approx.)—Close Down.

PARIS (France)

Ecole Supérieure (FPPT). 671 kc/s (447 m.); 0.8 kw.
Transmits at intervals from 8.0 a.m.
6.30 p.m.—Radio Journal de France.
8.0 p.m.—Talk by M. Lassalle.
8.15 p.m.—Sports Notes.
8.30 p.m.—Legal Talk.

Programmes for Saturday—(Cont.)

8.45 p.m.—Concert, followed by News, Time, Weather and Dance Music from the Coliseum de Paris.
12 midnight (approx.)—Close Down.

PARIS (France)

Eiffel Tower (FL). 206 kc/s (1,455 m.); 12 kw.
7.56 a.m.—Time Signal on 9,231 kc/s (32.5 m.).
9.26 a.m.—Time Signal on 113.13 kc/s (2,650 m.).
5.45 p.m.—Pasdeloup Concert.
7.10 p.m.—Meteorological Report.
7.20 p.m.—Le Journal Parlé.
7.56 p.m.—Time Signal on 9,231 kc/s (32.5 m.).
8.0 p.m.—Variety Programme. "Quand les chats sont partis"—Operetta Sketch (Quinel and Girral). Cello Solo: Chant Russe (Liault). Saxophone Solo: Dancing Tambourine (Collin). Violin Solo: Extase d'amour (Chavanne). Recital of the Songs of Léon Raiter, with Accordion accompaniment.
10.26 p.m.—Time Signal on 113.13 kc/s (2,650 m.).

PARIS (France)

Petit Parisien. 914 kc/s (329 m.); 0.5 kw.
8.30 p.m.—Transmission of Pictures.
8.45 p.m.—Gramophone Selections, Talk and News.
9.0 p.m.—Concert. Overture, "Polyeucte" (Dukas). Waltz from "L'Enfant et les Sortilèges" (Ravel). Till Eulenspiegel (R. Strauss). Selection from "Paysages Franciscains" (Pierne). Prelude, Tango and Malaguena from "España" (Albéniz). Selection from "Bertrand de Born" (Casadesu).

PARIS (France)

Radio-Paris (CFR). 174 kc/s (1,725 m.); 12 kw.
Transmits at intervals from 6.45 a.m.
12.30 p.m.—Gramophone Concert. News in the intervals.
2.0 p.m.—Market Prices.
3.30 p.m.—New York Exchange.
3.35 p.m.—Paris Exchange Quotations.
3.45 p.m.—Dance Music Programme
4.15 p.m.—Programme for Children.
4.55 p.m.—News Bulletin.

6.0 p.m.—Agricultural Report and Racing Results.
6.30 p.m.—New York Closing Prices.
6.35 p.m.—Gramophone Records.
7.15 p.m.—Talk: Amendments in the Law of Social Insurance.
7.45 p.m.—Commercial Prices, Economic Report, News and Amusement Guide.

POSEN (Poland)

806 kc/s (335 m.); 1.2 kw. Relayed on 9,428 kc/s (31.8 m.) from 6.30 to 7.0 p.m. and 9.15 p.m. to 1.0 a.m. (Sunday).
Transmits at intervals from 6.15 a.m.
6.30 p.m.—Selections by a Mandoline Orchestra.
7.0 p.m.—Miscellaneous Items.
7.15 p.m.—Programme for Women.
7.20 p.m.—Vocal and Pianoforte Recital with Talk; Theatre and Station Notes in the interval.
9.0 p.m.—Time and News.
9.15 p.m.—Transmission of Pictures.
9.45 p.m.—Gramophone Cabaret Concert.
11.0 p.m.—Concert arranged by Messrs. Philips.
1.0 a.m. (Sunday)—Close Down.

PRAGUE (Czechoslovakia)

Strasnice. 617 kc/s (487 m.); 5 kw.
Transmits at intervals from 10.15 a.m.
6.0 p.m.—Time, News, Sports Notes.
6.5 p.m.—Orchestral Concert.
6.45 p.m.—Astronomical Talk.
7.0 p.m.—Gollwell's Popular Evening.
8.0 p.m.—Gramophone Records of Dance Music.
9.0 p.m.—Time, News, Sports Notes.
9.20 p.m.—Concert from the Café Prague.
9.55 p.m.—News, Theatre Review and Programme Announcements.
10.0 p.m.—Music from the Café Lloyd.

ROME (Italy)

Ente Italiano Audizioni Radiofoniche (IRO). 680 kc/s (441 m.); 2.4 kw.
Transmits at intervals from 12 noon.
7.15 p.m.—News, Sports Notes,

Weather, Press Review and Report of the International Labour Office at Geneva.

8.0 p.m.—Time Signal.
8.2 p.m.—Vocal and Instrumental Concert, including "The King's Son"—Comedy in One Act (Forzano). Recitations in the interval.
10.40 p.m.—News after the Programme.
10.40 p.m.—News Bulletin.

STOCKHOLM (Sweden)

Radiotjänst (SASA). 689 kc/s (436 m.); 1.5 kw. Relayed by Boden, 250 kc/s (1,200 m.); Göteborg, 932 kc/s (322 m.); Hörby, 1,166 kc/s (257 m.); Motala, 223 kc/s (1,345 m.); Östersund, 389 kc/s (770 m.); Sundsvall, 554 kc/s (542 m.).
Transmits at intervals from 6.15 a.m.
5.30 p.m.—Cabaret Programme.
6.30 p.m.—"The Eve of the Fair"—A Peasant Comedy in Two Acts (Vilhelm Moberg).
8.0 p.m.—Topical Talk.
8.15 p.m.—News and Weather.
8.40 p.m.—The Week's Comedy.
9.0 p.m.—Dance Music Programme.
11.0 p.m. (approx.)—Close Down.

STUTTGART (Germany)

Süddeutscher Rundfunk. 833 kc/s (360 m.); 1.5 kw. Relayed by Freiburg, 527 kc/s (570 m.).
Transmits at intervals from 9.0 a.m.
2.30 p.m.—Orchestral Concert.
4.45 p.m.—Time and Sports Notes.
5.0 p.m.—Talk: Thoughts on a National Theatre.
5.30 p.m.—Talk: The Four Temperaments.

6.0 p.m.—Talk: Methods of Payment—The Postal Cheque.
6.30 p.m.—Soprano and Instrumental Recital of Old German, French and Italian Melodies (arr. Waldemar von Bausnern).

7.15 p.m.—Orchestral Concert and Literary Selections from the Works of Celebrities before they became famous. Overture, "Das Liebesverbot" (R. Wagner). Wagner as the Boy Tell. Episode from the Life of Eleonora Duse. Anecdote: The Unsuccessful Verdi. Overture, "Nebuchadnezzar" (Verdi). One of Kainz' Letters. Caruso—intoxicated. La donna è mobile (Caruso Record). A Tramway Conductor in Chicago—an Autobiographical Story (Knut Hamsun).

Stars and Stripes—American National Anthem. Reading from Henry Ford's "Life and Work." Reading from Jack London's "King Alcohol." Pianoforte Pieces, Op. 3 (Rich. Strauss). Reading from a Letter written by Mussolini in 1902. Giovinetta—Fascist Hymn. Reading: Lenin in Exile (A. G. Richter). March of the Red Guards. Chaplin at the Age of Thirteen. Selections from the Music to the Film "The Circus."

TOULOUSE (France)

Radiophonie du Midi. 788 kc/s (381 m.); 8 kw.
Transmits at intervals from 1.0 p.m.
6.30 p.m.—Dance Music Programme.
6.45 p.m.—Exchange Quotations and Racing Results.
7.0 p.m.—Solo Selections.
7.15 p.m.—News Bulletin.
7.30 p.m.—Dance Music Programme.
8.0 p.m.—Exchange Quotations.
8.15 p.m.—Concert of Operetta Selections from "Les Dragons de Villars" (Maillart), "Le Grand Mogol" (Audran), "Hans the Flute Player" (Ganne), "A Waltz Dream" (O. Strauss), "Mam'zelle Nitouche" (Hervé); and "Les Cloches de Corneville" (Planquette).
8.45 p.m.—Instrumental Concert.
10.15 p.m.—North African News.
10.30 p.m. (approx.)—Close Down.

TURIN (Italy)

Ente Italiano Audizioni Radiofoniche (ITO). 1,094 kc/s (274 m.).
Transmits at intervals from 7.15 a.m.
6.15 p.m.—Concert.
7.0 p.m.—Variety Items.
7.15 p.m.—Wireless News.
7.30 p.m.—Time Signal.
7.32 p.m.—Quintet Selections. Overture, "Morning, Noon and Night" (Suppé). Serenade, Notte di stelle (De Michel). Selection from "Lucia di Lammermoor" (Donizetti).
8.5 p.m.—"The Merry Widow"—Operetta (Lehár). In the Intervals, Talks. After the Operetta, Concert. In the interval at 10.30 p.m.—Wireless News.
11.5 p.m.—Relay from America.
12 midnight (approx.)—Close Down.

VIENNA (Austria)

Radio-Wien 581 kc/s (516.3 m.); 15 kw. Relayed by Graz, 851 kc/s (352.5 m.); Innsbruck, 1,059 kc/s (283.5 m.); and Linz, 1,220 kc/s (245.9 m.).
Transmits at intervals from 10.0 a.m.
5.20 p.m.—Chamber Music. String Quartet in A Major (Glère). String Quartet in E Flat Minor (Tchaikovsky).
6.30 p.m.—Talk: Current Events.
7.0 p.m.—Time and Weather.
7.5 p.m.—"The Circus Princess"—Operetta in Three Acts (Kálmán), followed by Phototelegraphy Transmission.

WARSAW (Poland)

Polskie Radio. 212 kc/s (1,411 m.); 8 kw.
Transmits at intervals from 10.58 a.m.
6.58 p.m.—Time Signal.
7.0 p.m.—Programme Announcements and News Bulletin.
7.15 p.m.—Talk: The Clown.
7.30 p.m.—"Princess O-la-la"—Operetta in Three Acts (Jean Gilbert).
9.0 p.m.—Talk: Whilst drinking Black Coffee.
9.15 p.m.—Weather, Police and Sports Notes.
9.25 p.m.—Talk: Whilst smoking a Cigarette.
9.35 p.m.—News Bulletin.
10.0 p.m.—Dance Music relayed from the Hotel Bristol.
11.0 p.m. (approx.)—Close Down.



The Best of the British Units

BEFORE you buy a unit for your cone speaker, send for a leaflet on this Watmel Unit. Both in theory and in practice this is the best unit yet turned out either in this or in any other country.

Magnets of Cohalt Steel, pole pieces of turbo-stalloy, armature of best charcoal-annealed iron, positive adjustment and true four pole action combine to make this a unit of outstanding performance and sensitivity. Fully descriptive folder free on application.



WATMEL WIRELESS CO. LTD.,
Imperial Works, High Street, Edgware, Mx.
Telephone: Edgware 0323.

**WORLD-RADIO
STATION IDENTIFICATION
PANEL**

Saves all difficulties in finding and recognising

EUROPEAN STATIONS.

Wavelengths, frequencies, call signs clearly set out, together with maps of European Stations.

1/-
Post free.

Apply
B.B.C. BOOKSHOP,
Savoy Hill,
W.C.2.

1/-
Post free.

Stations in Order of Frequencies and Wavelengths

Corrected in accordance with the latest official information available at the time of going to press

Kc/s	M.	Station	Dial Readings	Kc/s	M.	Station	Dial Readings	Kc/s	M.	Station	Dial Readings
EUROPEAN											
155	1935	Kaunas (Lithuania), 7 kw.		779	385	Wilno (Poland), 0.5 kw.				Abo (Finland), 0.5 kw.	
160	1875	Huizen (Holland), 6.5 kw.		788	381	Toulouse (Radio) (France), 3kw.				Kalmar, 0.2 kw. (relays Stockholm).	
167	1796	Lahti (Finland), 40 kw.		797	377	Manchester (2ZY) (Gt. Britain), 1 kw.				Säffle, 0.4 kw. (relays Stockholm).	
174	1725	Radio Paris (CFR) (France), 12 kw.		806	372	Hamburg (Germany), 1.5 kw.				Eskilstuna (Sweden), 0.2 kw. (relays Stockholm).	
183.5	1635	Königswusterhausen (Zeeseu) (Germany), 26 kw.		815	363	Radio LL (France).		1220	248	Jakobstad (Finland), 0.25 kw.	
193	1554	Daventry (5XX) (Gt. Britain), 25 kw.		815	368	Seville (Union Radio) (EAJ5) (Spain), 1.5 kw.				Linz (Austria), 0.5 kw.	
202.5	1481	Moscow (Old Komintern) (RA1) (Russia), 12 kw.		823	364.5	Algiers (Algeria).				Kiel (Germany) (relays Hamburg), 0.35 kw.	
207.5	1444	Eiffel Tower (FL) (France), 12 kw.		824	364	Bergen (Norway), 1 kw.				Cassel (Germany) (relays Frankfurt), 0.25 kw.	
212.5	1411	Warsaw (Poland), 8 kw.		833	360	Stuttgart (Germany), 1.5 kw.				Kiruna (Sweden) (relays Boden), 0.2 kw.	
222.5	1348	Motala (Sweden) (relays Stockholm), 30 kw.		842	356	London (2LO) (Gt. Britain), 30 kw.		1238	242	Cartagena (Spain), 0.4 kw.	
230	1304	Kharkov (U.S.S.R.), 4 kw.		851	352	Graz (Austria) (usually relays Vienna), 7 kw.		1243.4	241.3	Belfast (2BE) (Ireland), 1 kw.	
250	1200	Stamboul (Turkey), 5 kw.		855.5	351	Leningrad (U.S.S.R.), 1.2 kw.				Rjukan (relays Oslo), Norway, 0.18 kw.	
250	1200	Boden (Sweden), 0.6 kw.		860	349	Barcelona (Radio Barcelona) (EAJ1) (Spain), 8 kw.		1256	239	Nimes (France), 1 kw.	
260	1153	Kajundborg (Denmark), 7.5 kw.		878	342	Brno (Czechoslovakia), 2.4 kw.		1256	239	Nürnberg (Germany) (relays Munich), 2 kw.	
269.6	1116	Novosibirsk (Russia), RA, 4 kw.		887	338.2	Brussels, No. 2 (Belgium) Flemish programme.		1260.4	238	Bordeaux-Sud-Ouest (France)	
279.6	1073	Rostov-Don (Russia), 4 kw.		895	333	Cadiz (Spain), 0.5 kw.		1265	237	Juan-les-Pins (Nice) (France)	
280	1071	Scheveningen Haven (Holland) 2.5 kw. (until 5.40 p.m. only)		896	335	Posen (Poland), 1.2 kw.		1265	237	Örebro (relays Stockholm) (Sweden), 0.2 kw.	
280	1071	Hilversum (Holland), 6.5 kw. Daily after 5-40 p.m.		905	332	Naples (INA) (Italy), 1.5 kw.		1273.5	235.5	Charleroi (Belgium).	
297	1010	Basle, 0.25 kw.		914	329	Grenoble (PTT) (France).		1283	234	Münster (Germany), 0.5 kw.	
300	1000	Leningrad (Russia), 20 kw.		914	329	Paris-Petit Parisien (France).				Boras (relays Göteborg) (Sweden), 0.15 kw.	
320	938	Moscow (CCSP), 2 kw.		923	325	Dreslau (Germany), 2 kw.		1301	231	Umea (Sweden), 0.2 kw.	
344.8	870	Tiflis, 4 kw.		932	322	Göteborg (Sweden), 10 kw.				Malmö (Sweden), 0.6 kw.	
357	840	Nijni Novgorod, 1.8 kw.		932	322	Falun (Sweden), 0.5 kw.				Hälsingborg (Sweden), 0.2 kw.	
375	800	Kiev, 1.2 kw.		941	319	Dresden (Germany), 0.25 kw.		1313	228.4	Biarritz (Côte d'Argent, France), 1.5 kw.	
385	778	Petrozavodsk (Russia), 2 kw.		941.2	318.8	Bremen (Germany) (relays Hamburg), 0.35 kw.		1319	227	Cologne (Germany), 2 kw.	
389	770	Ostersund, 0.6 kw. Relays Sundsvall.		950	316	Marseilles (PTT) (France), 0.5 kw.		1337	224.4	Cork (6CK) (Ireland), 1 kw.	
395	760	Geneva (Radio-Genève), 0.25 kw.		955.4	314	Oviedo (Spain), 0.7 kw.		1345	223	Radio Luxembourg (Experimental), 3 kw. 8-9 p.m. daily.	
428	700	Minsk (Russia), 4 kw.		959	313	Cracow (Poland), 0.5 kw.		1355	221	Helsingfors (Finland), 0.9 kw.	
442	680	Lausanne (Switzerland), HBZ, 0.5 kw.		968	310	Cardiff (5WA) (Gt. Britain), 1 kw.		1384	220	Fécamp (Radio)	
527	570	Freiburg-im-Breisgau (Germany), 0.35 kw.		973	303	Radio-Vitus (France), 1 kw.		1370	219	Radio-Beziere (France), 0.6 kw.	
527	570	Hamar (relays Oslo), 0.7 kw.		973	303	Zagreb (Yugoslavia), 0.7 kw.				Karlstad (Sweden), 0.25 kw.	
530	566	Ljubljana (Yugoslavia), 2.5 kw.		981.7	305.6	Agen (France).		1373	218	Flensburg (Germany), 0.5 kw.	
531	565	Smolensk (U.S.S.R.), 2 kw.		986	304	Bordeaux-Lafayette (PTT), France, 1 kw.				Ornskoldsvik, 0.2 kw. (relays Sundsvall).	
536	560	Augsburg (Germany), 0.25 kw. Hanover 0.35 kw. (relays Hamburg).		1004	298.8	Aberdeen (2BD) (Gt. Britain), 1 kw.				Björneborg (Finland), 0.8 kw. (relays Helsingfors).	
545	550	Budapest (Hungary), 20 kw.		1013	295	Hilversum (Holland), 6.5 kw. Daily until 5.40 p.m.		1391	216	Halmsstad (Sweden), 0.2 kw.	
554	542	Sundsvall (Sweden), 0.6 kw.		1022	293	Tallinn (Estonia), 0.7 kw.		1470	204	Gävle (Sweden) (relays Stockholm), 0.2 kw.	
563	533	Munich (Germany), 1.5 kw.		1022	293	Kosice (Czechoslovakia), 2 kw.		1480	203	Kristinehamn (Sweden), 0.25 kw.	
572	525	Riga (Latvia), 3 kw.		1022	293	Limoges (France), 0.5 kw.		1490	202	Jonköping, 0.25 kw. (relays Stockholm).	
581	517	Vienna (Rosenhügel) (Austria), 15 kw.		1030.3	291.1	Turin (Italy), 7 kw.		1500	200	Leeds (2LS) (Gt. Britain), 0.13 kw.	
585	511	Archangel (U.S.S.R.), 1.2 kw.		1031	291	Viborg (Finland), 0.4 kw.		1530	196	Karlkrona (relays Stockholm) (Sweden), 0.25 kw.	
590	509	Brussels No.1 (Belgium), 1 kw.				Bournemouth (6BM) (Gt. Britain), 1 kw.					
599	501	Milan (Italy), 7 kw.				Bradford (2LS) (Gt. Britain), 0.13 kw.					
603.5	497	Moscow, 1.2 kw.				Dundee (2DE) (Gt. Britain), 0.13 kw.					
608	493	Oslo (Norway), 1.2 kw.				Edinburgh (2EH) (Gt. Britain), 0.35 kw.					
617	487	Prague (Czechoslovakia), 5 kw.		1040	288.5	Hull (6KH) (Gt. Britain), 0.13 kw.					
626	479	Daventry (5GB) (Gt. Britain), 25 kw.				Liverpool (6LV) (Gt. Britain), 0.13 kw.					
630	476	Simferopol (Russia), 1.2 kw.				Newcastle (5NO) (Gt. Britain), 1 kw.					
635	473	Langenberg (Germany), 13 kw.				Plymouth (5YP) (Gt. Britain), 0.13 kw.					
644	466	Lyon (La Doua), France (relays Ecole Supérieure), 5 kw.				Sheffield (6FL) (Gt. Britain), 0.13 kw.					
653	459	Zürich (Switzerland), 0.63 kw. Porsgrund (relays Oslo), 0.7 kw.				Stoke-on-Trent (6ST) (Gt. Britain), 0.13 kw.					
		Aix-la-Chapelle (Germany) 0.35 kw.				Swansea (5SX) (Gt. Britain), 0.13 kw.					
		Aalesund (Norway), 0.3 kw.		1049	286	Lyon (Radio) (France), 0.5 kw.					
		Salamanca (Spain), EAJ22, 1 kw.		1049	286	Montpellier (France), 0.2 kw.					
		Bolzano (Italy) 1 BZ, 0.2 kw.				Notodden (Norway), 0.05 kw.					
		Danzig, 0.25 kw. (relays Königsberg).				Magdeburg (Germany), 0.5 kw.					
		Klagenfurt, 0.5 kw. (relays Vienna).		1058	283	Innsbruck (Austria), 0.5 kw.					
		Tromsø (Norway), 0.1 kw.				Stettin (Germany), 0.5 kw.					
		Uppsala, 0.15 kw. (relays Stockholm).				Berlin Relay (Germany), 0.5 kw.					
		Tammerfors, relays Helsingfors, 0.8 kw.				Uddévalle (Sweden), 0.05 kw. (relays Göteborg).					
668.5	450	Moscow (S.P.) RA2, 1 kw.		1067	281	Varberg (Sweden), 0.3 kw.					
671	447	Paris (PTT) (Ecole Supérieure), France, 0.8 kw.		1071	280	Copenhagen (Denmark), 0.75 kw.					
680	441	Rome (IRO) (Italy), 2.4 kw.		1079	279	Radio-Liége.					
689	436	Stockholm (Sweden), 1.5 kw.				Bratislava (Czechoslovakia), 12.5 kw.					
689	436	Malmberget (relays Boden) (Sweden), 0.25 kw.		1085	276	Königsberg (Germany), 2.5 kw.					
698	430	Belgrade (Yugoslavia), 2.5 kw.		1103	272	Rennes (France), 0.5 kw.					
702.5	427	Kharkov (Russia), 4 kw.				Trollhättan, 0.45 kw. (relays Göteborg).					
707	424	Madrid (Union Radio) (EAJ7) (Spain), 2 kw.		1112	270	Hudiksvall, 0.15 kw. (relays Sundsvall).					
711	418	Berlin (Witzleben) (Germany), 1.5 kw.				Norrköping (Sweden), 0.25 kw. (relays Stockholm).					
725	413	Dublin (2RN) (Ireland), 1 kw.				Kaiserslautern (Germany), 0.25 kw.					
727	412	Rabat (Morocco), 10 kw.		1121	268	Barcelona (Radio Catalana) (EAJ13), 10 kw.					
734	408	Katowice (Poland), 10 kw.		1121	260	Strasbourg (France), 0.1 kw.					
743	403	San Sebastian (EAJ8) (Spain), 0.3 kw.		1130	265.4	Lille (PTT) (France), 0.7 kw.					
743	403	Berne (Switzerland), 1 kw.		1139	263	Moravska-Ostrava (Czechoslovakia), 10 kw.					
752	399	Glasgow (SSC) (Gt. Britain), 1 kw.				Leipzig (Germany), 1.5 kw.					
761	394	Bucarest (Roumania), 12 kw.		1157	259	Hörby (Sweden), 10 kw.					
761	394	Fredr.ksstad (Norway) (relays Oslo), 0.7 kw.		1175	255	Toulouse (PTT), (France), 1.5 kw.					
770	390	Frankfurt (Germany), 1.5 kw.		1184	253	Gleiwitz (Germany), 5 kw.					
779	385	Genoa (IGE) (Italy), 1 kw.		1193	251	Almeria (Spain) (EAJ18), 1 kw.					
				1196.6	250.9	Schaerbeek (Brussels) (Belgium)					

The following are the actual deviations from the Prague Plan frequencies, as noted during measurements made at the Tatsfield Checking Station. All differences of 1.0 kc/s and over are shown.

Kc/s	M.	Station	Dial Readings
205.25	1461	Eiffel Tower (France)	
521.3	575.5	Freiburg-im-Breisgau (Germany)	
526.8	569.5	Ljubljana (Yugoslavia)	
530.	566	Augsburg (Germany)	
729.5	411.2	Rabat (Morocco)	
763.5	392.9	Bucarest (Roumania)	
822	365	Bergen (Norway)	
849.8	353	Algiers (Algeria)	
862	348	Barcelona, (EAJ1) (Spain)	
901.4	332.8	Naples (INA) (Italy)	
910.3	329.5	Petit Parisien (France)	
1011	296.7	Tallinn (Estonia)	
1100.5	272.6	Rennes, P.T.T. (France)	
1114.6	269.1	Kaiserslautern (Germany)	
1124.25	266.8	Radio Catalana, EAJ13, (Spain)	
1135	264.3	Moravska Ostrava (Czechoslovakia)	
1218	246.2	Schaerbeek (Belgium)	

EXTRA-EUROPEAN STATIONS U.S.A.

660.1	454	New York (WEAF), 25 kw.
700	428.5	Cincinnati, O. (WLW), 25 kw.
720	416.6	Chicago, Ill. (WGN), 25 kw.
760	395	Bound Brook, N.J. (WJZ), 25 kw.
770	389	Chicago, Ill. (WBBM), 25 kw.
790	380	Schenectady, N.Y. (WGY), 50 kw.
980	306	Pittsburg, Pa. (KDKA), 25 kw.
990	303	Springfield, Mass. (WBZ), 15 kw.
1090	275.2	St. Louis, Mo. (KMOX), 25 kw.

CANADA

690	434	Calgary (CFPC), 1.8 kw.
690	434	Toronto (CKGW), 5 kw.
730	411	Montreal (CNRM), 1.6 kw.

AUSTRALIA

665	451	Sydney (2FC), 5 kw.
690	435	Perth (6WF), 5 kw.
734	409	Adelaide (5CL), 5 kw.
779	385	Brisbane (4QG), 5 kw.
808	371	Melbourne (1LO), 5 kw.
838	358	Sydney (2BL), 5 kw.

SOUTH AFRICA

677	443	Johannesburg (JB), 10 kw.
731	410	Durban, 1.5 kw.
815	363	Cape Town, 1.5 kw.

For Complete List of Short Wave Stations see page 769



Look! inside!

★ NEW Construction

Look at the **NEW** Cossor Construction— all the elements firmly braced together— all joints electrically welded. See the new Anode of immense strength and rigidity completely enclosing the grid and filament, thereby ensuring maximum efficiency.

★ NEW Filament

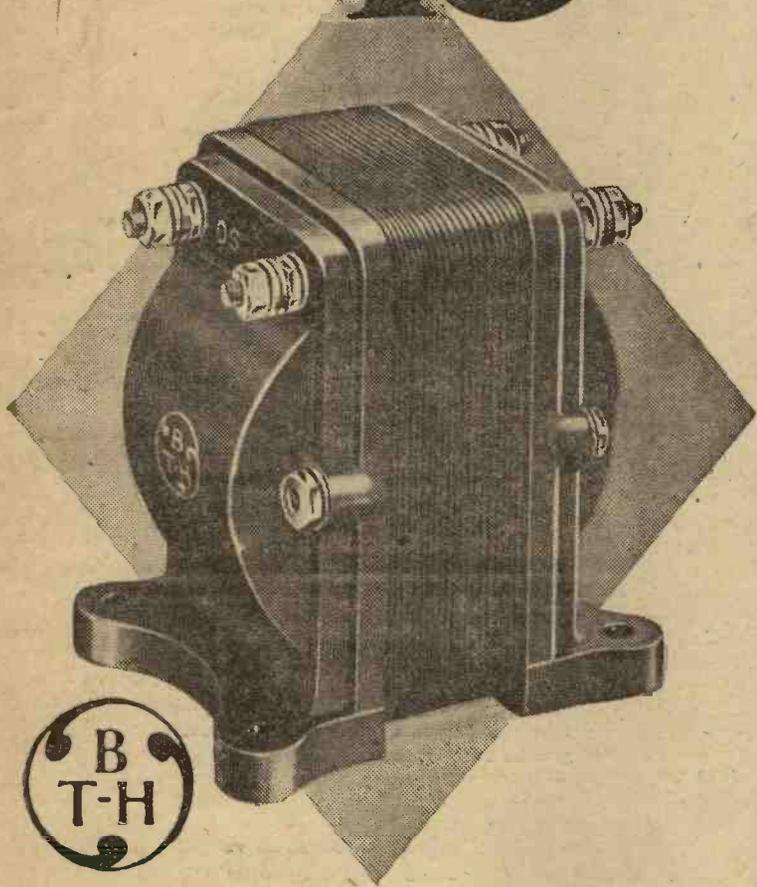
Now look at the **NEW** Cossor filament— tungsten-cored— tougher than steel yet pliable as whipcord—tough for strength, pliable for long life. The **NEW** Cossor filament gives an enormous emission—far greater than ever before.

★ NEW Process

The **NEW** Cossor is built under an entirely new process which cost thousands of pounds to perfect and which ensures maximum results from every valve— greater volume—longer range and better tone. Use the **NEW** Cossor in your Receiver—all Wireless Dealers stock the 2-volt types.

The NEW
COSSOR
It's a wonderful Valve!

A guaranteed L.F. TRANSFORMER for 15/-



For 15/- you can buy a guaranteed transformer of first-class design—a transformer that is used in some of the finest Cinema and public address equipments in the world.

The windings are so designed that screening is quite unnecessary and breakdown impossible under normal conditions.

The core is of ample cross sectional area and has a very high saturation point.

Put one in your set and note the improvement in quality.

EDISWAN RADIO PRODUCTS

THE EDISON SWAN ELECTRIC CO., LIMITED.
Head Office Ediswan Radio Division and West End Showrooms:
1a, NEWMAN STREET, OXFORD STREET, W.1.

(Phone: MUSEUM 9801.)

SHOWROOMS IN ALL THE PRINCIPAL TOWNS.

W. 42.

SMASHING PROOF

"little short of marvellous"

SAYS read what **power engineer** about **STANDARD**

SAC CEE-LANCHE

Permanent H.T. Batteries.

BEST BATTERY HE HAS HAD IN 7 YEARS' EXPERIENCE.

Teddington, 6-8-29.

Dear Sir,

I am a Power Station electrician by trade, so you will appreciate that I have gone pretty fully into the matter. I received the battery on Friday, March 1st, and put it into service right away. Since then it has never had less than 6 hours' work per day on a three valve set. On making a test to-day with an accurate instrument, while on discharge after four hours' continuous work, I got an average of 1.21 volts per cell, this seems

WRITE FOR FREE BOOK TO-DAY.

Giving overwhelming facts on why Standard is the best form of H.T. extant. Why waste money on constant replacements? Install Standard. Convenient deferred payments. No rets.

THE STANDARD WET BATTERY CO. (Dept. W.R.),
184/188, Shaftesbury Avenue, LONDON, W.C.2.

M.B.

ADVICE & INFORMATION

Standard Batteries are efficiently built to give every satisfaction and trouble-free service after purchase. Supplied in neat Uniloco Cabinets to occupy minimum space. On receipt of battery merely add chemical which we supply, insert cartridges in jars, press home caps. Battery will immediately register full voltage, which it maintains for 12 months or more. It can then be refilled at home cheaply, with the wonderful Cartridge Refill Sacs, now introduced, and it is again ready for further hard service.

Any voltage or capacity supplied to suit all sets. Ask us to quote you. Smooth current ensures amazing improvement in reception. Stocked by Halford's Stores, Curry's Stores and all dealers, on cash or deferred.

SPECIAL OFFER

No. 3 Cartridge Model Battery, 96 volts (16 milliamps capacity). Comprises two trays of 32 cells each, with lid and necessary electrolyte chemical. Cash £2 13 10, or 9s down and 5 monthly payments of 9/5.

9/5

DOWN

TABLE CABINETS

In Oak or Mahogany, supplied to hold batteries. Well designed and finished to take any number of cells and also forms stand for set. Oak from £2 9 6. Mahogany from £3 0 0.

Little short of marvellous. In addition the quality of reception and tone is increased considerably over any other type of H.T. I have used during seven years' wireless experience. I should think that with the aid of your very complete instruction book the assembly and maintenance of your batteries should be quite simple for the merest novice, and I should certainly advise any newcomer to wireless to start right away with your "Trouble-free H.T." and save pounds later.

(Signed)

N. A. Williams.

WRITE BOOKLET FREE NOW!

PERFORMANCE ALONE PROVES IT

LET YOUR EAR - CONVINCED YOU

HEAR it but ONCE. Your ear will convince you there is no other reproducing unit, irrespective of price, to equal the Wates Star—its superlative tonal beauty and the amazing verve and sparkle of its performance. The Wates Star has been deliberately built for those who desire something more than the glut of "built down to a price" units can provide. True its cost is considerably higher—BUT by RESULTS alone and from the sensational interest caused at the Show, there is little doubt that those who do not inspect the Wates Star are missing Radios "Best Yet."

Ask also for details of the Wates Double Cone Chassis **12/-**

And the complete Unit assembled in Oak or Mahogany Cabinets **£4 : 0 : 0**

or **£4 : 6 : 0** respectively.

THE SHAFESBURY RADIO CO. (Dept. W.R.)
184/188, Shaftesbury Avenue, London, W.C.2.

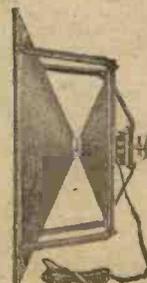


The handsome Wates Star Cab.net.

WATES STAR LOUD SPEAKER UNIT

YOUR SET IS ONLY AS GOOD AS ITS SPEAKER

36/- PRICE



Sent against cash on 14 days approx. if your dealer cannot supply,

M.B.

Make Sure of Your Copy TO-DAY!

**THE
B.B.C.
YEAR BOOK**

**OFFICIAL "INSIDE"
INFORMATION FOR
EVERY LISTENER**

on

THE YEAR'S PROGRESS.
Programmes, Technical, Educa-
tional, Religious, Sport, etc.

A History of
THE OLD B.B.C.
1922-1926.

GENERAL SECTION.
Including numerous matters of
vital interest and value to the
listener of to-day.

TECHNICAL MATTERS.
Including Transmission, Recep-
tion, The Ether, Studio and Relay,
International and General In-
formation.

B.B.C. PUBLICATIONS.
And a large **REFERENCE
SECTION** containing General
Information, Technical Symbols,
Tables and Reference Dictionary.



**464 PAGES
130 PHOTOGRAPHS
30 DRAWINGS
TECHNICAL SECTION
CHARTS**

NOW ON SALE

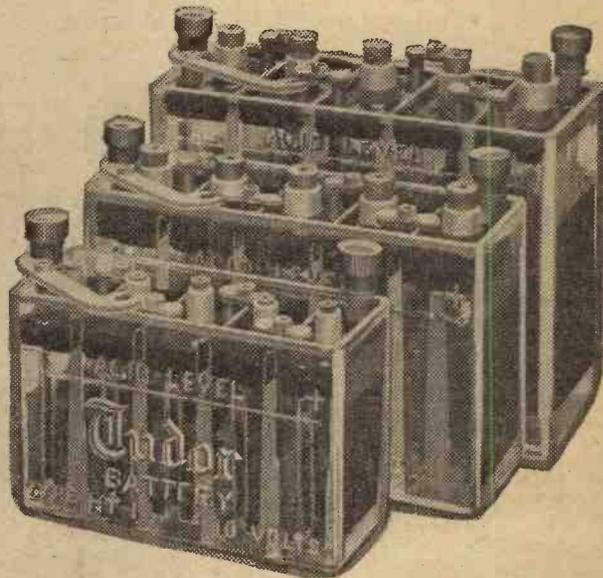
2/6

Tudor

H.T. UNITS FOR MODERN SETS

For modern sets, with power valves, pentodes and moving coil loudspeakers, the Tudor Monobloc High Tension Unit has no superior.

It is a 10 volt Unit sold in three capacities, each more than ample for ordinary requirements, yet not too heavy to make awkward handling—a unit that will stand for months between charges without a drop in voltage, because of its absolutely non-current-leaking construction. It is a unit which has sold in thousands since its introduction, not one single unit having been returned because of unsatisfactory performance. A unit made by a company with 35 years battery experience, whose huge stationary batteries, weighing hundreds of tons each, are used by the majority of power stations in this country.



M.C. 45.

ESTABLISHED IN PUBLIC SERVICE

COUPON
Please send me full particulars of Tudor Wireless Batteries.
Name.....
Address.....
Tudor Accumulator Co., Ltd., 2, Norfolk St., Strand, W.C.2.

10 VOLT HIGH TENSION UNITS

	Capacity	Price
5 H.T.1.	2,750 milliamps	6/9
5 H.T.2.	5,500 "	10/-
5 H.T.4.	12,500 "	17/6

Advt. of Tudor Accumulator Co., Ltd., 2, Norfolk Street, Strand, London, W.C.2.

HAVE YOU HEARD A SET YOU WOULD LIKE TO OWN?

we supply **EVERYTHING WIRELESS** for **CASH** or **EASY TERMS**

ALL COMPONENTS, SETS, SPEAKERS, H.T. Units, Accumulators, etc., SUPPLIED
The following are examples of our terms.

RITS—
COSSOR 1930. Cash £8 15 0. Send 16/-, balance by 11 monthly payments of 16/-.
NEW OSRAM MUSIC MAGNET. Cash £9. Send 16/6 and balance by 11 monthly payments of 16/6.

MULLARD ORGOLA KIT WITH CABINET. Cash £7 15 0. Send 14/3, balance by 11 monthly payments of 14/3.
CELESTION C.12 Oak Speaker. Cash £5 12 6. Send 10/4 and balance by 11 monthly payments of 10/4.

EKCO A.C. All-Power Unit C2A. Cash £10 17 6. Send 20/- and balance by 11 monthly payments of 20/-.

Any Constructor's Kit or set from Blue Print built and tested for only 10/- extra (plus Marconi Royalties at 5/- per valve-holder).

P.W. Sets, Magic Three, Titan Sets, Brookmans 3, P.W.4, "A.W." Sets, Clarion 3, Knife-Edge 3, Music Leader, Talsman 2-3.

Call, write or phone, giving a list of your requirements—**CASH PRICES** or **best MONTHLY TERMS** by return of post.
QUICKEST DELIVERY IN LONDON. EXPERT ADVICE AT YOUR SERVICE.

The P.D.P. Co., Ltd., (Dept. W.R.) 121, CHEAPSIDE, LONDON, E.C.2
Tel.: National 9846.

COMPLETE RECEIVERS—
PHILLIPS ALL-ELECTRIC Type 2514. Cash £23. Send £3 and balance by 12 monthly payments of 37/2.
COSSOR ALL-MAINS. Cash £10 10 0. Send 19/3, bal. by 11 payments of 19/3.
LANGHAM POPULAR PORTABLE. Cash 16 Gns. Send £2 and balance by 12 monthly payments of 27/5.
NATIONAL PORTABLE. Cash 15 Gns. Send 26/8 and balance by 12 monthly payments of 26/8.

Other sets, by Fye, Halsey, Burndep, McMichael, Marconiophone, Rolls, Selector, etc., etc.

SAY SIFAM AND GET THE BEST

Measuring Instruments

They tell you everything about your set—and they tell the truth! Distortion, unbalanced plate and filament voltage, circuit faults—a Sifam meter will enable you to trace these in a moment, save untold trouble, and perhaps expense.

There is a model for every need.

Milliammeters. Moving Coil in models from 25/- to 500 M.A.	Moving Iron, in models from 60-500 M.A.
10/-	10/-

Write for interesting Free Leaflets:
SIFAM ELECTRICAL INSTRUMENT CO., LTD. (Dept. W.R.) Bush House, Aldwych, London, W.C.2 N.B.

SWITCH OFF!

AND SO TO BED

With the restful knowledge that all is well with your set. Happy satisfaction when using a LYONS' B.A.T 750 WATT SWITCH "Best after Test" for all purposes.



Send for FREE 4-pp. circular; request at the same time our famous 28-pp. "CLAROSTAT" Book (all about D.C. and A.C. Mains Units, with scale drawings).

PRICE 2/6

CLAUDE LYONS LTD.
76 OLDHALL STREET, LIVERPOOL

The Listener

THE BEST XMAS PRESENT FOR OVERSEAS FRIENDS.

Send the Briton abroad an annual subscription for *The Listener*. It will keep overseas friends in touch with contemporary thought and accomplishments.

From week to week the views and experiences of the greatest men and women appear in *The Listener*.

For rates of subscription see "The Listener" or apply to the B.B.C. Bookshop, Savoy Hill, W.C.2.

Better Reception

could not be obtained by any child than that accorded to fatherless little ones on their admission to the Alexandra Orphanage at Haverstock Hill. They come from all parts of the country and the Dominions, at all ages up to 11 years, and are retained until 15. Their education fits them for useful positions in after life.

Opportunities occur for suitable children to have a secondary education; some boys are selected for training as Officers of the Mercantile Marine. £10,000 needed each year from voluntary donations.

Please send a gift to the Treasurer, LORD MARSHALL, at the offices of the

ALEXANDRA ORPHANAGE,
34-40, Ludgate Hill,
London, E.C.4.

The Choir of the Orphanage, trained by Mr. Leslie Woodgate, have assisted in the broadcast of Opera, e.g., "Le Jongleur de Notre Dame," and arrangements are being made for them to help in Mahler's Eighth Symphony early in 1930. Please watch your programme.

FREE!!

TO CALLERS— BY POST 6d.

Our stupendous catalogue showing all the latest and up-to-date sets, components, loud speakers, etc. No enquiries too small.

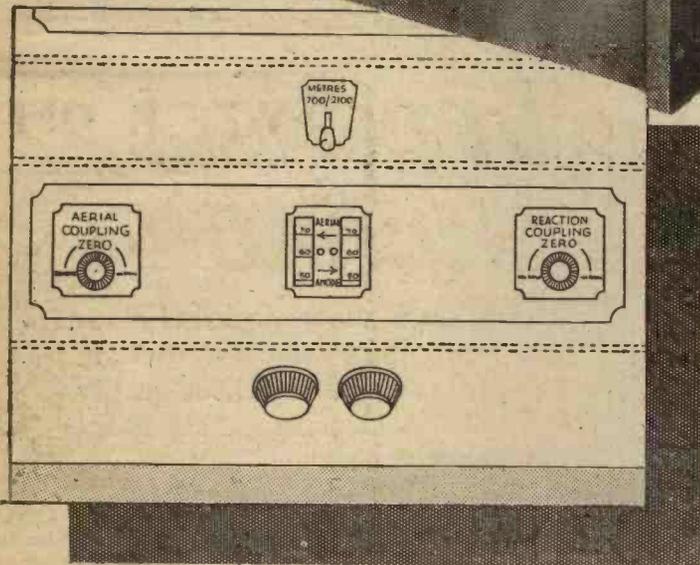
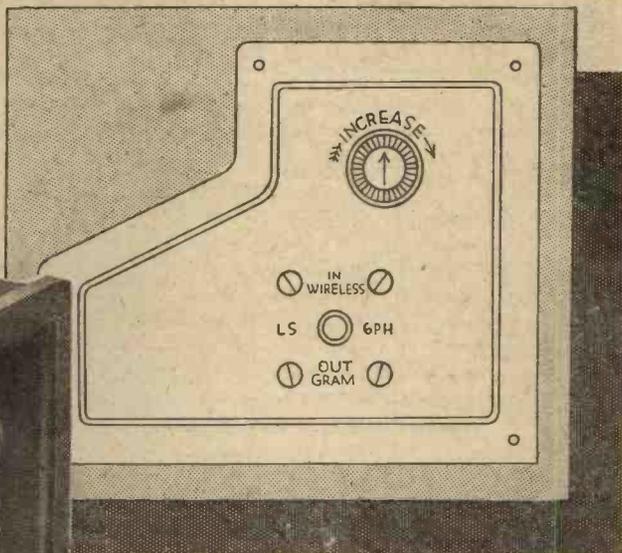
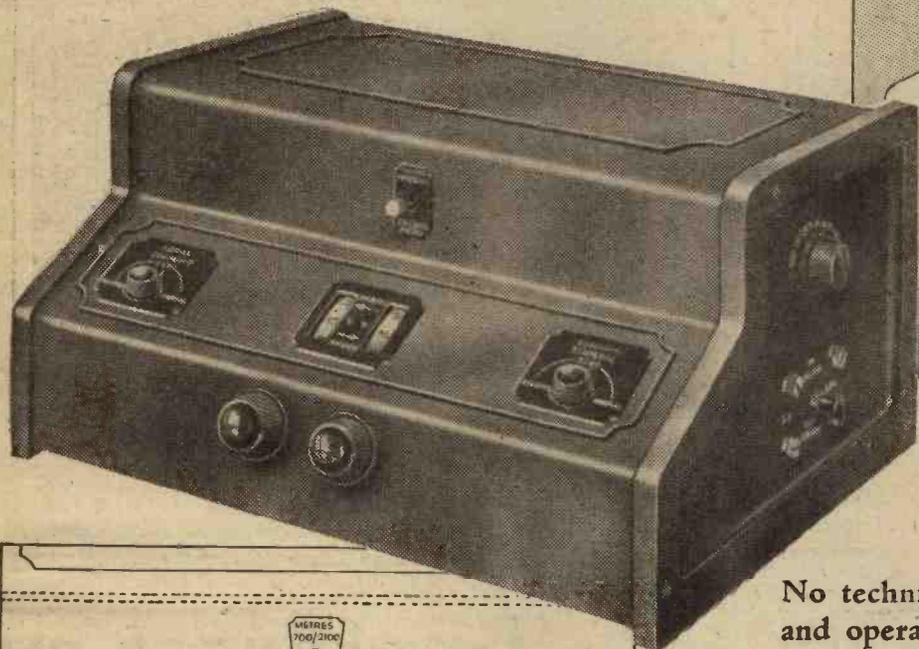
WILL DAY LTD

(THE BEST IN THE WEST)

19, Lisle St., Leicester Square,
London, W.C.2.

Telephones (3 lines): Regent 0121 and 0922. Telegrams: Tiltel, Westrande, London.

NO OTHER SET IS SUCH SPLENDID VALUE



No technical knowledge is needed to instal and operate this set—it is only necessary to insert a plug in an electric light socket and the choice of the British and foreign programmes is at your command.

The price is low and a few shillings are sufficient to cover a year's running costs.

Ask your dealer to demonstrate.

PRICE 20 GUINEAS
(including valves)

"Pay as you use" terms may be arranged with your dealer.

EDISWAN *All Electric* RECEIVERS

All British

THE EDISON SWAN ELECTRIC COMPANY, LIMITED.

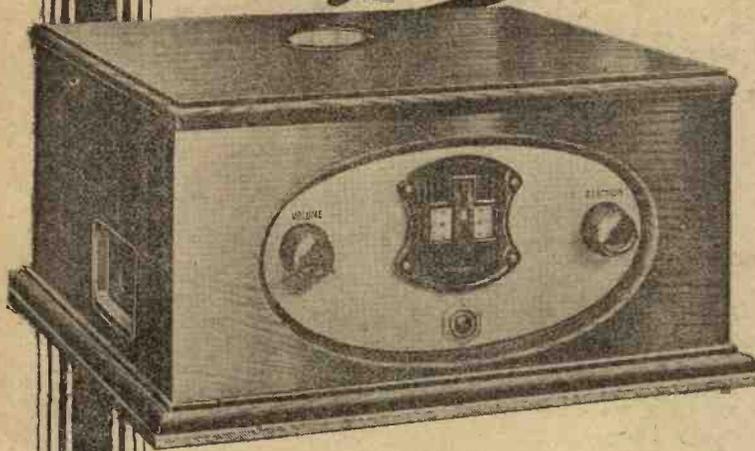
Head Office Ediswan Radio Division and West-End Showrooms:

1a, NEWMAN STREET, OXFORD STREET, W.1.

Phone: Museum 9801.

SHOWROOMS IN ALL THE PRINCIPAL TOWNS
W.40

*The most
Simple and
Serviceable
Set Yet
Designed!*



Here it is—the set that simplifies and improves radio reception. Here is radio that is really electric. Now all radio power is in your own light socket—dependable, ready all the time, radio power as constant as your house current itself.

The Lotus 3-valve S.G.P. All Electric Receiver is entirely self-contained, comprising S.G., detector and pentode. No batteries are required, there are no complicated controls. In appearance, it is neat and well finished, and can be used in any room where there is a light socket.

This set will give you a splendid range of British and Continental Stations at full loudspeaker strength.

Hear this set at any wireless dealer.

Price £21.

LOTUS

ALL ELECTRIC RECEIVER

"Gets the best reception."

OTHER LOTUS SETS.

Ask your radio dealer to demonstrate the following sets—Lotus 3-valve S.G.P. Receiver, battery model, £13 15s. od. Lotus 3-valve S.G.P. Kit, battery model, for constructors, £7 12s. 6d. Lotus 3-valve All Mains transportable, Oak, £25 4s. od.

Made in one of the most modern radio factories in Great Britain by

GARNETT WHITELEY & CO., LTD.,
Lotus Works, LIVERPOOL.



*In perfect
harmony*

Here is a loudspeaker of moderate price which, in addition to giving an excellent quality of reproduction, has a graceful appearance and tasteful colouring that will harmonise with any surroundings.

See and hear it at your dealer's.

PRICE 45/-



C2 LOUDSPEAKER

THE EDISON SWAN ELECTRIC COMPANY, LTD.

Head Office Edison Radio Division and West-End Showrooms:

1a, NEWMAN STREET, OXFORD STREET, W.1.

Phone: Museum 9801. SHOWROOMS IN ALL THE PRINCIPAL TOWNS.

W. 39

Send
To-day
for the
New
LOTUS
Set and
Component
Catalogues



500 HOURS

FAULTLESS SERVICE

AT A COST OF ½d PER HOUR

NOT only does an Ever Ready Battery give a purer and more perfect reception than any other form of current supply, but it is cheaper both in initial cost and upkeep.

FOR YOUR RADIO SET

TAKING TEN MILLIAMPERES



BRITAIN'S BEST BATTERIES

EVER READY
"Popular Power"
(For 10-16 M.A. Emission)

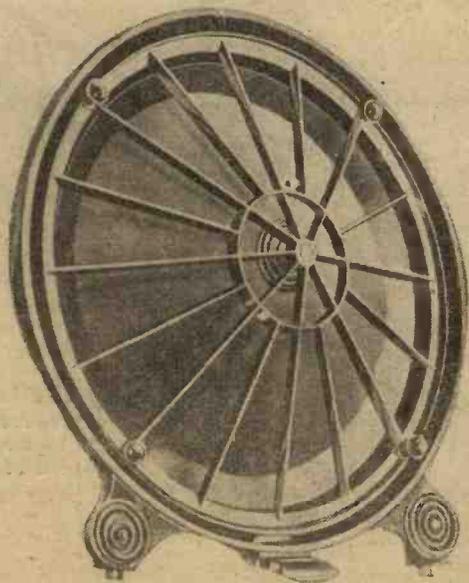
60 VOLTS	..	13/6
64 "	..	14/6
99 "	..	22/6
105 "	..	24/-
120 "	..	27/-

It makes the programme live

We've always been keen on radio, but since we bought a Mullard 'H' Type speaker, the set is never silent. If it's not father enthralled with a symphony concert, it's Joan showing a few friends the latest dance step.

That's the marvel of the Mullard 'H' speaker, it's so versatile. It reproduces symphony or syncopation with the same lifelike sparkle and vitality.

Mullard P.M. Valves and speakers give the finest radio reception and reproduction.



The Mullard 'H' Type Speaker.

PRICE £6-6-0

The Mullard 'C' Type Speaker.

PRICE £2-10-0

Advert: The Mullard Wireless Service Co., Ltd., Mullard House, Charing Cross Road, London, W.C.2.

“
that's why we use a

Mullard
P. M. SPEAKER